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TI Models of decision making and residential energy use
SO ANNUAL REVIEW OF ENVIRONMENT AND RESOURCES
SE Annual Review of Environment and Resources
LA English
DT Review; Book Chapter
DE economics; energy demand; psychology; sociology
ID UTILITY CONSERVATION PROGRAMS; ENVIRONMENTAL CONCERN; BEHAVIORAL ECONOMICS; PROSPECT-THEORY; UNITED-STATES; LIFE-STYLE; PSYCHOLOGICAL-RESEARCH; BOUNDED RATIONALITY; PLANNED BEHAVIOR; CARBON EMISSIONS
AB Research traditions across the social sciences have explored the drivers of individual behavior and proposed different models of de cision making. Four diverse perspectives are reviewed here: conventional and behavioral economics, technology adoption theory and attitude-based decision making, social and environmental psychology, and sociology. The individual decision models in these traditions differ axiomatically. Some are founded on informed rationality or psychological variables, and others emphasize physical or contextual factors from individual to social scales. Each perspective suggests particular lessons for designing interventions to change behavior. Throughout the review, these lessons are applied to decisions affecting residential energy use. Examples are drawn from both intuitive and reasoning-based types of decision as well as from a range of decision contexts that include capital investments in weatherization and repetitive behaviors such as appliance use. Areas of difference and similarity between various theoretical approaches and their practical implications are highlighted. Conclusions are drawn on how to develop a more integrated approach to both behavioral research and intervention design in a residential energy context.
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TI Health and productivity gains from better indoor environments and their relationship with building energy efficiency
SO ANNUAL REVIEW OF ENERGY AND THE ENVIRONMENT
LA English
DT Review
DE economics; health; productivity
ID RESPIRATORY-TRACT INFECTIONS; OFFICE WORKERS; UNITED-STATES; TASK-PERFORMANCE; ALLERGIC DISEASE; ECONOMIC COSTS; ASTHMA; CHILDREN; SYMPTOMS; SATISFACTION
AB Theoretical considerations and empirical data suggest that existing technologies and procedures can improve indoor environments in a manner that significantly increases productivity and health. The existing literature contains moderate to strong evidence that characteristics of buildings and indoor environments significantly influence rates of communicable respiratory illness, allergy and asthma symptoms, sick building symptoms, and worker performance. Whereas there is considerable uncertainty in the estimates of the magnitudes of productivity gains that may be obtained by providing better indoor environments, the projected gains are very large. For the United States, the estimated potential annual savings and productivity gains are $6 to $14 billion from reduced respiratory disease, $1 to $4 billion from reduced allergies and asthma, $10 to $30 billion from reduced sick building syndrome symptoms, and $20 to $160 billion from direct improvements in worker performance that are unrelated to health. Productivity gains that are quantified and demonstrated could serve as a strong stimulus for energy efficiency measures that simultaneously improve the indoor environment.
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PI PALO ALTO
PA 4139 EL CAMINO WAY, PO BOX 10139, PALO ALTO, CA 94303-0139 USA
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J9 ANNU REV ENERG ENV
JI Annu. Rev. Energ. Environ.
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WC Energy & Fuels; Engineering, Environmental
SC Energy & Fuels; Engineering
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PT J
AU Nguyen, TA
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AF Tuan Anh Nguyen
Aiello, Marco
TI Energy intelligent buildings based on user activity: A survey
SO ENERGY AND BUILDINGS
LA English
DT Review
DE Building automation; Energy awareness; Activity recognition
ID OFFICE BUILDINGS; EMBEDDED AGENTS; CONSUMPTION; NETWORKS

AB Occupant presence and behaviour in buildings has been shown to have large impact on heating, cooling and ventilation demand, energy consumption of lighting and appliances, and building controls. Energy-unaware behaviour can add one-third to a building's designed energy performance. Consequently, user activity and behaviour is considered as a key element and has long been used for control of various devices such as artificial light, heating, ventilation, and air conditioning. However, how are user activity and behaviour taken into account? What are the most valuable activities or behaviours and what is their impact on energy saving potential? In order to answer these questions, we provide a novel survey of prominent international intelligent buildings research efforts with the theme of energy saving and user activity recognition. We devise new metrics to compare the existing studies. Through the survey, we determine the most valuable activities and behaviours and their impact on energy saving potential for each of the three main subsystems, i.e., HVAC, light, and plug loads. The most promising and appropriate activity recognition technologies and approaches are discussed thus allowing us to conclude with principles and perspectives for energy intelligent buildings based on user activity. (c) 2012 Elsevier B.V. All rights reserved.

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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Gram-Hanssen, K
AF Gram-Hanssen, Kirsten
TI Residential heat comfort practices: understanding users
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE control systems; domestic heating; energy demand; habits; indoor environment; inhabitant behaviour; social convention; thermal comfort
ID CULTURE
AB The user-centred approach to heat consumption in housing is a highly relevant, but often neglected, aspect of residential energy consumption. The practice-theory approach is presented as a development within the socio-technical approach. A detailed analysis of empirical evidence from different households living in similar buildings in a suburb of Copenhagen, Denmark, shows significant variation in energy consumption due to different usage patterns of both the house and its heating system. An analysis using practice-theory finds that technologies, embodied habits, knowledge, and meanings are the main components in the understanding of both what holds this practice together as a collectively shared practice and the different socio-material configurations of each of the individual households.
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PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
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J9 BUILD RES INF
JI Build. Res. Informat.
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WC Construction & Building Technology
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PT J
AU Linden, AL
Carlsson-Kanyama, A
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AF Linden, AL
Carlsson-Kanyama, A
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TI Efficient and inefficient aspects of residential energy behaviour: What are the policy instruments for change?
SO ENERGY POLICY
LA English
DT Article
DE environmental awareness; energy attitudes; energy efficient behaviour; households
AB The empirical part of this study is based on a survey of 600 Swedish households and a number of interviews where questions about residential energy behaviour and possible policy instruments for change were raised. The study provides insight into current behavioural patterns and gives a bottom-up perspective on the realistic perspective potentials for change and ways to achieve them. Residential energy use accounts for a fifth of the total in Northern nations and patterns of behaviour may influence levels of energy use to the same extent as choice of appliances. The study revealed those behavioural patterns that are efficient and those that need to be improved for energy conservation. Several policy instruments for change were identified in the study and they include combinations of information, economic measures, administrative measures and more user friendly technology as well as equipment with sufficient esthetic quality. Policy instruments that have fostered energy efficient behaviour in Sweden include the massive information campaigns during the oil crises in the 1970s as well as energy labelling of appliances. Still, many households are "energy-unaware" and several energy efficient behaviours are motivated not by energy conservation concern but of a perceived lack of time. This shows that it is important to have a broad perspective in energy conservation, to evaluate trends and to use policy instruments timely to support or discourage them. (c) 2005 Elsevier Ltd. All rights reserved.
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JI Energy Policy
PD SEP
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
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PT J

AU Diakaki, C
Grigoroudis, E
Kolokotsa, D
AF Diakaki, Christina
Grigoroudis, Evangelos
Kolokotsa, Dionyssia
TI Towards a multi-objective optimization approach for improving energy efficiency in buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE building; energy efficiency; energy improvement; multi-objective optimization
ID MULTICRITERIA; PERFORMANCE; ENVIRONMENT; SCENARIOS; RETROFIT; DESIGN; MODEL
AB The energy sector worldwide faces evidently significant challenges that everyday become even more acute. Innovative technologies and energy efficiency measures are nowadays well known and widely spread, and the main issue is to identify those that will be proven to be the more effective and reliable in the long term. With such a variety of proposed measures, the decision maker has to compensate environmental, energy, financial and social factors in order to reach the best possible solution that will ensure the maximization of the energy efficiency of a building satisfying at the same time the building's final user/occupant/owner needs. This paper investigates the feasibility of the application of multi-objective optimization techniques to the problem of the improvement of the energy efficiency in buildings, so that the maximum possible number of alternative solutions and energy efficiency measures may be considered. It further shows that no optimal solution exists for this problem due to the competitiveness of the involved decision criteria. A simple example is used to identify the potential strengths and weaknesses of the proposed approach, and highlight potential problems that may arise. (C) 2008 Elsevier B.V. All rights reserved.
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OI Diakaki, Christina/0000-0003-1724-0193; Kolokotsa, Dionysia/0000-0003-2960-3772
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Newsham, GR
Bowker, BG
AF Newsham, Guy R.
Bowker, Brent G.
TI The effect of utility time-varying pricing and load control strategies on residential summer peak electricity use: A review
SO ENERGY POLICY
LA English
DT Review
DE Demand response; Load shedding
AB Peak demand for electricity in North America is expected to grow, challenging electrical utilities to supply this demand in a cost-effective, reliable manner. Therefore, there is growing interest in strategies to reduce peak demand by eliminating electricity use, or shifting it to non-peak times. This strategy is commonly called "demand response". In households, common strategies are time-varying pricing, which charge more for energy use on peak, or direct load control, which allows utilities to curtail certain loads during high demand periods. We reviewed recent North American studies of these strategies. The data suggest that the most effective strategy is a critical peak price (CPP) program with enabling technology to automatically curtail loads on event days. There is little evidence that this causes substantial hardship for occupants, particularly if they have input into which loads are controlled and how, and have an override option. In such cases, a peak load reduction of at least 30% is a reasonable expectation. It might be possible to attain such load reductions without enabling technology by focusing on household types more likely to respond, and providing them with excellent support. A simple time-of-use (TOU) program can only expect

to realise on-peak reductions of 5%. Crown Copyright (C) 2010 Published by Elsevier Ltd. All rights reserved.
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FU Program of Energy Research and Development (PERD); National Research Council Canada
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J9 ENERG POLICY
JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Jakob, M
AF Jakob, M
TI Marginal costs and co-benefits of energy efficiency investments - The case of the Swiss residential sector
SO ENERGY POLICY
LA English
DT Article
DE marginal costs; energy efficiency; co-benefits
AB Key elements of present investment decision-making regarding energy efficiency of new buildings and the refurbishment of existing buildings are the marginal costs of energy efficiency measures and incomplete knowledge of investors and architects about pricing, co-benefits and new technologies. This paper reports on a recently completed empirical study for the Swiss residential sector. It empirically quantifies the marginal costs of energy efficiency investments (i.e. additional insulation, improved window systems, ventilation and heating systems and architectural concepts). For the private sector, first results on the economic valuation of co-benefits such as improved comfort of living, improved indoor air quality, better protection against external noise, etc. may amount to the same order of magnitude as the energy-related benefits are given. The cost-benefit analysis includes newly developed technologies that show large variations in prices due to pioneer market pricing, add-on of learning costs and risk components of the installers. Based on new empirical data on the present cost-situation and past techno-economic progress, the potential of future cost reduction was estimated applying the experience curve concept. The paper shows, for the first time, co-benefits and cost dynamics of energy efficiency investments, of which decision makers in the real estate sector, politics and administrations are scarcely aware. (c) 2004 Elsevier Ltd. All rights reserved.
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PT J
AU Dubois, MC
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Blomsterberg, Ake
TI Energy saving potential and strategies for electric lighting in future North European, low energy office buildings: A literature review
SO ENERGY AND BUILDINGS
LA English
DT Review
DE Office; Lighting; Daylight harvesting; Occupancy controls; Manual or automatic dimming; Potential electricity savings; Illuminance; Windows; Shading devices; Reflectance
ID PRIVATE OFFICES; CONTROL-SYSTEMS; WINDOW BLINDS; OCCUPANT USE; DAYLIGHT; ENVIRONMENT; CONSUMPTION; RESPONSES; DEMAND; DESIGN
AB This article presents key energy use figures and explores the energy saving potential for electric lighting in office buildings based on a review of relevant literature, with special emphasis on a North European context. The review reveals that theoretical calculations, measurements in full-scale rooms and simulations with validated lighting programs indicate that an energy intensity of around 10 kWh/m(2) yr is a realistic target for office electric lighting in future low energy office buildings. This target would yield a significant reduction in energy intensity of at least 50% compared to the actual average electricity use for lighting (21 kWh/m(2) yr in Sweden). Strategies for reducing energy use for electric lighting are presented and discussed, which include: improvements in lamp, ballast and luminaire technology, use of task/ambient lighting, improvement in maintenance and utilization factor, reduction of maintained illuminance levels and total switch-on time, use of manual dimming and switch-off occupancy sensors. Strategies based on daylight harvesting are also presented and the relevant design aspects such as effects of window characteristics, properties of shading devices, reflectance of inner surfaces, ceiling and partition height are discussed. (C) 2011 Elsevier B.V. All rights reserved.
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FX The authors thank SBUF (the development fund of the Swedish Building trade), CERBOF (Centre for energy and resource efficient construction and management of buildings) and NCC Construction Sweden for funding this research project.
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U1 6
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JI Energy Build.
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ER

PT J
AU Gram-Hanssen, K
AF Gram-Hanssen, Kirsten
TI Understanding change and continuity in residential energy consumption
SO JOURNAL OF CONSUMER CULTURE
LA English
DT Article
DE energy consumption; everyday life; practice theory; routines; technology
AB Practice theory has recently emerged within consumer studies as a promising approach that shifts focus from the individual consumer towards the collective aspects of consumption, and from spectacular and conspicuous dimensions of consumption towards routine and mundane aspects of consumption. Practice theory is, however, not a commonly agreed upon theory, but more like an approach, or a turn within contemporary social theory. When using practice theory in consumer studies, there are thus several conditions that need further clarification. The focus in this article is on how change and continuity in practices can be understood in practice theory. Discussions will include the balance between routinization and reflectivity as well as ways to understand the role of new technology in introducing change in consumer practices. One aspect of this is a discussion on how to include technologies and other types of material consumer goods in practice theory. Case studies on household energy consumption are used as an empirical basis for these discussions. Looking at household energy consumption through the theoretical lens of practice theory necessitates discussion on whether energy consumption should be viewed as one single practice or part of several different practices. The latter stimulates questioning on how these different consumer practices are related to each other horizontally and vertically, as parallel practices or as

different levels of practices, and whether changes in one practice affect (or refrain from affecting) other related consumer practices, whether through reflexivity, routines or the materiality of consumer goods.
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WC Cultural Studies; Sociology
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PT J
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AF Ahmad, A. S.
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Saidur, R.
TI A review on applications of ANN and SVM for building electrical energy consumption forecasting
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Forecasting; Building energy consumption; Artificial Neural Networks; GMDH; LSSVM
ID ARTIFICIAL NEURAL-NETWORKS; SUPPORT VECTOR MACHINES; CONSERVATION MEASURES; PREDICTION; DEMAND; LOAD; TEMPERATURE; CLIMATE; SYSTEM; GMDH
AB The rapid development of human population, buildings and technology application currently has caused electric consumption to grow rapidly. Therefore, efficient energy management and forecasting energy consumption for buildings are important in decision-making for effective energy saving and development in particular places. This paper reviews the building electrical energy forecasting method using artificial intelligence (AI) methods such as support vector machine (SVM) and artificial neural networks (ANN). Both methods are widely used in the field of forecasting and their aim on finding the most accurate approach is ever continuing. Besides the already existing single method of forecasting, the hybridization of the two forecasting methods has the potential to be applied for more accurate results. Further research works are currently ongoing, regarding the potential of hybrid method of Group Method of Data Handling (GMDH) and Least Square Support Vector Machine (LSSVM), or known as GLSSVM, to forecast building electrical energy consumption. (C) 2014 Elsevier Ltd. All rights reserved.
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OI Abdul Rahman, Hasimah/0000-0001-8655-3818; Saidur, Rahman/0000-0002-2656-3034; abdullah, md pauzi/0000-0002-8357-731X; hassan, mohammad yusri/0000-0002-7952-0054
FU Malaysian Ministry of Higher Education; Universiti Teknologi Malaysia through Research University Grant (GUP) [vot 00G18]
FX This work was supported by the Malaysian Ministry of Higher Education and Universiti Teknologi Malaysia through Research University Grant (GUP) vot 00G18.
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Z9 113
U1 26
U2 128
PU PERGAMON-ELSEVIER SCIENCE LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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J9 RENEW SUST ENERG REV
JI Renew. Sust. Energ. Rev.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
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PT J
AU Haas, R
Schipper, L
AF Haas, R
Schipper, L
TI Residential energy demand in OECD-countries and the role of irreversible efficiency improvements
SO ENERGY ECONOMICS
LA English
DT Article
DE residential energy demand; irreversible efficiency improvements; energy policy
AB After undergoing substantial changes during a period of high energy prices, household energy demand did not rebound in times of declining energy prices as might have been expected. Hence, other factors, such as irreversible improvements in technical efficiency, must be understood in order to describe both past and future household energy demand. In this paper we consider irreversible efficiency improvements as a major reason for the moderate growth in energy demand after the plummeting of the oil price in 1985. We test different econometric models to take into account efficiency indicators. The major conclusions of our investigation are: (i) price elasticities are different for rising and falling prices - for the latter they are

close to zero, implying a low rebound-effect in the residential sector; (ii) technical efficiency is an important parameter for describing and forecasting energy demand; and (iii) income elasticities turn out to be higher once we incorporate indicators of technological efficiency in the process of estimating energy demand. (C) 1998 Elsevier Science B.V. All rights reserved.
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TC 101
Z9 101
U1 1
U2 15
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J9 ENERG ECON
JI Energy Econ.
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VL 20
IS 4
BP 421
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SC Business & Economics
GA 126HF
UT WOS:000076287300005
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PT J
AU Ouyang, JL
Hokao, K
AF Ouyang, Jinlong
Hokao, Kazunori
TI Energy-saving potential by improving occupants' behavior in urban

residential sector in Hangzhou City, China
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Household lifestyle; Energy-saving potential; Improve; Electric appliance
ID CONSUMPTION INFORMATION-SYSTEM; THERMAL SIMULATION; BUILDINGS; ENVIRONMENT; ELECTRICITY; APPLIANCES; ISSUE
AB Besides technical measures, occupants' behavior is one of the most important issues with respect to energy efficiency in households. This paper will discuss the relationship between electricity consumption and household lifestyle and evaluate the energy-saving potential by improving occupants' behavior in domestic life through energy-saving education. After 124 households in three typical residential buildings in Hangzhou city of China being selected as research subjects, a series of surveys were conducted: (1) recording of the monthly electricity uses of all subject households from March 2007 to July 2008; (2) energy-saving education to the half of the households before July 2008; (3) a comprehensive survey about the household lifestyle of all subject households in the beginning of August 2008. By comparison analysis of the survey data, major findings are as follows: (1) residential electricity consumption will increase continually in the next years in China, because of the improvement of people's living standard and more dependency on electric appliances; (2) improving occupants' behavior in domestic life can save more than 10% household electricity use; and (3) some effort on residential energy savings should be shifted from technological measures to improving occupants' behavior in ordinary domestic life. Crown Copyright (c) 2009 Published by Elsevier B.V. All rights reserved.
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TC 97
Z9 105
U1 13
U2 44
PU ELSEVIER SCIENCE SA
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PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
SN 0378-7788
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JI Energy Build.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Jain, RK
Smith, KM
Culligan, PJ
Taylor, JE
AF Jain, Rishee K.
Smith, Kevin M.
Culligan, Patricia J.
Taylor, John E.
TI Forecasting energy consumption of multi-family residential buildings using support vector regression: Investigating the impact of temporal and spatial monitoring granularity on performance accuracy
SO APPLIED ENERGY
LA English
DT Article
DE Forecasting; Machine learning; Monitoring; Prediction; Residential building; Support vector regression
ID ARTIFICIAL NEURAL-NETWORKS; OCCUPANT BEHAVIOR; PREDICTION; MACHINES; SYSTEM; LOAD
AB Buildings are the dominant source of energy consumption and environmental emissions in urban areas. Therefore, the ability to forecast and characterize building energy consumption is vital to implementing urban energy management and efficiency initiatives required to curb emissions. Advances in smart metering technology have enabled researchers to develop "sensor based" approaches to forecast building energy consumption that necessitate less input data than traditional methods. Sensor-based forecasting utilizes machine learning techniques to infer the complex relationships between consumption and influencing variables (e.g., weather, time of day, previous consumption). While sensor-based forecasting has been studied extensively for commercial buildings, there is a paucity of research applying this data-driven approach to the multi-family residential sector. In this paper, we build a sensor-based forecasting model using Support Vector Regression (SVR), a commonly used machine learning technique, and apply it to an empirical data-set from a multi-family residential building in New York City. We expand our study to examine the impact of temporal (i.e., daily, hourly, 10 min intervals) and spatial (i.e., whole building, by floor, by unit) granularity have on the predictive power of our single-step model. Results indicate that sensor based forecasting models can be extended to multi-family residential buildings and that the optimal monitoring granularity occurs at the by floor level in hourly intervals. In addition to implications for the development of residential energy forecasting models, our results have practical significance for the deployment and installation of advanced smart metering devices. Ultimately, accurate and cost effective wide-scale energy prediction is a vital step towards next-generation energy efficiency initiatives, which will require not only consideration of the methods, but the scales for which data can be distilled into meaningful information. (C) 2014 Elsevier Ltd. All rights reserved.
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FU National Science Foundation [1142379, 0903597]
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Science Foundation under Grant Nos. 1142379 and 0903597. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. The authors would like to thank Rimas Gulbinas and Amy Tang for their support in the development and launch of this study.

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PT J
AU Nair, G
Gustavsson, L
Mahapatra, K
AF Nair, Gireesh
Gustavsson, Leif
Mahapatra, Krushna
TI Factors influencing energy efficiency investments in existing Swedish residential buildings
SO ENERGY POLICY
LA English
DT Article
DE Building envelope measures; Energy efficiency investment measures; Homeowners
ID PSYCHOLOGICAL-RESEARCH; POLICY INSTRUMENTS; HEATING-SYSTEMS; CONSERVATION; BEHAVIOR; DETERMINANTS; CONSUMPTION; STRATEGIES; DIFFUSION; PATTERNS
AB We used the data from a survey conducted in 2008 of 3,000 owners of detached houses to analyse the factors that influence the adoption of investment measures to improve the energy efficiency of their buildings. For the majority of Swedish homeowners, it was important to reduce their household energy use, and most of them undertook no-cost measures as compared to investment measures. Personal attributes such as income, education, age and contextual factors, including age of the house, thermal discomfort, past investment, and perceived energy cost, influence homeowners' preference for a particular type of energy efficiency measure. The implications for promoting the implementation of energy efficiency investment measures are discussed. (C) 2010 Elsevier Ltd. All rights reserved.
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FU Swedish Energy Agency; European Union
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NR 60
TC 92
Z9 93
U1 2
U2 33
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Energy Policy
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GA 601JS
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ER

PT J
AU Schleich, J
AF Schleich, Joachim
TI Barriers to energy efficiency: A comparison across the German commercial and services sector
SO ECOLOGICAL ECONOMICS
LA English
DT Article
DE Energy efficiency; Energy consumption; Energy policy; Organizational investment behaviour; Technology diffusion
ID DECISION-MAKING; MARKET; POLICY; CONSERVATION; ECONOMICS; INVESTMENTS; DISCOUNT; FIRMS; RISK
AB Based on a large sample for the German commercial and services sector, this paper econometrically assesses the relevance of various types of barriers to energy efficiency at the sectoral level and across fifteen subsectors. The results at the level of entire sectors suggest that the lack of information about energy consumption patterns and about energy efficiency measures, lack of staff time, priority setting within organizations, and - in particular - the investor/user dilemma are all relevant barriers. Allowing for sector-specific differences in the relevance of these individual barriers yields a more heterogeneous picture. The numbers and types of relevant barriers vary across sub-sectors, and the majority of sub-sectors are subject to relatively few barriers. The statistically most significant barriers are found for the sub-sector of public administrations. These findings are robust, independent of whether the definition of an organization's energy efficiency performance includes only measures that have actually been realized or also those that are being planned. For planned projects. however. organizations appear to underestimate internal priority setting as a barrier to energy efficiency. (C) 2009 Elsevier B.V. All rights reserved.
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NR 39
TC 91
Z9 92
U1 1
U2 27
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ECOL ECON
JI Ecol. Econ.
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VL 68
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BP 2150
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SC Environmental Sciences & Ecology; Business & Economics
GA 450HZ
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ER

PT J
AU Bordass, B
Cohen, R
Standeven, M
Leaman, A
AF Bordass, B

Cohen, R
Standeven, M
Leaman, A
TI Assessing building performance in use 3: energy performance of the Probe buildings
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE benchmarks; carbon dioxide emissions; energy consumption; metering; post-occupancy surveys; sustainability; unintended consequences; United Kingdom
AB By early 1999, the Probe series of post-occupancy studies had reported individually on 16 buildings. This paper compares their energy performance and carbon emissions (for technical performance and occupant satisfaction, see papers 2 and 4 in this issue). All but one building (which paradoxically used the least energy of Probe's air-conditioned offices) claimed to be energy efficient, but achieved performance ranged from excellent to below average. Across the sample, there was a factor of six in carbon dioxide emissions per unit floor area, and even more per occupant. The air-conditioned buildings tended to use the most energy: they usually contained more equipment, were more intensively occupied, but also usually ran more liberally and wastefully - as did more complex systems generally. Often complication seemed to have been added before the fundamentals had been made efficient. Design objectives were also frustrated by poor airtightness, control problems, unintended consequences, a dearth of energy management, and a tendency for systems to default to 'on' - also a pathological trend for information technology and its associated cooling demands. Solutions include load reduction, 'gentle engineering', better matches between demand and supply, and predictions based on a better understanding of in-use performance.
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NR 15
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PU E & FN SPON
PI LONDON
PA 2-6 BOUNDARY ROW, LONDON SE1 8HN, ENGLAND
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JI Build. Res. Informat.
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BP 114

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WC Construction & Building Technology
SC Construction & Building Technology
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PT J
AU Mills, B
Schleich, J
AF Mills, Bradford
Schleich, Joachim
TI Residential energy-efficient technology adoption, energy conservation, knowledge, and attitudes: An analysis of European countries
SO ENERGY POLICY
LA English
DT Article
DE Household energy-efficiency; Technology adoption; Energy conservation
ID UNITED-STATES; BEHAVIOR; CONSUMPTION; DETERMINANTS; HOUSEHOLDS; VALUATION; PATTERNS; SWEDEN
AB Relationships between measures of household energy use behavior and household characteristics are estimated using a unique dataset of approximately 5000 households in 10 EU countries and Norway. Family age-composition patterns are found to have a distinct impact on household energy use behavior. Households with young children are more likely to adopt energy-efficient technologies and energy conservation practices and place primary importance on energy savings for environmental reasons. By contrast, households with a high share of elderly members place more importance on financial savings, and have lower levels of technology adoption, energy conservation practice use, and knowledge about household energy use. Education levels also matter, with higher levels associated with energy-efficient technology adoption and energy conservation practice use. Similarly, university education increases the stated importance of energy savings for greenhouse gas reductions and decreases the stated importance for financial reasons. Education impacts also vary greatly across survey countries and there is some evidence of an Eastern-Western European divide with respect to attitudes towards energy savings. These cross-country differences highlight the need to balance a common EU energy-efficiency policy framework with flexibility for country specific policies to address unique constraints to energy-efficient technology and conservation practice adoption. (C) 2012 Elsevier Ltd. All rights reserved.
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FU German Ministry of Education and Research
FX We are thankful for the helpful comments provided by two anonymous reviewers. We also gratefully acknowledge funding within the project "Social, ecologic and economic dimensions of sustainable energy consumption" (Soziale, okologische und okonomische Dimensionen eines nachhaltigen Energiekonsums in Wohngebauden) under the research program "From words to deeds-new ways of sustainable consumption" (Vom Wissen zum Handeln-neue Wege zum nachhaltigen Konsum) of the German Ministry of Education and Research.
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NR 76
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Z9 88
U1 3
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PU ELSEVIER SCI LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
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UT WOS:000309493900067
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ER

PT J
AU Ek, K
Soderholm, P
AF Ek, Kristina
Soderholm, Patrik
TI The devil is in the details: Household electricity saving behavior and the role of information
SO ENERGY POLICY
LA English
DT Article
DE Household behavior; Electricity conservation; Information
ID ECONOMIC MOTIVATION; ENERGY; DECISION; NORMS; CONSERVATION; DIFFUSION; PARADOX; SWEDEN; RISK
AB The purpose of this paper is to analyze Swedish households' willingness to increase their daily efforts to save electricity. The analysis builds on a broad theoretical framework, which embraces both economic and

norm-based motivations in explaining household behavior. The paper pays particular attention to the role of information about the availability of different behavioral changes that can be undertaken at the household level. The empirical results are based on a postal survey that was sent out to 1200 Swedish households, and the econometric analysis is carried out within a so-called ordered probit framework. Our results indicate that costs, environmental attitudes and social interactions are all important determinants of electricity saving activities within Swedish households. We tested the hypothesis that information about available savings measures that is presented in a more concrete and specific way is more likely to affect (stated) behavior than is more general information, and the data collected support this notion. The paper ends by discussing some implications of these results for the design of future informative policy measures in the energy-efficiency field. (C) 2009 Elsevier Ltd. All rights reserved.
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PT J
AU Davis, M
AF Davis, M
TI Rural household energy consumption - The effects of access to
electricity - evidence from South Africa
SO ENERGY POLICY
LA English
DT Article
DE rural; household; transition
ID FUELWOOD
AB This paper examines household energy consumption patterns in rural areas in the light of energy transition theories. In particular, the study aims to identify the effects of access to electricity on fuel choice. The analysis uses data from an extensive household survey conducted in South Africa and examines the prevalence of different fuels, energy expenditure, the end-uses of fuels, and multiple-fuel use patterns. It is concluded that evidence exists for the presence of an energy transition in rural households, largely driven by income. Access to electricity affects the nature of this transition, and there is weak evidence to suggest that it accelerates the process. (C) 1998 Published by Elsevier Science Ltd. All rights reserved.
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PT J
AU Ekholm, T
Krey, V
Pachauri, S
Riahi, K
AF Ekholm, Tommi
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Pachauri, Shonali
Riahi, Keywan
TI Determinants of household energy consumption in India
SO ENERGY POLICY
LA English
DT Article
DE Household energy consumption; Energy access; India
ID SOCIOECONOMIC IMPACTS; DEVELOPING-COUNTRIES; RURAL-AREAS; FUEL; ACCESS; MODEL; COOKING; SECTOR; POOR
AB Improving access to affordable modern energy is critical to improving living standards in the developing world. Rural households in India, in particular, are almost entirely reliant on traditional biomass for their basic cooking energy needs. This has adverse effects on their health and productivity, and also causes environmental degradation. This study presents a new generic modelling approach, with a focus on cooking fuel choices, and explores response strategies for energy poverty eradication in India. The

modelling approach analyzes the determinants of fuel consumption choices for heterogeneous household groups, incorporating the effect of income distributions and traditionally more intangible factors such as preferences and private discount rates. The methodology is used to develop alternate future scenarios that explore how different policy mechanisms such as fuel subsidies and micro-financing can enhance the diffusion of modern, more efficient, energy sources in India. (C) 2010 Elsevier Ltd. All rights reserved.
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FX The funding from TEKES, a consortium of Finnish companies and the Finnish Academy of Sciences for the IIASA YSSP attendance of Tommi Ekholm is appreciated. Also, funding from Helsinki Institute of Science and Technology Studies (HIST) for extending the work and writing the paper is greatly appreciated.
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PT J
AU Zhao, XL
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TI Residential energy consumption in urban China: A decomposition analysis
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DE Residential energy consumption; Index Decomposition Analysis (IDA);
China
ID EFFICIENCY STANDARDS; BUILDINGS; INTENSITY; RETROFIT; PROGRESS; SECTOR;
IMPACT
AB Residential energy consumption (REC) is the second largest energy use category (10%) in China and urban residents account for 63% of the REC. Understanding the underlying drivers of variations of urban REC thus helps to identify challenges and opportunities and provide advices for future policy measures. This paper applies the LMDI method to a decomposition of China's urban REC during the period of 1998-2007 at disaggregated product/activity level using data collected from a wide range of sources. Our results have shown an extensive structure change towards a more energy-intensive household consumption structure as well as an intensive structure change towards high-quality and cleaner energy such as electricity, oil, and natural gas, which reflects a changing lifestyle and consumption mode in pursuit of a higher level of comfort, convenience and environmental protection. We have also found that China's price reforms in the energy sector have contributed to a reduction of REC while scale factors including increased urban population and income levels have played a key role in the rapid growth of REC. We suggest that further deregulation in energy prices and regulatory as well as voluntary energy efficiency and conservation policies in the residential sector should be promoted. (C) 2011 Elsevier Ltd. All rights reserved.
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PT J
AU de Almeida, A
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Feilberg, N
AF de Almeida, Anibal
Fonseca, Paula
Schlomann, Barbara
Feilberg, Nicolai
TI Characterization of the household electricity consumption in the EU,
potential energy savings and specific policy recommendations
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy; Electronic loads; Standby consumption; Savings; Efficiency
policies; Climate change
AB Although significant improvements in energy efficiency have been achieved in home appliances and lighting, the electricity consumption in the European Union household has increased by 2% per year during the past 10 years. Some reasons are associated with an increased degree of basic comfort and level of amenities and with the widespread utilisation of new types of loads. Wishing to increase the understanding of the energy consumption in the EU households for the different types of equipment including the consumers' behaviour and comfort levels, and to identify demand trends, an energy monitoring campaign, was carried out in 12 geographically representative EU countries, accompanied by a lifestyle survey. From the measurements carried out it was concluded that Information Technologies and entertainment loads are key contributors to the power demand. in basically all types of loads there is wide range of performance levels in the models available in the market. Available technology, associated with responsible consumer behaviour, can reduce wasteful consumption. Based on a bottom up approach the European residential sector potential electricity savings that can be implemented by existing technologies and improved behaviour can reach 48%. The paper presents policy recommendations promoting market transformation and behavioural changes in the equipment selection and operation. (C) 2011 Elsevier B.V. All rights reserved.
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FU European Commission; Executive Agency for Competitiveness and Innovation (EACI)
FX The REMODECE project was mainly supported by the European Commission, Executive Agency for Competitiveness and Innovation (EACI).
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PT J
AU Chen, L
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van den Berg, M
TI Energy consumption in rural China: A household model for three villages in Jiangxi Province
SO ECOLOGICAL ECONOMICS
LA English
DT Article
DE China; fuelwood; coal; households; energy sources
ID INDIA; CHOICE; IMPACT
AB In China, fuelwood and coal are the most important energy sources for rural households in poor areas. Along with population and economic growth, excessive fuelwood collection is a major cause of deforestation. Burning coal contributes to environmental problems such as air pollution, acid rain and greenhouse gas emissions. The purpose of this article is to analyze factors determining choice of energy source and labor input into fuelwood collection in poor, forest-rich regions, and to provide policy recommendations on ways to affect these choices. To this end, a nonseparable household model, reflecting choices in labor allocation and energy demand of rural households, is estimated from available data for three villages in a poor, forest-rich region in Jiangxi Province, Southeast China. Innovative aspects of this article are the analyses of factors driving household substitution between forest and non-forest fuels and of dissimilarities in household responses under different market access conditions. (c) 2005 Elsevier B.V. All rights reserved.
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WC Ecology; Economics; Environmental Sciences; Environmental Studies
SC Environmental Sciences & Ecology; Business & Economics
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ER

PT J
AU Ryghaug, M
Sorensen, KH
AF Ryghaug, Marianne
Sorensen, Knut H.
TI How energy efficiency fails in the building industry
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency; Building industry; Energy policy
ID TECHNOLOGY; CONSTRUCTION
AB This paper examines how energy efficiency fails in the building industry based on many years of research into the integration of energy efficiency in the construction of buildings and sustainable architecture in Norway. It argues that energy-efficient construction has been seriously restrained by three interrelated problems: (1) deficiencies in public policy to stimulate energy efficiency, (2) limited governmental efforts to regulate the building industry, and (3) a conservative building industry. The paper concludes that innovation and implementation of new, energy-efficient technologies in the building industry requires new policies, better regulations and reformed practices in the industry itself.
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FU Research Council of Norway
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NR 23
TC 68
Z9 68
U1 0
U2 20
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0301-4215
J9 ENERG POLICY
JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
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PT J
AU Martani, C
Lee, D
Robinson, P
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Ratti, C
AF Martani, Claudio
Lee, David
Robinson, Prudence
Britter, Rex
Ratti, Carlo
TI ENERNET: Studying the dynamic relationship between building occupancy and energy consumption
SO ENERGY AND BUILDINGS
LA English
DT Article

DE Energy; Consumption; Efficiency; WiFi; Monitoring
ID TEMPERATURE
AB With cities accounting for approximately two thirds of the global demand for energy, there is significant scope to optimize energy usage of cities, in particular by improving the use of the built form. Large non-domestic buildings are increasingly the focus of attention, due to their substantial demands and associated environmental impacts such as CO2 emissions. Various approaches have been adopted to address building energy efficiency, with more recent studies relating consumption patterns to human occupancy. This paper proposes a new method to measure activity, using WiFi connections as a proxy for human occupancy. Data on the number of WiFi connections and energy consumption (electricity. steam and chilled water) were compared for two buildings within the Massachusetts Institute of Technology's campus. The results of the study demonstrate: the operation of the heating, ventilation and air conditioning (HVAC) systems adhered more closely to factors other than occupancy i.e. external temperature, whilst a small part of the electricity levels did correlate with the occupancy. In order to present possible solutions to address the disconnect between the HVAC system and occupancy levels, this paper identifies future steps that could begin to improve energy usage. (C) 2011 Elsevier B.V. All rights reserved.
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FU MITEI at MIT; National Science Foundation; ATT Foundation; MIT SMART; GE; Audi Volkswagen; BBVA; SNCF; ENEL; MIT Senseable City Lab Consortium
FX Technical advice by Cinzia Talamo and Giancarlo Paganin from the Politecnico di Milano is gratefully acknowledged. The authors also thank the MITEI program at MIT, the National Science Foundation, the AT&T Foundation, the MIT SMART program, GE, Audi Volkswagen, BBVA, SNCF, ENEL and the members of the MIT Senseable City Lab Consortium for supporting the research.
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PT J
AU Mavrotas, G
Diakoulaki, D
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AF Mavrotas, George
Diakoulaki, Danae
Florios, Kostas
Georgiou, Paraskevas
TI A mathematical programming framework for energy planning in services' sector buildings under uncertainty in load demand: The case of a hospital in Athens
SO ENERGY POLICY
LA English
DT Article
DE multi-objective programming; energy planning; minimax regret
ID INTERVAL OBJECTIVE FUNCTION; UTILITY SYSTEMS; MODELS; OPTIMIZATION; REGRET; ENVIRONMENT; STRATEGIES; COSTS
AB The aim of this paper is to provide an integrated modeling and optimization framework for energy planning in large consumers of the services' sector based on mathematical programming. The power demand is vaguely known and the underlying uncertainty is modeled using elements from fuzzy set theory. The defined fuzzy programming model is subsequently transformed to an equivalent multi-objective problem, where the minimization of cost and the maximization of demand satisfaction are the objective functions. The Pareto optimal solutions of this problem are obtained using a novel version of the e-constraint method and represent the possibly optimal solutions of the original problem under uncertainty. In the present case, in order to select the most preferred Pareto optimal solution, the minimax regret criterion is properly used to indicate the preferred configuration of the system (i.e. the size of the installed units) given the load uncertainty. Furthermore, the paper proposes a model reduction technique that can be used in similar cases and further examines its effect in the final results. The above methodology is applied to the energy rehabilitation of a hospital in the Athens area. The technologies under consideration include a combined heat and power unit for providing power and heat, an absorption unit and/or a compression unit for providing cooling load. The obtained results demonstrate that, increasing the degree of demand satisfaction, the total annual cost increases almost linearly. Although data compression allows obtaining realistic results, the size of the proposed units might be slightly changed.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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PT J
AU Daioglou, V
van Ruijven, BJ
van Vuuren, DP
AF Daioglou, Vassilis
van Ruijven, Bas J.
van Vuuren, Detlef P.
TI Model projections for household energy use in developing countries
SO ENERGY
LA English
DT Article
DE Household energy consumption; Energy modeling; Developing countries; Climate policy
ID INDIAN HOUSEHOLDS; CLIMATE-CHANGE; SECTOR; POLICY; STRATEGIES; EFFICIENCY; DEMAND; COSTS
AB The residential sector plays an important role in the energy system of developing countries. In this paper we introduce a bottom up simulation model for household energy use. The model describes energy demand for several end-use functions based on a set of physical drivers, such as floor space and heating degree days. The model also recognizes different population groups: i.e. urban and rural households, each distinguishing five income quintiles. The model is applied to analyze possible future developments of residential energy use in five developing world regions: India, China, South East Asia, South Africa and Brazil. We find that in each of these regions cooking is currently the main end-use function, but that other functions, such as space heating, cooling and appliances become more important. At the same time, energy consumption slowly shifts towards modern fuels. The model also shows that climate policy can reduce residential energy emissions, but could also slow down the energy transition away from traditional fuels in low income classes. (C) 2011 Elsevier Ltd. All rights reserved.
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OI Daioglou, Vassilis/0000-0002-6028-352X; van Vuuren, Detlef/0000-0003-0398-2831; van Ruijven, Bas/0000-0003-1232-5892
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WC Thermodynamics; Energy & Fuels
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PT J
AU Doukas, H
Nychtis, C
Psarras, J
AF Doukas, Haris
Nychtis, Christos
Psarras, John
TI Assessing energy-saving measures in buildings through an intelligent decision support model
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Intelligent models; Building energy Management systems; Energy efficiency
ID MANAGEMENT; SIMULATION; SYSTEM
AB Indeed, in the recent years, important efforts in applying energy management processes have been focused on the building sector, which demonstrates the increasing energy intensity and energy consumption indexes. The role of the building energy management systems (BEMS) is known and significant in this respect, for the management of the daily energy operations of a typical building. Effective energy management however requires the use of tools and methodologies that support the strategic decision making process of selecting energy saving measures, which are viable and environmental friendly. The aim of this paper is the presentation of an innovative intelligent decision support model for the identification of the need for intervention and further evaluation of energy saving

measures in a typical existing building, based on the systematic incorporation of BEMS data (loads, demands and user requirements). The operation of the model is supportive to the decision makers authorized with the energy-efficient performance of the building and responsible for its management (energy auditors and building administration). In addition, the corresponding computerized decision support system and the appraisal of its pilot application to a typical existing office building in Athens, Greece, are presented and discussed. (C) 2008 Elsevier Ltd. All rights reserved.
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FU Hellenic General Secretariat for Research and Technology
FX This paper was based on research conducted within the "BUILDING INTELLIGENCE: Energy Savings in Buildings via Intelligent Control and Communications (ESBi2C)" project of the Hellenic Ministry for Development and funded by the Hellenic General Secretariat for Research and Technology (GSRT). The content of the paper is the sole responsibility of its authors and does not necessarily reflect the views of the GSRT.
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TC 61
Z9 62
U1 2
U2 16
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J9 BUILD ENVIRON
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WC Construction & Building Technology; Engineering, Environmental; Engineering, Civil
SC Construction & Building Technology; Engineering
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DA 2018-05-03
ER

PT J
AU Davis, LW
AF Davis, Lucas W.
TI Durable goods and residential demand for energy and water: evidence from a field trial
SO RAND JOURNAL OF ECONOMICS
LA English
DT Article
ID EFFICIENCY STANDARDS; ELECTRICITY DEMAND; ALLOCATION; APPLIANCE; TIME; US
AB This article describes a household production model in which energy-efficient durable goods cost less to operate so households may use them more. The model is estimated using household-level data from a field trial in which participants received high-efficiency clothes washers free of charge. The estimation strategy exploits this quasi-random replacement of washers to derive precise estimates of the household production technology and a demand function for clothes washing. During the field trial, households increased clothes washing on average by 5.6% after receiving a high-efficiency washer, implying a price elasticity of -.06. The complete model is used to evaluate the cost-effectiveness of recent changes in minimum efficiency standards for clothes washers.
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SN 0741-6261
J9 RAND J ECON
JI Rand J. Econ.
PD SUM
PY 2008
VL 39
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BP 530
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WC Economics
SC Business & Economics
GA 314YI
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PT J
AU Vaage, K
AF Vaage, K
TI Heating technology and energy use: a discrete/continuous choice approach to Norwegian household energy demand
SO ENERGY ECONOMICS
LA English
DT Article
DE residential energy demand; discrete/continuous choice
AB The aim of this paper is to describe the structure of the household's energy demand as a discrete/continuous choice and, on this basis, establish an econometric model suitable for the data available in the Norwegian Energy Surveys. The discrete appliance choice is specified as a multinomial logit model, with a mixture of appliance attributes (operating costs) and individual characteristics (income, housing unit characteristics, etc.) as explanatory variables. In the next step the continuous choice of energy use is modelled conditional on the appliance choice. The energy prices turn out to be significant both when estimating the appliance choice and the conditional energy demand. The estimated price elasticity for energy exceeds minus unity. The paper discusses how this relatively strong price response should be interpreted in the context of other econometric analysis with no explicit appliance dependence. Finally, the significance of the many household characteristics at both stages of the model signals a high degree of heterogeneity within the households, which justifies the use of detailed micro-data in the modelling of the energy demand. (C) 2000 Elsevier Science B.V. All rights reserved. JEL classifications: C25; D12.
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SN 0140-9883
J9 ENERG ECON
JI Energy Econ.
PD DEC
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VL 22
IS 6
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DI 10.1016/S0140-9883(00)00053-0
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WC Economics
SC Business & Economics
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PT J
AU van Ruijven, BJ
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Isaac, M
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AF van Ruijven, Bas J.
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Balachandra, P.
TI Model projections for household energy use in India
SO ENERGY POLICY
LA English

DT Article
DE Household energy consumption; Energy modelling; India
ID WORLDS POOR; DEVELOPING-COUNTRIES; DISCOUNT RATES; COOKING; SECTOR; DEATON,ANGUS; TECHNOLOGIES; EMISSIONS; CLIMATE; DEMAND
AB Energy use in developing countries is heterogeneous across households. Present day global energy models are mostly too aggregate to account for this heterogeneity. Here, a bottom-up model for residential energy use that starts from key dynamic concepts on energy use in developing countries is presented and applied to India. Energy use and fuel choice is determined for five end-use functions (cooking, water heating, space heating, lighting and appliances) and for five different income quintiles in rural and urban areas. The paper specifically explores the consequences of different assumptions for income distribution and rural electrification on residential sector energy use and CO2 emissions, finding that results are clearly sensitive to variations in these parameters. As a result of population and economic growth, total Indian residential energy use is expected to increase by around 65-75% in 2050 compared to 2005, but residential carbon emissions may increase by up to 9-10 times the 2005 level. While a more equal income distribution and rural electrification enhance the transition to commercial fuels and reduce poverty, there is a trade-off in terms of higher CO2 emissions via increased electricity use. (C) 2011 Elsevier Ltd. All rights reserved.
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FU DG-Research of the European Commission
FX The contribution of Bas van Ruijven and Paul Lucas has benefited from funding of the POEM project (DG-Research of the European Commission). The contribution of Detlef van Vuuren was supported by funding of the RESPONSES project (DG Research of the European Commission).
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PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
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PT J
AU Dai, HC
Masui, T
Matsuoka, Y
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AF Dai, Hancheng
Masui, Toshihiko
Matsuoka, Yuzuru
Fujimori, Shinichiro
TI The impacts of China's household consumption expenditure patterns on energy demand and carbon emissions towards 2050
SO ENERGY POLICY
LA English
DT Article
DE Household consumption expenditure pattern; Energy demand and CO2 emissions; Computable general equilibrium model
ID LONG-TERM TRENDS; BOTTOM-UP; DEMATERIALIZATION; SYSTEM; REQUIREMENTS; TECHNOLOGY; MODEL
AB This paper explores how China's household consumption patterns over the period 2005-2050 influence the total energy demand and carbon dioxide (CO2) emissions in two baseline scenarios, and how it influences carbon prices as well as the economic cost in the corresponding carbon mitigation scenarios. To this end we first put forward two possible household consumption expenditure patterns up to 2050 using the Working-Leser model, taking into account total expenditure increase and urbanization. For comparison, both expenditure patterns are then incorporated in a hybrid recursive dynamic computable

general equilibrium model. The results reveal that as income level increases in the coming decades, the direct and indirect household energy requirements and CO2 emissions would rise drastically. When household expenditure shifts from material products and transport to service-oriented goods, around 21,000 mtce(1) of primary energy and 45 billion tons of CO2 emissions would be saved over the 45-year period from 2005 to 2050. Moreover, carbon prices in the dematerialized mitigation scenario would fall by 13% in 2050, thus reducing the economic cost. 2012 Elsevier Ltd. All rights reserved.
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PT J
AU Kowsari, R
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TI Three dimensional energy profile: A conceptual framework for assessing household energy use
SO ENERGY POLICY
LA English

DT Article
DE Energy analysis; Rural energy; Integrated model
ID DEVELOPING-COUNTRIES; ELECTRICITY CONSUMPTION; EMPIRICAL-EVIDENCE; INDIAN HOUSEHOLDS; RURAL ENERGY; FUEL CHOICE; MODEL; BEHAVIOR; DEMAND; ACCESS
AB The provision of adequate, reliable, and affordable energy has been considered as a cornerstone of development. More than one-third of the world's population has a very limited access to modern energy services and suffers from its various negative consequences. Researchers have been exploring various dimensions of household energy use in order to design strategies to provide secure access to modern energy services. However, despite more than three decades of effort, our understanding of household energy use patterns is very limited, particularly in the context of rural regions of the developing world. Through this paper, the past and the current trends in the field of energy analysis are investigated. The literature on rural energy and energy transition in developing world has been explored and the factors affecting households' decisions on energy use are listed. The and the factors affecting households' decisions on energy use are listed. The gaps identified in the literature on rural household energy analysis provide a basis for developing an alternative model that can create a more realistic view of household energy use. The three dimensional energy profile is presented as a new conceptual model for assessment of household energy use. This framework acts as a basis for building new theoretical and empirical models of rural household energy use. (C) 2011 Elsevier Ltd. All rights reserved.
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FU Province of British Columbia under a Pacific Century Trust; University of British Columbia; Liu Institute for Global Issues
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AU Tzikopoulos, AF
Karatza, MC
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TI Modeling energy efficiency of bioclimatic buildings

SO ENERGY AND BUILDINGS
LA English
DT Article
DE bioclimatic architecture; sustainable architecture; energy efficiency; passive solar technologies; regression model
ID DESIGN; PERFORMANCE; CLIMATE
AB The application of bioclimatic principles is a critical factor in reducing energy consumption and CO2 emissions of the building sector. This paper develops a regression model of energy efficiency as a function of environmental conditions, building characteristics and passive solar technologies. A sample of 77 bioclimatic buildings (including 45 houses) was collected, covering Greece, other Mediterranean areas and the rest of Europe. Average energy efficiency varied from 19.6 to 100% with an average of about 68%. Environmental conditions included latitude, altitude, ambient temperature, degree days and sun hours; building characteristics consisted in building area and volume. Passive solar technologies included (among others) solar water heaters, shading, natural ventilation, greenhouses and thermal storage walls. Degree days and a dummy variable indicating location in the Mediterranean area were the strongest predictors of energy efficiency while taller and leaner buildings tended to be more energy efficient. Surprisingly, many passive technologies did not appear to make a difference on energy efficiency while thermal storage walls in fact seemed to decrease energy efficiency. The model developed may be of use to architects, engineers and policy makers. Suggestions for further research include obtaining more building information, investigating the effect of passive solar technologies and gathering information on the usage of building.
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PT J
AU Chen, JY
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TI Modeling building occupant network energy consumption decision-making:
The interplay between network structure and conservation
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Agent-based simulation; Behavior; Energy efficiency; Social networks
ID BEHAVIOR; PATTERNS; SYSTEMS; POWER
AB The exposure and diffusion of energy consumption information in building occupant peer networks has been shown to influence an individual's energy consumption decisions. In this paper, we develop an agent-based computational model for individual energy consumption behavior based on data collected during an experiment on residential energy use. We simulate the building occupants' decision making and the information transmission process. By comparing the impact of several parameters in the network level computational model and validating the parameters in a second experimental setting, our research serves to clarify how network relations can be leveraged for modifying energy consumption behavior. Network degree and weight were identified as the major structural parameters that impact building occupants' conservation decisions, while network size was found to have no significant impact. These findings have

important implications for the design and effectiveness of residential energy feedback systems designed to promote energy conservation in residential buildings. (C) 2011 Elsevier B.V. All rights reserved.
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PT J
AU Kelly, S
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TI Do homes that are more energy efficient consume less energy?: A structural equation model of the English residential sector
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DT Article
DE Residential; Energy; Efficiency; Structural; Equation; Modelling
ID BOTTOM-UP; TOP-DOWN; UK; DEMAND; ELECTRICITY; SCENARIOS; POLICIES; STOCK
AB Energy consumption from the residential sector is a complex socio-technical problem that can be explained using a combination of physical, demographic and behavioural characteristics of a dwelling and its occupants. A structural equation model (SEM) is introduced to calculate the magnitude and significance of explanatory variables on residential energy consumption. The benefit of this approach is that it explains the complex relationships that exist between manifest variables and their overall effect though direct, indirect and total effects. Using the English House Condition Survey (EHCS) consisting of 2531 unique cases, the main drivers behind residential energy consumption are found to be the number of household occupants, floor area, household income, dwelling efficiency (SAP), household heating patterns and living room temperature. In the multivariate case, SAP explains very little of the variance of residential energy consumption. However, this procedure fails to account for simultaneity bias between energy consumption and SAP. Using SEM its shown that dwelling energy efficiency (SAP), has reciprocal causality with dwelling energy consumption and the magnitude of these two effects are calculable. When non-recursivity between SAP and energy consumption is allowed for, SAP is shown to have a negative effect on energy consumption but conversely, homes with a propensity to consume more energy also have higher SAP rates. (C) 2011 Elsevier Ltd. All rights reserved.
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PT J
AU Hiemstra-van der Horst, G
Hovorka, AJ
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Hovorka, Alice J.
TI Reassessing the "energy ladder": Household energy use in Maun, Botswana
SO ENERGY POLICY
LA English
DT Article
DE fuelwood; urban energy; Africa
ID SOUTH-AFRICA; DEVELOPING-COUNTRIES; URBAN-POOR; DEFORESTATION; TRANSITION; FUELWOOD; CONSUMPTION; ZIMBABWE; SUBSTITUTION; DYNAMICS
AB In the context of Sub-Saharan Africa's rapid urbanization, improved insight into urban energy use is increasingly important. Based on the predictions of "energy transition" theory, a regional shift from biomass to "modern" fuels has long been expected to occur in tandem with urban growth. However, trends observed in the region's towns and cities have often not followed such patterns and fuelwood continues to be important in most areas. This paper examines the practical relevance of transition theory using a recent case study, conducted by the authors in Maun, Botswana, and results previously reported in the literature. It finds that, despite the long-term link between socio-economic development and increased modern fuel consumption at the national scale, the notion of "transition" does not accurately reflect ongoing energy-use patterns at lower levels of aggregation. This is chiefly because its model of household fuel switching largely dismisses the importance of active (and strategic) decision making by urban consumers and their responsiveness to structural factors such as relative fuel prices. As the Botswana case illustrates, this weakness can significantly distort expectations and policies around urban fuelwood use. (C) 2008 Elsevier Ltd. All rights reserved.
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FU Social Sciences and Humanities Research Council of Canada
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PT J
AU Barton, J
Huang, SK
Infield, D
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AF Barton, John
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Ogunkunle, Damiete
Torriti, Jacopo
Thomson, Murray
TI The evolution of electricity demand and the role for demand side participation, in buildings and transport
SO ENERGY POLICY
LA English
DT Article
DE Transition; Pathways; Demand side management
ID THERMAL-ENERGY STORAGE; HEAT; FUEL

AB This paper explores the possible evolution of UK electricity demand as we move along three potential transition pathways to a low carbon economy in 2050. The shift away from fossil fuels through the electrification of demand is discussed, particularly through the uptake of heat pumps and electric vehicles in the domestic and passenger transport sectors. Developments in the way people and institutions may use energy along each of the pathways are also considered and provide a rationale for the quantification of future annual electricity demands in various broad sectors. The paper then presents detailed modelling of hourly balancing of these demands in the context of potential low carbon generation mixes associated with the three pathways. In all cases, hourly balancing is shown to be a significant challenge. To minimise the need for conventional generation to operate with very low capacity factors, a variety of demand side participation measures are modelled and shown to provide significant benefits. Lastly, projections of operational greenhouse gas emissions from the UK and the imports of fossil fuels to the UK for each of the three pathways are presented. (C) 2012 Elsevier Ltd. All rights reserved.

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FU Engineering and Physical Sciences Research Council, UK [EP/F022832/1]
FX This work was supported by the Engineering and Physical Sciences Research Council, UK, within the Transition Pathways to a Low Carbon Economy project (EP/F022832/1).

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PT J
AU Peschiera, G
Taylor, JE
AF Peschiera, Gabriel
Taylor, John E.
TI The impact of peer network position on electricity consumption in building occupant networks utilizing energy feedback systems
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Buildings; Conservation; Electricity consumption feedback; Peer networks; Social networks
ID SOCIAL NETWORK; HOUSEHOLD; BEHAVIOR; CONSERVATION
AB There is a growing need to reduce building energy consumption to limit greenhouse gas emissions and lessen the strain on our electricity grids. Researchers have shown that people are more likely to implement conservation practices in response to energy consumption feedback the more socially proximal the norm provided in that feedback. It has also been shown that sharing individual room-level electricity usage information with peers is more effective in inducing consumption reduction than exposure to generic norms. Designers of energy use feedback systems are leveraging social networks to encourage energy-efficient behavior. Yet, despite growing interest in the role of peer networks to induce energy savings, we know little about how properties of peer networks, such as a given user's position in a peer network, impact consumption behavior. In a 22-room study group where building residents shared room-level

electricity consumption information among peer groups in the same building, we tested the correlation of network degree and Eigenvector centrality with percent change in consumption relative to non-participants. This result shows that energy use feedback is more effective in promoting the implementation of energy saving practices as more peers share energy usage information through the feedback system. This finding underscores the importance of exploring and exploiting linkages between social structure and energy conservation. (C) 2012 Elsevier B.V. All rights reserved.
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AU Gronhoj, A
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TI Feedback on household electricity consumption: learning and social influence processes
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DE Consumer learning; energy conservation; feedback; sustainability; technology
ID ENERGY-CONSERVATION; INFORMATION; INTERVENTION; PERFORMANCE
AB In this paper, we present results from a project aiming to develop a new feedback technology to support sustainable living in private households. Against the backdrop of a review of the relevant literature and based on qualitative family interviews and registration of the households' electricity consumption, we evaluate the effects of giving households detailed feedback about their electricity consumption on a small liquid crystal display (LCD) screen. Twenty Danish households participated in the study over a 5-month period. A new feedback system was developed in a user-involved innovation process. The average electricity saving in participating households is estimated to 8.1%, compared with a 0.8% saving in the control group. The qualitative interviews revealed that the feedback made household electricity consumption more visible and salient, and empowered electricity consumers to take action with respect to lowering their energy consumption. In addition, the feedback stimulated social influences processes related to energy savings between spouses as well as between (teenage) children and their parents. Notably, families with teenage children appear to be particularly receptive to this type of feedback.
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TI A residential energy demand system for Spain
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DE DEMAND; ENGEL CURVES; CONSUMPTION; ELASTICITIES; MICRO; CONSTRAINTS; TECHNOLOGY

AB Sharp price fluctuations and increasing environmental and distributional concerns, among other issues, have led to a renewed academic interest in energy demand. In this paper we estimate, for the first time in Spain, an energy demand system with household microdata. In doing so, we tackle several econometric and data problems that are generally recognized to bias parameter estimates. This is obviously relevant, as obtaining correct price and income responses is essential if they may be used for assessing the economic consequences of hypothetical or real changes. With this objective, we combine data sources for a long time period and choose a demand system with flexible income and price responses. We also estimate the model in different sub-samples to capture varying responses to energy price changes by households living in rural, intermediate and urban areas. This constitutes a first attempt in the literature and it proved to be a very successful choice.

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JI Energy J.
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TI Modeling the effect of climate change on U.S. state-level buildings energy demands in an integrated assessment framework
SO APPLIED ENERGY
LA English
DT Article
DE Buildings energy demand; Electricity use; Climate change; Integrated assessment model; Sensitivity
ID RESIDENTIAL SECTOR; CONSUMPTION; CHINA; TRANSPORTATION; TECHNOLOGIES; WORLD; US
AB Objective: Because long-term socioeconomic transformation and energy service expansion show large spatial heterogeneity, advanced understanding of climate change impact on buildings energy use at the sub-national level will offer useful insights into climate policy and regional energy system planning.
Methods: In this study, we present a detailed buildings energy model with U.S. state-level representation, nested in an integrated assessment framework of the Global Change Assessment Model (GCAM). We project state-level buildings energy demand and its spatial pattern through the end of the century, considering the impact of climate change based on the estimates of heating and cooling degree days derived from downscaled USGS CASCaDE temperature data.
Results: The results indicate that climate change has a large impact on heating and cooling buildings energy and fuel use at the state level and that the 48 U.S. contiguous states exhibit a large spatial heterogeneity (ranges from -10% to +10% for total, -10% to +20% for electricity use and -20% to -5% for oil and gas use in the A2 scenario). Sensitivity analysis explores the potential implications of multiple driving forces, including climate action that would both change the price of energy and reduce climate change, the choice of climate models, and population and GDP growth. In addition, the 50-state building model is compared to a comparable version of the model which represents the entire United States as one region.
Conclusions: The study clearly demonstrates the spatially varying nature of fuel consumption changes that might occur from a changing climate. Although the study illustrates the importance of incorporating climate change into infrastructure-planning exercises, it also demonstrates that uncertainties about underlying drivers still must weigh heavily on these planning decisions. Finally, the study demonstrates that the 50-state building model provides both insights at the regional level and potentially better national-level estimates.
Practice implication: The findings from this study will help the climate-based policy decision and energy system, especially utility planning related to the buildings sector at the U.S. state and regional level facing the potential climate change. C) 2013 Elsevier Ltd. All rights reserved.
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FX The research described in this paper is part of the Platform for Regional Integrated Modeling and Analysis (PRIMA) Initiative at Pacific Northwest National Laboratory (PNNL). It was conducted under the Laboratory Directed Research and Development Program at PNNL, a multiprogram national laboratory operated by Battelle for the U.S. Department of Energy. The authors wish to express appreciation to the Integrated Assessment Research Program in the Office of Science of the U.S. Department of Energy (DOE SC-IARP). This research also used

Evergreen computing resources at the PNNL's Joint Global Change Research Institute at the University of Maryland in College Park, which is supported by DOE SC-IARP. PNNL is operated by Battelle for the U.S. Department of Energy under contract DE-AC05-76RL01830. The authors would like to thank Jennie Rice, Laurel Schmidt, Maoyi Huang, Ying Liu, and Erik Jensen for providing the data used in this project. The views and opinions expressed in this paper are those of the authors alone.

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AU Freire-Gonzalez, J
AF Freire-Gonzalez, Jaume
TI Methods to empirically estimate direct and indirect rebound effect of energy-saving technological changes in households
SO ECOLOGICAL MODELLING
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DT Article
DE Rebound effect; Energy efficiency; Energy policy; Sustainable consumption; Input-output; Re-spending
ID CARBON EMISSIONS; CLIMATE-CHANGE; CONSUMPTION; EFFICIENCY; PRICE; POLICIES; DEMAND; TIME; REQUIREMENTS; PERSPECTIVE
AB Energy efficiency policies have a special importance within carbon emission reduction policies to mitigate the climate change effects. However, potential reductions of energy consumption and, consequently, its resulting emissions, can be offset through the so called "rebound effect". The concept of "rebound effect" refers to a set of mechanisms whereby the improvement of efficiency reduces the cost of the energy service and this results in the household energy consumption rising and totally or partially negating the reduction achieved by the energy efficiency improvement. This paper provides a methodology to estimate the static direct plus indirect rebound effect of energy efficiency improvements in the use of energy in households. It is based on the combination of econometric estimations of energy demand functions, re-spending modelling and generalised intput-output of energy modelling. It also provides estimations for Catalonia.
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TC 46
Z9 46
U1 1
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PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ECOL MODEL
JI Ecol. Model.
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BP 32
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WC Ecology
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GA 871FX
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PT J
AU Cayla, JM
Maizi, N
Marchand, C
AF Cayla, Jean-Michel
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TI The role of income in energy consumption behaviour: Evidence from French households data
SO ENERGY POLICY
LA English
DT Article
DE Household energy consumption; Investment choice; Energy behaviour
ID DISCOUNT RATES; CONSERVATION; INVESTMENT; EFFICIENCY; DIFFUSION; PURCHASE
AB The main purpose of this paper is to characterise quantitatively the impact of income on household energy consumption in the residential and transport sectors. Starting from the data collected in a paper survey, we analyse the extent of the constraint experienced by households in terms of equipment purchasing behaviour and daily energy consumption. This analysis shows that the least well-off

households are particularly constrained since the share of their budget represented by these energy services is very large (15-25%), and this corresponds to a level of energy service well below that of the better-off households. The case of space-heating shows a factor of 2 in terms of level of comfort achieved between the extreme 10-percentiles. These households also face a strong capital constraint for equipment purchases. This leads either to a large increase in the required rate of return or to a reduction in the proportion of households that are prepared to replace their equipment earlier. The least well-off households are thus doubly constrained, since it is more difficult for them to invest. In our opinion, it is crucial to take into account this observation in the context of political measures aimed at reducing households'CO(2) emissions. (C) 2011 Elsevier Ltd. All rights reserved.

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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Mastrucci, A
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AF Mastrucci, Alessio
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TI Estimating energy savings for the residential building stock of an entire city: A GIS-based statistical downscaling approach applied to Rotterdam
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Sustainable urban planning; Building stock modelling; Multiple linear regression; Energy savings potential; Downscaling
ID MODELING TECHNIQUES; URBAN SCALE; END-USE; CONSUMPTION; SECTOR
AB Energy retrofit of buildings represents an important sector for mobilizing investments to address carbon mitigation of cities. The identification of the actual energy consumption profile of large building stocks is a necessary step to evaluate the impact of retrofit measures, e.g. energy savings, at city scale.
The present study introduces a bottom-up statistical methodology based on a Geographical Information System (GIS) to estimate the energy consumption of residential stocks across an entire city.
The adoption of a multiple linear regression model allows the downscaling of measured natural gas and electricity consumption from the aggregated post-code level to single dwellings, based on several descriptors, such as dwelling type, period of construction, floor surface and number of occupants. The energy consumption is apportioned to different end-uses and corrected for weather, then the energy savings potential is estimated by accounting for the implementation of typical refurbishment measures. Results are finally aggregated across the whole city for evidence-based decision support in sustainable urban planning.

The study provided relevant results to prioritize the implementation of energy retrofit measures for the residential stock of Rotterdam city, consisting of about 300,000 dwellings. The methodology can be further applied to other contexts due to its generic nature. (C) 2014 Elsevier B.V. All rights reserved.

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JI Energy Build.
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Wang, ZH
Lu, ML
Wang, JC
AF Wang, Zhaohua
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Wang, Jian-Cai
TI Direct rebound effect on urban residential electricity use: An empirical study in China
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Rebound effect; Energy efficiency; Energy service; Energy consumption
ID ENERGY EFFICIENCY; CONSUMPTION; PANEL; INDICATORS; COUNTRY; TESTS; OECD
AB Though improving energy efficiency is an important approach to decrease the energy consumption, the rebound effect caused by technology progress negatively affects the effectiveness of energy efficiency policies. This paper empirically investigates direct rebound effect of urban residential electricity use in China. Using China's 30 provincial government panel data from 1996 to 2010, we build a co-integration equation and a panel error correction model to analyze the direct rebound effect. The results indicate that an obvious rebound effect in the Chinese urban residential electricity consumption does exist. Specifically, the long-term rebound effect is 0.74, while the short-term rebound effect is 0.72. Therefore, the rebound effect significantly impairs functions of energy efficiency policies. For this reason, Chinese government should take the rebound effect into consideration when formulating energy policies. (C) 2013 Elsevier Ltd. All rights reserved.
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FU Fok Ying Tung Education Foundation [121079]; National Natural Science Foundation of China [71173017, 71271030, 71172106, 71020107026]; Ministry of Education of China [20101101110034]; State Key Development Program of Basic Research of China [2012CB955703, 2012CB955704]; Nature Science Foundation of Beijing [9112013]
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
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PT B
AU Pierce, J
Schiano, DJ
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AF Pierce, James
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GP ACM
TI Home, Habits, and Energy: Examining Domestic Interactions and Energy Consumption
SO CHI2010: PROCEEDINGS OF THE 28TH ANNUAL CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS, VOLS 1-4
LA English
DT Proceedings Paper
CT 28th Annual CHI Conference on Human Factors in Computing Systems
CY APR 10-15, 2010
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SP Google, Microsoft, NSF, Yahoo Labs, ACM SIGCHI
DE Energy; Sustainability; Sustainable Interaction Design
AB This paper presents findings from a qualitative study of people's everyday interactions with energy-consuming products and systems in the home. Initial results from a large online survey are also considered. This research focuses not only on "conservation behavior" but importantly investigates interactions with technology that may be characterized as "normal consumption" or "over-consumption." A novel vocabulary for analyzing and designing energy-conserving interactions is proposed based on our findings, including: cutting, trimming, switching, upgrading, and shifting. Using the proposed vocabulary, and informed by theoretical developments from various literatures, this paper demonstrates ways in which everyday interactions with technology in the home are performed without conscious consideration of energy consumption but rather are unconscious, habitual, and irrational. Implications for the design of energy-conserving interactions with technology and broader challenges for HCI research are proposed.
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NR 34
TC 43
Z9 43
U1 0
U2 7
PU ASSOC COMPUTING MACHINERY
PI NEW YORK
PA 1515 BROADWAY, NEW YORK, NY 10036-9998 USA
BN 978-1-60558-929-9
PY 2010
BP 1985
EP +
PG 3
WC Computer Science, Information Systems; Computer Science,
Interdisciplinary Applications; Computer Science, Theory & Methods
SC Computer Science
GA BQM07
UT WOS:000281276701068
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ER

PT J
AU Sartori, I
Wachenfeldt, BJ
Hestnes, AG
AF Sartori, Igor

Wachenfeldt, Bjorn Jensen
Hestnes, Anne Grete
TI Energy demand in the Norwegian building stock: Scenarios on potential reduction
SO ENERGY POLICY
LA English
DT Article
DE Energy demand; Building stock; Scenario analysis
ID CURRENT TRENDS; SECTOR
AB A model has been developed for studying the effect of three hypothetical approaches in reducing electricity and energy demand in the Norwegian building stock: wide diffusion of thermal carriers, heat pumps and conservation measures, respectively. Combinations of these are also considered. The model has a demand side perspective, considers both residential and service sectors, and calculates energy flows from net to delivered energy. Energy demand is given by the product of activity and intensity matrices. The activity levels are defined for the stock and the new construction, renovation and demolition flows. The intensity properties are defined in archetypes, and are the result of different energy class and heating carriers share options. The scenarios are shaped by combining the activity flows with different archetypes. The results show that adopting conservation measures on a large scale does allow reducing both electricity and total energy demand from present day levels while the building stock keeps growing. The results also highlight the importance of making a clear distinction between the assumptions on intensity and activity levels. (C) 2009 Elsevier Ltd. All rights reserved.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0301-4215
J9 ENERG POLICY
JI Energy Policy
PD MAY
PY 2009
VL 37
IS 5
BP 1614
EP 1627
DI 10.1016/j.enpol.2008.12.031
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 437BS
UT WOS:000265461400003
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ER

PT J
AU Rhodes, JD
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Edgar, TF
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AF Rhodes, Joshua D.
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TI Clustering analysis of residential electricity demand profiles
SO APPLIED ENERGY
LA English
DT Article
DE Energy; Smart meter data; Residential
ID ENERGY-CONSUMPTION; EMISSIONS; IMPACTS; AUSTIN; TEXAS; POWER
AB Little is known about variations in electricity use at finely-resolved timescales, or the drivers for those variations. Using measured electricity use data from 103 homes in Austin, TX, this analysis sought to (1) determine the shape of seasonally-resolved residential demand profiles, (2) determine the optimal number of normalized representative residential electricity use profiles within each season, and (3) draw correlations to the different profiles based on survey data from the occupants of the 103 homes. Within each season, homes with similar hourly electricity use patterns were clustered into groups using the k-means clustering algorithm. Then probit regression was performed to determine if homeowner survey responses could serve as predictors for the clustering results. This analysis found that Austin homes fall into one of two seasonal groups with some homes using more expensive electricity (from a wholesale electricity market perspective) than others. Regression results indicate that variables such as if someone works from home, hours of television watched per week, and education levels have significant correlations with average profile shape, but might vary across seasons. The results herein also indicate that policies such as time-of-use or real-time electricity structures might be more likely to affect lower income households during some high electricity use parts of the year. (C) 2014 Published by Elsevier Ltd.
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FU National Science Foundation [DGE-1110007]
FX The authors would like to thank the US Department of Energy, the Doris Duke Charitable Foundation, Austin Energy, the Texas Advanced Computing Center, and Pecan Street Inc. for their direct and in-kind support. The authors would also like to thank the study participants and the Mueller neighborhood groups for their support. This material is partly based upon work supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE-1110007. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.
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JI Appl. Energy

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SC Energy & Fuels; Engineering
GA AU2TJ
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PT J
AU Zhou, N
Lin, J
AF Zhou, Nan
Lin, Jiang
TI The reality and future scenarios of commercial building energy consumption in China
SO ENERGY AND BUILDINGS
LA English
DT Article
DE China; Commercial building; Energy intensity; Energy efficiency; Scenario; Elasticity; Bottom-up modeling; Energy statistics; Energy consumption
AB While China's 11th Five-Year Plan called for a reduction of energy intensity by 2010, whether and how the energy consumption trend can be changed in a short time has been hotly debated. This research intends to evaluate the impact of a variety of scenarios of gross domestic product (GDP) growth, energy elasticity and energy-efficiency improvement on energy consumption in commercial buildings in China using a detailed China End-Use Energy Model.
China's official energy statistics have limited information on energy demand by end-use. This is a particularly pertinent issue for building energy consumption. The authors have applied reasoned judgments, based on experience of working on Chinese efficiency standards and energy-related programs, to present a realistic interpretation of the current energy data. The bottom-up approach allows detailed consideration of end-use intensity, equipment efficiency, etc., thus facilitating assessment of potential impacts of specific policy and technology changes on building energy use.
The results suggest that: (1) commercial energy consumption in China's current statistics is underestimated by about 44%, and the fuel mix is misleading; (2) energy-efficiency improvements will not be sufficient to offset the strong increase in end-use penetration and intensity in commercial buildings: (3) energy intensity (particularly electricity) in commercial buildings will increase; (4) different GDP growth and elasticity scenarios could lead to a wide range of floor area growth trajectories, and therefore, significantly impact energy consumption in commercial buildings. (C) 2008 Elsevier B.V. All rights reserved.
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J9 ENERG BUILDINGS
JI Energy Build.
PY 2008
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA 363OI
UT WOS:000260276200003
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ER

PT J
AU Santamouris, M
AF Santamouris, Mat
TI Innovating to zero the building sector in Europe: Minimising the energy consumption, eradication of the energy poverty and mitigating the local climate change
SO SOLAR ENERGY
LA English
DT Article
DE Near zero energy buildings; Climate change; Low income households; Energy poverty; Local climate change and urban heat island; Mitigation and adaptation
ID URBAN HEAT-ISLAND; LOW-INCOME HOUSEHOLDS; INDOOR ENVIRONMENTAL-QUALITY; OF-THE-ART; THERMAL COMFORT; NIGHT-VENTILATION; DISTRIBUTIONAL IMPLICATIONS; RESIDENTIAL BUILDINGS; AMBIENT-TEMPERATURE; IMPACT
AB The present paper discusses issues related to the three major problems of the built environment in Europe and in particular, the energy consumption of buildings, the energy poverty and the local climate change. The article introduces the idea of a zero concept world where the global impact of the three specific sectors

will be diminished. The paper analyses the actual status of each sector and identifies the main problems. It discusses and sets a road map to satisfy this objective, involving future quantitative and qualitative targets for the three considered sectors while it investigates the major technological, economic and social forces and policies that have to be employed in order to minimize the energy consumption of buildings, eradicate the energy poverty and mitigate the local climate change. The links, synergies and impacts between them are analysed in a comprehensive way and the interrelated nature and characteristics of the three sectors is highlighted. The mechanisms to transform the actual problems into opportunities and appropriate drivers for future development are identified and analysed. A road map involving a full estimation of the necessary investments to fulfil the defined targets is presented. The major medium and long term benefits for the society, including the impact on the economy, employment, the environment and health are fully quantified and analysed. (C) 2016 Elsevier Ltd. All rights reserved.

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AU Baynes, T
Lenzen, M
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TI Comparison of household consumption and regional production approaches to assess urban energy use and implications for policy
SO ENERGY POLICY
LA English
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DE Input-output analysis; Regional assessment; Energy catchment
ID CARBON FOOTPRINT; GREENHOUSE GASES; CITY-SCALE; CITIES; REQUIREMENTS; COST; TRANSPORT; AUSTRALIA; TRADE
AB Assessment of urban energy use may proceed by a number of methods. Here we derive an energy account from local statistics, and compare them with an input output (10) analysis as applied to Melbourne, Australia. These approaches highlight different aspects of urban energy use and comparable outputs are presented together to assess consistency, to identify complementarities and discuss the insight each approach brings to understanding urban energy. The 10 method captures the direct and embodied primary energy requirements of local household expenditure (235.8 GJ/capita/year) while the regional assessment more directly accounts for local production activity (258.1 GJ/capita/year). The parity of these results is unexpected for a developed city with a strong tertiary sector. Sectoral detail reveals differences between the primary energy required by Melbourne's economic structure and that ultimately required through the full supply chain relating to household expenditure. This is accompanied by an 10 analysis of the geography of Melbourne's 'energy catchment'. It is suggested that the 10 consumption and regional production approaches have particular relevance to policies aimed at consumption behaviour and economic, (re)structuring, respectively. Their complementarity further suggests that a combined analysis would be valuable in understanding urban energy futures and economic transitions elsewhere.
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OI Steinberger, Julia/0000-0002-5925-9602; Bai, Xuemei/0000-0001-6556-8041; Baynes, Timothy/0000-0001-8416-3365; Lenzen, Manfred/0000-0002-0828-5288
FU Global Energy Assessment; CSIRO; Australian Research Council [LP0347812]; SUME; European Community [212034]; GEA; College of Medicine, Biology and Environment at Australian National University
FX Timothy Baynes was supported by the Global Energy Assessment and CSIRO's Urban Futures Project. The regional approach analysis was prepared as a technical paper for Global Energy Assessment. The algorithm used by Manfred Lenzen for regionalising the energy catchment was developed in the scope of Linkage Project LP0347812 funded by the Australian Research Council. Julia Steinberger acknowledges funding from the SUME project, European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement 212034. Xuemei Bai was supported by GEA, the CSIRO Climate Adaptation Flagship, and a research fund from the College of Medicine, Biology and Environment at Australian National University. We thank Arnulf Grubler for the inspiration to conduct a methodological comparison, and Helga Weisz, Heinz Schandl and Steve Hatfield-Dodds for their critical input.

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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Eom, J
Clarke, L
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Patel, Pralit
TI China's building energy demand: Long-term implications from a detailed assessment
SO ENERGY
LA English
DT Article
DE China buildings; Building energy modeling; Scenario analysis; Integrated assessment model; Electrification
ID INTEGRATED ASSESSMENT; SCENARIOS; FUTURE; MODEL; TRANSPORTATION; TECHNOLOGIES; PROJECTIONS; FRAMEWORK
AB Buildings are an important contributor to China's energy consumption and attendant CO2 emissions. Measures to address energy consumption and associated emissions from the buildings sector will be an important part of strategy to reduce the country's CO2 emissions. This study presents a detailed, service-based model of China's building energy demand, nested in the GCAM (Global Change Assessment Model) integrated assessment framework. Using the model, we explored long-term pathways of China's building energy demand and identified opportunities to reduce greenhouse gas emissions. A range of different scenarios was also developed to gain insights into how China's building sector might evolve and what the implications might be for improved building energy technology and carbon policies. The analysis suggests that China's building energy growth will not wane anytime soon, although technology improvement will put downward pressure on this growth: In the reference scenarios, the sector's final energy demand will increase by 110 -150% by 2050 and 160-220% by 2095 from its 2005 level. Also, regardless of the scenarios represented, the growth will involve the continued, rapid electrification of the buildings sector throughout the century, and this transition will be accelerated by the implementation of carbon policy. (C) 2012 Elsevier Ltd. All rights reserved.
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AU Zhang, T
Siebers, PO
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TI Modelling electricity consumption in office buildings: An agent based approach
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DT Article
DE Office energy consumption; Agent-based simulation; Energy management technologies; Energy management strategies
ID SIMULATION; DIFFUSION; BEHAVIOR; RETAIL
AB In this paper, we develop an agent-based model which integrates four important elements, i.e. organisational energy management policies/regulations, energy management technologies, electric appliances and equipment, and human behaviour, to simulate the electricity consumption in office buildings. Based on a case study, we use this model to test the effectiveness of different electricity management strategies, and solve practical office electricity consumption problems. This paper theoretically contributes to an integration of the four elements involved in the complex organisational issue of office electricity consumption, and practically contributes to an application of an agent-based approach for office building electricity consumption study. (C) 2011 Elsevier B.V. All rights reserved.
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FU UK Engineering and Physical Sciences Research Council [EP/G05956X/1]
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AF Byun, Jinsung
Park, Sehyun
TI Development of a Self-adapting Intelligent System for Building Energy Saving and Context-aware Smart Services
SO IEEE TRANSACTIONS ON CONSUMER ELECTRONICS
LA English
DT Article
DE Self-adapting; pattern generation; intelligent sensor; adaptive middleware; wireless sensor networks
ID NETWORKS
AB Recent advances in ubiquitous technologies facilitate context-aware systems which can offer situation-based services. Wireless sensor networks (WSNs) have become increasingly important in recent years due to their ability to monitor and manage situational information for various intelligent services in ubiquitous environments. However, existing energy management systems are not effectively implemented in home and building environments due to their architectural limitations, such as static system architecture and a finite battery lifetime. Therefore, in this paper, we propose a Self-adapting intelligent system used for providing building control and energy saving services in buildings. Our system consists of a gateway (self-adapting intelligent gateway) and a sensor (self-adapting intelligent sensor). In addition, we also propose an energy-efficiency self-clustering sensor network (ESSN) and a node type indicator based routing (NTIR) protocol that considers the requirements of WSNs, such as network lifetime and system resource management. In order to verify the efficiency of our system, we implemented our system in real test bed and conducted experiments. The results show that autonomous power saving using our system is approximately 16-24% depending on the number of SIS1.
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NR 18
TC 40
Z9 40
U1 6
U2 32
PU IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC
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PA 445 HOES LANE, PISCATAWAY, NJ 08855-4141 USA
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JI IEEE Trans. Consum. Electron.
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SC Engineering; Telecommunications
GA 738XW
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Kim, Wooyoung
TI Analysis of an energy efficient building design through data mining approach
SO AUTOMATION IN CONSTRUCTION
LA English
DT Article
DE Energy simulation; Data mining; Classification; Factor selection; Energy design process
AB Incorporating energy efficiency and sustainable green design features into new/existing buildings has become a top priority in recent years for building owners, designers, contractors, and facility managers. This paper intends to address why delivery of an energy efficient building is not just the result of applying one or more isolated technologies. Rather, it can best be obtained using an integrated whole building process throughout the entire project development process, which leads building designers to generate a large amount of data during energy simulations. The authors observed that even a simple energy modeling run generated pages of data with many different variables. The volumes of energy modeling data clearly overwhelm traditional data analysis methods such as spreadsheets and ad-hoc queries with so many factors to be considered. An integrated or whole building design process involves studies of the energy-related impacts and interactions of all building components, including the building location, envelope (walls, windows, doors, and roof), heating, ventilation and air conditioning (HVAC) system, lighting, controls, and equipment, which shows why it is so difficult to find the correlation between different systems. The objective of this research is to develop an energy efficient building design process using data mining technology which can help project teams discover important patterns to improve the building design. This paper utilizes the data mining technology to extract interrelationships and patterns of interest from a large dataset Case study revealed that data mining based energy modeling help project teams discover useful patterns to improve the energy efficiency of building design during the design phase. The method developed during this research could be used to guide designers and engineers through the process of completing an early design energy analysis based on energy simulation models. (C) 2010 Elsevier B.V. All rights reserved.
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NR 9
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Z9 40
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U2 46
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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JI Autom. Constr.
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SC Construction & Building Technology; Engineering
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PT J
AU Al-Ghandoor, A
Jaber, JO
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AF Al-Ghandoor, A.
Jaber, J. O.
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Mansour, I. M.
TI Residential past and future energy consumption: Potential savings and environmental impact
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Electricity; Fuel; GHG emissions; Multivariate regression; Jordan; Residential sector
ID EFFICIENCY STANDARD; ELECTRICITY CONSUMPTION; HOUSEHOLD REFRIGERATORS; NEURAL-NETWORKS; SECTOR; APPLIANCE; MALAYSIA; SPACE; IMPLEMENTATION; CONSERVATION
AB In order to identify main drivers behind changes in electricity and fuel consumptions in the household sector in Jordan, two empirical models are developed based on multivariate linear regression analysis. In addition, this paper analyzes and evaluates impacts of introducing some efficient measures, such as high efficiency lightings and solar water heating systems, in the housing stock, on the future fuel and electricity demands and associated reduction in GHG emissions. It was found that fuel unit price, income level, and population are the most important variables that affect demand on electrical power, while population is the most important variable in the case of fuel consumption. Obtained results proved that the multivariate linear regression models can be used adequately to simulate residential electricity and fuel consumptions with very high coefficient of determination. Without employing most effective energy conservation measures, electricity and fuel demands are expected to rise by approximately 100% and 23%, respectively within 10 years time. Consequently, associated GHG emissions resulting from activities within the residential sector are predicted to rise by 59% for the same period. However, if recommended energy management measures are implemented on a gradual basis, electricity and fuel consumptions as well as GHG emissions are forecasted to increase at a lower rate. (C) 2008 Elsevier Ltd. All rights reserved.
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TC 40
Z9 41
U1 0
U2 16
PU PERGAMON-ELSEVIER SCIENCE LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Renew. Sust. Energ. Rev.
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PT J
AU Dianshu, F
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Vu, KM
AF Dianshu, Feng
Sovacool, Benjamin K.
Vu, Khuong Minh
TI The barriers to energy efficiency in China: Assessing household electricity savings and consumer behavior in Liaoning Province
SO ENERGY POLICY
LA English
DT Article
DE Liaoning Province; Energy efficiency; Household electricity consumption
ID CONSERVATION; CONSUMPTION; ENVIRONMENT; EMISSIONS
AB This article investigates the barriers to energy efficiency at the residential sector within one province in China and explores patterns of household electricity consumption. The article presents the results of a survey questionnaire distributed to more than 600 households in Liaoning Province, field research at various Liaoning government agencies, and research interviews of Liaoning government officials to determine the efficacy of their energy efficiency efforts in China. It then investigates the extent that electricity consumers have taken advantage of energy efficiency opportunities relating to more efficient lights, water heaters, appliances, air-conditioners and heaters, and better energy-efficiency labels. The article also assesses the degree that electricity users have become more aware about electricity prices and their levels of consumption, and touches on the connection between rising levels of income and electricity use. It concludes by providing recommendations for how to improve efforts to promote conservation and reduce electricity load growth in Liaoning Province and beyond. (C) 2009 Elsevier Ltd. All rights reserved.
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U2 20
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JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Frederiks, ER
Stenner, K
Hobman, EV
AF Frederiks, Elisha R.
Stenner, Karen
Hobman, Elizabeth V.
TI The Socio-Demographic and Psychological Predictors of Residential Energy Consumption: A Comprehensive Review
SO ENERGIES
LA English
DT Review
DE review; energy consumption; energy conservation; household energy use; pro-environmental behavior; psychology; motivation; behavior change
ID PRO-ENVIRONMENTAL BEHAVIOR; FAMILY-LIFE CYCLE; CONSERVATION PROGRAMS; CONSUMER-BEHAVIOR; MOTIVATION THEORY; PLANNED BEHAVIOR; DECISION-MAKING; HUMAN-VALUES; DETERMINANTS; PATTERNS
AB This article provides a comprehensive review of theory and research on the individual-level predictors of household energy usage. Drawing on literature from across the social sciences, we examine two broad categories of variables that have been identified as potentially important for explaining variability in energy consumption and conservation: socio-demographic factors (e. g., income, employment status, dwelling type/size, home ownership, household size, stage of family life cycle) and psychological factors (e. g., beliefs and attitudes, motives and intentions, perceived behavioral control, cost-benefit appraisals, personal and social norms). Despite an expanding literature, we find that empirical evidence of the impact of these variables has been far from consistent and conclusive to date. Such inconsistency poses challenges for drawing generalizable conclusions, and underscores the complexity of consumer behavior in this domain. In this article, we propose that a multitude of factors-whether directly, indirectly, or in interaction-influence how householders consume and conserve energy. Theory, research and practice can be greatly advanced by understanding what these factors are, and how, when, where, why and for whom

they operate. We conclude by outlining some important practical implications for policymakers and directions for future research.

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TI Role of residential demand response in modern electricity markets
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Smart grid; Residential demand response; Electricity markets;
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ID ENERGY-CONSUMPTION; CHALLENGES
AB Electricity generation must match the demand at each instant, following seasonal patterns and instantaneous fluctuations. Thus, one of the biggest drivers of costs and capacity requirements is the electricity demand that occurs during peak periods.
This paper reviews market-related problems of modern electric grids and possible solutions to address them. In particular, one techno-economical solution, namely residential demand response programs

enabled by a smart grid, is analyzed and modeled in detail. The implications of this solution from both economic and policy perspectives are discussed.

The analysis results in several insights: first a local optimum does not generally lead to a global optimum, especially for complex markets; second, in this approach, there exists a disconnection between the locus of the problem (electric utilities) and the locus of the solution (change of demand); third, any techno-economic solution must be carefully designed and global impact should be evaluated to ensure that the final objective is achieved; and fourth, two-way communication is an essential requirement for the successful deployment of smart grids. (C) 2014 Elsevier Ltd. All rights reserved.

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TI Barriers and opportunities for labels for highly energy-efficient houses
SO ENERGY POLICY
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DT Article
DE Buildings; Energy efficiency; Policy instruments
ID INNOVATIONS; DIFFUSION
AB Promoting energy efficiency in the building sector is essential if the agreements of the Kyoto Protocol are to be honoured. Different initiatives for energy labelling of highly energy-efficient residential buildings have emerged throughout Europe as an essential method to stimulate market demand, to control grants or to ensure the quality of demonstration projects with excellent energy performance.
The paper identifies the barriers and opportunities for the further diffusion of labels for highly energy-efficient houses. A model based on the theory of the diffusion of innovation is developed to analyse perceived attributes of existing European labels. The paper investigates the innovation characteristics of existing labels in Europe, with a focus on advanced countries. The question of compatibility with the development of the European Energy Performance of Buildings Directive (EPBD) is examined in detail.
We found that the diffusion of emerging and already existing voluntary European labels for highly energy-efficient houses is needed. Their complexity can be lowered and relative advantage, trialability, observability, and compatibility can be increased. EPBD calculation procedures should be able to receive highly energy-efficient houses. In the framework of the recast of the EPBD, official recognition of existing voluntary labels is recommended. (C) 2010 Elsevier Ltd. All rights reserved.
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TI Enabling Applicability of Energy Saving Applications on the Appliances of the Home Environment
SO IEEE NETWORK
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DT Article
AB Given the energy waste problem in contemporary households and the consequent need for optimal energy use, this article presents a novel network architecture that is generically applicable on domestic appliances, such as white goods, and audiovisual and communication equipment, and is capable of performing real-time management of their energy consumption. Deploying the latest information and communication technology, the proposed architecture enables definition of energy saving applications that perform three main functions: real-time estimation of the energy consumption of the home environment,

without exploiting smart metering devices; control of domestic appliances energy use so that energy consumption of the home environment is kept within user-defined limits; and autonomous identification and management of standby devices, targeting minimal energy consumption.
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FU European Commission
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CR *AIM CONS, DEL 2 3 APPL PROF SP
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JI IEEE Netw.
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TI Thermal comfort assessment and potential for energy efficiency enhancement in modern tropical buildings: A review
SO ENERGY AND BUILDINGS
LA English
DT Review
DE Air conditioning system; Thermal comfort; Tropical buildings; Energy efficiency; Computational simulation; Adaptive behaviour
ID AIR-CONDITIONED BUILDINGS; NATURALLY VENTILATED BUILDINGS; NATURAL VENTILATION; TRANSITIONAL SPACES; INDOOR TEMPERATURE; FIELD EXPERIMENTS; OFFICE BUILDINGS; ADAPTIVE MODEL; HUMID CLIMATE; ENVIRONMENT
AB The rapid growth in population and economy activities in the tropical countries has led to an increase in energy consumption which hastens the depletion of available energy resources. The building sector is one of the major end users of energy. On the other hand, the air conditioning system is viewed as an important tool to sustain and improve thermal comfort of occupants, but this system is often the biggest energy consumer in buildings. This has raised concerns on efficient use of the air conditioning system for reduction in energy cost. In order to identify the thermal comfort perception of occupants as well as energy conservation potentials in tropical buildings, various thermal comfort assessments were conducted which included field surveys and chamber studies. This paper provides a comprehensive review of the energy efficiency improvement potentials in air-conditioned tropical buildings by considering thermal comfort of occupants. Some of the studies conducted in the institutes of learning, offices and residential were reviewed and focus was placed on the thermal comfort studies that emphasis on balance between energy efficiency and thermal comfort. It was estimated that a reduction of 2150 GWh of energy demand annually in Malaysia can be achieved if the thermostat set-point is set higher by 2 degrees C, together with a reduction of 3 x 10(9) lbs (1.36 x 10(9) kg) of greenhouse gases. Besides, the use of computational simulation tools for prediction of thermal comfort and adaptive behaviour of people in the tropics towards their immediate thermal environment are also highlighted. (C) 2013 Elsevier B.V. All rights reserved.
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AF Mlecnik, E.
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TI End-user experiences in nearly zero-energy houses
SO ENERGY AND BUILDINGS
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DT Article
DE Passive house; Low-energy house; Post-occupancy evaluation; Comfort;
User experiences; End-user satisfaction; Heating; Mechanical
ventilation; Indoor air quality; Summer comfort
ID BUILDINGS
AB High end-user satisfaction levels are key for the acceptance of nearly zero-energy housing. Post-occupancy evaluation research on highly energy-efficient dwellings can lead to recommendations which will influence their performance in the expected future large volume market of such houses. This study analysed mainly German, Austrian and Swiss post-occupancy evaluation research results on nearly zero-energy dwellings and undertook a survey of occupants of nearly zero-energy houses in the Netherlands. The study determined how various comfort parameters (such as winter thermal comfort, summer thermal

comfort, indoor air quality and acoustics), information provision and control parameters are related to positive or negative end-user appraisal, finding that summer comfort design and the quality of - and information about - heating and ventilation systems are critical factors which must be addressed to improve user satisfaction in nearly zero-energy dwellings. (C) 2012 Elsevier B.V. All rights reserved.
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TI Stagnating energy efficiency in the Swedish building sector-Economic and organisational explanations
SO ENERGY POLICY
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DT Article
DE Energy efficiency; Swedish building sector; Energy price elasticity
ID DISCOUNT RATES; PARADOX; ELASTICITIES; CONSUMPTION; BARRIERS; DEMAND; POLICY
AB The development towards higher energy efficiency in the Swedish building sector stagnated in the late 1980s and 1990s. In new buildings the average specific energy use for heating is twice as high as in the best performing buildings 20 years ago. By combining econometric studies and interviews with actors in the

building sector we analyse the underlying economic and organisational causes for this development. In the stock of buildings, specific energy use for heating (kWh/m(2)/yr) has a high correlation with increasing energy prices and price elasticities have not changed markedly over time. This implies that the stagnation to a large extent can be explained by energy price trends. On the contrary, in new buildings the correlation between energy prices and specific energy use is much weaker. One important cause of low sensitivity to price changes is that information about the life cycle cost (LCC) of different investment alternatives is often not available to the involved actors. The most common investment criterion is instead the requirements of the national building energy standard which has developed into a norm rather than a minimum for energy performance. In this paper we also discuss potential improvements in the learning processes within the sector. (C) 2008 Elsevier Ltd. All rights reserved.
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AU Kumar, A
Hancke, GP
AF Kumar, Anuj
Hancke, Gerhard P.
TI An Energy-Efficient Smart Comfort Sensing System Based on the IEEE 1451 Standard for Green Buildings
SO IEEE SENSORS JOURNAL
LA English
DT Article
DE IEEE1451 standard; sensor node; thermal comfort; graphical user interface; smart sensor; green building
ID THERMAL COMFORT; IEEE-1451 STANDARD; SENSOR NETWORKS; CLASSIFICATION; ENVIRONMENT; QUALITY
AB In building automation, comfort is an important aspect, and the real-time measurement of comfort is notoriously complicated. In this paper, we have developed a wireless, smart comfort sensing system. The

important parameters in designing the prevalent measurement of comfort systems, such as portability, power consumption, reliability, and system cost, were considered. To achieve the target design goals, the communication module, sensor node, and sink node were developed based on the IEEE1451 standard. Electrochemical and semiconductor sensors were considered for the development of the sensor array, and the results of both technologies were compared. The sensor and sink nodes were implemented using the ATMega88 microcontroller. Microsoft Visual Studio 2013 preview was used to create the graphical user interface in C#. The sensors were calibrated after the signal processing circuit to ensure that the standard accuracy of the sensor was achieved. This paper presents detailed design solutions to problems that existed in the literature.

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PT J
AU Dilaver, Z
Hunt, LC
AF Dilaver, Zafer
Hunt, Lester C.
TI Modelling and forecasting Turkish residential electricity demand
SO ENERGY POLICY
LA English
DT Article
DE Turkish residential electricity demand; Structural time series model (STSM); Energy demand modelling and future scenarios
ID DYNAMIC REGRESSION-MODELS; TIME-SERIES ANALYSIS; ENERGY DEMAND; STOCHASTIC TRENDS; SEASONALITY; UK; TURKEY
AB This research investigates the relationship between Turkish residential electricity consumption, household total final consumption expenditure and residential electricity prices by applying the structural time series model to annual data over the period from 1960 to 2008. Household total final consumption

expenditure, real energy prices and an underlying energy demand trend are found to be important drivers of Turkish residential electricity demand with the estimated short run and the long run total final consumption expenditure elasticities being 0.38 and 1.57, respectively, and the estimated short run and long run price elasticities being -0.09 and -0.38, respectively. Moreover, the estimated underlying energy demand trend, (which, as far as is known, has not been investigated before for the Turkish residential sector) should be of some benefit to Turkish decision makers in terms of energy planning. It provides information about the impact of past policies, the influence of technical progress, the impacts of changes in consumer behaviour and the effects of changes in economic structure. Furthermore, based on the estimated equation, and different forecast assumptions, it is predicted that Turkish residential electricity demand will be somewhere between 48 and 80 TWh by 2020 compared to 40 TWh in 2008. (C) 2011 Elsevier Ltd. All rights reserved.

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PT J
AU Menanteau, P
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Lefebvre, H
TI Competing technologies and the diffusion of innovations: the emergence of energy-efficient lamps in the residential sector
SO RESEARCH POLICY
LA English
DT Article
DE lighting; technological competition; learning; incentive programmes; energy efficiency
ID PROGRESS
AB The emergence of a new lighting technology in the residential sector at the beginning of the 1980s has created a situation of technological competition with an existing and mature technology. Despite specific advantages in terms of durability and energy efficiency, the new compact fluorescent lamp faced numerous adoption barriers when introduced on the market. Further improvement of performance and characteristics has been necessary to reduce these barriers and establish a solid driving force for dissemination. The authors point out the importance of public programmes in this respect, which created initial niche markets and allowed a technological learning process to become established.
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WC Management; Planning & Development
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PT J
AU Berardi, U
AF Berardi, Umberto
TI Stakeholders' influence on the adoption of energy-saving technologies in Italian homes
SO ENERGY POLICY
LA English
DT Article
DE Energy saving technologies; Stakeholder's influence; Technology diffusion
ID RESIDENTIAL BUILDINGS; EUROPEAN-UNION; BARRIERS; POLICY; PERFORMANCE; INNOVATION; EFFICIENCY; OPPORTUNITIES; CONSTRUCTION; BEHAVIOR
AB The instability and fragmentation of the temporary aggregations of many stakeholders in construction processes are barriers to adopting new technologies. This paper investigates the influence of different stakeholders on the adoption of mature energy-saving technologies in new residential buildings. Recent literature about the influence of different stakeholders on construction processes is reviewed focusing in

their interest for energy saving technologies. To gain an insight into the specific roles played by stakeholders (general contractors, construction firms, architects, users and public governments) in different projects, a case study methodology was used. The influence on the adoption of energy-saving technologies of stakeholders was assessed through semi-structured interviews. These interviews focused on the interest and power for the adoption of several energy-saving technologies. Having recognized that the interest in adoption is often expressed late in the construction processes, the time of introduction of this interest was assessed. This paper provides an empirical insight into significant barriers for the adoption of energy saving technologies which are the low influence of highly motivated stakeholders on the decision of adoption, and the delay at which the interest in energy-saving technologies emerges. Finally, policies to overcome these barriers are suggested. (C) 2013 Elsevier Ltd. All rights reserved.
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SO IEEE TRANSACTIONS ON POWER SYSTEMS
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management; TOU and CPP
ID LOAD CONTROL; CONSUMPTION; MARKETS; IMPACTS
AB Demand response programs are currently being proposed as a solution to deal with issues related to peak demand and to improve the operation of the electric power system. In the demand response paradigm, electric utilities provide incentives and benefits to private consumers as a compensation for their flexibility in the timing of their electricity consumption. In this paper, a dynamic energy management framework, based on highly resolved energy consumption models, is used to simulate automated residential demand response. The models estimate the residential demand using a novel bottom-up approach that quantifies consumer energy use behavior, thus providing an accurate estimation of the actual amount of controllable resources. The optimal schedule of all of the controllable appliances, including plug-in electric vehicles, is found by minimizing consumer electricity-related expenditures. Recently, time-varying electricity rate plans have been proposed by electric utilities as an incentive to their customers with the objective of re-shaping the aggregate demand. Large-scale simulations are performed to analyze and quantitatively assess the impact of demand response programs using different electricity price structures. Results show that simple time-varying electricity price structures, coupled with large-scale adoption of automated energy management systems, might create pronounced rebound peaks in the aggregate residential demand. To cope with the rebound peaks created by the synchronization of the individual residential demands, innovative electricity price structures-called Multi-TOU and Multi-CPP-are proposed.
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FU National Science Foundation [1029337]
FX This work was performed at The Ohio State University-Center for Automotive Research supported by the National Science Foundation under Grant 1029337. Paper no. TPWRS-01072-2014.
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J9 IEEE T POWER SYST
JI IEEE Trans. Power Syst.
PD MAR
PY 2016
VL 31
IS 2
BP 1108
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DI 10.1109/TPWRS.2015.2414880
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WC Engineering, Electrical & Electronic
SC Engineering
GA DG4CH
UT WOS:000372017600024
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AU Veldman, E
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TI Scenario-based modelling of future residential electricity demands and assessing their impact on distribution grids
SO ENERGY POLICY
LA English
DT Article
DE Distribution networks; Energy transition; Load management
ID POWER-SYSTEMS
AB New developments towards a more sustainable energy delivery system require electricity distribution grids that support distributed generation and a potential increase in electricity demand. In this article, the impact of changes in future residential use on the electricity distribution grids is assessed by using a scenario-based methodology to model residential loads. It illustrates that scenarios resulting from varied economic and demographic developments, but also driven by the focus of energy policies, can have considerable consequences on the loading and the resulting required network capacities of electricity distribution grids. A strategy for network operators to cope with these changes and optimise the utilisation of their grids is to use the possibilities to control flexible loads to reduce peak loads and shift demands. This article shows that if these loads can be managed in such way, the electricity profiles can be flattened significantly. For the case of the Netherlands, the peak demands in residential areas can be reduced with 35-67% in various scenarios. Load-flow analyses of medium voltage networks show that a load

management strategy to reduce peak demands can realise a reduction of 21-40% for required capacity of cables and transformers. This makes a reduction 45-72% in investment costs possible. (C) 2013 Elsevier Ltd. All rights reserved.
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JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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AU Byun, J
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Lee, B
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AF Byun, Jinsung
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Lee, Byoungjoo
Park, Sehyun
TI Intelligent Household LED Lighting System Considering Energy Efficiency and User Satisfaction
SO IEEE TRANSACTIONS ON CONSUMER ELECTRONICS
LA English
DT Article
DE household LED lighting system; situation awareness; minimum light intensity control; adaptive middleware
ID NETWORKS; DESIGN
AB Saving energy has become one of the most important issues these days. The most waste of energy is caused by the inefficient use of the consumer electronics. Particularly, a light accounts for a great part of the total energy consumption. Various light control systems are introduced in current markets, because the installed lighting systems are outdated and energy-inefficient. However, due to architectural limitations, the existing light control systems cannot be successfully applied to home and office buildings. Therefore, this paper proposes an intelligent household LED lighting system considering energy efficiency and user satisfaction. The proposed system utilizes multi sensors and wireless communication technology in order to control an LED light according to the user's state and the surroundings. The proposed LED lighting system can autonomously adjust the minimum light intensity value to enhance both energy efficiency and user satisfaction. We designed and implemented the proposed system in the test bed and measured total power consumption to verify the performance. The proposed LED lighting system reduces total power consumption of the test bed up to 21.9%(1).
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Evaluation and Planning (KETEP); Korea government Ministry of Knowledge Economy [20104010100570]
FX This research was supported by the MKE(The Ministry of Knowledge Economy), Korea, under the ITRC(Information Technology Research Center) support program (NIPA-2012-H0301-12-4004) supervised by the NIPA (National IT Industry Promotion Agency) and by the Human Resources Development of the Korea Institute of Energy Technology Evaluation and Planning (KETEP) grant funded by the Korea government Ministry of Knowledge Economy (20104010100570).
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WC Engineering, Electrical & Electronic; Telecommunications
SC Engineering; Telecommunications
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PT J
AU Pelenur, MJ
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AF Pelenur, Marcos J.
Cruickshank, Heather J.
TI Closing the Energy Efficiency Gap: A study linking demographics with barriers to adopting energy efficiency measures in the home
SO ENERGY
LA English

DT Article
DE Cities; Energy efficiency; Barriers; Demographics; Multi-response contingency tables; Rao-Scott chi-square test
ID MULTIWAY CONTINGENCY-TABLES; MULTIPLE COLUMN RESPONSES; CHI-SQUARED TESTS; MARGINAL INDEPENDENCE; ASSOCIATION; CONSUMPTION; VARIABLES; BEHAVIOR
AB This paper presents a study which linked demographic variables with barriers affecting the adoption of domestic energy efficiency measures in large UK cities. The aim was to better understand the 'Energy Efficiency Gap' and improve the effectiveness of future energy efficiency initiatives. The data for this study was collected from 198 general population interviews (1.5-10 min) carried out across multiple locations in Manchester and Cardiff. The demographic variables were statistically linked to the identified barriers using a modified chi-square test of association (first order Rao-Scott corrected to compensate for multiple response data), and the effect size was estimated with an odds-ratio test. The results revealed that strong associations exist between demographics and barriers, specifically for the following variables: sex; marital status; education level; type of dwelling; number of occupants in household; residence (rent/own); and location (Manchester/Cardiff). The results and recommendations were aimed at city policy makers, local councils, and members of the construction/retrofit industry who are all working to improve the energy efficiency of the domestic built environment.
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FX This research was conducted at the Department of Engineering, Centre for Sustainable Development, University of Cambridge, and is part of the EPSRC funded research project: Re-Engineering the City 2020-2050 (RETROFIT 2050) Urban Foresight and Transition Management. Finally, the authors would like to thank all of the friendly interviewees in Manchester and Cardiff, and the anonymous paper reviewers for their invaluable feedback.
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SN 0360-5442
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JI Energy
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IS 1
BP 348
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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PT J
AU Kobus, CBA
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AF Kobus, Charlotte B. A.
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Schoormans, Jan P. L.
TI A real-life assessment on the effect of smart appliances for shifting households' electricity demand
SO APPLIED ENERGY
LA English
DT Article
DE Longitudinal user study; Demand response; Energy management systems;

Smart appliances
ID SIDE MANAGEMENT; IMPACT; CONSUMPTION; GRIDS; STRATEGIES; VEHICLES; FEEDBACK; SAVINGS; PRICES; USERS
AB Today's major developments in the production and demand of electricity in domestic areas make it increasingly important that domestic electricity demand can respond to the availability of electricity. Energy management systems and smart appliances can facilitate this by supporting the user to shift electricity demand of appliances to moments in time when electricity is abundantly available. However, the benefits resulting from domestic demand response depend on household acceptance and behaviour change. This paper explores the real electricity demand shift of households in time and the role of smart appliances to bring about this shift. A longitudinal study was conducted among Dutch households over a period of one year. The households received a dynamic electricity tariff, an energy management system and a smart washing machine. Results show that households shift their usage of the smart washing machine mostly to the day when the sun is shining and electricity is produced by their own solar panels. Households who regularly used automation of the smart washing machine, which implicates that the use of the washing machine is automatically shifted to time periods where electricity supply is abundantly available, were more likely to shift their electricity usage. Furthermore, during the course of one year, the results remained stable, indicating a structural shift in demand. (C) 2015 Elsevier Ltd. All rights reserved.
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PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0306-2619
EI 1872-9118
J9 APPL ENERG
JI Appl. Energy
PD JUN 1
PY 2015
VL 147
BP 335
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DI 10.1016/j.apenergy.2015.01.073
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA CH1BB
UT WOS:000353755000031
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PT J
AU Dietz, T
Stern, PC
Weber, EU
AF Dietz, Thomas
Stern, Paul C.
Weber, Elke U.
TI Reducing Carbon-Based Energy Consumption through Changes in Household Behavior
SO DAEDALUS
LA English
DT Article
ID ENVIRONMENTAL-POLICY; US; PERCEPTIONS; TECHNOLOGY; INCENTIVES; EFFICIENCY; EMISSIONS; CHOICES; GREEN
AB Actions by individuals and households to reduce carbon-based energy consumption have the potential to change the picture of U.S. energy consumption and carbon dioxide emissions in the near term. To tap this potential, however, energy policies and programs need to replace outmoded assumptions about what drives human behavior; they must integrate insights from the behavioral and social sciences with those from engineering and economics. This integrated approach has thus far only occasionally been

implemented. This essay summarizes knowledge from the social sciences and from highly successful energy programs to show what the potential is and how it can be achieved.

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PU MIT PRESS

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J9 DAEDALUS-US
JI Daedalus
PD WIN
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VL 142
IS 1
BP 78
EP 89
DI 10.1162/DAED_a_00186
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WC Humanities, Multidisciplinary; Social Sciences, Interdisciplinary
SC Arts & Humanities - Other Topics; Social Sciences - Other Topics
GA 073RS
UT WOS:000313760800006
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ER

PT J
AU Pisello, AL
Bobker, M
Cotana, F
AF Pisello, Anna Laura
Bobker, Michael
Cotana, Franco
TI A Building Energy Efficiency Optimization Method by Evaluating the
Effective Thermal Zones Occupancy
SO ENERGIES
LA English
DT Article
DE building energy efficiency; dynamic simulation and validation;
post-occupancy evaluation; equipment operations and management
ID RESIDENTIAL BUILDINGS; PERFORMANCE; CONSUMPTION; ENVIRONMENT;
SIMULATION; IMPACT; COMFORT; NETWORK; CHINA; MODEL
AB Building energy efficiency is strongly linked to the operations and control systems, together with the integrated performance of passive and active systems. In new high quality buildings in particular, where these two latter aspects have been already implemented at the design stage, users' perspective, obtained through post-occupancy assessment, has to be considered to reduce whole energy requirement during service life. This research presents an innovative and low-cost methodology to reduce buildings' energy requirements through post-occupancy assessment and optimization of energy operations using effective users' attitudes and requirements as feedback. As a meaningful example, the proposed method is applied to a multipurpose building located in New York City, NY, USA, where real occupancy conditions are assessed. The effectiveness of the method is tested through dynamic simulations using a numerical model of the case study, calibrated through real monitoring data collected on the building. Results show that, for the chosen case study, the method provides optimized building energy operations which allow a reduction of primary energy requirements for HVAC, lighting, room-electricity, and auxiliary supply by about 21%. This paper shows that the proposed strategy represents an effective way to reduce buildings' energy waste, in particular in those complex and high-efficiency buildings that are not performing as well as expected during the concept-design-commissioning stage, in particular due to the lack of feedback after the building handover.
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FU H2CU (Honors Center of Italian Universities)
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PA POSTFACH, CH-4005 BASEL, SWITZERLAND

SN 1996-1073
J9 ENERGIES
JI Energies
PD DEC
PY 2012
VL 5
IS 12
BP 5257
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WC Energy & Fuels
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PT J
AU van Ruijven, B
de Vries, B
van Vuuren, DP
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AF van Ruijven, Bas
de Vries, Bert
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van der Sluijs, Jeroen P.
TI A global model for residential energy use: Uncertainty in calibration to regional data
SO ENERGY
LA English
DT Article
DE Uncertainty; Model calibration; Residential energy use
ID ENVIRONMENTAL KUZNETS CURVE; GREENHOUSE-GAS EMISSIONS; DEVELOPING-COUNTRIES; STYLIZED FACTS; POLICY MODELS; BRAZIL; SCENARIOS; INDIA; REQUIREMENTS; 21ST-CENTURY
AB Uncertainties in energy demand modelling allow for the development of different models, but also leave room for different calibrations of a single model. We apply an automated model calibration procedure to analyse calibration uncertainty of residential sector energy use modelling in the TIMER 2.0 global energy model. This model simulates energy use on the basis of changes in useful energy intensity, technology development (AEEI) and price responses (PIEEI). We find that different implementations of these factors yield behavioural model results. Model calibration uncertainty is identified as influential source for variation in future projections: amounting 30% to 100% around the best estimate. Energy modellers should systematically account for this and communicate calibration uncertainty ranges.
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NR 88
TC 32
Z9 32
U1 0
U2 8
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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J9 ENERGY
JI Energy
PD JAN
PY 2010
VL 35
IS 1
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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PT J
AU Zhao, J
Zhu, N
Wu, Y
AF Zhao, Jing
Zhu, Neng
Wu, Yong
TI Technology line and case analysis of heat metering and energy efficiency retrofit of existing residential buildings in Northern heating areas of China
SO ENERGY POLICY
LA English
DT Article
DE Technology line; Existing residential building; Building energy efficiency retrofit
AB The building area in northern heating areas accounting for 70% of the total land area in China is 6,500,000,000 m(2). The average heating energy consumption in northern China is 100-200% times more than developed countries in the same latitude. This paper introduced firstly the heat metering and energy efficiency retrofit background of existing residential buildings in northern heating areas of China organized by mohurd and MOF, and then put forward the total principle and contents of retrofit. Through analyzing some retrofit cases in Germany, Poland and China, some technological experiences were summarized and finally a technology line suitable for heat metering and energy efficiency retrofit of existing residential buildings in northern heating areas of China which involved retrofit for heat metering and temperature regulation of heating systems, heat balance of heat source and network, and building envelope was described to provide a systematic, scientific, technological guide for the retrofit projects of 0.15 billion m(2) in "the Eleventh Five-Year Plan" period. (C) 2008 Elsevier Ltd. All rights reserved.
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SN 0301-4215
J9 ENERG POLICY
JI Energy Policy

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VL 37
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DI 10.1016/j.enpol.2008.11.045
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 448AK
UT WOS:000266233300011
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ER

PT J
AU DYNER, I
SMITH, RA
PENA, GE
AF DYNER, I
SMITH, RA
PENA, GE
TI SYSTEM DYNAMICS MODELING FOR RESIDENTIAL ENERGY EFFICIENCY ANALYSIS AND MANAGEMENT
SO JOURNAL OF THE OPERATIONAL RESEARCH SOCIETY
LA English
DT Article
DE SYSTEM DYNAMICS; SIMULATION; ENERGY PLANNING; ENERGY EFFICIENCY; ENERGY SUBSTITUTION; TECHNOLOGY PENETRATION
AB A System Dynamics model to simulate the substitution of installed household appliances by more efficient ones is presented. The model allows the construction of scenarios and also the analyses of several other issues such as: alternatives for technology penetration, electricity consumption growth, gas consumption growth and effects of pricing policies on various energy demands. The proposed methodology has been applied to assist the decision process in relation to gas penetration policies. The model also supports policy making on energy efficiency and it allows the calculation of total energy savings under different scenarios. Furthermore, government underpricing policies on tariffs and appliance acquisition (longer loan terms, lower interest rates and grace periods) may also be analysed.
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SN 0160-5682
J9 J OPER RES SOC
JI J. Oper. Res. Soc.
PD OCT
PY 1995
VL 46
IS 10
BP 1163
EP 1173
DI 10.1057/jors.1995.165
PG 11
WC Management; Operations Research & Management Science
SC Business & Economics; Operations Research & Management Science
GA RX135
UT WOS:A1995RX13500001
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PT J
AU Rocha, P
Siddiqui, A
Stadler, M
AF Rocha, Paula
Siddiqui, Afzal
Stadler, Michael
TI Improving energy efficiency via smart building energy management
systems: A comparison with policy measures
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Smart building energy management; Dynamic energy consumption;
Energy-efficiency policy measures; Non-linear optimisation
ID MICROGRIDS; SIMULATION; POWER
AB To foster the transition to more sustainable energy systems, policymakers have been approving measures to improve energy efficiency as well as promoting smart grids. In this setting, building managers are encouraged to adapt their energy operations to real-time market and weather conditions. Yet, most fail to do so as they rely on conventional building energy management systems (BEMS) that have static temperature set points for heating and cooling equipment. In this paper, we investigate how effective policy measures are at improving building-level energy efficiency compared to a smart BEMS with dynamic temperature set points. To this end, we present an integrated optimisation model mimicking the smart BEMS that combines decisions on heating and cooling systems operations with decisions on energy sourcing. Using data from an Austrian and a Spanish building, we find that the smart BEMS results in greater reduction in energy consumption than a conventional BEMS with policy measures. (C) 2014 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/3.0/).
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OI Siddiqui, Afzal/0000-0003-1841-1310; Rocha, Paula/0000-0003-3498-6077
FU European Union Seventh Framework Programme [260041]; Austrian Federal
Ministry for Transport, Innovation, and Technology through the "Building

of Tomorrow" program; Theodor Kery Foundation of the province of Burgenland
FX The research leading to these results has received funding from the European Union Seventh Framework Programme under grant agreement no. 260041 for Collaborative Project "Energy Efficiency and Risk Management in Public Buildings" (EnRiMa). The Center for Energy and Innovative Technologies (CET) is supported by the Austrian Federal Ministry for Transport, Innovation, and Technology through the "Building of Tomorrow" program and by the Theodor Kery Foundation of the province of Burgenland. Cooperation of Fundacion Asturiana de Atencion y Proteccion a Personas con Discapacidades y/o Dependencias (Siero, Asturias, Spain), Fachhochschule Burgenland's Pinkafeld campus (Burgenland, Austria), and Fachhochschule Technikum Wien's ENERGYbase facility (Vienna, Austria) has greatly enhanced our understanding of energy management at the building level. Feedback from Ruud Egging (SINTEF and NTNU) has helped to improve this paper. We are also grateful for comments provided by two anonymous reviewers. All remaining errors are the authors' own.
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U2 24
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PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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JI Energy Build.
PD FEB 1
PY 2015
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EP 213
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
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PT J
AU Li, C
Hong, TZ
Yan, D
AF Li, Cheng
Hong, Tianzhen
Yan, Da
TI An insight into actual energy use and its drivers in high-performance buildings
SO APPLIED ENERGY
LA English
DT Article
DE Actual energy use; Building technologies; Driving factors; High-performance buildings; Integrated design; Performance rating
ID TRENDS
AB Using portfolio analysis and individual detailed case studies, we studied the energy performance and drivers of energy use in 51 high-performance office buildings in the U.S., Europe, China, and other parts of Asia. Portfolio analyses revealed that actual site energy use intensity (EUI) of the study buildings varied by a factor of as much as 11, indicating significant variation in real energy use in HPBs worldwide. Nearly half of the buildings did not meet the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 90.1-2004 energy target, raising questions about whether a building's certification as high performing accurately indicates that a building is energy efficient and suggesting that improvement in the design and operation of HPBs is needed to realize their energy-saving potential. We studied the influence of climate, building size, and building technologies on building energy performance and found that although all are important, none are decisive factors in building energy use. EUIs were widely scattered in all climate zones. There was a trend toward low energy use in small buildings, but the correlation was not absolute; some small HPBs exhibited high energy use, and some large HPBs exhibited low energy use. We were unable to identify a set of efficient technologies that correlated directly to low EUIs. In two case studies, we investigated the influence of occupant behavior as well as operation and maintenance on energy performance and found that both play significant roles in realizing energy savings. We conclude that no single factor determines the actual energy performance of HPBs, and adding multiple efficient technologies does not necessarily improve building energy performance; therefore, an integrated design approach that takes account of climate, technology, occupant behavior, and operations and maintenance practices should be implemented to maximize energy savings in HPBs. These findings are intended to help architects, engineers, operators, and policy makers improve the design and operation of HPBs.
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FU United States Department of Energy [DE-AC02-05CH11231]; China Ministry of Housing and Urban - Rural Development; Ministry of Science & Technology under the U.S.-China Clean Energy Research Center for Building Energy Efficiency [2010DFA72740-02]
FX This work was sponsored by the United States Department of Energy (Contract No. DE-AC02-05CH11231) and the China Ministry of Housing and Urban - Rural Development and the Ministry of Science & Technology (Grant No. 2010DFA72740-02) under the U.S.-China Clean Energy Research Center for Building Energy Efficiency. Data and information on the

CalSTRS building were provided by David Hill of Jones Lang LaSalle. Some data on Chinese buildings were provided by Qi Zhang of Tsinghua University, China.
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JI Appl. Energy
PD OCT 15
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA AO4TY
UT WOS:000341335500036
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PT J
AU McMichael, M
Shipworth, D
AF McMichael, Megan
Shipworth, David
TI The value of social networks in the diffusion of energy-efficiency innovations in UK households
SO ENERGY POLICY
LA English
DT Article
DE Residential energy demand; Social capital; Energy-efficiency innovations
ID INFORMATION; POLICY; BEHAVIOR; MODEL; TIES
AB The UK Government has policy goals for increasing energy efficiency in existing homes. However, there are doubts that standard technology and behavioural innovations will be adopted widely enough in time to achieve the targets. Diffusion of innovation theory states that the communication of information on innovations through a social system encourages adoption. Social capital theory states that interpersonal communication is a key means of gaining resources, such as information on energy-efficiency innovations, for attaining certain goals. Case study research of three British communities was conducted in 2009 in order to understand the influence of social capital on information diffusion regarding the adoption of household energy-efficiency measures. The findings show that while standard campaigns may account for two-thirds of information-seeking behaviour, they may not be addressing up to one-third of information-seekers who would prefer to speak to people they know. Findings also indicate that seeking information amongst personal contacts is often associated with adoption of energy-efficiency innovations, increasing the likelihood of adoption by up to four times, but that there are important differences between types of innovations and communities. Tailoring campaigns to communities' communication channels is therefore imperative. These findings have important implications for informing community-based energy-efficiency programmes. (C) 2012 Elsevier Ltd. All rights reserved.
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JI Energy Policy
PD FEB
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Wada, K
Akimoto, K
Sano, F
Oda, J
Homma, T
AF Wada, Kenichi
Akimoto, Keigo
Sano, Fuminori
Oda, Junichiro
Homma, Takashi
TI Energy efficiency opportunities in the residential sector and their feasibility
SO ENERGY
LA English
DT Article
DE Energy efficiency; CO2 mitigation; Climate change
ID DISCOUNT RATES
AB The objective of this paper is to address the question of what would be the real impact of energy efficiency improvements on the reduction of GHG (greenhouse gas) emissions through the deployment of energy-efficient technologies. We study the cost effectiveness of replacing current appliances with more efficient models, taking into consideration the implicit discount rate observed in people's purchasing behavior. This is followed by a discussion of why the efficiency gap exists and how large it is. If the world were to successfully implement every negative- or zero-cost measure, the CO2 abatement potential in the global residential and commercial sector in 2020, on a conservative estimate, would be 1.4 Gt of CO2, roughly equivalent to the current CO2 emissions of India as the world fourth largest emitter. If a longer payback period is allowed, a further 1.2 Gt of opportunities, which almost amount to the current CO2 emissions of Japan as the world's fifth largest emitter of CO2, could be gained globally at below zero-cost in 2020. (C) 2012 Elsevier Ltd. All rights reserved.
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Z9 31
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PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
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J9 ENERGY
JI Energy
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IS 1
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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PT J
AU Min, J
Hausfather, Z
Lin, QF
AF Min, Jihoon
Hausfather, Zeke

Lin, Qi Feng
TI A High-Resolution Statistical Model of Residential Energy End Use Characteristics for the United States
SO JOURNAL OF INDUSTRIAL ECOLOGY
LA English
DT Article
DE electricity; energy efficiency; energy modeling; geographic information systems; industrial ecology; information and communication technology (ICT)
ID CONSUMPTION; SECTOR; FUEL
AB P>The absence of detailed information on residential energy end use characteristics for the United States has in the past presented an impediment to the effective development and targeting of residential energy efficiency programs. This article presents a framework for modeling space heating, cooling, water heating, and appliance energy end uses, fuels used, and carbon emissions at a zip code-level resolution for the entire United States. It combines a regression-based statistical model derived from Residential Energy Consumption Survey data with U.S. census 2000 five-digit zip code level information, climate division-level temperature data, and other sources. The results show large variations in energy use characteristics both between and within different regions of the country, with particularly notable differences in the magnitude of and distribution by fuel of residential energy use in urban and rural areas. The results are validated against residential energy sales data and have useful implications for both residential energy efficiency planning and further study of variations in use patterns.
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PU WILEY-BLACKWELL PUBLISHING, INC
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SN 1088-1980
J9 J IND ECOL
JI J. Ind. Ecol.
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VL 14
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SI SI
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
GA 673VQ
UT WOS:000283692700010
OA gold
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ER
FN Clarivate Analytics Web of Science
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PT J
AU Crosbie, T
AF Crosbie, Tracey
TI Household energy consumption and consumer electronics: The case of television
SO ENERGY POLICY
LA English
DT Article
DE consumer electronics; televisions; household energy consumption
AB In recent years, there has been a dramatic rise in the number of consumer electronics in households. These new technologies and the services that support them enable new highly energy intensive behaviours. Using in-depth interview data collected from 20 households in 2006, this paper explores these energy intensive behaviours, using the example of the use of televisions, In doing so, it illustrates how the design and marketing of consumer electronics, and the services which support them, actively encourage energy intensive behaviours and how householders are reconfiguring their homes and lifestyles to fit these behaviours. This latter point is significant because, as householders change their homes and daily lives to fit energy intensive consuming behaviours, it will become increasingly difficult to encourage people to reduce their household energy consumption. This paper concludes with the implications of the research findings for policies designed to reduce household energy consumption. (C) 2008 Elsevier Ltd. All rights reserved.
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PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Energy Policy
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PT J
AU Azar, E
Menassa, CC
AF Azar, Elie
Menassa, Carol C.
TI A comprehensive framework to quantify energy savings potential from improved operations of commercial building stocks
SO ENERGY POLICY
LA English
DT Article
DE Energy savings quantification; Energy conservation; Commercial building stocks; Operation-focused interventions; Energy management; Occupancy interventions
ID PERFORMANCE SIMULATION; OFFICE BUILDINGS; CONSUMPTION; BEHAVIOR; MODELS
AB While studies highlight the significant impact of actions performed by occupants and facility managers on building energy performance, current policies ignore the importance of human actions and the potential energy savings from a more efficient operation of building systems. This is mainly attributed to the lack of methods that evaluate non-technological drivers of energy use for large stocks of commercial buildings to support policy making efforts. Therefore, this study proposes a scientific approach to quantifying the energy savings potential due to improved operations of any stock of commercial buildings. The proposed framework combines energy modeling techniques, studies on human actions in buildings, and surveying and sampling methods. The contributions of this study to energy policy are significant as they reinforce the role of human actions in energy conservation, and support efforts to integrate operation-focused solutions in energy conservation policy frameworks. The framework's capabilities are illustrated in a case study performed on the stock of office buildings in the United States (US). Results indicate a potential 21 percent reduction in the current energy use levels of these buildings through realistic changes in current building operation patterns.
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PT J
AU Lin, HW
Hong, TZ
AF Lin, Hung-Wen
Hong, Tianzhen
TI On variations of space-heating energy use in office buildings
SO APPLIED ENERGY
LA English
DT Article
DE Building simulation; Design and operation; EnergyPlus; Office buildings;
Performance benchmarking; Space heating
ID COMMERCIAL BUILDINGS; CLIMATES; CONSUMPTION; DISTRICT; SYSTEMS
AB Space heating is the largest energy end use, consuming more than seven quintillion joules of site energy annually in the U.S. building sector. A few recent studies showed discrepancies in simulated space-heating energy use among different building energy modeling programs, and the simulated results are suspected to be underpredicting reality. While various uncertainties are associated with building simulations, especially when simulations are performed by different modelers using different simulation programs for buildings with different configurations, it is crucial to identify and evaluate key driving factors to space-heating energy use in order to support the design and operation of low-energy buildings. In this study, 10 design and operation parameters for space-heating systems of two prototypical office buildings in each of three U.S. heating climates are identified and evaluated, using building simulations with EnergyPlus, to determine the most influential parameters and their impacts on variations of space-heating energy use. The influence of annual weather change on space-heating energy is also investigated using 30-year actual weather data. The simulated space-heating energy use is further benchmarked against those from similar actual office buildings in two U.S. commercial-building databases to better understand the discrepancies between simulated and actual energy use. In summary, variations of both the simulated and actual space-heating energy use of office buildings in all three heating climates can be very large. However these variations are mostly driven by a few influential parameters related to building design and operation. The findings provide insights for building designers, owners, operators, and energy policy makers to make better decisions on energy-efficiency technologies to reduce space-heating energy use for both new and existing buildings. (C) 2013 Elsevier Ltd. All rights reserved.
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FX This work was supported by the U.S. Department of Energy under the U.S.-China Clean Energy Research Center on Building Energy Efficiency. It was co-sponsored by the Bureau of Energy, Ministry of Economic Affairs, Taiwan, ROC.
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA 236YH
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PT J
AU Gram-Hanssen, K
AF Gram-Hanssen, Kirsten
TI Efficient technologies or user behaviour, which is the more important when reducing households' energy consumption?
SO ENERGY EFFICIENCY
LA English

DT Article
DE Households; Energy consumption; User practices; Energy efficiency; Appliance use; Meter data; Energy statistics
ID ELECTRICITY CONSUMPTION; OCCUPANCY; FEEDBACK; COMFORT; SAVINGS
AB Much policy effort focuses on energy efficiency of technology, though not only efficiency but also user behaviour is an important factor influencing the amount of consumed energy. This paper explores to what extent energy efficiency of appliances and houses or user behaviour is the more important, both for understanding why some households consume much more energy than others, and when looking for relevant approaches to a future low-carbon society. The paper uses several sources to explore this question, most of them from a Danish context, including results from the researcher's own projects and Danish national statistics. These Danish data are discussed together with international studies. Through the presentation of these different projects and examples, it is shown how user behaviour is at least as important as the efficiency of technology when explaining households' energy consumption in Denmark. In the conclusion, these results are discussed in a broader international perspective and it is concluded that more research in this field is necessary. In relation to energy policy, it is argued that it is not a question of technology efficiency or behaviour, as both have to be included in future policy if energy demand is actually to be reduced. Furthermore, it is also argued that not only individual behaviour is relevant, but also a broader perspective on collectively shared low-carbon practices has to be promoted.
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TI Projections of energy services demand for residential buildings: Insights from a bottom-up methodology
SO ENERGY
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DE Energy services demand; Residential buildings; Portugal
ID CLIMATE-CHANGE; ELECTRICITY CONSUMPTION; CALIFORNIA; IMPACTS; TRENDS; COSTS; STOCK; MODEL
AB Projections of energy demand are important for energy security supply and low carbon futures, and usually rely on final energy consumption trends methods, limiting the opportunity for future options. Methods supported by energy services are much preferred to estimate future energy demand, since they are better suited to accomplish end-users needs. Final energy can then be assessed through complementary tools, as technological models, resulting in deeper knowledge on the relation between energy services and technology options.
This paper presents a bottom-up methodology to project detailed energy end-uses demand in the Portuguese residential buildings until 2050, aiming to identify the parameters governing energy services

demand uncertainty, through a sensitivity analysis. The partial equilibrium TIMES (The Integrated MARKAL-EFOM System) model was used to assess technology options and final energy needs for the range of parameters variations for each end-use, allowing to conclude on the impact of uncertainty of energy services demand in final energy.

Main results show that technology can overweight behavioral practices and lifestyle changes for some end-uses as in space heating and lighting. Nevertheless, important focus should be given to uncertain parameters related with consumer behavior, especially those on heating and other electric end-uses, as thermal comfort and equipment's use. (C) 2012 Elsevier Ltd. All rights reserved.

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TI Understanding household energy consumption behavior: The contribution of energy big data analytics
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
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DE Household energy consumption behavior; Energy big data; Big data analytics; Energy informatics; Intervention strategies
ID DEMAND-SIDE MANAGEMENT; PRO-ENVIRONMENTAL BEHAVIOR; ELECTRICITY CONSUMPTION; SOCIAL INFORMATICS; SAVING BEHAVIOR; CLIMATE-CHANGE; CONSERVATION BEHAVIOR; FEEDBACK INFORMATION; RESEARCH AGENDA; POWER INDUSTRY
AB Understanding and changing household energy consumption behavior are considered as effective ways to improve energy efficiency and promote energy conservation. With the increasing penetration of conventional and emerging information and communication technologies (ICTs) in energy sector, traditional energy systems are being digitized. The energy big data provides a new way to analyze and understand individuals' energy consumption behavior, and thus to improve energy efficiency and promote energy conservation. We first propose a framework of the interdisciplinary research of energy, social and information science, which includes energy social science, social informatics and energy informatics. Then, different dimensions and different research paradigms of household energy consumption behavior are presented. Household energy consumption behavior can be analyzed in time dimension, user dimension and spatial dimension. The economic paradigm (including demand response) and the behavior-oriented paradigm (including intervention strategies) are two major research streams of household energy consumption behavior. Finally, the "4V" characteristics (i.e., volume, velocity, variety and value) of energy big data are discussed.
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NR 129
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U1 11
U2 139
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 1364-0321
J9 RENEW SUST ENERG REV
JI Renew. Sust. Energ. Rev.
PD APR
PY 2016
VL 56
BP 810
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels
GA DC8IC
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PT J
AU Noailly, J
AF Noailly, Joelle
TI Improving the energy efficiency of buildings: The impact of environmental policy on technological innovation
SO ENERGY ECONOMICS
LA English
DT Article
DE Innovation; Technological change; Patents; Energy-efficiency; Buildings; Environmental policy
ID PATENT STATISTICS; DIFFUSION; CONSERVATION; INDICATORS; PRICES; MODELS
AB This paper investigates the impact of alternative environmental policy instruments on technological innovations aiming to improve energy efficiency in buildings. The empirical analysis focuses on three main types of policy instruments, namely regulatory energy standards in buildings codes, energy taxes as captured by energy prices and specific governmental energy R&D expenditures. Technological innovation is measured using patent counts for specific technologies related to energy efficiency in buildings (e.g. insulation, high-efficiency boilers, energy-saving lightings). The estimates for seven European countries over the 1989-2004 period imply that a strengthening of 10% of the minimum insulation standards for walls would increase the likelihood to file additional patents by about 3%. In contrast, energy prices have no significant effect on the likelihood to patent. Governmental energy R&D support has a small positive significant effect on patenting activities. (C) 2011 Elsevier B.V. All rights reserved.
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U2 38
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SN 0140-9883
J9 ENERG ECON
JI Energy Econ.
PD MAY
PY 2012
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IS 3
BP 795
EP 806
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WC Economics
SC Business & Economics
GA 948OW
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PT J
AU Yohanis, YG
AF Yohanis, Yigzaw Goshu
TI Domestic energy use and householders' energy behaviour

SO ENERGY POLICY
LA English
DT Article
DE Household energy efficiency; Appliances; Interventions
ID ELECTRICITY CONSUMPTION; EMBODIED ENERGY; EFFICIENCY GAP; SAVINGS; UK; CONSERVATION; APPLIANCES; DESIGN; HOMES; BUILDINGS
AB This paper discusses domestic energy use and energy behaviour. It shows some improvement in domestic energy consumption and adoption of good energy practice. The survey conducted indicated that 35% of homes could improve their energy efficiency by improved tank insulation. In the last 5 years condensing boilers have been installed only in 3% of homes, indicating that householders are unaware of their advantages. Although 88% of surveyed homes had purchased a major appliance in the last 2 years, only 16% had any idea of the energy rating of their new appliances. Use of energy saving light bulbs is predominant in kitchens compared to other rooms. 70-80% of householders undertook some kind of day-to-day energy efficiency measures. 20-35% of householders would like to invest in energy-saving measures but found cost to be a key barrier. Approximately 84% of those surveyed were unaware of the energy rating of their household appliances. Price and brand were the most important factors determining the purchase of a new appliance. Significant energy-saving could be achieved by providing appropriate information to the general public regarding temperature control, efficiency of appliances and energy-saving heating systems. (C) 2011 Elsevier Ltd. All rights reserved.
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FU Northern Ireland Housing Executive; Northern Ireland Electricity
FX Part of this work was supported by the Northern Ireland Housing Executive and Northern Ireland Electricity.
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NR 63
TC 29
Z9 29
U1 1
U2 41
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0301-4215
J9 ENERG POLICY
JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 903XH
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ER

PT J
AU Kuckshinrichs, W

Kronenberg, T
Hansen, P
AF Kuckshinrichs, Wilhelm
Kronenberg, Tobias
Hansen, Patrick
TI The social return on investment in the energy efficiency of buildings in Germany
SO ENERGY POLICY
LA English
DT Article
DE CO(2) emissions; Energy efficiency; Technology diffusion
ID EXISTING BUILDINGS; INSULATION
AB The German government has developed a variety of policy instruments intended to reduce national CO(2) emissions. These instruments include a programme administered by KfW bank, which aims at improving the energy efficiency of buildings. It provides attractive credit conditions or subsidies to finance refurbishment measures which improve the energy efficiency of buildings significantly.
The refurbishment programme leads to a reduction in energy use, which benefits private investors by reducing their energy bills. In order to estimate whether the programme benefits society as a whole, additional effects must be taken into account, such as the amount of employment generated and the impact on the public budget.
The aim of this paper is to evaluate the social benefits of the German CO(2) refurbishment programme for the years 2005-2007. An extended input-output model is used to estimate the effect of the refurbishment works on public revenue via taxes and social security contributions. The value of avoided CO(2) emissions is approximated using a range of marginal damage estimates from the literature. From these social benefits, the programme cost is deducted. The net social benefit thus computed turns out to be positive. This finding suggests that the refurbishment programme is a reasonable investment of public funds. (c) 2010 Elsevier Ltd. All rights reserved.
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JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Ashina, S
Nakata, T
AF Ashina, Shuichi
Nakata, Toshihiko
TI Energy-efficiency strategy for CO2 emissions in a residential sector in Japan
SO APPLIED ENERGY
LA English
DT Article
DE energy efficiency; rural energy-policy; residential sector
ID COGENERATION PLANTS; MANAGEMENT; SYSTEMS; DEMAND; DESIGN; CONSERVATION; TECHNOLOGIES; CONVERSION; MODEL; HEAT
AB This study examines the economics of energy-efficiency strategies, for reducing CO2 emissions in a residential sector in Japan, from the perspective of regional characteristics. For this study, the residential sector in the Iwate prefecture was selected as representative of rural areas in Japan. In order to promote the purchases of energy-efficient consumer appliances, the prefectural government is presumed to reimburse purchasers a part of the cost difference between energy-efficient and conventional appliances. This paper begins with a discussion of the prefecture's financial support for purchasers of energy-efficient appliances and assumes that the payments come from prefectural government funds. This paper then looks at the effect of a carbon-tax refund on the reduction of CO2 emissions. The results show that, if half of the households use energy-efficient appliances, then CO2 emissions in the residential sector in the year 2020 will decreases from the BAU scenario of 0.726 Mt-C to 0.674 Mt-C. However, the Iwate prefectural government expends $105 million annually, which is 1.5% of the total tax revenue for the year 2003. The carbon-tax refund effectively encourages further reductions in CO2 emissions. Under the $20/tC carbon-tax, proposed by the Ministry of the Environment, the carbon-tax refund leads to a reduction in residential CO2 emissions from 0.726 Mt-C to 0.712 Mt-C. (c) 2007 Published by Elsevier Ltd.
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*JAP MIN ENV, 2005, IMPL CARB TAX JAP
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Z9 29
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Appl. Energy
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA 243CV
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ER

PT J
AU Gulbinas, R
Taylor, JE
AF Gulbinas, Rimas
Taylor, John E.
TI Effects of real-time eco-feedback and organizational network dynamics on energy efficient behavior in commercial buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Behavior; Commercial buildings; Eco-feedback; Energy management; Organizational networks; Social networks
ID ELECTRICITY CONSUMPTION; SOCIAL-INFLUENCE; CONSERVATION; INFORMATION; IMPACT; SAVINGS; ANTECEDENTS; SYSTEM; NORMS; USERS
AB Commercial buildings account for a significant portion of energy consumption and associated carbon emissions around the world. Consequently, many countries are instituting building energy efficiency policies to mitigate the negative environmental impacts of building operations. As building owners and operators act to address the challenge of increasing energy efficiency, occupant behavior modification programs are growing increasingly popular. Recent advances in energy monitoring and control technologies have enabled the development of eco-feedback systems that collect, process, and relay high resolution, real-time energy consumption information to help building occupants control their energy-use. These systems have extended research into the effects of high resolution eco-feedback on building occupant behavior and energy efficiency from residential to commercial building settings. However, little is understood about how organizational network dynamics impact user-engagement levels with such systems and how these network connections may impact the energy conservation behavior of individuals inside commercial buildings. In this paper, results are presented from a novel 9-week eco-feedback system study which demonstrates that organizational network dynamics can significantly impact energy conservation among commercial building occupants. Furthermore, it is shown that exposure to eco-feedback impacts building occupant energy conservation differently in commercial office buildings than it does in residential buildings. (C) 2014 Elsevier B.V. All rights reserved.
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FX This material is based upon work supported by the Department of Energy Building Technologies Program and the National Science Foundation under Grant No. 1142379. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the Department of Energy or the National Science Foundation. The authors would like to thank the Alliance for Sustainable Colorado for hosting the study and helping with management and study administration.
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PT J
AU Gamtessa, SF
AF Gamtessa, Samuel Faye
TI An explanation of residential energy-efficiency retrofit behavior in Canada
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Home energy-efficiency audits; Energy-efficiency retrofits; Energy-efficiency retrofit behavior; Zero-inflated count data estimation
ID WILLINGNESS-TO-PAY; CONSERVATION; MODEL; DIFFUSION; POLICY
AB In 1998 the Canadian government introduced the EnerGuide for Houses (EGH) program, essentially consisting of home energy audits with financial incentives provided to the homeowner upon verification that sufficient auditor-recommended upgrades were undertaken to achieve energy savings. In this study, we analyze the EGH data compiled between October 1998 and September 2005 to determine what types of households chose to participate and what appear to be the main factors underlying retrofit decisions. In the program, homeowners were prescribed specific upgrade types in the first audit. Hence, the decision problem involves whether to retrofit at all and how many of the prescribed upgrades to adopt. Moreover, the second audit that reveals this decision does not reflect the possibility that some homeowners might have undertaken the recommended upgrades but opted not to or have yet to undergo the second audit. We adopt an econometric technique that takes these features of the data into account. We find that energy cost savings, financial incentives, and costs of retrofits are important factors behind retrofit decisions given several other home- and household-specific characteristics.
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PT J
AU Chow, LCH
AF Chow, LCH
TI A study of sectoral energy consumption in Hong Kong (1984-97) with special emphasis on the household sector
SO ENERGY POLICY
LA English
DT Article
DE sectoral energy consumption; energy transition; household energy consumption
AB This study consists of two major parts. The first part deals with the changes in the pattern of sectoral energy consumption from 1984 to 1997, when the sectoral share of industry plummeted from 33.2% to 14.6%, whereas the share of the commercial sector advanced from 20.0% to 29.9%, trailed by smaller rises in the transportation and household sectors. Three factors contributed to these developments : First, changes in the economic structure, i.e. the decline in the role of manufacturing caused by the northward movement of industries into the Mainland, and the accompanying rise in the role of the tertiary activities; secondly, government policy and planning issues relating to the spatial development of Hong Kong; thirdly, the phenomenal hiking in living standard.

The second part analyses household energy consumption in light of the energy transition model. Electricity played an increasingly important role in satisfying household energy demand, while LPG and kerosene were displaced by towngas as heating fuels. Lastly, ramifications of the study are presented.

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JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Beal, CD
Bertone, E
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AF Beal, Cara D.
Bertone, Edoardo
Stewart, Rodney A.
TI Evaluating the energy and carbon reductions resulting from resource-efficient household stock
SO ENERGY AND BUILDINGS

LA English
DT Article
DE Water end-uses; Micro-components; Climate change; Climate adaptation; Energy-efficient technology; Carbon footprint; Intervention strategies; Greenhouse gas; Water heating
ID GREENHOUSE-GAS EMISSIONS; WATER; SYSTEMS; WASTE
AB The nexus of water and energy and greenhouse gas emissions is now well recognised, however, quantifying the energy savings from (hot) water-efficient technologies has been largely based on modelled or assumed consumption data from water use appliances and fixtures. The aim of this paper is to determine water, energy and greenhouse gas emission savings from resource-efficient household stock using empirical water end-use data and detailed stock specifications for homes in Queensland, Australia. Hot water system type is considered with comparisons made between intervention scenarios with and without inclusion of a low energy heating system. The results confirm the significant impact that coal-fired electricity water heating has on total household energy consumption. Further, it appears that substantial savings can be achieved by substituting water (e.g. high star rating appliances) and energy (e.g. solar hot water system) efficient appliances in the home. The findings also suggest that retrofitting cheaper resource-efficient technologies are still an effective means of reducing both water and energy consumption, regardless of hot water system type. Future work in this area is needed to expand the current research outcomes, such as the consideration of all thermal losses from heating systems and the use of empirical energy end-use data. (C) 2012 Elsevier B.V. All rights reserved.
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FU Urban Water Security Research Alliance
FX The authors would like to acknowledge the Urban Water Security Research Alliance for funding the SEQREUS upon which much of this data was based.
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PT J
AU Niemeyer, S
AF Niemeyer, Shirley
TI Consumer voices: adoption of residential energy-efficient practices
SO INTERNATIONAL JOURNAL OF CONSUMER STUDIES
LA English
DT Article
DE Barriers; constraints; consumer; energy; household; residential
ID CO2
AB The purpose of this research is to identify constraining variables that may impinge on adopting energy-efficient practices, materials, equipment and technology in households. The intent is to uncover relationships of attitudes, beliefs, knowledge and other resource constraints to: (1) existing housing adaptations and adjustments for energy efficiency; and (2) more efficient use of energy in homes. A second objective is to identify existing practices used to reduce energy use and the adaptations made to the existing structure, materials, equipment and technology for energy efficiency as well as their intentions to make future adaptations. Constraint variables include knowledge of existing energy-efficient practices and technology; economic constraints (household income, cost as a problem, financial need and existing energy costs); obstacles to making changes (lack of information, assistance, time, cooperation, trained persons and the condition of home); and demographic variables (age, education level and urban/rural). Attitude and

belief constraints include measures of felt responsibility for energy use-related actions that impact the natural resources and environment, and measures of concern. These constraints may impinge on or contribute to making energy-efficient changes in residential households. Questionnaires were mailed to a random stratified sample of 800 households in Nebraska (US state) in April and May of 2008, resulting in a 29% return rate. The analysis indicates that the research produced information about constraining factors that impact the existing energy-efficiency levels of households. The use of energy-efficient equipment and technology, and behaviour practices that reduce energy use are related to those barriers. However, residential energy use and behaviour change result from a range of psychological and contextual influences on behaviour. Behaviour is often inconsistent with attitudes because of the presence of various constraining factors that preclude consistency with behaviour. Educational programmes have a challenging task if they are to alter attitudes and norms to overcome situational constraints. It may be more fruitful to educate and to remove the constraints impinging on those who already have a positive attitude about the need to increase energy efficiency for whatever reason.

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J9 INT J CONSUM STUD
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PT J
AU Wall, R
Crosbie, T
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Crosbie, Tracey
TI Potential for reducing electricity demand for lighting in households: An exploratory socio-technical study
SO ENERGY POLICY
LA English
DT Article
DE Lighting; Household; Electricity
ID ENERGY USE; BEHAVIOR; QUESTIONS
AB Illuminance data were collected from 18 UK dwellings during 1-week periods in spring 2007, to establish when luminaires were used and to calculate electricity consumption for lighting. Householders were also interviewed about lighting use and choices. The potential for reducing lighting electricity consumption by replacing incandescent bulbs with compact fluorescent lamps (CFLs) is assessed. Mean weekly electricity consumption for lighting was 3.756kWh and mean proportion of total electricity consumption used for lighting was 6.55%. It is notable, however, that participants generally expressed high levels of environmental awareness and that electricity consumption figures for less environmentally-aware households may differ. On average, households could have reduced lighting electricity consumption by 50.9% if all incandescent bulbs were replaced with CFLs. Even householders making extensive use of efficient lighting technologies expressed concerns about these technologies' performance, but seemed willing to tolerate perceived shortcomings for environmental reasons. However, the study raises questions about whether people without strong environmental motivations can be convinced that efficient lighting technologies will meet their needs. It also raises questions about the effectiveness of policies phasing out general lighting service incandescent bulbs, as there is a risk that householders may switch to tungsten halogen bulbs rather than low-energy options. (C) 2008 Elsevier Ltd. All rights reserved.
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FU Carbon Trust; Engineering and Physical Sciences Research Council; Economic and Social Research Council; Natural Environment Research Council
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U2 10
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SN 0301-4215
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JI Energy Policy
PD MAR
PY 2009
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PT J
AU Westergren, KE
Hogberg, H
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TI Monitoring energy consumption in single-family houses
SO ENERGY AND BUILDINGS
LA English
DT Article
DE energy signature models; monitoring end-use energy for heating; climate standardization; sample design; Internet-based data communication
AB A technical and statistical solution to the problem of obtaining timely and reliable estimates of end-use energy consumption in single-family houses is presented. This approach is called 'The Energy Barometer' to allude to its possibility to follow the 'pressure' on the energy market. Recently developed Internet-based communication techniques are used to monitor building energy end-use at short time-intervals. We describe how this new technology is combined with statistical methods based on Energy Signature models into a system. Measured energy use from a random sample of houses is standardized for each investigated house by (i) statistically regressing energy data against climate data and (ii) using climate data for a 'normal' year together with the obtained regression equation to determine average annual energy use. The results are generalized to apply for the studied building stock by using a weighting procedure.
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J9 ENERG BUILDINGS
JI Energy Build.
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DI 10.1016/S0378-7788(98)00065-6
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU HACKETT, B
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TI SOCIAL-STRUCTURES AND ECONOMIC CONDUCT - INTERPRETING VARIATIONS IN HOUSEHOLD ENERGY-CONSUMPTION
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LA English
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DE ENERGY CONSUMPTION; ECONOMICS; SOCIAL STATUS; TECHNOLOGY
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PU PLENUM PUBL CORP
PI NEW YORK
PA 233 SPRING ST, NEW YORK, NY 10013
SN 0884-8971
J9 SOCIOL FORUM
JI Sociol. Forum
PD SEP
PY 1991
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IS 3
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DI 10.1007/BF01114472
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WC Sociology
SC Sociology
GA GF894
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PT J
AU Chaturvedi, V
Eom, J
Clarke, LE
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TI Long term building energy demand for India: Disaggregating end use energy services in an integrated assessment modeling framework
SO ENERGY POLICY
LA English
DT Article
DE Building energy demand; India; Integrated assessment modeling
ID HOUSEHOLDS
AB With increasing population, income, and urbanization, meeting the energy service demands for the building sector will be a huge challenge for Indian energy policy. Although there is broad consensus that the Indian building sector will grow and evolve over the coming century, there is little understanding of the potential nature of this evolution over the longer term. The present study uses a technologically detailed, service based building energy model nested in the long term, global, integrated assessment framework, GCAM, to produce scenarios of the evolution of the Indian buildings sector up through the

end of the century. The results support the idea that as India evolves toward developed country per-capita income levels, its building sector will largely evolve to resemble those of the currently developed countries (heavy reliance on electricity both for increasing cooling loads and a range of emerging appliance and other plug loads), albeit with unique characteristics based on its climate conditions (cooling dominating heating and even more so with climate change), on fuel preferences that may linger from the present (for example, a preference for gas for cooking), and vestiges of its development path (including remnants of rural poor that use substantial quantities of traditional biomass). (C) 2012 Elsevier Ltd. All rights reserved.

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PT J
AU Niu, SW
Zhang, X
Zhao, CS
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AF Niu, Shuwen
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Niu, Yunzhu
TI Variations in energy consumption and survival status between rural and urban households: A case study of the Western Loess Plateau, China
SO ENERGY POLICY
LA English
DT Article
DE Energy ladder; Energy consumption; Survival status
ID INDOOR AIR-POLLUTION; SOCIOECONOMIC IMPACTS; DEVELOPING-COUNTRIES; FUEL; EMISSIONS; LADDER; TECHNOLOGY; KNOWLEDGE; PROVINCE; ACCESS
AB As energy consumption is closely related to all aspects of human life, it becomes the standard by which to measure people's quality of life and the national development level. Based on the "energy ladder" hypothesis, we conducted questionnaire surveys in the Western Loess Plateau of China, and accessed a considerable amount of information about the energy usage of rural and urban households. The results show that the per capita effective heat is 323.3, 282.8, 250.0 and 123.6 kgce in the provincial capital, medium-sized cities, county towns and rural areas, respectively. The energy ladder feature is obvious. Using 719 sample data, the multiple regression analysis was conducted between per capita effective heat and two independent variables including per capita income and the attributes of energy used, the parameter estimation of the cross-quadratic model produced more significant effects. The three-dimensional graph clearly shows the differences in living standards and survival status between urban and rural households. High-income residents in urban areas consume more high-quality energy, they enjoy an affluent lifestyle. While low-income households in rural areas obtain less effective heat, and use poor quality fuels, they are still at the level of basic survival. (C) 2012 Elsevier Ltd. All rights reserved.
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FU National Natural Science Foundation of China; Ministry of Education of China; Ministry of Science and Technology of China [41171437, 20100211110018, 2008DFA62040]
FX The authors would like to thank all the members of the project team for their hard work. They are: Dr. Li Guozhu, GuoXiaodong, Ma Libang, Luo Guanghua, Qin Jing, Hu Lili, Master Sun Hongjie, Liu Jianlan, Dong Jianmei, Li Yixin, Ding Yongxia, Yang Lina and Zhang Xifeng. We are also grateful to anonymous reviewers for their valuable suggestions, and National Natural Science Foundation of China, Ministry of Education of China and The Ministry of Science and Technology of China for their financial support during this study (Grant No. 41171437, 20100211110018, 2008DFA62040).
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PT J
AU Auffhammer, M
Aroonruengsawat, A
AF Auffhammer, Maximilian
Aroonruengsawat, Anin
TI Simulating the impacts of climate change, prices and population on
California's residential electricity consumption
SO CLIMATIC CHANGE
LA English
DT Article
DE Climate change; Adaptation; Impacts estimation; Electricity consumption
ID DEMAND; US; ADAPTATION
AB This study simulates the impacts of higher temperatures resulting from anthropogenic climate change on residential electricity consumption for California. Flexible temperature response functions are estimated by climate zone, which allow for differential effects of days in different temperature bins on households' electricity consumption. The estimation uses a comprehensive household level dataset of electricity bills for California's three investor-owned utilities (Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison). The results suggest that the temperature response varies greatly across climate zones. Simulation results using a downscaled version of the National Center for Atmospheric Research global circulation model suggest that holding population constant, total consumption for the households considered may increase by up to 55% by the end of the century. The study further simulates the impacts of higher electricity prices and different scenarios of population growth. Finally, simulations were conducted consistent with higher adoption of cooling equipment in areas which are not yet saturated, as well as gains in efficiency due to aggressive energy efficiency policies.
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NR 22
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Z9 25
U1 2
U2 18
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PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 0165-0009
J9 CLIMATIC CHANGE
JI Clim. Change
PD DEC
PY 2011
VL 109
SU 1
SI SI
BP 191
EP 210
DI 10.1007/s10584-011-0299-y
PG 20
WC Environmental Sciences; Meteorology & Atmospheric Sciences
SC Environmental Sciences & Ecology; Meteorology & Atmospheric Sciences
GA 871SF
UT WOS:000298757300010
DA 2018-05-03
ER

PT J
AU Linhart, F
Scartezzini, JL
AF Linhart, Friedrich
Scartezzini, Jean-Louis
TI Evening office lighting - visual comfort vs. energy efficiency vs.
performance?
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Office lighting; Electric lighting; Lighting power density;

Energy-efficiency; Perfomance; Comfort
ID DAYLIGHT; FREQUENCY; SAVINGS
AB During the study presented in this article, we compared two highly energy-efficient lighting scenarios for evening office lighting (i.e. electric lighting that is typically used for approxiamately 2 h in the evening). The first of these lighting scenarios (referred to as "Reference"-scenario, Lighting Power Density or LPD of 4.5 W/m(2)) has been successfully in use in many office rooms of the Solar Energy and Building Physics Laboratory's experimental building, located on the campus of the Swiss Federal Institute of Technology in Lausanne, for several years. The second lighting scenario (referred to as "Test"-scenario, Lighting Power Density of 3.9 W/m(2)) is more energy-efficient, creates higher workplane illuminances but leads to an increased risk of discomfort glare. The aim of this study was to meticulously compare the two lighting scenarios in order to find a lighting solution for evening office lighting that offers an optimal trade-off between energy-efficiency, visual comfort and visual performance.
For this purpose, objective visual performance tests (computer-based and paper-based) and subjective visual comfort assessments with 20 human subjects were carried out. The main hypothesis of our study was that the study participants would not perform worse under the more energy-efficient "Test" -scenario than under the "Reference"-scenario (which is extremely well accepted by the buidling's occupants).
We found that the two tested scenarios are comparable to usual lighting scenarios in other office rooms in terms of subjective visual comfort. The study participants preferred the "Test"-scenario to the "Reference"-scenario. Their performance in a paper-based task was significantly better under the "Test"-scenario than under the "Reference"-scenario. No significant differences in the performance during two computer-based tasks were found. We conclude that energy-efficient lighting with Lighting Power Densities of less than 5 W/m2 is already achievable in today's office rooms Without jeopardizing visual comfort and performance. Less powerfull electric lighting systems do not necessarily mean a decrease in visual comfort and/or performance: our results even show that better visual comfort and better visual performance can be achieved with less connected lighting power.
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Z9 25
U1 0
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PU PERGAMON-ELSEVIER SCIENCE LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 0360-1323
J9 BUILD ENVIRON
JI Build. Environ.
PD MAY
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BP 981
EP 989
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WC Construction & Building Technology; Engineering, Environmental; Engineering, Civil
SC Construction & Building Technology; Engineering
GA 717TB
UT WOS:000287069200001
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ER

PT J
AU Granderson, J
Piette, MA
Ghatikar, G
AF Granderson, Jessica
Piette, Mary Ann
Ghatikar, Girish
TI Building energy information systems: user case studies
SO ENERGY EFFICIENCY
LA English
DT Article
DE Anomaly detection; Baselining; Benchmarking; Energy efficiency; Diagnostics; Energy analysis; Energy information system; Enterprise energy management; Performance monitoring; Web-based energy management and control system
AB Measured energy performance data are essential to national efforts to improve building efficiency, as evidenced in recent benchmarking mandates, and in a growing body of work that indicates the value of permanent monitoring and energy information feedback. This paper presents case studies of energy information systems (EIS) at four enterprises and university campuses, focusing on the attained energy savings, and successes and challenges in technology use and integration. EIS are broadly defined as performance monitoring software, data acquisition hardware, and communication systems to store, analyze, and display building energy information. Case investigations showed that the most common energy savings and instances of waste concerned scheduling errors, measurement and verification, and inefficient operations. Data quality is critical to effective EIS use, and is most challenging at the subsystem or component level, and with non-electric energy sources. Sophisticated prediction algorithms may not be well understood but can be applied quite effectively, and sites with custom benchmark models or metrics are more likely to perform analyses external to the EIS. Finally, resources and staffing were identified as a universal challenge, indicating a need to identify additional models of EIS use that extend beyond exclusive in-house use, to analysis services.
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FU California Energy Commission; California Institute for Energy and Environment [MUC-08-04]; US Government
FX Vendor participation was critical to the success of this study, and the authors wish to acknowledge their generosity and willingness to be

FU included in this work. This work was supported by the California Energy Commission and the California Institute for Energy and Environment under Contract No. MUC-08-04.; This document was prepared as an account of work sponsored by the US Government. While this document is believed to contain correct information, neither the US Government nor any agency thereof, nor The Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the US Government or any agency thereof, or The Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the US Government or any agency thereof or The Regents of the University of California.
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U1 2
U2 24
PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
J9 ENERG EFFIC
JI Energy Effic.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
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UT WOS:000293067800003
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PT J
AU Louw, K
Conradie, B
Howells, M
Dekenah, M
AF Louw, Kate
Conradie, Beatrice
Howells, Mark
Dekenah, Marcus
TI Determinants of electricity demand for newly electrified low-income African households
SO ENERGY POLICY
LA English
DT Editorial Material
DE electrification; determinants; consumption
ID DEVELOPING-COUNTRIES; SOUTH-AFRICA; ENERGY
AB Access to clean, affordable and appropriate energy is an important enabler of development. Energy allows households to meet their most basic subsistence needs; it is a central feature of all the millennium development goals (MDGs) and, while a lack of access to energy may not: be a Cause of poverty, addressing the energy needs of the impoverished lets them access set-vices which in turn address the causes of poverty.

While much is known about the factors affecting the decisions made when choosing between fuel types within a household, few quantitative studies have been carried out in South Africa to determine the extent to which these factors affect energy choice decisions, It is assumed that the factors traditionally included in economic demand such as price and income of the household affect choice: tastes and preferences as well as external factors such as distance to fuel Suppliers are expected to influence preferences.

This Study follows two typical low-income rural sites in South Africa, Antioch and Garagapola, where the Electricity Basic Services Support Tariff (EBSST) was piloted in 2002. The EBSST is set at 50 kWh/month per household for low domestic consumers; this is worth approximately R20' (+/- USS3). This subsidy is a lifeline tariff, where households receive the set amount of units per month, free of charge irrespective of whether more units are purchased. These data (collected in 2001 and 2002), recently collated with detailed electricity consumption data, allow us to determine the drivers of electricity consumption within these households. The sample analysed is taken from the initial phase of the study, when no FBE had been introduced to the households. This enabled the Study presented here to make use of the well-populated datasets to assess what affects the electricity use decision in these households.

This paper attempts to assess which factors affected the decision-making process for electricity consumption within these households. A brief history of the electricity industry and the electrification is provided and the theoretical background for the electricity consumption model is provided.

It was found that income, woodfuel usage, iron ownership and credit obtained were significant in determining consumption levels within these households. Price and cross-price elasticities were difficult to assess due to lack of data within the sample. The results have many possible implications for policy, including the effect that easily obtained credit has for low-income households. (C) 2008 Elsevier Ltd. All rights reserved.
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NR 17
TC 25
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U1 0
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PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 342TI
UT WOS:000258806000006
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ER

PT J
AU Jones, RV
Lomas, KJ
AF Jones, Rory V.
Lomas, Kevin J.
TI Determinants of high electrical energy demand in UK homes:
Socio-economic and dwelling characteristics
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Electricity consumption; Socio-economic factors; Dwelling factors;

Domestic buildings; Odds ratio
ID HOUSEHOLD ELECTRICITY; RESIDENTIAL SECTOR; CONSUMPTION; APPLIANCES; BUILDINGS; CLIMATE; MODELS; USAGE
AB This paper provides an analysis of the socio-economic and dwelling factors contributing to high electrical energy demand in UK domestic buildings. The socio-economic, dwelling and electricity consumption data were collected during a large-scale, city-wide survey, carried out in Leicester, UK, in 2009-2010. Annual electrical energy demand was estimated for 315 dwellings and an odds ratio analysis used to identify the socio-economic and dwelling factors that led to high electricity consumption. The effects of a number of socio-economic and dwelling factors which have not previously been studied for the UK domestic sector are included. Thus, for the first time, presence of teenagers, having electric space heating as the primary form of heating, portable electric heating and electric water heating were identified as significant drivers of high electricity demand in UK homes. The employment status and education level of the Household Representative Person, the number of floors in a dwelling, presence of fixed electric heating, and the proportion of low-energy lighting were shown to have no effect on high electricity consumption in UK homes. Given the impetus to reduce electricity consumption and CO2 emissions from the domestic sector, these observations can help shape energy saving campaigns and future energy policy. (C) 2015 The Authors. Published by Elsevier BM.
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FU Engineering and Physical Sciences Research Council (EPSRC) under Sustainable Urban Environments programme [EP/F007604/1]; eViz project: Energy Visualisation for Carbon Reduction; EPSRC under Transforming Energy Demand in Buildings through Digital Innovation programme [EP/K002465/1]
FX This research was supported in parts by the 4M project: Measurement, Modelling, Mapping and Management: An Evidence-Based Methodology for Understanding and Shrinking the Urban Carbon Footprint, funded by the Engineering and Physical Sciences Research Council (EPSRC) under the Sustainable Urban Environments programme (grant reference EP/F007604/1) and the eViz project: Energy Visualisation for Carbon Reduction, funded by the EPSRC under the Transforming Energy Demand in Buildings through Digital Innovation programme (grant reference EP/K002465/1). For further details, see http://mmmm.lboro.ac.uk/ and http://www.eviz.org.uk/
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PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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JI Energy Build.
PD AUG 15
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Gago, EJ
Muneer, T
Knez, M
Koster, H
AF Gago, E. J.
Muneer, T.
Knez, M.
Koester, H.
TI Natural light controls and guides in buildings. Energy saving for electrical lighting, reduction of cooling load
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Sustainable building; Healthy buildings; Environmental impact of daylight and control systems of daylighting
ID HOLOGRAPHIC OPTICAL-ELEMENTS; AUTOMATED VENETIAN BLIND; HIGHLY LUMINOUS CLIMATES; LOUVER SHADING DEVICES; PASSIVE SOLAR DESIGN; CONTROL STRATEGIES; OFFICE BUILDINGS; VISUAL COMFORT; SKY CONDITIONS; CONTROL-SYSTEM
AB The residential sector is responsible for approximately a quarter of energy consumption in Europe. This consumption, together with that of other buildings, mainly from the tertiary sector, makes up 40% of total energy consumption and 36% of CO2 emissions. Artificial lighting makes up 14% of electrical consumption in the European Union and 19% worldwide. Through the use of well-designed natural lighting, controlled by technologies or systems which guarantee accessibility from all areas inside buildings, energy consumption for lighting and air conditioning can be kept to a minimum. The authors of this article carried out a state of the art on the technologies or control systems of natural light in buildings, concentrating on those control methods which not only protect the occupants from direct solar glare but also maximize natural light penetration in buildings based on the occupants' preferences, whilst allowing for a reduction in electrical consumption for lighting and cooling. All of the control and/or natural light guidance systems and/or strategies guarantee the penetration of daylight into the building, thus reducing the electrical energy consumption for lighting and cooling. At the same time they improve the thermal and visual comfort of the users of the buildings. However various studies have also brought to light certain disadvantages to these systems. (C) 2014 Elsevier Ltd. All rights reserved.
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TI User satisfaction adaptive behaviors for assessing energy efficient building indoor cooling and lighting environment
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DE Energy efficient building; User satisfaction; Adaptive behavior; Energy efficient indoor environment; Building assessment; Energy Behavior; Thermal comfort

ID MIXED-MODE BUILDINGS; THERMAL COMFORT; OFFICE BUILDINGS; DISCOMFORT GLARE; SUSTAINABLE BUILDINGS; SYSTEMATIC REVIEWS; ASSESSMENT TOOLS; VISUAL COMFORT; OCCUPANTS; PERFORMANCE

AB Many techniques for managing sustainability including sustainable building assessment tools and standards have been developed globally. The sustainable building assessment tools measure the user satisfaction dependent to environmental and economic aspects of energy efficient building practices. However, these tools have not yet measure energy efficiency index by involving user satisfaction from adaptive behaviors dependently, which can determine the actual energy consumption versus the planed energy consumption of the building. Hence, this research aimed at providing a comprehensive list of adaptive behaviors for assessing energy efficient building indoor environment in design phase of building lifecycle. The study focused on identifying and establishing adaptive behaviors that are in response to indoor conditions provided by Cooling and Lighting systems in energy efficient office buildings. This research involves adaptations across Technological and Personal. The research was conducted in two phases. Phase one identified the list of user satisfaction adaptive behaviors through a systematic approach. Next, an expert input study was conducted to validate the findings of the literature review. Expert input data was collected using Delphi structured close group discussion method, and then analyzed through Grounded Group Decision Making (GGDM) method. Eight experts were involved in four sessions of the GGDM application procedure. The research established 18 adaptive behaviors relevant to cooling system in energy efficient indoor environments, and 18 adaptive behaviors relevant to the lighting system. The comprehensive list of user satisfaction adaptive behaviors can be applied in both current and future sustainable building assessment tools' energy efficiency indexes. This aids architects, engineers, facility managers, building owners, consultants, authorities, contractors, and academic researchers in accreditation of building users, building design and reduction of building's energy consumption. (C) 2014 Elsevier Ltd. All rights reserved.

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NR 149
TC 24
Z9 24
U1 5
U2 52
PU PERGAMON-ELSEVIER SCIENCE LTD
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PT J
AU Menezes, AC
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AF Menezes, A. C.
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TI Estimating the energy consumption and power demand of small power equipment in office buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Small power; Plug loads; Offices; Predictions; Estimates; Computers; Energy consumption; Power demand; Operational performance
ID LOADS
AB Small power is a substantial energy end-use in office buildings in its own right, but also significantly contributes to internal heat gains. Technological advancements have allowed for higher efficiency computers, yet current working practices are demanding more out of digital equipment. Designers often rely on benchmarks to inform predictions of small power consumption, power demand and internal gains. These are often out of date and fail to account for the variability in equipment speciation and usage patterns in different offices. This paper details two models for estimating small power consumption in office buildings, alongside typical power demand profiles. The first model relies solely on the random sampling of monitored data, and the second relies on a 'bottom-up' approach to establish likely power demand and operational energy use. Both models were tested through a blind validation demonstrating a good correlation between metered data and monthly predictions of energy consumption. Prediction ranges for power demand profiles were also observed to be representative of metered data with minor exceptions. When compared to current practices, which often rely solely on the use of benchmarks, both proposed methods provide an improved approach to predicting the operational performance of small power equipment in offices. (C) 2014 The Authors. Published by Elsevier B.V.
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AU Paudel, S
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TI Pseudo dynamic transitional modeling of building heating energy demand using artificial neural network
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Building energy prediction; Short term building energy forecasting; Operational heating characteristics; Occupancy profile; Artificial neural network; Orthogonal arrays
ID COOLING LOAD PREDICTION; MIXED ORTHOGONAL ARRAYS; RESIDENTIAL BUILDINGS; CONSUMPTION; SIMULATION; CONSTRUCTION; OPTIMIZATION; VALIDATION
AB This paper presents the building heating demand prediction model with occupancy profile and operational heating power level characteristics in short time horizon (a couple of days) using artificial neural network. In addition, novel pseudo dynamic transitional model is introduced, which consider time dependent attributes of operational power level characteristics and its effect in the overall model performance is outlined. Pseudo dynamic model is applied to a case study of French Institution building and compared its results with static and other pseudo dynamic neural network models. The results show the coefficients of correlation in static and pseudo dynamic neural network model of 0.82 and 0.89 (with energy consumption error of 0.02%) during the learning phase, and 0.61 and 0.85 during the prediction phase, respectively. Further, orthogonal array design is applied to the pseudo dynamic model to check the schedule of occupancy profile and operational heating power level characteristics. The results show the new schedule and provide the robust design for pseudo dynamic model. Due to prediction in short time horizon, it finds application for Energy Services Company (ESCOs) to manage the heating load for dynamic control of heat production system. (C) 2013 Elsevier B.V. All rights reserved.
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FU Erasmus Mundus Joint Doctoral Programme SELECT+
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AU Morrissey, J
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AF Morrissey, J.
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TI Cost-benefit assessment of energy efficiency investments: Accounting for future resources, savings and risks in the Australian residential sector
SO ENERGY POLICY
LA English
DT Article
DE Residential building; Thermal efficiency; Cost-benefit
ID DISCOUNT RATES; CLIMATE-CHANGE; SUSTAINABLE DEVELOPMENT; POLICY-ANALYSIS; UNCERTAINTY; ENVIRONMENT; ECONOMICS; LIFE; WEAK
AB This article focuses on the impact of the discount rate on cost-benefit assessment of investment options for residential building efficiency. An integrated thermal modeling, life cycle costing approach is applied to an extensive sample of dominant house designs for Australian conditions. The relative significance of predicted thermal performance and the applied discount rate on the Present Value of energy savings from alternative investment scenarios is investigated. Costs and benefits are also evaluated at the economy-wide scale, including carbon pricing considerations, and for a test-case household faced with alternative investment options at the point of construction. The influence of the applied discount rate on produced cost-benefit calculations is investigated, as is the interaction between critical cost-benefit input parameters. Findings support that the discounting framework is the primary driver of difference in estimates about costs and benefits of higher standards of efficiency in the residential sector. Results demonstrate that agreement on a low discount rate based on sustainability principals would prioritise those projects with significant environmental benefits. (C) 2012 Elsevier Ltd. All rights reserved.
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FX This research is supported under the Australian Research Council's Linkage Projects funding scheme (project LPO776834). The views expressed herein are those of the authors and are not necessarily those of the Australian Research Council. The authors wish to acknowledge the contribution of project partner's the Building Commission, Land Management Corporation and VicUrban as well as Adjunct Professor Alan Pears, RMIT University for his input and advice. The authors also wish to thank the anonymous reviewers whose suggestions greatly strengthened the central argument of the paper.
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J9 ENERG POLICY
JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Soratana, K
Marriott, J
AF Soratana, Kullapa
Marriott, Joe
TI Increasing innovation in home energy efficiency: Monte Carlo simulation of potential improvements
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Home energy efficiency; Energy services companies; Low-income household; Energy consumption
AB Despite the enormous potential for savings, there is little penetration of market-based solutions in the residential energy efficiency market. We hypothesize that there is a failure in the residential efficiency improvement market: due to lack of customer knowledge and capital to invest in improvements, there is unrecovered savings. In this paper, we model a means of extracting profit from those unrecovered energy savings with a market-based residential energy services company, or RESCO. We use a Monte Carlo simulation of the cost and performance of various improvements along with a hypothetical business model to derive general information about the financial viability of these companies. Despite the large amount of energy savings potential, we find that an average contract length with residential customers needs to be nearly 35 years to recoup the cost of the improvements. However, our modeling of an installer knowledge parameter indicates that experience plays a large part in minimizing the time to profitability for each home. Large numbers of inexperienced workers driven by government investment in this area could result in the installation of improvements with long payback periods, whereas a free market might eliminate companies making poor decisions. (C) 2010 Elsevier B.V. All rights reserved.
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FX The authors acknowledge funding for this project from the Mascaro Center for Sustainable Innovation 2008 seed grant and assistance from Conservation Consultants Inc.
CR Bureau of Labor Statistics, 2008, LOC AR UN STAT LAUS

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PU ELSEVIER SCIENCE SA
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PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
SN 0378-7788
J9 ENERG BUILDINGS
JI Energy Build.
PD JUN
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT S
AU Bang, M
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BE DeKort, Y
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Eggen, B
Fogg, BJ
TI Promoting new patterns in household energy consumption with pervasive learning games
SO PERSUASIVE TECHNOLOGY
SE Lecture Notes in Computer Science
LA English
DT Proceedings Paper
CT 2nd International Conference on Persuasive Technology (PERSUASIVE 2007)
CY APR 26-27, 2007
CL Stanfore Univ, Palo Alto, CA
HO Stanfore Univ
AB Engaging computer games can be used to change energy consumption patterns in the home. PowerAgent is a pervasive game for Java-enabled mobile phones that is designed to influence everyday activities and use of electricity in the domestic setting. PowerAgent is connected to the household's automatic electricity meter reading equipment via the cell network, and this setup makes it possible to use actual consumption data in the game. In this paper, we present a two-level model for cognitive and behavior learning, and we discuss the properties of PowerAgent in relation to the underlying situated learning, social learning, and persuasive technology components that we have included in the game.
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Z9 24
U1 2
U2 3
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 0302-9743
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J9 LECT NOTES COMPUT SC
PY 2007
VL 4744
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WC Computer Science, Theory & Methods; Information Science & Library Science; Social Issues
SC Computer Science; Information Science & Library Science; Social Issues

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PT J
AU Carroll, J
Lyons, S
Denny, E
AF Carroll, James
Lyons, Sean
Denny, Eleanor
TI Reducing household electricity demand through smart metering: The role of improved information about energy saving
SO ENERGY ECONOMICS
LA English
DT Article
DE Residential electricity demand; Smart meters; Consumption feedback; Household knowledge; Conservation motivations
ID CONSERVATION; CONSUMPTION; FEEDBACK
AB The international roll out of residential smart meters has increased considerably in recent years. The improved consumption feedback provided, and in particular, the installation of in-house displays, has been shown to significantly reduce residential electricity demand in some international trials. This paper attempts to uncover the underlying drivers of such information-led reductions by exploring two research questions. First, does feedback improve a household's stock of information about potential energy reducing behaviours? And second, do improvements in such information help explain the demand reductions associated with the introduction of smart metering and time-of-use tariffs? Data is from a randomised controlled smart metering trial (Ireland) which also collected extensive information on household attitudes towards energy conservation and self-reported stocks of information related to energy saving. As with previous results in Ireland, we find that participation in a smart metering programme with time-of-use tariffs significantly reduces demand. Although treated households also increased their selfreported energy-reducing information, such improvements are not correlated with demand reductions in the short-run. Given this result, it is possible that feedback and other information provided in the context of smart metering are mainly effective in reducing and shifting demand because they act as a reminder and motivator.
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PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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JI Energy Econ.
PD SEP
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WC Economics
SC Business & Economics
GA AR5GQ
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PT J
AU Yu, S
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Zhou, YY
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AF Yu, Sha
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Clarke, Leon
TI Scenarios of building energy demand for China with a detailed regional representation
SO ENERGY
LA English
DT Article
DE China; Building energy use; Integrated assessment; Downscaled analysis; Climate change
ID CLIMATE-CHANGE; RESIDENTIAL BUILDINGS; RURAL CHINA; CONSUMPTION; COUNTY; PROVINCE; SECTOR; AREAS; MODEL
AB Building energy consumption currently accounts for 28% of China's total energy use and is expected to continue to grow induced by floorspace expansion, income growth, and population change. Fuel sources and building services are also evolving over time as well as across regions and building types. To understand sectoral and regional difference in building energy use and how socioeconomic, physical, and technological development influence the evolution of the Chinese building sector, this study developed a building energy use model for China downscaled into four climate regions under an integrated assessment framework. Three building types (rural residential, urban residential, and commercial) were modeled specifically in each climate region. Our study finds that the Cold and Hot Summer Cold Winter regions lead in total building energy use. The impact of climate change on heating energy use is more significant

than that of cooling energy use in most climate regions. Both rural and urban households will experience fuel switch from fossil fuel to cleaner fuels. Commercial buildings will experience rapid growth in electrification and energy intensity. Improved understanding of Chinese buildings with climate change highlighted in this study will help policy makers develop targeted policies and prioritize building energy efficiency measures. (C) 2014 Elsevier Ltd. All rights reserved.
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OI Eom, Jiyong/0000-0002-8092-5921
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PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
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WC Thermodynamics; Energy & Fuels
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PT J
AU Gram-Hanssen, K
AF Gram-Hanssen, Kirsten
TI Existing buildings - Users, renovations and energy policy
SO RENEWABLE ENERGY
LA English
DT Article; Proceedings Paper
CT WREC The World Renewable Energy Congress
CY MAY 08-13, 2011
CL Linkoping, SWEDEN
DE Detached houses; Energy renovations; User practices; Energy policy
AB This paper deals with the energy consumption of existing owner-occupied detached houses and the question of how they can be energy renovated. Data on the age of the Danish housing stock, and its energy consumption is presented. Research on the potential for energy reductions in the Danish housing sector is discussed, and it is shown that there is a huge potential for reductions. It is a well-known problem that even if there are relevant technical means and even if it is economically feasible, the majority of house owners do not energy renovate their homes. This paper intends to address what can be done to solve this problem. The paper draws on different sources of why, when, and how, people do not energy renovate their homes. These results are then compared and discussed together with a presentation and discussion of the Danish policy measures aimed at encouraging people to energy renovate their homes. These policy measures include building regulations, energy tax and different types of incentives and information dissemination. The conclusion calls for new and innovative policy measures to cope with the realities of renovations of owner-occupied houses and how energy efficiency improvement could be part of that. (C) 2013 Elsevier Ltd. All rights reserved.
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PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 0960-1481
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JI Renew. Energy
PD JAN
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels
GA 241BI
UT WOS:000326141000022
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ER

PT J
AU Yu, BY
Zhang, JY
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AF Yu, Biying
Zhang, Junyi
Fujiwara, Akimasa
TI Representing in-home and out-of-home energy consumption behavior in Beijing
SO ENERGY POLICY
LA English
DT Article
DE Household energy consumption behavior; Joint representation; MDCEV
ID LIFE-STYLE; ELECTRICITY CONSUMPTION; RESIDENTIAL SECTOR; MODEL; REQUIREMENTS; IMPACT; APPLIANCES; HOUSEHOLDS; OWNERSHIP; EMISSIONS
AB It is expected that in-home and out-of-home energy consumption behavior in a household might be correlated with each other, probably due to the existence of household budget constraints. Ownership and usage of energy-saving technologies for in-home appliances (or vehicles) might lead to the increase in out-of-home (or in-home) energy consumption. It is therefore necessary to jointly represent in-home and out-of-home energy consumption in the same modeling framework. With this consideration, we first build a new type of energy consumption model based on the Multiple Discrete-Continuous Extreme Value (MDCEV) modeling framework. Next, we conducted a questionnaire survey in Beijing in 2009 and successfully collected the information about households' energy consumption, ownership/usage of in-home appliances and vehicles, and households' and their members' attributes from 1014 households. Throughout an empirical analysis, it is confirmed that the MDCEV model is effective to simultaneously describe the in-home and out-of-home energy consumption behavior. In addition, it is revealed that a set of household and personal attributes affect the ownership and usage of in-home appliances and vehicles. Furthermore, it is shown that the unobserved factors play a much more important role in explaining energy consumption behavior than the observed attributes of households and their members. (C) 2011 Elsevier Ltd. All rights reserved.
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FU Japan Society for the Promotion of Science (JSPS) [22246068]; Ministry

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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
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IS 7
SI SI
BP 4168
EP 4177
DI 10.1016/j.enpol.2011.04.024
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 790WG
UT WOS:000292620800031
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PT J
AU Tao, J
Yu, SR
AF Tao, Jing
Yu, Suiran
TI Implementation of energy efficiency standards of household refrigerator/freezer in China: Potential environmental and economic impacts
SO APPLIED ENERGY
LA English
DT Article
DE Household refrigerator; Energy efficiency standard; Electricity conservation; Life cycle cost; Benefit/cost ratio
ID LABELS
AB Due to the rapid economic development, living standards in China are improving fast. Chinese families are having more household electrical appliances, among which refrigerators are indispensable. Energy consumption of refrigerators is huge in China and causes environmental concerns. China has issued the national energy efficiency standards of household refrigerators, GB12021.2-2003 and GB12021.2-2008 to promote high-efficiency refrigerator production and use. This study evaluated the impacts of the standards on the environment, manufacturers and consumers over a long-term period of 2003-2023. It first evaluated the potential electricity conservation and GHG emission reduction resulting from energy efficiency improvements driven by the standards. Next, manufacturers' technological and economic concerns about complying with the standards were discussed. Some efficiency improving design options were considered and the resulting increases in manufacturing cost and retail price were estimated. The return of consumers from invest in efficiency was analyzed based on lifecycle cost saving of the improved models. The economical viability of the standards was then evaluated by national consumer costs and benefits. Results

showed that the considered efficiency standards will potentially save a cumulative total of 588-1180 TWh electricity, and reduce emission of 629-1260 million tons of CO(2), 4.00-8.04 million tons of SO(x) and 2.37-4.76 million tons of NO(x) by 2023, depending on sale share of models by efficiency. In a more environmentally optimal case (75% sale share of high-efficiency models), the national consumer benefits are 121 billion RMB (discounted), with the benefit/cost ratio of consumer's expenditure being 1.45:1. However, the preference to high-efficiency models is substantial influenced by consumer's expectation on return from the additional cost on efficiency. (C) 2010 Elsevier Ltd. All rights reserved.
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FX This study is supported by National Natural Science Foundation of China, Project No. 50775141.
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PT J
AU Isaacs, N
Saville-Smith, K
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Burrough, L
AF Isaacs, Nigel
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Camilleri, Michael
Burrough, Lisa
TI Energy in New Zealand houses: comfort, physics and consumption
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE building performance; building stock; demand temperature; fuel poverty; housing; inhabitant behaviour; residential energy use; space heating; New Zealand
AB The Household Energy End-use Study (HEEP) quantified how, where, when, and why energy was used in New Zealand houses based on the monitoring of energy and end-uses in a national sample of 400 houses. Based on these data, space heating was found to average 34% of total household energy use. Three issues are highlighted in relation to space heating: firstly, the extent to which low indoor temperatures are associated with persistent under-heating; secondly, whether some space-heating sources tend to be associated with higher (or lower) winter indoor temperatures than others; and thirdly, what the drivers of under-heating might be. An overview of the HEEP research and its complex data set is provided. The range of winter indoor temperatures are then compared with international benchmarks and established healthy temperature ranges. Occupants' perceptions of winter indoor temperature conditions are presented and explored in relation to heating patterns and household energy consumption. The impacts of this research have assisted in changing public policy, moving from a narrow focus on energy efficiency toward an integrated energy, environmental, and health policy for the building stock and future interventions.
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FU New Zealand government's Foundation for Research Science and Technology
FX This work was supported by long-term funding from the New Zealand government's Foundation for Research Science and Technology's 'Public Good Science Fund' and Building Research Levy. The support of other funders, researchers, and the many house occupants involved in the research is also gratefully acknowledged. The authors also thank the referees and editors for their comments and suggestions.
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PT J
AU Voss, K
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AF Voss, Karsten
Herkel, Sebastian
Pfafferott, Jens
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Wagner, Andreas
TI Energy efficient office buildings with passive cooling - Results and experiences from a research and demonstration programme
SO SOLAR ENERGY
LA English
DT Article
DE office buildings; energy monitoring; passive cooling; thermal comfort; user behaviour
ID BLINDS
AB To gain access to information on energy use in office buildings, the German Federal Ministry for Economy launched an intensive research and demonstration programme in 1995. In advance of the 2002 EU energy performance directive a limited primary energy coefficient of about 100 kW h m(-2) a(-1) as a goal for the complete building services technology was postulated (HVAC + lighting) for all demonstration buildings to be supported. A further condition was that active cooling be avoided. Techniques such as natural or mechanical night ventilation or heat removal by slab cooling with vertical ground pipes as well as earth-to-air heat exchangers in the ventilation system were applied. An accompanying research was established to keep track of the results and the lessons learned from about 22 demonstration buildings realized and monitored until the end of 2005. As one outcome this paper summarises the energy performance of a selection of characteristic buildings together with an overview on the summer thermal comfort situations achieved. The research program will proceed during the next five years. Detailed reports and future results may be downloaded from the internet: www.enbaumonitor.de.
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U2 12
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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PT B
AU Baraka, K
Ghobril, M
Malek, S
Kanj, R
Kayssi, A
AF Baraka, Kim
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Malek, Sami
Kanj, Rouwaida
Kayssi, Ayman
BE AlDabass, D
Romero, G
Orsoni, A
Pantelous, A
TI Low cost Arduino/Android-based Energy-Efficient Home Automation System
with Smart Task Scheduling
SO 2013 FIFTH INTERNATIONAL CONFERENCE ON COMPUTATIONAL INTELLIGENCE,
COMMUNICATION SYSTEMS AND NETWORKS (CICSYN)
LA English
DT Proceedings Paper
CT 5th International Conference on Computational Intelligence,
Communication Systems and Networks (CICSyN)
CY JUN 05-07, 2013
CL Madrid, SPAIN
SP IEEE UK & RI Comp Chapter, IEEE Reg 8, IEEE Reg 10, UK Simulat Soc, Asia Modelling & Simulat Soc,
Univ Polytechn Madrid, Univ Technol Malaysia, Univ Malaysia Pahang, Univ Sci Malaysia, Univ Malaysia
Sabah, Inst Technol Bandung, Machine Intelligence Res Labs, Norway Univ Sci & Technol, Nottingham
Trent Univ, UK European Simulat Council, European Council Modelling & Simulat, IEEE Comp Soc, IEEE
DE Home automation; Arduino; Android; Smart scheduling; Energy management

AB In this paper, we make use of Home Automation techniques to design and implement a remotely controlled, energy-efficient and highly scalable Smart Home with basic features that safeguard the residents' comfort and security. Our system consists of a house network (sensors and appliance actuators to respectively get information from and control the house environment). As a central controller, we used an Arduino microcontroller that communicates with an Android application, our user interface. Our house network brings together both wireless Zigbee and wired X10 technologies, thus making it a cost-efficient hybrid system. Events can be programmed to be triggered under specific conditions, and this can have a great role in reducing the total energy consumed by some appliances. On the other hand, the system can suggest smart task scheduling. The scheduling algorithm we present is a heuristic for the Resource-constrained-scheduling problem (RCPSP) with hybrid objective function merging both resource-leveling and weighted completion time considerations.
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Yuan J., NP HARDNESS SINGLE V
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U1 0
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PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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PY 2013
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WC Computer Science, Artificial Intelligence; Computer Science, Theory & Methods; Engineering, Electrical & Electronic
SC Computer Science; Engineering
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AU Dlamini, NG
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TI Implementing peak load reduction algorithms for household electrical

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DT Article
DE Demand-side management; Household automation; Behaviour
AB Considering household appliance automation for reduction of household peak power demand, this study explored aspects of the interaction between household automation technology and human behaviour. Given a programmable household appliance switching system, and user-reported appliance use times, we simulated the load reduction effectiveness of three types of algorithms, which were applied at both the single household level and across all 30 households. All three algorithms effected significant load reductions, while the least-to-highest potential user inconvenience ranking was: coordinating the timing of frequent intermittent loads (algorithm 2): moving period-of-day time-flexible loads to off-peak times (algorithm 1); and applying short-term time delays to avoid high peaks (algorithm 3) (least accommodating). Peak reduction was facilitated by load interruptibility, time of use flexibility and the willingness of users to forgo impulsive appliance use. We conclude that a general factor determining the ability to shift the load due to a particular appliance is the time-buffering between the service delivered and the power demand of an appliance. Time-buffering can be 'technologically inherent', due to human habits, or realised by managing user expectations. There are implications for the design of appliances and home automation systems. (C) 2012 Elsevier Ltd. All rights reserved.
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U2 10
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Berardi, U
AF Berardi, Umberto
TI A cross-country comparison of the building energy consumptions and their trends
SO RESOURCES CONSERVATION AND RECYCLING
LA English
DT Article
DE Energy consumption; Buildings; Energy saving; Building energy efficiency; Building stock; BRIC countries
ID RESIDENTIAL BUILDINGS; EFFICIENCY POLICIES; LONG-TERM; CHINA; SECTOR; DEMAND; IMPACT; INDIA; CHALLENGES; MITIGATION
AB Although it is often stated that the energy consumption in buildings accounts for more than 30% of total global final energy use, only a few studies analyze updated data about the current building energy consumptions or focus on comparing different countries. Similarly, models that predict future trends in building energy demand often use contrasting algorithms which result in diverse forecasts. Scope of this paper is to present and discuss data taken from several studies about the building energy consumptions in US, EU, and BRIC (Brazil, Russia, India, and China) countries and to provide an updated inventory of useful figures. Comparisons among countries are used to show historical, actual, and future energy consumption trends. Data presented by the World Bank, the United Nations Environment Program, the Intergovernmental Panel on Climate Change, and the International Energy Agency are compared with national reports as well as with research studies. The variety of the approaches used in each of the previous sources was considered fundamental to allow a complete review. The paper shows that the total building energy consumptions in BRIC countries have already overcome those in developed countries, and the continuous increase in the building stock of the BRIC countries creates an urgency for promoting building energy efficiency policies in these countries. At the same time, the policies actually adopted in developed countries are insufficient to guarantee a significant reduction in their building energy consumption in the years to come. In the current scenario, at least a doubling of the global energy demand in buildings compared to today's levels will occur by 2050. To avoid this forecast, cost-effective best practices and technologies as well as behavioral and lifestyle changes need to be diffused and accepted globally. (C) 2016 Elsevier B.V. All rights reserved.
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PT J
AU Huang, H
Chen, L
Hu, E
AF Huang, Hao
Chen, Lei
Hu, Eric
TI A new model predictive control scheme for energy and cost savings in commercial buildings: An airport terminal building case study
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Model predictive control; Neural network model; Energy efficiency; HVAC
ID OPTIMAL TEMPERATURE CONTROL; NEURAL-NETWORK MODELS; THERMAL COMFORT; CONTROL-SYSTEMS; PART II; UNCERTAINTY; ALGORITHM; STORAGE; MPC
AB Predictive control technology for heating, ventilation and air conditioning (HVAC) systems has been proven to be an effective way to reduce energy consumption and improve thermal comfort within buildings. Such methods rely on models to accurately predict the thermal dynamics of a specific building to achieve the optimal control. Implementing a predictive control at the building level faces several challenges, since buildings' thermal dynamics are nonlinear, time-varying, and contain several uncertainties. This paper presents a hybrid model predictive control (HMPC) scheme, which can minimise the energy and cost of running HVAC systems in commercial buildings. The proposed control framework combines a classical MPC with a neural network feedback linearisation method. The control model for the HMPC is developed using a simplified physical model, while the nonlinearity associated with HVAC process is handled independently by an inverse neural network model. To achieve the maximum energy saving, the proposed MPC integrates several advanced air-conditioning control strategies, such as an economizer control, an optimal start-stop control, and a load shifting control. This approach has been tested at the check-in hall of the T-1 building of the Adelaide Airport, through simulations and a field experiment. The merits of the proposed method compared to the existing control method are analysed from both the energy saving and cost saving points of view. The result shows that the proposed HMPC scheme performs reasonably well, and achieves a considerable amount of savings without violating thermal comfort. (C) 2015 Elsevier Ltd. All rights reserved.
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FX The authors of this work would like to thank Adelaide Airport Limited

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NR 44
TC 21
Z9 21
U1 5
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PU PERGAMON-ELSEVIER SCIENCE LTD
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PT J
AU Nilsson, A
Bergstad, CJ
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Meiling, P
AF Nilsson, Andreas
Bergstad, Cecilia Jakobsson
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Andersson, Kristin
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TI Effects of continuous feedback on households' electricity consumption: Potentials and barriers
SO APPLIED ENERGY
LA English
DT Article
DE Electricity consumption; Intervention; Continuous feedback; In-home displays
ID ENERGY-CONSUMPTION; CONSERVATION; IMPACT
AB Two field experiments were carried out to study (a) the effects on energy savings of continuous visual feedback via in-home displays, and (b) the motives for responding or not. In study 1.40 participants living in separate or semi-detached houses in two different towns participated. All participants received a questionnaire and a list of possible energy saving measures. Households were then randomly assigned to an experimental condition (display) or a control condition (no display). In study 2, 32 households in rented apartments participated. No significant differences between the conditions were found for either of the studies. In study 2, semi-structured interviews were conducted among nine of the households. Through an analysis of interview transcripts barriers were identified explaining why the feedback intervention was not sufficient to change behaviour and reduce consumption. The barriers experienced indicate that there is a risk of overconfidence in IHDs. For the development of energy policies and more wide-scale implementation, it is important to be aware of the potential obstacles to success. (c) 2014 Elsevier Ltd. All rights reserved.
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FU Swedish Energy Agency [32320-1]; Swedish Research Council [421-2008-2119]
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JI Appl. Energy
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
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PT J
AU Rahut, DB

Das, S
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Behera, B
AF Rahut, Dil Bahadur
Das, Sukanya
De Groote, Hugo
Behera, Bhagirath
TI Determinants of household energy use in Bhutan
SO ENERGY
LA English
DT Article
DE energy-use pattern; households; Bhutan; multinomial logit model
ID DEVELOPING-COUNTRIES; INDIAN HOUSEHOLDS; FUEL CHOICE; RURAL INDIA; LADDER; CONSUMPTION; TRANSITION; COOKING; MODEL; POVERTY
AB Using the Bhutan Living Standard Survey (BLSS) data for the year 2007, this paper attempts to identify and analyze the factors that are likely to influence household decisions when choosing a particular energy source for various uses such as lighting, cooking, and heating. A multinomial logit selection model has been applied for this identification and analysis. The results show that a household's choice of cleaner fuels for lighting, cooking, and heating is driven by level of income, age, education and gender of the household head, access to electricity, and location. Households with a better-educated or female head, those with a higher level of income, and urban households, have a higher probability of switching to the use of clean energy, while poor households, rural households and those with a low level of education are constrained by these factors to continue using dirty energy. The study shows that femaleheaded households are more likely to choose cleaner fuels, and that above all the availability of a clean and cost-effective source of energy within the proximity is an important factor in the adoption of clean energy. We combined BLSS 2003 and 2007 and conducted similar analyses and confirmed the robustness of the result.
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NR 45
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Z9 21
U1 0
U2 11
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JI Energy
PD MAY 1
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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ER
FN Clarivate Analytics Web of Science
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PT J
AU Zografakis, N
Karyotakis, K
Tsagarakis, KP
AF Zografakis, Nikolaos
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Tsagarakis, Konstantinos P.

TI Implementation conditions for energy saving technologies and practices in office buildings: Part 1. Lighting
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Energy efficiency; Energy saving; Lighting; Office buildings; Public acceptance; Public awareness; Willingness to pay
ID COMPACT FLUORESCENT LAMPS; DAYLIGHT RESPONSIVE SYSTEMS; PERFORMANCE; CONSUMPTION; EFFICIENCY; SECTOR; ENVIRONMENT; EMISSIONS; BALLASTS; SUPPORT
AB This paper provides a review of lighting energy saving and energy efficiency policies and practices in office buildings. The results of a face to face survey of 685 managers of companies are presented, which give insights into the factors that have influenced them to invest in lighting saving technologies. The assessment of the available lighting technologies in use in office buildings, showed that the installation of lighting saving technologies was positively influenced by a number of parameters, such as high annual financial turnover, recently established companies and companies managed by older, highly educated and energy aware people. The acceptability of the adoption and use of new efficient lighting technologies and the willingness to pay for proposed new efficient office lighting technologies, following a technico-economic information session, were also investigated. The willingness of a manager to invest in lighting energy saving/efficient technology was positively influenced by a number of factors including when a company was located in old buildings, if it was companies affected by electricity shortages, and/or if it had a large floor area. (c) 2012 Elsevier Ltd. All rights reserved.
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FU Interreg IIIC
FX This work was financed by Interreg IIIC "Action program for Sustainable Strengthening Energy Efficiency and Source Saving by Sustainable Local Development in European Regions (ENERCY REGIO)/Subproject: Practical Training in Companies" where Region of Crete - Regional Energy Agency of Crete was a partner. Thanks are due to trine Drakaki, Irine Kritsotaki and Melina Mantidaki for helping in the data collection.
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SN 1364-0321
J9 RENEW SUST ENERG REV
JI Renew. Sust. Energ. Rev.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels

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PT J
AU Karkanias, C
Boemi, SN
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Tsoutsos, TD
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Karagiannidis, A.
TI Energy efficiency in the Hellenic building sector: An assessment of the restrictions and perspectives of the market
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency; Bioclimatic architecture; Sustainable building
ID SAMPLE-SIZE; GREECE; DEMAND
AB The significance of bioclimatic architecture has become widely accepted since the 19705 and the implementation of its principles in practice is a key factor in order to achieve energy efficiency in the building sector. The way, however, from scientific acceptance to commercial utilization is not a straightforward one. This paper deals with the notion of bioclimatic architecture in buildings and investigates the aspects of this concept in Hellas. A sample of university researchers, building contractors and members of public organisations was interviewed using a standardised set of guidelines. The barriers to promoting bioclimatic design, role of the local government in the adoption process, level of environmental culture as well as perspectives of this concept in Hellas were the key areas of discussion in each of the interviews. The results from the data analysis reveal insufficient economic incentives, a lack in technical information as well as a lack in specific environmental policies that would foster the propagation of bioclimatic architecture. (C) 2010 Elsevier Ltd. All rights reserved.
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PU ELSEVIER SCI LTD
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PT J
AU Andrews, CJ
Krogmann, U
AF Andrews, Clinton J.
Krogmann, Uta
TI Explaining the adoption of energy-efficient technologies in US
commercial buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Commercial buildings; Energy efficiency; United States; Technology

diffusion; Innovation
AB This paper investigates factors explaining the adoption of energy-efficient heating, cooling, window, and lighting technologies in U.S. commercial buildings. It presents multinomial logit models of technology adoption using the 2003 Commercial Buildings Energy Consumption Survey microdata set, examining, first, fundamental building components, and, second, energy-efficient adaptations. Key findings are that the choice of fundamental building components is strongly influenced by locational factors, the activities that are expected to take place in the building, and building-specific characteristics. Lighting technologies are an exception, and are poorly explained by these factors. By contrast, energy-efficient heating, cooling, window, lighting, and control adaptations appear to share common drivers, and are more likely to be adopted in newer, larger, more energy-intensive, owner-occupied buildings. These are the buildings that can best afford the up-front costs of innovation, which is often a design-intensive process. Absent policy interventions, the energy-efficient adaptations are unlikely to diffuse rapidly to the rest of the commercial building stock. (C) 2008 Elsevier B.V. All rights reserved.
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FU National Science Foundation [CMS-0424625, CMMI-0725503]
FX This research was supported by National Science Foundation grants CMS-0424625 and CMMI-0725503.
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JI Energy Build.
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Parnell, R
Larsen, OP
AF Parnell, R
Larsen, OP
TI Informing the development of domestic energy efficiency initiatives an everyday - An everyday householder-centered framework
SO ENVIRONMENT AND BEHAVIOR
LA English
DT Article
DE domestic energy efficiency; information program; self-interest; energy knowledge; cognitive capacity
ID ENVIRONMENTALLY RESPONSIBLE BEHAVIOR; CONSERVATION; PERSPECTIVE; PARTICIPATION; INFORMATION; PSYCHOLOGY; BARRIERS; VALUES
AB This article challenges the assumptions of the techno-economic paradigm that has dominated U.K. energy policy and associated domestic energy efficiency programs since the 1970s. The process of development of an alternative conceptual framework, the everyday householder-centered approach, is described. The study began with semistructured interviews with domestic energy efficiency program providers, the results of which guided a subsequent literature review. The developed framework was structured around three core traits of the everyday householder in the context of information and advice programs for domestic energy efficiency: self-interest, energy knowledge, and cognitive capacity. The conceptual framework is presented for practical application in guiding the development of effective information and advice-focused domestic energy efficiency programs.
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AU Kolokotsa, D
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TI Review of the indoor environmental quality and energy consumption
studies for low income households in Europe
SO SCIENCE OF THE TOTAL ENVIRONMENT
LA English
DT Review
DE Energy poverty; Low income households; Indoor environmental quality;
Energy consumption
ID THERMAL COMFORT; EFFICIENT REFURBISHMENT; FUEL POVERTY; LUNG-CANCER;
COLD HOMES; TEMPERATURES; HEALTH; ENGLAND; IMPROVEMENTS; DWELLINGS
AB The term energy poverty is used to describe a situation of a household not able to satisfy socially and materially the required levels of its energy services. Energy and fuel poverty is an increasing problem in the European Union. Although the specific conditions vary from country to country the drivers defining fuel and energy poverty are similar in all Europe. This paper aims to present the state of the art regarding the energy demand and indoor environmental quality of low income households in Europe. The characteristics of this specific population group are presented including details on the specific energy consumption, the indoor comfort and finally the impact of the specific living conditions on the occupants' health. (C) 2015 Elsevier B.V. All rights reserved.
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AU Battista, G
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AF Battista, Gabriele
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TI Buildings Energy Efficiency: Interventions Analysis under a Smart Cities Approach
SO SUSTAINABILITY
LA English
DT Article
DE TRNSYS; smart environment; building efficiency; intervention efficiency
ID ICT; SUSTAINABILITY
AB Most of the world's population lives in urban areas and in inefficient buildings under the energy point of view. Starting from these assumptions, there is the need to identify methodologies and innovations able to improve social development and the quality of life of people living in cities. Smart cities can be a viable solution. The methodology traditionally adopted to evaluate building energy efficiency starts from the structure's energy demands analysis and the demands reduction evaluation. Consequently, the energy savings is assessed through a cascade of interventions. Regarding the building envelope, the first intervention is usually related to the reduction of the thermal transmittance value, but there is also the need to emphasize the building energy savings through other parameters, such as the solar gain factor and dye solar absorbance coefficients. In this contribution, a standard building has been modeled by means of the well-known dynamic software, TRNSYS. This study shows a parametrical analysis through which it is possible to evaluate the effect of each single intervention and, consequently, its influence on the building energy demand. Through this analysis, an intervention chart has been carried out, aiming to assess the intervention efficiency starting from the percentage variation of energy demands.
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OI Battista, Gabriele/0000-0001-9321-3061; Evangelisti, Luca/0000-0002-9502-4309; de lieto vollaro, roberto/0000-0002-1010-2313
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PU MDPI AG
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PA POSTFACH, CH-4005 BASEL, SWITZERLAND
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J9 SUSTAINABILITY-BASEL
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GP IEEE
TI Design of Energy Consumption Monitoring and Energy-saving Management
System of Intelligent Building based on the Internet of Things
SO 2011 INTERNATIONAL CONFERENCE ON ELECTRONICS, COMMUNICATIONS AND CONTROL
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CL Ningbo, PEOPLES R CHINA
SP IEEE, Ningbo Univ, Key Lab Sci & Tech Natl Def (KLSTND)
DE Building energy-saving; Intelligent Building; Wireless sensor network;
Internet of things
AB for people improving the energy-saving performances of buildings, the applications of information communication, computer network, automation control and etc. are the current building energy-saving technologies. They form with a serial of technique measures for buildings with energy management systems running implementation and intelligent monitoring. This paper introduces and analyzes the information technology in building energy-saving. For building energy-saving on the demand for intelligent building energy monitoring, this paper proposed a system framework of Building Energy Monitoring and Analysis System based on the Internet of things, which has some enlightening in Building energy consumption further to achieve real-time monitoring and control, and improve the energy-saving of intelligent building.
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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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TI Estimating building energy consumption using extreme learning machine method
SO ENERGY
LA English
DT Article
DE Energy consumption; Residential buildings; Estimation; Energy efficiency; ELM (extreme learning machine)
ID ARTIFICIAL NEURAL-NETWORKS; RESIDENTIAL BUILDINGS; THERMAL COMFORT; PREDICTION; TECHNOLOGIES; ALGORITHM; ACCURATE; SYSTEMS; WALLS
AB The current energy requirements of buildings comprise a large percentage of the total energy consumed around the world. The demand of energy, as well as the construction materials used in buildings, are becoming increasingly problematic for the earth's sustainable future, and thus have led to alarming concern. The energy efficiency of buildings can be improved, and in order to do so, their operational energy usage should be estimated early in the design phase, so that buildings are as sustainable as

possible. An early energy estimate can greatly help architects and engineers create sustainable structures. This study proposes a novel method to estimate building energy consumption based on the ELM (Extreme Learning Machine) method. This method is applied to building material thicknesses and their thermal insulation capability (K-value). For this purpose up to 180 simulations are carried out for different material thicknesses and insulation properties, using the EnergyPlus software application. The estimation and prediction obtained by the ELM model are compared with GP (genetic programming) and ANNs (artificial neural network) models for accuracy. The simulation results indicate that an improvement in predictive accuracy is achievable with the ELM approach in comparison with GP and ANN. (C) 2015 Elsevier Ltd. All rights reserved.

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NR 43
TC 19
Z9 19
U1 2
U2 25
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 0360-5442
EI 1873-6785
J9 ENERGY
JI Energy
PD FEB 15
PY 2016
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BP 506
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DI 10.1016/j.energy.2015.11.037
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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UT WOS:000371841100043
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ER

PT J
AU Fan, H
MacGill, IF
Sproul, AB
AF Fan, H.
MacGill, I. F.
Sproul, A. B.
TI Statistical analysis of driving factors of residential energy demand in the greater Sydney region, Australia
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy demand; Residential household characteristics; Driving factors for electricity consumption; Empirical data; Smart grid; Energy

modelling
ID NEURAL-NETWORK; ELECTRICITY LOAD; TOP-DOWN; CONSUMPTION; SECTOR; MODEL; PERFORMANCE; PROFILES; TRENDS; IMPACT
AB The residential sector represents some 30% of global electricity consumption but the underlying composition and drivers are still only poorly understood. The drivers are many, varied, and complex, including local climate, household demographics, household behaviour, building stock and the type and number of appliances. There is considerable variation across households and, until recently, often a lack of good data. This study draws upon a detailed household dataset from the Australian Smart Grid Smart City project to build a household electricity consumption model. A statistical linear regression model for household energy demand was established and tested for both individual households and regional aggregations of households. The model showed only reasonable performance in forecasting the consumption of individual households - highlighting the influence of factors beyond those surveyed - but good performance for aggregated household consumption. Models such as this would seem highly useful for a range of stakeholders including individual households trying to understand the potential implications of different choices, utilities looking to better forecast the impact of different possible residential trends and policy makers seeking to assist households in improving their energy efficiency through targeted policies and programs. Crown Copyright (C) 2015 Published by Elsevier B.V. All rights reserved.
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FU Australian Postgraduate Award scholarship; Cooperative Research Centre for Low Carbon Living whose activities - Australian Governments Cooperative Research Centre Programme
FX Hua Fan gratefully acknowledges the financial support of an Australian Postgraduate Award scholarship, and additional scholarship support from the Cooperative Research Centre for Low Carbon Living whose activities are funded by the Australian Governments Cooperative Research Centre Programme. Special thanks go to Miss Zoe Hungerford for her editing and Jin Zhang for his statistics advice.
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NR 62
TC 19
Z9 19
U1 5
U2 36
PU ELSEVIER SCIENCE SA
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PD OCT 15
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil

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GA CS5UG
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ER

PT J
AU Leung, MC
Tse, NCF
Lai, LL
Chow, TT
AF Leung, M. C.
Tse, Norman C. F.
Lai, L. L.
Chow, T. T.
TI The use of occupancy space electrical power demand in building cooling load prediction
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Building cooling load prediction; Artificial neural network; Occupants' activities
ID ARTIFICIAL NEURAL-NETWORKS; FEEDFORWARD NETWORKS; ENERGY; SIMULATION; OFFICES; BLINDS; MODELS; IMPACT
AB This paper presents an investigation into the use of occupancy space electrical power demand to mimic occupants' activities in building cooling load prediction by intelligent approach. The occupancy space electrical power demand is obtained from an intelligent networked building power monitoring system. It works as a prototype advanced metering infrastructure - a key feature in smart grid technology. The artificial neural network model adopted is the Levenberg-Marquardt algorithm. The input parameters include the usual external climatic data, hour-type/day-type and pretreated air unit operation schedule, and the occupancy space electrical power demand. The output is the electrical power demand of the building cooling system. Simulation studies are conducted for a university building in Hong Kong. The 2010 and 2011 yearly data is used to conduct simulations. The performance indices used in evaluating the prediction performance are the coefficient of correlation (R), coefficient of variation (CV) and mean absolute percentage error (MAPE). It is demonstrated that with the use of occupancy space electrical power demand as one of the model input parameters, the prediction accuracy of the building cooling load model can be improved. In summer season, the best MAPE and CV is 4.494% and 5.808% respectively for hourly prediction, and is 1.935% and 2.345% respectively for daily prediction. On daily peak cooling load prediction in summer season, the best MAPE and CV is 2.313% and 2.862% respectively. It is found that the variability in the prediction is modest in summer season. (C) 2012 Elsevier B.V. All rights reserved.
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FX This work was supported in full by a grant from City University of Hong Kong [Ref. No. CityU 7002614]. Weather data are obtained from Hong Kong Observatory of the Hong Kong SAR. The authors would like to thank the building facility management of City University of Hong Kong for the support and advice.
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NR 36
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U1 0
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PD DEC
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GA 065MK
UT WOS:000313152400018
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ER

PT J
AU Lanzisera, S

Nordman, B
Brown, RE
AF Lanzisera, Steven
Nordman, Bruce
Brown, Richard E.
TI Data network equipment energy use and savings potential in buildings
SO ENERGY EFFICIENCY
LA English
DT Article
DE Network equipment energy use; Ethernet energy use; IP networks; Energy efficiency
AB Network connectivity has become nearly ubiquitous, and the energy use of the equipment required for this connectivity is growing. Network equipment consists of devices that primarily switch and route Internet Protocol (IP) packets from a source to a destination, and this category specifically excludes edge devices like PCs, servers and other sources, and sinks of IP traffic. This paper presents the results of a study of network equipment energy use and includes case studies of networks in a campus, a medium commercial building, and a typical home. The total energy use of network equipment is the product of the stock of equipment in use, the power of each device, and their usage patterns. This information was gathered from market research reports, broadband market penetration studies, field metering, and interviews with network administrators and service providers. We estimate that network equipment in the USA used 18 TWh, or about 1% of building electricity, in 2008 and that consumption is expected to grow at roughly 6% per year to 23 TWh in 2012; world usage in 2008 was 51 TWh. This study shows that office building network switches and residential equipment are the two largest categories of energy use consuming 40% and 30% of the total respectively. We estimate potential energy savings for different scenarios using forecasts of equipment stock and energy use, and savings estimates range from 20% to 50% based on full market penetration of efficient technologies.
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NR 15
TC 19
Z9 19
U1 0
U2 8
PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
J9 ENERG EFFIC
JI Energy Effic.
PD MAY
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DI 10.1007/s12053-011-9136-4
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Axon, CJ
Bright, SJ
Dixon, TJ
Janda, KB
Kolokotroni, M
AF Axon, C. J.
Bright, S. J.
Dixon, T. J.
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Kolokotroni, M.
TI Building communities: reducing energy use in tenanted commercial property
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE asset management; commercial property; communities of practice; energy management; green leases; landlords; refurbishment; research agenda; socio-legal; tenants
ID STAKEHOLDERS; ENVIRONMENT; DIFFUSION; MARKET
AB Reducing energy use in tenanted commercial property requires a greater understanding of 'buildings as communities'. Tenanted commercial properties represent: (1) the divergent communities that share specific buildings; and (2) the organizational communities represented by multi-site landlord and tenant companies. In any particular tenanted space the opportunity for environmental change is mediated (hindered or enabled) through the lease. This discussion draws on theoretical and practical understandings of (1) the socio-legal relationships of landlords, tenants and their advisors; (2) the real performance of engineering building services strategies to improve energy efficiency; (3) how organizational cultures affect the ability of the sector to engage with energy-efficiency strategies; and (4) the financial and economic basis of the relationship between owners and occupiers. The transformational complexity stems from: (1) the variety of commercial building stock; (2) the number of stakeholders (solicitors, investors, developers, agents, owners, tenants and facilities managers); (3) the fragmentation within the communities of practice; and (4) leasehold structures and language. An agenda is proposed for truly interdisciplinary research that brings together both the physical and the social sciences of energy use in buildings so that technological solutions are made effective by an understanding of the way that buildings are used and communities behave.
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FU UK Engineering and Physical Sciences Research Council; Carbon Trust's Carbon Vision initiative
FX These are two of the projects funded by the UK Engineering and Physical Sciences Research Council and Carbon Trust's Carbon Vision initiative.
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SN 0961-3218
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J9 BUILD RES INF
JI Build. Res. Informat.
PY 2012
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SI SI
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GA 971RE
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AU Xu, PP
Chan, EHW
Visscher, HJ
Zhang, XL
Wu, ZZ
AF Xu, Pengpeng
Chan, Edwin H. W.
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TI Sustainable building energy efficiency retrofit for hotel buildings using EPC mechanism in China: analytic Network Process (ANP) approach
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Building energy efficiency; Retrofit; Energy performance contracting (EPC); ANP
ID PERFORMANCE CONTRACTING EPC; PROJECT; SUCCESS; MODEL
AB Building Energy Efficiency Retrofit (BEER) is considered as a valuable way to improve energy efficiency of high-energy-consumption buildings. Sustainable BEER helps integrate sustainable development strategy into existing buildings and retrofit projects. To ensure BEER projects that can fulfill the sustainable development strategy, Energy Performance Contracting (EPC) is one possible market mechanism to deliver energy efficiency projects. Sustainable BEER under the EPC mechanism is a comprehensive system which involves the various demands of sustainable dimensions, performance criteria and groups of project success factors, making multi-criteria decisions become a challenging problem for decision makers. This paper aims to examine the interrelationships of sustainable BEER by focusing on an existing hotel building. EPC mechanism is applied in the case study and an effective Analytic Network Process (ANP) approach is also employed in the research. The result indicates that sustainable BEER in hotel buildings under the EPC mechanism is mainly determined by project control mechanism, available technology, organizing capacity of the team leader, trust, accurate Measurement and Verification (M&V), and team workers' technical skills. Decision makers should dedicate more attention to these aspects. From the research findings, several policy implications are proposed in this paper.
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PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI J. Clean Prod.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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PT J
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Gong, J
Farzan, F
Stryker, A
AF Farzan, Farbod
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Gong, Jie
Farzan, Famaz
Stryker, Andrew
TI A multi-scale adaptive model of residential energy demand
SO APPLIED ENERGY
LA English
DT Article
DE Bottom-up demand modeling; Technology adoption; Demand side management;

Electric vehicles; Price responsive demand
ID ENGINEERING MODELS; SECTOR; CONSUMPTION
AB In this paper, we extend a previously developed bottom-up energy demand model such that the model can be used to determine changes in behavioral and energy usage patterns of a community when: (i) new load patterns from Plug-in Electrical Vehicles (PEV) or other devices are introduced; (ii) new technologies and smart devices are used within premises; and (iii) new Demand Side Management (DSM) strategies, such as price responsive demand are implemented. Unlike time series forecasting methods that solely rely on historical data, the model only uses a minimal amount of data at the atomic level for its basic constructs. These basic constructs can be integrated into a household unit or a community model using rules and connectors that are, in principle, flexible and can be altered according to the type of questions that need to be answered. Furthermore, the embedded dynamics of the model works on the basis of: (i) Markovian stochastic model for simulating human activities, (ii) Bayesian and logistic technology adoption models, and (iii) optimization, and rule-based models to respond to price signals without compromising users' comfort. The proposed model is not intended to replace traditional forecasting models. Instead it provides an analytical framework that can be used at the design stage of new products and communities to evaluate design alternatives. The framework can also be used to answer questions such as why demand behaves the way it does by examining demands at different scales and by playing What-If games. These analyses are not possible with demand forecast models built on historical samples, simply because, these forecast models and their level of accuracy are limited by their training data sets and can hardly demonstrate variations that are not present in the historical data sets.
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JI Appl. Energy
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA CK3NJ
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PT J
AU Lin, BQ
Liu, HX
AF Lin, Boqiang
Liu, Hongxun
TI A study on the energy rebound effect of China's residential building energy efficiency
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Building energy efficiency; Energy rebound effect; LA-AIDS model
ID DEMAND; CONSUMPTION; PRICES; KOREA
AB China's building energy efficiency design standards have been always treated as the base of national energy conservation planning and industrial investment. However, they cannot fully achieve the expected benefits due to the energy rebound effect. This paper verifies the energy rebound effect in China's urban and rural residential buildings based on the LA-AIDS theory, and further estimates the building energy conservation by counterfactual analysis, catching the specific influences of rebound effect on building energy conservation and the corresponding residential building energy conservation potentials of China. The empirical results reveal that: (i) The rebound effect in the rural residential buildings is much larger than that in the urban residential buildings, where presenting the "back-fire" effect. (ii) The rebound effect

in the rural residential buildings is weakening while it is enhancing in the urban residential buildings. (iii) Nationally, if energy policies including price polices, technological improvements as well as some other measures were implemented to avoid the rebound effect, we could have conserved about 20% electricity consumption in China's residential buildings each year. The magnitude increased by time to the highest level (107.66 GWh) in 2011, equivalent to the CO2 emission reduction of 0.1 billion tons. (C) 2014 Elsevier B.V. All rights reserved.
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FU Newhuadu Business School Research Fund; China Sustainable Energy Program [G-1311-19436, G-1404-20905]; Ministry of Education [10JBG013]
FX This paper is supported by Newhuadu Business School Research Fund, the China Sustainable Energy Program (G-1311-19436, and G-1404-20905), and Ministry of Education (Grant No. 10JBG013).
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J9 ENERG BUILDINGS
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PD JAN
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Du, P
Zheng, LQ
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AF Du, Ping
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Mahalingam, Arjun
TI Barriers to the adoption of energy-saving technologies in the building sector: A survey study of Jing-jin-tang, China
SO ENERGY POLICY
LA English
DT Article
DE Barrier; Building sector; Energy-saving technology; Factor analysis; Survey study
ID MEDIUM-SIZED ENTERPRISES; EFFICIENT USE; LONG-TERM; CONSERVATION; EVIDENCES; BENEFITS; DRIVERS; COSTS
AB The building sector of China currently consumes 20% of the total energy consumption. Studies on barriers to the adoption of building energy-saving technologies are of great significance on implementing policies related to achieving energy-saving goals. This paper studied 15 barriers with the aid of information collected through questionnaires and semi-structured interviews. The respondents were 135 employees working in the Jing-jin-tang area. Based on the results of the factor analysis, the barriers were categorized into five groups: attitudes of stakeholders, policies and regulations, auxiliary resources, profitability, and adaptability of the technologies. Analysis of the entire sample showed that the stakeholders' reluctance to

use was the largest barrier, followed by high initial investment and low profitability. Further analysis showed that the occupation and designation of the respondents and the size of the enterprises that they served influenced their perspectives on the barriers. It was found that architects attributed more importance to the adoption of energy-saving technologies than contractors; barriers confronted by employees of large enterprises and small enterprises were different; managers perceived weaker barriers than frontline employees and were more optimistic about the prospect of building energy-saving technologies. Finally, policy recommendations were proposed based on these in-depth and targeted analyses. (C) 2014 Elsevier Ltd. All rights reserved.

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FU National Natural Science Foundation of China [71003072, 71373172]; National Development and Reform Commission [2012023]; Ministry of Housing and Urban-rural Development of China [11-R1-338]; Tianjin Urban-Rural Construction and Transport Commission; China State Construction Engineering Corporation
FX We would like to express our gratitude to the reviewers and Dr. David Reiner of University of Cambridge. Their constructive comments played an important role in improving the quality of our manuscript. We also sincerely acknowledge the financial support from the National Natural Science Foundation of China under Grant nos. 71003072 and 71373172, the support from National Development and Reform Commission under Grant no. 2012023 and the support from Ministry of Housing and Urban-rural Development of China under Grant no. 11-R1-338. Moreover, the authors are also grateful to the Tianjin Urban-Rural Construction and Transport Commission, China State Construction Engineering Corporation and Dr. Peng-Cheng Sun of China State Construction Technical Center for their support in this survey study.

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U2 24
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Azar, E
Menassa, CC
AF Azar, Elie
Menassa, Carol C.
TI Framework to Evaluate Energy-Saving Potential from Occupancy
Interventions in Typical Commercial Buildings in the United States
SO JOURNAL OF COMPUTING IN CIVIL ENGINEERING
LA English

DT Article
DE Commercial buildings; Energy efficiency; United States; Commercial buildings; Energy conservation; Energy efficiency; Agent-based modeling; Social subnetworks
ID NORMATIVE SOCIAL-INFLUENCE; ELECTRICITY CONSUMPTION; ENVIRONMENTAL BEHAVIOR; EXTREMISM PROPAGATION; BOUNDED CONFIDENCE; DECISION-MAKING; NETWORKS; DYNAMICS; CONSERVATION; DIFFUSION
AB Occupancy-focused interventions to reduce building energy use have been shown to be effective but often result in unsustained energy reductions. In addition, these interventions have rarely been applied to commercial buildings. Research on residential buildings has linked the success of these interventions to the buildings' social structures. However, the results cannot be directly applied to commercial buildings given their complex social structures formed by independent entities (i.e.,companies) with different organizational structures and cultures within a building. In this paper, an agent-based modeling framework is developed to (1)provide a more realistic representation of social subnetworks in commercial buildings, (2)model interactions between occupants and the resulting peer pressure to change their energy-use characteristics based on the relative agreement interaction model, and (3)evaluate the efficiency of occupancy interventions for different subnetwork characteristics on a typical medium-sized office building in the United States. Statistical analyses are performed and recommendations made on how to improve energy conservation from occupancy interventions by as much as 24.7%. The contributions of this research to the fields of computing and energy conservation are significant and can be used to shape future occupancy interventions for more effective and sustained energy reductions in commercial buildings.
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WC Computer Science, Interdisciplinary Applications; Engineering, Civil
SC Computer Science; Engineering
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PT J
AU Chen, C
Cook, DJ
Crandall, AS
AF Chen, Chao
Cook, Diane J.
Crandall, Aaron S.
TI The user side of sustainability: Modeling behavior and energy usage in the home
SO PERVASIVE AND MOBILE COMPUTING
LA English
DT Article
DE Smart environments; Machine learning; Energy; Anomaly detection
ID CONSUMPTION; BUILDINGS
AB Society is becoming increasingly aware of the impact that our lifestyle choices make on energy usage and the environment. As a result, research attention is being directed toward green technology, environmentally-friendly building designs, and smart grids. This paper looks at the user side of sustainability. In particular, it looks at energy consumption in everyday home environments to examine the relationship between behavioral patterns and energy consumption. It first demonstrates how data mining techniques may be used to find patterns and anomalies in smart home-based energy data. Next, it describes a method to correlate home-based activities with electricity usage. Finally, it describes how this information could inform users about their personal energy consumption and to support activities in a more energy-efficient manner. These approaches are validated by using real energy data collected in a set of smart home testbeds.
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PT J
AU Kalz, DE
Herkel, S
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TI The impact of auxiliary energy on the efficiency of the heating and cooling system: Monitoring of low-energy buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE End and primary energy use; Auxiliary energy use; Energy efficiency; Energy long-term monitoring; Thermo-active building systems; Low-energy building; Environmental heat source and sink
AB This paper presents a detailed meta-analysis of end and primary energy use for heating, cooling and ventilation of I I low-energy non-residential buildings and one residential building in Germany that belong to the EnOB research program launched by the German Federal Ministry for Economy. In particular, the analysis emphasizes the substantial impact of auxiliary energy use on the efficiency of heating and cooling

performance. The investigated buildings employ environmental energy sources and sinks - such as the ground, ground water, rainwater and the ambient air - in combination with thermo-active building systems. These concepts are promising approaches for slashing the primary energy use of buildings without violating occupant thermal comfort. A limited primary energy use of about 100 kWh(prim)/m(ner)(2)a) as a target for the complete building service technology (HVAC and lighting) was postulated for all buildings presented. With respect to this premise, a comprehensive long-term monitoring in high time resolution was carried out over the course of two to five years, with an accompanying commissioning of the building performance. Measurements include the energy use for heating, cooling, and ventilation, as well as the auxiliary equipment, the performance of the environmental heat source and sink, and local climatic site conditions. (C) 2009 Elsevier B.V. All rights reserved.

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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Huang, B
Mauerhofer, V
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TI Analysis of existing building energy saving policies in Japan and China
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Building; Energy saving policy; Obstacle
ID IMPLEMENTATION THEORY; EFFICIENCY; SUSTAINABILITY; REDUCTION
AB Building sector accounts for a large percentage of the total national energy consumption in most of the countries, thus it is critical to formulate and implement appropriate energy saving policies in the building sector. This paper focuses on energy saving policies in the building sector by conducting a comparative study between Japan and China. The exiting Building Energy Saving (BES) policies, actual effectiveness of policy implementation and obstacles to the effective policy implementation are compared in sequence. Related policies are categorized into four groups: control and regulatory instruments; economic/market-based instruments; fiscal instruments and information and voluntary actions. Policy effect analysis identifies that BES policies have promoted building energy saving in both Japan and China. Obstacles comparison reveals that Japan and China shared many obstacles including high transaction costs and lack of applicable methodology. Compared with Japan, China is suffering more obstacles such as inefficient enforcement, insufficient levels of information and awareness and immature financial regulation system. Based on the previous findings, common suggestions for overcoming these obstacles of BES policies in Japan and China are presented, such as the accurate methods of baseline identification and emission accountings, innovative incentives, and more capacity building activities. Distinct suggestions for Japan and China are also added by considering their own situations so that both countries can further improve their BES policies.
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FX This study was supported by the National Natural Science Foundation of China (Grant Nos. 71403170, 71325006, 71461137008). The advice from Mrs. Yuko Nishida from the Bureau of Environment, Tokyo Metropolitan Government and Mr. Norichika Kanie from Tokyo Institute of Technology is highly valued. The authors are also thankful to Marlen S. Krause for her careful proofreading of an earlier version and helpful comments.
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U1 0
U2 28
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DI 10.1016/j.jclepro.2015.07.041
PN 2
PG 9
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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PT J
AU Zhou, ZH
Zhang, SZ
Wang, CD
Zuo, J
He, Q
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AF Zhou, Zhihua
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TI Achieving energy efficient buildings via retrofitting of existing buildings: a case study
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Existing building; Retrofitting; Operation strategy; Indoor environment
ID RESIDENTIAL BUILDINGS; POLICY INSTRUMENTS; ECONOMIC-ANALYSIS; CHINA; TECHNOLOGIES; PERFORMANCE; CONSUMPTION; SIMULATION; EMISSION; GERMANY
AB Retrofitting of existing buildings plays a critical role to achieve sustainable development. There are a number of factors that affect the effectiveness of building energy efficient retrofitting. These factors can be

broadly categorised as technology and management. A case study approach was employed in this study to examine effective ways of building energy efficient retrofitting based on one year of monitoring. Several feasible schemes of building energy efficient retrofitting were identified according to the characteristics of the case building. The best scheme was chosen according to results of simulation, comparison and analysis. The focuses of building energy efficient retrofitting were placed on energy conservation and indoor environment quality. In particular, during the operation stage, staff can regulate the terminal unit in accordance with their own demands. Results showed that the building operation can satisfy staff's individual requirements after the retrofit. Similarly, the annual energy consumption can be reduced by 57% compared to the national average of office buildings in China. These findings provide useful inputs for the future building energy efficient retrofitting practices as well as policy making process. (C) 2015 Elsevier Ltd. All rights reserved.

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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI J. Clean Prod.
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SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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TI Improving the energy efficiency in buildings while reducing the waste using autoclaved aerated concrete made from power industry waste
SO ENERGY AND BUILDINGS

LA English
DT Article
DE Aerated concrete; Industrial waste; Building; Insulation; Sorption; Energy saving
AB Production of autoclaved aerated concrete (AAC) from power industry waste cinders represents a progressive technology for processing of industrial waste in a new form of building material with good qualities. Despite these positive aspects, the share of cinder concrete in the building industry is less popular. The low popularity is partially caused by the poor aesthetic of cinder concrete in comparison with sand-based AAC; however, the main cause is the slightly smaller thermal and moisture qualities of fly ash-based AAC, respecting uncertainty because there are no supporting scientific research and publications about it. This paper is dedicated to a study of the thermal and moisture properties of the cinder concrete and mutual behaviour with the sand-based AAC. It was determined that fly ash-based AAC demonstrated slightly larger moisture sorption in comparison with sand-based concrete under similar conditions. On the contrary, the thermal insulating properties of fly ash-based concrete, as indicated by the heat conductivity, exhibits less moisture influence in comparison with sand-based AAC. Concerning volume changes, fly ash-based AAC showed, in the condition of low moisture, slightly better properties when compared with autoclaved aerated sand concrete. (C) 2012 Elsevier B.V. All rights reserved.
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FU advance building material centre [GACR 103/09/0016]; European Social Funds, Operational programme Education for Competitiveness
FX This research was supported by the project of GACR 103/09/0016 and project SUPMAT - Promotion of further education of research workers from advance building material centre. Registration number: CZ.1.07/2.3.00/20.0111, funded by European Social Funds, Operational programme Education for Competitiveness.
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Z9 20
U1 2
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PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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J9 ENERG BUILDINGS
JI Energy Build.
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PT J
AU Kobus, CBA
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AF Kobus, Charlotte B. A.
Mugge, Ruth
Schoormans, Jan P. L.
TI Washing when the sun is shining! How users interact with a household energy management system
SO ERGONOMICS
LA English
DT Article
DE energy management system; electricity consumption
ID FEEDBACK; CONSERVATION; BEHAVIOR; INTERVENTION; PRODUCTS; DESIGN
AB To make optimal use of sustainable energy, domestic electricity consumption should shift to match local supply conditions. Energy management systems (EMS) are a new sustainable technology that can help to disrupt consumers' habits concerning electricity consumption, whilst reinforcing desired behaviours. This research examined the factors that influence the likelihood that people will shift their electricity consumption to match sustainable supply. Twenty-one interviews were conducted with households who had used the EMS Smart Wash' for several months. The findings showed that the likelihood of behaviour change is influenced by a combination of the user's motivation, specific contextual factors and the design of the EMS. Based on these results, several recommendations are given for the future design of EMSs. Practitioner Summary: Energy management systems (EMS) are a new technology that encourages people to shift electricity consumption to match local solar supply. Interviews among users of an EMS showed that the likelihood of behaviour change is influenced by the combination of the user's motivation, contextual factors and the EMS design.
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Z9 17
U1 0
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PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
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J9 ERGONOMICS
JI Ergonomics
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SC Engineering; Psychology
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PT J
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TI European project Educa-RUE: An example of energy efficiency paths in educational buildings
SO APPLIED ENERGY
LA English
DT Article; Proceedings Paper
CT 3rd International Conference on Applied Energy (ICAE)
CY MAY 16-18, 2011
CL Perugia, ITALY
DE European project; Educational buildings; Energy efficiency
ID CONSUMPTION
AB The aim of Educa-RUE project is to improve energy performance in building sector at local level and with particular attention to educational buildings, by promoting the ability of local players to guide and orient initiatives, designed to encourage energy saving by means of specific measures and integrated tools.
The project is therefore focused to speed up the implementation of European Directive on Energy Performance in Buildings, EPBD (2002/91/EC), in Member States at local government level and to ensure its operability, within the various national legislations of reference.
Educa-RUE lasted 30 months, from January 2008 to June 2010, and involved the following eight partners: for Italy, Provinces of Potenza (project leader), Perugia, Rieti and Palermo; for other Countries, Climate Energy Ltd. Essex and Energy Solutions North West London (UK), Associacion Aragonesa de Entidades Locales ASAEL (Spain), Municipality of Prenzlau (Germany).
A number of closely interconnected actions were carried on in eight Work Packages (WPs) to face the energy efficiency aspects identified as primary problems by the partners. The project developed a model process, known as "Educa-RUE method", to assess possible policies of intervention on educational buildings, owned or managed by each Partner.
In particular the Province of Perugia, leader of WP 2 and 5, provided guide lines and tools in order to: identify the state of the art of EPBD implementation and the main non-technological barriers, which are preventing its application at local level; select, within the Province/area patrimony, the most suitable educational building, to be used as a shining example to develop the following testing phases of the project; carry on an energy check, or audit, of selected buildings, by involving the educational community as user and active participant in the whole process; elaborate an executive project, concerning the description of all the building elements (structure, roof, heating/cooling plants, etc.) which need to be replaced/improved and the application of an energy/environmental assessment; plan refurbishing interventions for the rest of the school buildings directly managed by each Partner, according to specific priority selection criteria, which represents a guiding and coordinating act for those Administrations directly or indirectly interested in the Project.
This paper presents the results obtained by testing and proving Educa-RUE method in different regional areas. Its findings can be extended to other building typologies in order to create a reference model for local planners and responsible.
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PT J
AU Corcoran, PM
Papai, F
Zoldi, A
AF Corcoran, PM
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Zoldi, A
TI User interface technologies for home appliances and networks
SO IEEE TRANSACTIONS ON CONSUMER ELECTRONICS
LA English
DT Article
AB The design and implementation of portable, lightweight user-interfaces to provide access to remote embedded home-systems and home-networks Is described. This:paper Is focussed on emerging standards in the consumer electronics field, including embedded-Java, the handheld device markup language (HDML) and remote frame buffer (RFB) technology as implemented in the public-domain virtual network computer (VNC.) software. A key goal of the present paper is to provide an objective technical assessment of the applicability of each of these technologies to the development of practical consumer applicances and handheld terminals providing enhanced user-access to the home environment.
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RP Corcoran, PM (reprint author), Natl Univ Ireland Univ Coll Galway, Dept Elect Engn, Galway, Ireland.
CR CORCORAN P, 1997, IEEE T CONSUMER NOV, P1063
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NR 5
TC 17
Z9 17
U1 0
U2 3
PU IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC
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PA 345 E 47TH ST, NEW YORK, NY 10017-2394 USA
SN 0098-3063
J9 IEEE T CONSUM ELECTR
JI IEEE Trans. Consum. Electron.
PD AUG
PY 1998
VL 44
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BP 679
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WC Engineering, Electrical & Electronic; Telecommunications
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GA 120UE
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PT J
AU Gruber, M
Truschel, A
Dalenback, JO
AF Gruber, Mattias
Truschel, Anders
Dalenback, Jan-Olof
TI Energy efficient climate control in office buildings without giving up implementability
SO APPLIED ENERGY
LA English
DT Article
DE Office buildings; Indoor climate control; Implementability; Air-based heating and cooling; Energy efficiency; Model-based controller
ID MODEL-PREDICTIVE CONTROL; COMMERCIAL BUILDINGS; SYSTEM; PERFORMANCE; IDENTIFICATION; RECOVERY; HVAC
AB The adaptation between a building and its automation system can potentially be increased by model-based controllers with an integrated control model and information about indoor climate disturbances. The associated energy savings potential is large but a widespread utilization is typically prevented by high complexities. From that point of view, a trade-off technology that combines implementability with an overall higher performance than the system of current practice would be a better option at most sites. This work presents an experimental evaluation of an alternative controller that follows the same principle as model-based, but has gone through a large number of simplification measures for a reduced overall complexity and a limited function. The controller was evaluated for indoor climate control by automating the ventilation flow rate during a typical office working day that was re-created in a laboratory environment. Experiments were conducted in two different office sites, as well as during two weather seasons of Swedish summer and winter. From the investigation, it was concluded that despite of the reduced complexity, the investigated controller could save between 12% and 19% of indicated energy compared to a system of common practice at the same time as the quality of indoor climate was maintained.
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FX Funding of this research has been provided by the department of Energy & Environment, Chalmers University of Technology.
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PT J
AU Azar, E
Menassa, CC
AF Azar, Elie
Menassa, Carol C.
TI Evaluating the impact of extreme energy use behavior on occupancy interventions in commercial buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Extremism; Occupancy interventions; Energy conservation; Extreme energy use characteristics and behaviors; Commercial buildings
ID SOCIAL NETWORKS; ENVIRONMENTAL BEHAVIOR; DECISION-MAKING; DYNAMICS; FRAMEWORK; CONSERVATION; PROPAGATION; OPINION
AB Occupancy interventions, which are typically used to diffuse energy conservation practices among commercial building occupants, are showing promising but un-sustained energy savings. One possible explanation to the observed results is the presence of extreme energy users in the buildings who can have an important influence on their moderate peers and revoke the benefits of occupancy interventions. While this 'extremism' in human behavior phenomenon has been extensively studied in various social science fields, it has yet to be applied on the study of energy conservation from occupancy interventions in commercial buildings. Using agent-based modeling and data from actual commercial buildings, this paper evaluates the influence of extreme energy users (1) on their peers and on the energy performance of commercial buildings and (2) on the effectiveness of commonly implemented occupancy interventions. Parametric variations and statistical analyses indicate that extremism can highly affect the effectiveness of traditional occupancy interventions. In parallel, a combination of methods has shown to empower moderate energy users, helping diffuse and maintain energy conservation practices even in the presence of extreme energy users. The demonstrated capability to test and optimize occupancy interventions is expected to support and boost their adoption in large-scale energy conservation initiatives.
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PT J
AU Liu, YM
Guo, X
Hu, FL
AF Liu, Yuming
Guo, Xia
Hu, Feiling
TI Cost-benefit analysis on green building energy efficiency technology application: A case in China
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Green buildings; Energy efficiency technology application; Cost-benefit evaluation; Incremental costs; Incremental benefits
ID DWELLINGS; IMPACT
AB In order to initiate economic evaluation of green buildings and foster their development, this article conducts the cost-benefit evaluation of energy efficiency technology application (EETA) on green buildings in China. Based on the economic evaluation theory of construction project (EETCP), the authors first establishes the theoretical framework system of cost-benefit evaluation of the EETA on green buildings and then develops the analysis methods of incremental costs and quantitative calculation formula of incremental benefits of the EETA on green buildings. Using these theories and methods, this article takes the Wanke City project in China as a study case, conducts the cost-benefit empirical analysis of the EETA on green buildings, and draws the following important conclusions: (1) the incremental costs of the EETA account for a large proportion of total incremental costs of green buildings, which are more than 50% in this case; (2) the EETA on green buildings can bring incremental economic benefits, as well as environmental benefits; (3) if only consider the incremental economic benefits of the EETA on green buildings, the financial evaluation indexes show green buildings do not have market investment potential; (4) among all the factors influencing the financial evaluation results of the EETA on green buildings, power price is the most sensitive factor, followed by the unit incremental costs, and the lifetime has the smallest influence. (C) 2014 Elsevier B.V. All rights reserved.
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FU Beijing Planning Project Fund of Philosophy and Social Science [10BaJG368]; Natural Science Foundation of China [71173011]
FX The first author would like to thank for the support in part from Beijing Planning Project Fund of Philosophy and Social Science (10BaJG368) and Natural Science Foundation of China (71173011). The authors would also like to express great appreciation to professor Sudong Ye from Beijing Jiaotong University, associate professor Pinar

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PT J
AU Vieira, AS
Beal, CD
Stewart, RA
AF Vieira, Abel S.
Beal, Cara D.
Stewart, Rodney A.
TI Residential water heaters in Brisbane, Australia: Thinking beyond technology selection to enhance energy efficiency and level of service
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Residential buildings; Energy-water nexus; Solar hot water; Heat pump; Electric water heater; Peak energy demand; Electricity tariffs
ID DOMESTIC HOT-WATER; ELECTRICITY CONSUMPTION; SYSTEMS; SOLAR; BUILDINGS; PUMP; TEMPERATURE; LEGIONELLA
AB A holistic approach to residential water heating systems specification is required to provide optimal energy efficiency. The objective of this study is to analyse the performance of residential water heating systems for the city of Brisbane in Australia, for different combinations of heating system technologies (solar, heat pump, electric), storage tank sizes (1251, 2501, 3251), time-distribution of energy in accordance to the tariff selection (all-day, controlled, night off-peak) and washing machine water heating sources (internal and external). Performance assessments considered the influence of 54 different water heating system configurations on the electricity grid (i.e. power peaks, time-distribution of energy according to electricity tariffs, and energy intensity), as well as their level of service (i.e. compliance rates with recommended hot water temperatures), Empirical water end use data from 27 households was utilised to model the performance of water heating systems. The study demonstrated that beyond merely specifying the type of technology (e.g. solar hot water), other key criteria such as hot water demand, hot water tank size and electricity tariff selection should also be considered in order to systematically optimise the energy and service performance of hot water systems in residential buildings. (C) 2014 Elsevier B.V. All rights reserved.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Liu, L
Zhao, J

Liu, X
Wang, ZX
AF Liu, Long
Zhao, Jing
Liu, Xin
Wang, Zhaoxia
TI Energy consumption comparison analysis of high energy efficiency office buildings in typical climate zones of China and US based on correction model
SO ENERGY
LA English
DT Article
DE Energy consumption comparison; Correction factors; High energy efficiency; Office buildings; Typical climate zones
ID RESIDENTIAL ELECTRICITY CONSUMPTION; COOLING LOAD; HONG-KONG; PERFORMANCE; TURKEY; OPTIMIZATION; SYSTEMS; SECTOR; SPACE; STOCK
AB Actual operation energy consumption of the high energy efficiency buildings built and operated in China and U.S. has been quite different than expected. This paper compares actual energy consumption to expect high energy efficiency office buildings in U.S. and China. Considering the different indoor design temperature, climate conditions and operated period between the compared cases in the two countries impact on the building energy consumption, correction model was built to eliminate the influence of the three factors on the comparison result and put the comparison analysis of high energy efficiency office buildings in the two countries into the same level. Regard to building general information and climate condition, four pairs of buildings in typical climate zones of China and U.S. were selected to compare the building energy conservation technology and building energy consumption based on a large scale of investigation and testing. After corrected, the energy consumption data are analyzed, including total energy consumption, and sub-metering energy consumption such as heating, cooling, lighting, office equipment, etc.. The energy saving technologies applied in these four pairs of buildings was also compared to explain energy consumption differences. (C) 2013 Elsevier Ltd. All rights reserved.
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FU "International Science & Technology Cooperation Program of China"sss [2010DFA72740-06]
FX Project (2010DFA72740-06) supported by "International Science & Technology Cooperation Program of China"sss.
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NR 30
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U2 28
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Energy
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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PT J
AU Fernandes, LL
Lee, ES
DiBartolomeo, DL
McNeil, A
AF Fernandes, Luis L.
Lee, Eleanor S.
DiBartolomeo, Dennis L.
McNeil, Andrew
TI Monitored lighting energy savings from dimmable lighting controls in The New York Times Headquarters Building
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Building energy-efficiency; Daylighting; Lighting control systems
ID CONTROL-SYSTEMS; PERFORMANCE; OFFICES
AB Digital addressable, dimmable lighting controls were introduced to the US market in the early 2000s with the promise of energy savings while allowing greater flexibility than their analog counterpart. The New York Times Company installed this emerging technology, after thorough pre-procurement testing, in their new building in New York, NY. Four years after full occupancy (2007), the owner agreed to participate in post-occupancy monitoring of the lighting system to verify actual performance. Annual lighting energy

savings from daylighting, setpoint tuning and occupancy controls were determined for the daylit, open-plan office areas on three typical floors (6th, 11th, and 20th) of the 51-story tower. Energy savings were calculated from data recorded by the lighting control system, after calibration through independent energy consumption measurements. Savings from dimming controls (daylighting and setpoint tuning) were 12.6 kWh/m(2) yr for the daylit spaces on the three floors overall, or 20%, relative to ASHRAE 90.1-2007. Against the prescriptive code in effect at the time of the building's construction (ASHRAE 90.1-2001), savings were 21.0 kWh/m(2) yr or 28%. Annual lighting energy use with all lighting control strategies was 33.9 kWh/m(2) yr in the daylit, open plan zones on average for the three floors. A simple payback analysis was conducted. (C) 2013 Elsevier B.V. All rights reserved.

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Z9 16

U1 2

U2 8

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JI Energy Build.

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GA 292EP
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PT J
AU Chingcuanco, F
Miller, EJ
AF Chingcuanco, Franco
Miller, Eric J.
TI A microsimulation model of urban energy use: Modelling residential space heating demand in ILUTE
SO COMPUTERS ENVIRONMENT AND URBAN SYSTEMS
LA English
DT Article
DE Urban energy; Agent-based modelling; Integrated urban models; Microsimulation; Residential energy; ILUTE
ID GREATER TORONTO; CONSUMPTION; CANADA; AREA; NETWORK; SECTOR
AB Rapid urbanization, climate change and energy security warrant a more detailed understanding of how cities today consume energy. Agent-based, integrated microsimulation models of urban systems provide an excellent platform to accomplish this task, as they can capture both the short- and long-term decisions of firms and households which directly affect urban energy consumption. This paper presents the current effort towards developing an urban energy model for the Integrated Land Use, Transportation, Environment (ILUTE) modelling system.

As a first step, a model for the residential space heating system evolution of the Greater Toronto-Hamilton Area was developed. A bottom-up approach, where individual uses are aggregated, was then employed to estimate the region's space heating demand. Conventional bottom-up methodologies often suffer from insensitivity to either technological or behavioral factors. It is argued that coupling a discrete choice model with building energy simulation software solves this problem. A joint logit model of heating fuel and equipment choice was developed and estimated using Toronto household microdata. The HOT2000 software was then used to compute individual dwelling unit space heating use. The entire residential energy analysis was performed in tandem with the housing market and demographic evolution processes. This allows the endogenous formation of the required inputs as well as adherence to the core ILUTE framework of integrated modelling.

This residential space heating model is a first step towards a comprehensive urban energy end-use model. Further steps include developing similar models for other residential end-uses, such electricity and hot water consumption, as well as extensions to the commercial and transportation sectors. The entire effort aims to introduce an alternate methodology to modelling urban energy consumption that takes advantage of agent-based microsimulation to enhance and address issues with current approaches.
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PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Comput. Environ. Urban Syst.
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SI SI
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WC Computer Science, Interdisciplinary Applications; Engineering, Environmental; Environmental Studies; Geography; Operations Research & Management Science
SC Computer Science; Engineering; Environmental Sciences & Ecology; Geography; Operations Research & Management Science
GA 921PC
UT WOS:000302488500009
DA 2018-05-03
ER

PT J
AU Li, BZ
Yao, RM
AF Li, Baizhan
Yao, Runming
TI Building energy efficiency for sustainable development in China: challenges and opportunities
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE built environment; carbon reduction; energy efficiency; integrated design; low-carbon society; research agenda; sustainable design; urbanization; China
ID SYSTEMS
AB Rapid urbanization in China has resulted in great demands for energy, resources and pressure on the environment. The progress in China's development is considered in the context of energy efficiency in the built environment, including policy, technology and implementation. The key research challenges and opportunities are identified for delivering a low-carbon built environment. The barriers include the existing traditional sequential design process, the lack of integrated approaches and insufficient socio-technical knowledge. A proposed conceptual systemic model of an integrated approach identifies research opportunities. The organization of research activities should be initiated, operated and managed in a collaborative way among policy-makers, professionals, researchers and stakeholders. More emphasis is needed on integrating social, economic and environmental impacts in the short, medium and long terms. An ideal opportunity exists for China to develop its own expertise, not merely in a technical sense but in terms of vision and intellectual leadership in order to flourish in global collaborations.
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FU National Natural Science Foundation of China [50838009]; UK FCO Strategic Programme Fund
FX Part of the information presented in this paper is from the project funded by the National Natural Science Foundation of China (50838009) and the UK FCO Strategic Programme Fund.
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NR 50
TC 16
Z9 16
U1 0
U2 19
PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
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JI Build. Res. Informat.
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WC Construction & Building Technology
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PT J
AU Martiskainen, M
Coburn, J
AF Martiskainen, Mari
Coburn, J.
TI The role of information and communication technologies (ICTs) in household energy consumption-prospects for the UK
SO ENERGY EFFICIENCY
LA English
DT Article
DE Information and communication technologies; Household energy consumption; Behavioural change
ID CONSERVATION; FEEDBACK; ATTITUDES; BEHAVIOR
AB Growing concerns about climate change and energy security have led to a strong focus on energy demand reduction and energy efficiency within United Kingdom (UK) energy policy. At the same time, information and communication technologies (ICTs) have become pervasive in society and this has brought with it new policy options which use them as enabling technologies. One such policy option planned for implementation in the UK is the use of smart meters and real-time displays to encourage people to become more aware of their energy consumption and possibly change their energy-related behaviours. Smart meters and display units by definition link individuals, technologies and society, and their effectiveness is influenced by a range of factors. Ten semi-structured stakeholder interviews with industry, government and academia and a review of literature were conducted in order to identify which factors are most likely to contribute to the effectiveness of implementing smart meters and real-time displays in the UK. Further analysis showed a number of key themes and perspectives on behavioural change, particularly as they relate to household electricity use and the role of smart meters in the UK energy policy, including the role of ICTs in energy demand reduction more generally.
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FU EdF Energy and the Economic and Social Research Council
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SN 1570-646X
J9 ENERG EFFIC
JI Energy Effic.
PD MAY
PY 2011
VL 4
IS 2
BP 209
EP 221
DI 10.1007/s12053-010-9094-2
PG 13
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA 796RA
UT WOS:000293068200006
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PT J
AU Biswas, MAR

Robinson, MD
Fumo, N
AF Biswas, M. A. Rafe
Robinson, Melvin D.
Fumo, Nelson
TI Prediction of residential building energy consumption: A neural network approach
SO ENERGY
LA English
DT Article
DE Residential buildings; Energy consumption modeling; Neural network
ID SECTOR; MODELS; DEMAND; SYSTEM; SPACE; ANN
AB Some of the challenges to predict energy utilization has gained recognition in the residential sector due to the significant energy consumption in recent decades. However, the modeling of residential building energy consumption is still underdeveloped for optimal and robust solutions while this research area has become of greater relevance with significant advances in computation and simulation. Such advances include the advent of artificial intelligence research in statistical model development. Artificial neural network has emerged as a key method to address the issue of nonlinearity of building energy data and the robust calculation of large and dynamic data. The development and validation of such models on one of the TxAIRE Research houses has been demonstrated in this paper. The TxAIRE houses have been designed to serve as realistic test facilities for demonstrating new technologies. The input variables used from the house data include number of days, outdoor temperature and solar radiation while the output variables are house and heat pump energy consumption. The models based on Levenberg-Marquardt and OWO-Newton algorithms had promising results of coefficients of determination within 0.87-0.91, which is comparable to prior literature. Further work will be explored to develop a robust model for residential building application. (C) 2016 Elsevier Ltd. All rights reserved.
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FX The authors would like to thank TxAIRE for providing the data and support. The authors would also like to thank the undergraduate research students including Daniel Lackey and John Henken for their contribution.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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J9 ENERGY
JI Energy
PD DEC 15
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BP 84
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DI 10.1016/j.energy.2016.10.066
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
GA EG0JP
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PT J
AU Tan, B
Yavuz, Y
Otay, EN
Camlibel, E
AF Tan, Baris
Yavuz, Yahya
Otay, Emre N.
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TI Optimal selection of energy efficiency measures for energy sustainability of existing buildings
SO COMPUTERS & OPERATIONS RESEARCH
LA English
DT Article
DE Energy efficiency measures; Multi-period technology selection problem; Knapsack problem; Energy efficiency of buildings; Sustainable retrofitting
ID PROJECT SELECTION; ESCO INDUSTRY; PORTFOLIO; RETROFIT; MODEL

AB This study is motivated by the need to increase energy efficiency in existing buildings. Around 33% of the energy used in the world is consumed in the buildings. Identifying and investing in the right energy saving technologies within a given budget helps the adoption of energy efficiency measures in existing buildings. We use a mathematical programming approach to select the right energy efficiency measures among all the available ones to optimize financial or environmental benefits subject to budgetary and other logical constraints in single- and multi-period settings. We also present a business model to offer energy efficiency measures as a service. By using a real case study of a university campus, all the relevant energy efficiency measures are identified and their effects are determined by using engineering measurements and modelling. Through numerical experiments using the case data, we investigate and quantify the effects of using environmental or financial savings as the main objective, the magnitude of benefit of using a multi-period planning approach instead of a single-period approach, and also feasibility of offering energy saving technologies as a service. We show that substantial environmental and financial savings can be obtained by using the proposed method to select and invest in technologies in a multi-period setting. We also show that offering energy efficient technologies as a service can be a win-win-win arrangement for a service provider, its client, and also for the environment. (c) 2015 Elsevier Ltd. All rights reserved.

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J9 COMPUT OPER RES
JI Comput. Oper. Res.
PD FEB
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WC Computer Science, Interdisciplinary Applications; Engineering, Industrial; Operations Research & Management Science
SC Computer Science; Engineering; Operations Research & Management Science
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PT J
AU Lee, SH
Hong, TZ
Piette, MA
Sawaya, G
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Taylor-Lange, SC
AF Lee, Sang Hoon
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Sawaya, Geof
Chen, Yixing
Taylor-Lange, Sarah C.
TI Accelerating the energy retrofit of commercial buildings using a database of energy efficiency performance
SO ENERGY
LA English
DT Article
DE High performance computing; EnergyPlus; Building simulation; Energy conservation measure; Energy modeling; Retrofit
AB Small and medium-sized commercial buildings can be retrofitted to significantly reduce their energy use, however it is a huge challenge as owners usually lack of the expertise and resources to conduct detailed on-site energy audit to identify and evaluate cost-effective energy technologies. This study presents a DEEP (database of energy efficiency performance) that provides a direct resource for quick retrofit analysis of commercial buildings. DEEP, compiled from the results of about ten million EnergyPlus simulations, enables an easy screening of ECMs (energy conservation measures) and retrofit analysis. The simulations utilize prototype models representative of small and mid-size offices and retails in California climates. In the formulation of DEEP, large scale EnergyPlus simulations were conducted on high performance computing clusters to evaluate hundreds of individual and packaged ECMs covering envelope, lighting, heating, ventilation, air-conditioning, plug-loads, and service hot water. The architecture and simulation environment to create DEEP is flexible and can expand to cover additional building types, additional climates, and new ECMs. In this study DEEP is integrated into a web-based retrofit toolkit, the Commercial Building Energy Saver, which provides a platform for energy retrofit decision making by querying DEEP and unearthing recommended ECMs, their estimated energy savings and financial payback. (C) 2015 Elsevier Ltd. All rights reserved.
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FU California Energy Commission under the Public Interest Energy Research (PIER) program [PIR-12-031]; United States Department of Energy [DE-AC02-05CH11231]
FX The establishment of DEEP was part of the Small and Medium Building Efficiency Toolkit and Community Demonstration Program funded by California Energy Commission under the Public Interest Energy Research (PIER) program (PIR-12-031). This work was also supported by the United States Department of Energy (Contract No. DE-AC02-05CH11231). The authors would like to thank the National Energy Research Scientific Computing center (NERSC) at Lawrence Berkeley National Laboratory for providing computing resource and technical support to run the EnergyPlus simulations.
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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FN Clarivate Analytics Web of Science
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PT J
AU Battista, G
Carnielo, E
Evangelisti, L
Frascarolo, M
Vollaro, RD
AF Battista, Gabriele
Carnielo, Emiliano
Evangelisti, Luca
Frascarolo, Marco
Vollaro, Roberto de Lieto
TI Energy Performance and Thermal Comfort of a High Efficiency House: RhOME for denCity, Winner of Solar Decathlon Europe 2014
SO SUSTAINABILITY
LA English
DT Article
DE solar decathlon; near zero energy buildings; energy efficiency
ID URBAN CANYON; BUILDINGS; RELIABILITY; OPTIMIZATION; SYSTEMS
AB The increase of people living in large cities and the expansion of new urban areas are keys to defining new sustainable models. It is estimated that about 70% of the EU population lives in urban areas, and it is expected to reach 80% by 2030. Consequently, it is important to find a new concept of buildings that can reduce the total energy consumption. The Solar Decathlon is an international university competition, born in 2002, created by the U.S. State Energy Department (DOE). Students are challenged to design and operate a full-scale, innovative and sustainable house able to exploit solar radiation as its sole energy source. The objective of the competition is to promote research and education in sustainable architecture and solar energy fields. This paper presents an overview on the contribution of LIFT (Interdisciplinary Laboratory of Technical Physics of Roma Tre University) to the winning project of the Solar Decathlon Europe 2014 competition: The RhOME for denCity. This project consists of a building properly designed to produce a solar-powered house that is cost-effective, energy-efficient, and attractive.
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PU MDPI AG
PI BASEL
PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
SN 2071-1050
J9 SUSTAINABILITY-BASEL
JI Sustainability
PD JUL
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VL 7
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BP 9681
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DI 10.3390/su7079681
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences; Environmental Studies
SC Science & Technology - Other Topics; Environmental Sciences & Ecology
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PT J
AU Salvalai, G
Masera, G
Sesana, MM
AF Salvalai, Graziano
Masera, Gabriele
Sesana, Marta Maria
TI Italian local codes for energy efficiency of buildings: Theoretical definition and experimental application to a residential case study
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Local building energy regulation code; Energy efficiency; Building practices; Geocluster distribution; nZEB
ID CO2 EMISSIONS; PERFORMANCE; SECTOR; POLICIES; GREECE
AB The environmental concern in light of anthropogenic climate change is directly concerning the building sector as one of the major energy consumers and CO2 producers. To reduce the environmental impact of new and refurbished buildings, one of the most promising policies is the widespread adoption of Building Energy Regulation Codes (BERC), since they have a direct impact on the everyday work of local planners, architects, engineers and building companies. This article will look at how BERCs were implemented in Italy, where Regions and municipalities have developed in recent years a number of local regulations trying to drive the market towards more energy efficient practices. This happened in a legislative vacuum because the Italian Government implemented the European Directive on the Energy Performance of Buildings (2002/91/EC) only in 2005 and defined the related National Guidelines only in 2009. This article provides an overview on EPBD implementation in Europe and a Geocluster Italian distribution of BERCs in order to show their geographical distribution and their influence on the construction sector practices, focusing in particular on the region of Lombardy. Then the article describes the methodology followed for the definition of BERCs in nine municipalities in the same region. In conclusion, the paper presents the practical application of one of the nine BERCs to a NZEB residential case study as an example of what the EBPD recast define as nZEB. (C) 2014 Elsevier Ltd. All rights reserved.
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NR 45
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Z9 15
U1 0
U2 7
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 1364-0321
J9 RENEW SUST ENERG REV
JI Renew. Sust. Energ. Rev.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels
GA AZ2TI
UT WOS:000348084800094
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ER

PT J
AU Streimikiene, D
AF Streimikiene, Dalia
TI Residential energy consumption trends, main drivers and policies in

Lithuania
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Residential energy use trends; The main drivers of energy consumption; Residential buildings; Energy saving potential; Costs
ID EFFICIENCY; FEASIBILITY; BEHAVIOR; DEMAND; SECTOR; COSTS; STOCK
AB Environmental pressure from residential energy use is projected to significantly increase by 2030. Different environmental policy measures provide different incentives for "environmentally responsive" consumer choices and behavioural responses. There is a great energy saving potential in residential buildings of Lithuania. Compared to the other EU countries with similar climate conditions, energy consumption for residential heating is approximately 1.8 times higher in Lithuania. About 60% of Lithuanian population resides in multi-apartment buildings constructed during 1961-1990. The aim of the paper is to define the main drivers of residential energy use in Lithuania and to compare energy saving technologies in terms of energy saving potential and costs in Lithuanian residential buildings. Seeking to achieve the aim the main tasks of the paper are to analyse theoretical issues of the main drivers of residential energy use; to analyse residential energy use trends in Lithuania and to compare these trends with other EU member states; to define the main drivers of residential energy use by applying correlation analysis; to analyse policies aiming to reduce energy consumption in residential buildings and their impacts on GHG emission reduction.
The comparative study of residential energy use in Lithuania and several old EU member states showed that residential energy use per capita in Lithuania is significantly lower than in old EU member states because of the lower income per capita and lower living standards. The economic and technological factors are the main driving forces of final energy consumption in all compared EU member states; however the impact of different factors varies between countries. The comparative analysis of energy saving and GHG emission reduction potential and costs in residential buildings provided by different studies showed that the most cost-effective instruments were appliance standards, energy efficiency obligations, Demand Side Management programs, public benefit charges and labelling. (C) 2014 Elsevier Ltd. All rights reserved.
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FU Research Council of Lithuania [MIP-004/2012]
FX This research was funded by a grant (No. MIP-004/2012) from the Research Council of Lithuania.
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NR 33
TC 15
Z9 15
U1 0
U2 24
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Renew. Sust. Energ. Rev.
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PT J
AU Xiao, H
Wei, QP
Wang, HL
AF Xiao, He
Wei, Qingpeng
Wang, Hailin
TI Marginal abatement cost and carbon reduction potential outlook of key energy efficiency technologies in China's building sector to 2030
SO ENERGY POLICY
LA English
DT Article
DE CO2 abatement cost; Building sector; China
AB China achieved an energy savings of 67.5 Mtce in the building sector at the end of the 11th Five-Year Plan and set a new target of 116 Mtce by the end of the 12th Five-Year Plan. In this paper, an improved bottom-up model is developed to assess the carbon abatement potential and marginal abatement cost (MAC) of 34 selected energy-saving technologies/measures for China's building sector. The total reduction potential is 499.8 million t-CO2 by 2030. 4.8 Gt-CO2 potential will be achieved cumulatively to 2030. By 2030, total primary energy consumption of Chinese building sector will rise continuously to 1343 Mtce in the reference scenario and 1114 Mtce in the carbon reduction scenario. Total carbon dioxide emission will rise

to 2.39 Gt-CO2 and 1.9 Gt-CO2 in two scenarios separately. The average carbon abatement cost of the aforementioned technologies is 19.5 $/t-CO2. The analysis reveals that strengthening successfully energy-saving technologies is important, especially for the residential building sector. The central government's direct investments in such technologies should be reduced without imposing significant negative effects. (C) 2014 Elsevier Ltd. All rights reserved.
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Zhang S., 2010, FRONT ENERGY POWER E, V4, P2
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U1 4
U2 30
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Wilkerson, JT
Cullenward, D
Davidian, D
Weyant, JP
AF Wilkerson, Jordan T.
Cullenward, Danny
Davidian, Danielle
Weyant, John P.
TI End use technology choice in the National Energy Modeling System (NEMS):
An analysis of the residential and commercial building sectors
SO ENERGY ECONOMICS
LA English
DT Article
DE Energy models; Consumer preferences; Behavior; Energy forecasting
ID IMPACTS; POLICY; GENERATION; ECONOMICS; FORECASTS
AB The National Energy Modeling System (NEMS) is arguably the most influential energy model in the United States. The U.S. Energy Information Administration uses NEMS to generate the federal government's annual long-term forecast of national energy consumption and to evaluate prospective federal energy policies. NEMS is considered such a standard tool that other models are calibrated to its forecasts, in both government and academic practice. As a result, NEMS has a significant influence over expert opinions of plausible energy futures. NEMS is a massively detailed model whose inner workings, despite its prominence, receive relatively scant critical attention.
This paper analyzes how NEMS projects energy demand in the residential and commercial sectors. In particular, we focus on the role of consumers' preferences and financial constraints, investigating how consumers choose appliances and other end-use technologies. We identify conceptual issues in the approach the model takes to the same question across both sectors. Running the model with a range of consumer preferences, we estimate the extent to which this issue impacts projected consumption relative to the baseline model forecast for final energy demand in the year 2035. In the residential sector, the impact ranges from a decrease of 0.73 quads (-6.0%) to an increase of 0.24 quads (+2.0%). In the commercial sector, the impact ranges from a decrease of 1.0 quads (-9.0%) to an increase of 0.99 quads (+9.0%). (C) 2013 Elsevier B.V. All rights reserved.
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Winebrake JJ, 2006, ENERG POLICY, V34, P3475, DOI 10.1016/j.enpol.2005.07.018
NR 42
TC 15
Z9 15
U1 2
U2 18
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ENERG ECON
JI Energy Econ.
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WC Economics
SC Business & Economics
GA 281DX
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ER

PT J
AU Doyle, R
Davies, AR
AF Doyle, Ruth
Davies, Anna R.
TI Towards sustainable household consumption: exploring a practice oriented, participatory backcasting approach for sustainable home heating practices in Ireland
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Ireland; Household consumption; Participatory backcasting; Visioning workshops; Sustainability assessment; Social practice
ID STAKEHOLDER PARTICIPATION; TRANSITION; FUTURE; POLICY
AB Current attempts to encourage sustainable consumption are failing to make significant advancements and consumption by households in daily practices continues to grow. Interventions in this area are often based on simplistic behavioural assumptions, which overlook the embeddedness of daily consumption practices and fail to challenge escalating consumption demands and expectations. Against this background there is a need to consider more radical socio-cultural, technological and organisational innovations that may fulfil the goals of daily practices more sustainably in the future. Taking the case of home heating, the most energy intensive practice in Irish households, this paper reports on a participatory backcasting study that developed future scenarios and action plans for sustainable heating. In contrast to conventional behavioural change models and forecasting techniques, this study adopted a social practice orientation. This paper focuses on the operationalisation of the social practice approach with special reference to the iterative processes around scenario development and the resultant backcasting outputs. Participant evaluations of the procedure are presented which indicate that despite significant operational complexity, the process was strongly valued and provided significant opportunity for learning amongst stakeholders involved. Whether such approaches can be integrated into governing systems, however will depend on a willingness amongst stakeholders to embrace a radical reconceptualisation of behaviour.
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NR 51
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U1 0
U2 21
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0959-6526
J9 J CLEAN PROD
JI J. Clean Prod.
PD JUN
PY 2013
VL 48
BP 260
EP 271
DI 10.1016/j.jclepro.2012.12.015
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
GA 169BD
UT WOS:000320751000028
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PT J

AU Puksec, T
Mathiesen, BV
Duic, N
AF Puksec, Tomislav
Mathiesen, Brian Vad
Duic, Neven
TI Potentials for energy savings and long term energy demand of Croatian households sector
SO APPLIED ENERGY
LA English
DT Article
DE Energy demand; Forecast; Households sector; Energy efficiency; Bottom-up modelling
ID RESIDENTIAL BUILDINGS; CONSUMPTION; SYSTEM
AB Households represent one of the most interesting sectors, when analyzing Croatia's energy balance. It makes up one of the largest energy consumers with around 75 PJ per year, which is almost 29% of Croatia's final energy demand. Considering this consumption, implementing various mechanisms, which would lead to improvements in energy efficiency of this sector, seems relevant. In order to plan future energy systems, important would be to know future possibilities and needs regarding energy demand of different sectors. Through this paper, long term energy demand projections of Croatian households sector will be shown. Focus of the paper will be on various mechanisms influencing future energy demand scenarios. Important would be to quantify this influence, whether positive or negative, and see which mechanisms would be the most significant. Energy demand projections in this paper are based upon bottom-up approach model which combines and processes a large number of input data. The model will be compared to Croatian National Energy Strategy and certain differences and conclusions will be presented. One of the major conclusions shown in this paper is significant possibilities for energy efficiency improvements and lower energy demand in the future, based on careful and rational energy planning. Different financial, legal and technological mechanisms can lead to significant savings in the households sector which leads to lower GHG emissions and lower Croatian dependence on foreign fossil fuels. (C) 2012 Elsevier Ltd. All rights reserved.
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JI Appl. Energy
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SI SI
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
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PT J
AU Chin, J
Callaghan, V
Clarke, G
AF Chin, Jeannette
Callaghan, Vic
Clarke, Graham
TI Soft-appliances: A vision for user created networked appliances in digital homes
SO JOURNAL OF AMBIENT INTELLIGENCE AND SMART ENVIRONMENTS
LA English
DT Article
DE Digital homes; virtual appliances; service aggregation; disruptive technology; future homes
AB In this paper we introduce a vision for a new type of domestic appliance, a soft-appliance, constructed from aggregations of elementary network services. The vision is based on the possibility of 'deconstructing', logically, conventional home appliances such as TVs into their elemental functions which may then be combined in novel ways with other deconstructed services to generate soft-appliance of a person's own choosing. Additionally our aim is to describe the computer science challenges involved in fulfilling this vision. An essential component of this vision is a concept called a MAp (meta-appliance/application); a semantic data template that describes the soft or virtual-appliance that can be instantiated by manufacturers and end-users in a way that redefines the nature of an appliance and which can be created, owned and traded. We also present a socio-technical framework to motivate the discussion of this research agenda, especially the use of the agent technology that would be needed to realise this vision.

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U2 1
PU IOS PRESS
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PA NIEUWE HEMWEG 6B, 1013 BG AMSTERDAM, NETHERLANDS
SN 1876-1364
J9 J AMB INTEL SMART EN
JI J. Ambient Intell. Smart Environ.
PY 2009
VL 1
IS 1
BP 69
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DI 10.3233/AIS-2009-0010
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WC Computer Science, Artificial Intelligence; Computer Science, Information Systems; Telecommunications

SC Computer Science; Telecommunications
GA V16AC
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PT J
AU Bertoldi, P
Atanasiu, B
AF Bertoldi, Paolo
Atanasiu, Bogdan
TI Characterization of residential lighting consumption in the enlarged European Union and policies to save energy
SO INTERNATIONAL JOURNAL OF GREEN ENERGY
LA English
DT Article
DE lighting; energy savings; compact fluorescent lamps; monitoring consumption
AB Lighting represents a considerable share of the electricity consumption in the residential sector of the enlarged European Union (EU-27). Although most citizens are well aware that lighting is an important part of their electricity consumption, they are still either unaware of the benefits of installing efficient lighting technologies or are reluctant to change their habits. The European Commission has promoted the reduction of lighting consumption through a number of polices and programmes, which together with successful national and utility driven programmes have contributed to a substantial market transformation in some Member States. However, there is still a large cost-effective saving potential of at least 12.8 TWh per year in the EU-27. With more aggressive policies the saving potential could reach 24.1 TWh. These savings can be achieved in a rather short time (e.g. by 2010), due to the fast turnover of lamps. This paper provides updated information on the lighting consumption in the residential sector, the penetration of efficient technologies and estimates of the saving potential if new polices and programmes for the reduction of residential lighting consumption are introduced. In particular the role of promotional campaigns, efficiency standards, building codes, and white certificates are discussed. Last but not least, the paper calls for the collection of more accurate end-use data to assess in a more accurate manner the saving potential in residential lighting.
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PU TAYLOR & FRANCIS INC
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J9 INT J GREEN ENERGY
JI Int. J. Green Energy
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VL 5
IS 1-2
BP 15
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DI 10.1080/15435070701839397
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WC Thermodynamics; GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Thermodynamics; Science & Technology - Other Topics; Energy & Fuels
GA 269MX
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PT J
AU Palacios-Garcia, EJ
Chen, A
Santiago, I
Bellido-Outeirino, FJ
Flores-Arias, JM
Moreno-Munoz, A
AF Palacios-Garcia, E. J.
Chen, A.
Santiago, I.
Bellido-Outeirino, F. J.
Flores-Arias, J. M.
Moreno-Munoz, A.
TI Stochastic model for lighting's electricity consumption in the residential sector. Impact of energy saving actions
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Residential electricity demand; Lighting consumption; Stochastic models;

LED technology; Reactive power
ID DEMAND; OCCUPANCY; FUTURE
AB The residential sector represents about 30% of the total energy demand in Europe. Included in this percentage, lighting consumption is one of the basic end uses in all households and it may come to represents 15-20% of the total electricity bill. This figure can be reduced using advanced control techniques or more efficient lighting technologies, requiring previous detailed information about current consumption patterns. In this context, bottom-up stochastic models are established as the main tools to study new energy savings. In this paper, a high-resolution stochastic model for simulating lighting consumption profiles was developed, obtaining both daily active and reactive instantaneous power demand profiles, with a 1-min resolution. The model takes into account the number of household residents and differentiates between weekdays and weekends. Moreover, the monthly and annual amounts of electricity demanded by lighting in Spanish households were simulated. The proposed model was also used to quantify the impact of LED technology's penetration into domestic lighting systems on consumption patterns. Research has revealed the existence of two consumption peaks matching with morning and evening. Although these peaks are hard to shift since they are due to human behavior, they are easy to reduce through the improvement of lighting systems. (C) 2014 Elsevier B.V. All rights reserved.
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FU Feder-Interconecta project TIGRIS [12013095 (ITC-20131002)]
FX This work is supported by Feder-Interconecta project TIGRIS under contract no. 12013095 (ITC-20131002).
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PI LAUSANNE
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J9 ENERG BUILDINGS
JI Energy Build.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU San, V
Sriv, T
Spoann, V
Var, S
Seak, S
AF San, Vibol
Sriv, Tharith
Spoann, Vin
Var, Sovanndara
Seak, Sophat
TI Economic and environmental costs of rural household energy consumption structures in Sameakki Meanchey district, Kampong Chhnang Province, Cambodia
SO ENERGY
LA English
DT Article
DE Energy consumption; Economic cost; Environmental cost; Cambodia
ID FUELWOOD CONSUMPTION; CHINA; GASIFICATION; TECHNOLOGY; EMISSIONS; PATTERNS; VILLAGES; STOVES; ASIA

AB Clean energy development in rural areas in Cambodia plays an important role in developing the economics of the poor. This study was conducted to explore rural household energy consumption in Sammeakki Meanchey district in Kampong Chhnang Province and its impact on the economy and environment using a quantitative model. The results show that most households consume a variety of non-conventional energy sources, including traditional biomass (fuelwood, plant waste and etc.), kerosene and even LPG (liquefied petroleum gas). Biomass is used for cooking and boiling water, while rechargeable batteries are exclusively used for lighting and running home devices. The monthly economic cost under the current structure with electricity at $US33.23 is higher than the structure without electricity at $US19.11. However, the monthly environmental cost of the structure with electricity is lower than the structure without electricity which the environmental cost is the highest. Monthly cash payment for energy structure with fossil fuel dominating is placed in the middle. Clear differences in the total cost, environmental cost, and economic cost for households are found among the four substitutable structures. Both the environmental and economic costs are lower when biogas is used, so this structure should be promoted throughout the rural areas in Cambodia. (C) 2012 Elsevier Ltd. All rights reserved.

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FU Economy and Environment Program for Southeast Asia (EEPSEA); Cambodian Development Resource Institute (CDRI)
FX The authors would like to express their gratitude to The Economy and Environment Program for Southeast Asia (EEPSEA) and Cambodian Development Resource Institute (CDRI) for providing financial support. We are also greatly indebted to Dr. David James and Dr. Herminia Francisco for their priceless support toward achieving the results that we were looking for. It should be noted that their professionals as well as moral assistance were the key for the successful accomplishment of this research work. The authors also would like to thank to Mr. Jonathan Gibson, Ms. Neang Im Chek and Mr. Sopheak Kong for their contribution and hard work in our survey.

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U2 29
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PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 0360-5442
J9 ENERGY
JI Energy
PD DEC
PY 2012
VL 48
IS 1
BP 484
EP 491
DI 10.1016/j.energy.2012.10.017
PG 8
WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
GA 069UE
UT WOS:000313461800055
DA 2018-05-03
ER

PT J
AU Tovar, MA
AF Tovar, Miguel A.
TI The structure of energy efficiency investment in the UK households and its average monetary and environmental savings
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency adoption; Household space heating; Government policy
ID TAX CREDITS; DEMAND; ELECTRICITY; DISCOUNT; FUTURE; MODELS; SECTOR;

POLICY

AB Socioeconomic and behavioural variables that influence the household's adoption of energy efficiency measures such as cavity and loft insulation and upgrades to the boiler are identified, contrary to previous literature. By extending Brechling and Smith's (1994) and Hassett and Metcalfs (1995) models, it is shown that the application of the Energy Act 2011, which contains provisions on the Green Deal, the new Energy Company Obligation (ECO) and the private rented sector, needs to follow a tailored strategy to reach the low adoption households identified by my model. Moreover, for the current adopters of the analysed measures, average monetary and environmental adoption benefits are estimated based on Parti and Parti's (1980) demand model. These estimates are smaller than their expected values showing an important energy efficiency gap in the sector. Particularly low cost measures can bring important savings that can help to meet the "pay as you save" rule (i.e., the Golden rule) of the new regulation. My model also shows that a poor state of dwelling repair can reduce the adoption benefits increasing the need of subsidies that will be financed through consumer's energy bills. However, this can increase the number of households in fuel poverty. (C) 2012 Elsevier Ltd. All rights reserved.

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J9 ENERG POLICY
JI Energy Policy

PD NOV
PY 2012
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BP 723
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DI 10.1016/j.enpol.2012.08.019
PG 13
WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 028EO
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ER

PT J
AU Chang, CC
Zhao, J
Zhu, N
AF Chang, Chenchen
Zhao, Jing
Zhu, Neng
TI Energy saving effect prediction and post evaluation of air-conditioning system in public buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Artificial Neural Network; Refrigeration Operation Energy Efficiency Ratio; Prediction evaluation; Post evaluation; Energy saving effect; Retrofit air-conditioning system
ID ARTIFICIAL NEURAL-NETWORKS; CONSUMPTION
AB Accurate energy saving effect evaluation analysis of building energy efficiency retrofit is of benefit to obtain technology optimization and fast return of investment. According to the implement sequence, evaluation methods can be divided into post evaluation and prediction evaluation. The energy saving effect of an air-conditioning system retrofit project was analyzed by these two models respectively. The post evaluation model was built based on the spot test data and a parameter called as Refrigeration Operation Energy saving Effect Ratio (ROEER). The prediction evaluation model was built based on Back-Propagation Artificial Neural Network by the use of MATLAB Neural Network Toolbox. The comparison result between these two kinds of evaluation models match well with each other. These two models can be used to predict and evaluate energy saving effect of air-conditioning system retrofit to further improve the real energy saving effect of building energy efficiency retrofit. (C) 2011 Elsevier B.V. All rights reserved.
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J9 ENERG BUILDINGS
JI Energy Build.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Ma, J
Cheng, JCP
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Cheng, Jack C. P.
TI Estimation of the building energy use intensity in the urban scale by integrating GIS and big data technology
SO APPLIED ENERGY
LA English
DT Article
DE Artificial Neural Network (ANN); Big Data; Energy use intensity (EUI); Feature selection; Geographic information system (GIS); Support Vector Regression (SVR)
ID RIDGE-REGRESSION; NEURAL-NETWORKS; CLIMATE-CHANGE; LOW-INCOME; CONSUMPTION; PREDICTION; SELECTION; OPTIMIZATION; IMPACT; REGULARIZATION
AB Buildings are the major source of energy consumption in urban areas. Accurate modeling and forecasting of the building energy use intensity (EUI) in the urban scale have many important applications, such as energy benchmarking and urban energy infrastructure planning. The use of Big Data technology is expected to have the capability of integrating a large number of predictors and giving an accurate prediction of the energy use intensity of buildings in the urban scale. However, past research has often used Big Data technology in estimating energy consumption of a single building rather than the urban scale, due to several challenges such as data collection and feature engineering. This paper therefore proposes a geographic information system integrated data mining methodology framework for estimating the building EUI in the urban scale, including preprocessing, feature selection, and algorithm optimization. Based on 216 prepared features, a case study on estimating the site EUI of 3640 multi-family residential buildings in New York City, was tested and validated using the proposed methodology framework. A comparative study on the feature selection strategies and the commonly used regression algorithms was

also included in the case study. The results show that the framework was able to help produce lower estimation errors than previous research, and the model built by the Support Vector Regression algorithm on the features selected by Elastic Net has the least cross-validation mean squared error. (C) 2016 Elsevier Ltd. All rights reserved.

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PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 APPL ENERG
JI Appl. Energy
PD DEC 1
PY 2016
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA EH6PY
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PT J
AU Mills, B
Schleich, J
AF Mills, Bradford
Schleich, Joachim
TI Household transitions to energy efficient lighting
SO ENERGY ECONOMICS
LA English
DT Article
DE Energy-efficient lamps; Household adoption; Rebound effect
ID SELECTION BIAS; CONSERVATION; CONSUMPTION; ATTITUDES; ADOPTION
AB New energy efficient lighting technologies can significantly reduce household electricity consumption, but adoption has been slow. A unique dataset of German households is used in this paper to examine the factors associated with the replacement of old incandescent lamps (Is) with new energy efficient compact

fluorescent lamps (CFLs) and light emitting diodes (LEDs). The 'rebound' effect of increased lamp luminosity in the transition to energy efficient bulbs is analyzed jointly with the replacement decision to account for household self-selection in bulb-type choice. Results indicate that the EU ban on Its accelerated the pace of transition to CFLs and LEDs, while storage of bulbs significantly dampened the speed of the transition. Higher lighting needs and bulb attributes like energy efficiency, environmental friendliness, and durability spur IL replacement with CFLs or LEDs. Electricity gains from new energy efficient lighting are mitigated by 23% and 47% increases in luminosity for CR. and LED replacements, respectively. Model results suggest that taking the replacement bulb from storage and higher levels of education dampen the magnitude of these luminosity rebounds in IL to CFL transitions. (c) 2014 Elsevier B.V. All rights reserved.
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JI Energy Econ.
PD NOV
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WC Economics
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PT J
AU Deng, SH
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Shen, F
Guo, H
Li, Y
Xiao, H
AF Deng, S. H.
Zhang, J.
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Li, Y. -w.
Xiao, H.
TI The Relationship Between Industry Structure, Household-number and Energy Consumption in China
SO ENERGY SOURCES PART B-ECONOMICS PLANNING AND POLICY
LA English
DT Article
DE energy policy implication; improved decomposing methodology; industry structure; modeling; number of household
ID ESTIMATORS
AB This article investigates the empirical relationship between energy consumption, industry structure, and household-number. An empirical model with energy consumption, structure and scale of industry, and household-number was built. Using ridge regression analysis and observed data from 1985 to 2007 in China, we examine the relationship between each part of energy consumption and the corresponding coefficients, including gross domestic production (GDP) in the secondary sector (IGDP), in primary and tertiary industries (PTGDP) and number of denizens (NDC). The results show that changing the independent variables (diminishing IGDP/GDP, NDC/GDP, IGDP, PTGDP, and NDC or increasing PTGDP/GDP) or their corresponding coefficients can both lower energy consumption, theoretically. But, in fact, it is not suitable to decrease total energy consumption by changing the independent variables for China. In order to diminish the parameters, the Chinese government must continue to promote energy efficiency by introducing advanced technologies and implementing the policy of saving energy.
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AU Joachain, H
Klopfert, F

AF Joachain, Helene
Klopfert, Frederic
TI Smarter than metering? Coupling smart meters and complementary currencies to reinforce the motivation of households for energy savings
SO ECOLOGICAL ECONOMICS
LA English
DT Article
DE Energy saving; Motivation; Complementary currencies; Smart metering; Innovative policy instruments; Households; Energy consumption
ID SELF-DETERMINED MOTIVATION; BEHAVIOR; INFORMATION; COMMUNITY; FEEDBACK; RISKS
AB A crucial argument in the debate around smart meter deployment in the EU is the potential for households to save energy. One strand of research in this field has investigated the effects on household energy consumption of the feed-back provided by smart meters. However, another aspect that deserves attention is the motivation for households to use the feed-back to save energy. This paper explores how the emerging trend of using complementary currencies for sustainability policies could translate into new interventions adapted to the smart meter deployment and capable of promoting more autonomous forms of motivation compared to interventions using official currencies. Three systems designs (rewarding, regulatory and hybrid) are presented and discussed within the framework of self-determination theory. Because the rewarding system S1 can contribute positively people's basic needs for autonomy, competence and relatedness, it could lead to more autonomous forms of motivation. The conclusions regarding the regulatory system S2 are less clear, although the hybrid variant S3 that integrates mechanisms from the rewarding system into the regulatory system could be perceived as more consonant with people's basic need for autonomy. (C) 2014 Elsevier B.V. All rights reserved.
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FX Part of this research was carried out in the context of the "Innovative Instruments for Energy Saving Policies (INESPO) project" financed by the Science for a Sustainable Development Programme of the Belgian Science Policy under grant INESPO SD/EN/09.
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AU Hoicka, CE
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TI Residential energy efficiency retrofits: How program design affects participation and outcomes
SO ENERGY POLICY
LA English
DT Article
DE Residential energy efficiency evaluation; Information and incentives; Program design and participation
ID COMMUNITY ENERGY; CONSERVATION; INNOVATIONS; BEHAVIOR; MANAGEMENT; CANADA
AB Better methods of characterizing and addressing heterogeneity in preferences and decision making are needed to stimulate reductions in household greenhouse gas emissions. Four residential energy efficiency programs were delivered consecutively in the Region of Waterloo, Canada, between 1999 and 2011, and each offered a unique combination of information, financial reward structure, and price. A natural quasi-experimental intervention design was employed to assess differences in outcomes across these program structures. Participation at the initial (evaluation by an energy advisor) and follow-up (verification of retrofit) stages, and the material characteristics (e.g., energy performance) were measured and compared between the groups of houses included in each program at each stage. The programs appealed to people with different types of material concerns; each phase of the program was associated with houses with a different mix of material characteristics and depths of recommended and achieved changes. While a performance-based reward attracted fewer houses at each stage than a larger list-based reward, older houses with poorer energy performance were included at each stage. The findings support experimentation with program designs to target sub-populations of housing stock; future program designs should experiment more carefully and with larger performance-based rewards and test parallels with potential carbon market structures. (C) 2013 Elsevier Ltd. All rights reserved.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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TI Households' pro-environmental habits and investments in water and energy consumption: Determinants and relationships
SO JOURNAL OF ENVIRONMENTAL MANAGEMENT
LA English
DT Article
DE Water conservation; Energy conservation; Technology adoption; Habits; Multivariate probit
ID WILLINGNESS-TO-PAY; POLICY INSTRUMENTS; PLANNED BEHAVIOR; CONSERVATION; TECHNOLOGY; ATTITUDES; EFFICIENT; DEMAND; INFORMATION; INTENTION
AB Economic instruments have received a lot of attention in the literature dealing with water and energy demand management. However factors driving households' behaviour/habits and investment in water-saving and energy-saving equipment have been seldom studied. The main purpose of this article is to contribute to this literature by analysing the main determinants of a set of households' conservation habits and pro-environmental investment decisions. Using household-level data from Spain, we show that conservation habits and the purchase of resource-efficient appliances are not independent. (C) 2013 Elsevier Ltd. All rights reserved.
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PT J
AU Zvingilaite, E
AF Zvingilaite, Erika
TI Modelling energy savings in the Danish building sector combined with internalisation of health related externalities in a heat and power system optimisation model

SO ENERGY POLICY
LA English
DT Article
DE Energy savings; Energy system modelling; Environmental externalities
ID ELECTRICITY-GENERATION; EFFICIENCY MEASURES; COST
AB A substantial untapped energy saving potential rests in the building sector and is expected to play an important role in achieving reduction of environmental impacts of energy. In order to utilise this potential, effective policy measures need to be adopted to remove the existing barriers and create incentives. For that purpose, the cost effective energy saving options together with an optimal level of savings and expected environmental benefits have to be identified. The paper reports on a study that analyses these questions by including heat-saving measures in buildings into an energy system optimisation model of the Danish heat and power sector. The achieved optimal level of heat savings reaches 11% of projected heat demand in 2025 under the model assumptions. Moreover, the analysis reveals the importance of considering energy conservation options in a system wide perspective. Furthermore, the results suggest that changes in the energy generation sector are the prime driver behind the reduction of environmental externalities of energy. Heat savings in buildings play only a small role under model assumptions.
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FU Danish Strategic Research Program on Sustainable Energy [2104-06-0027]
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J9 ENERG POLICY
JI Energy Policy
PD APR
PY 2013
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DI 10.1016/j.enpol.2012.09.056
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 099FL
UT WOS:000315606700007
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PT J
AU Asadi, S
Hassan, M
Beheshti, A
AF Asadi, Somayeh
Hassan, Marwa
Beheshti, Ali
TI Development and validation of a simple estimating tool to predict
heating and cooling energy demand for attics of residential buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Residential buildings; Radiant barrier; Multiple regression analysis;
Energy savings; Heating and cooling demand
ID RADIANT BARRIER RETROFITS; MASS-TRANSFER MODEL; TRANSIENT HEAT;
PERFORMANCE; CLIMATE
AB The application of attic radiant barriers as a residential building energy conservation tool has received considerable attention in recent years. Quantifying the benefits of radiant barrier is complicated because the energy savings provided by this system depend on various factors including local climate, geometry,

and other building parameters. Therefore, the objective of this study is to develop a simple estimating tool that may be used by homeowners and designers to assess the effectiveness and economic benefits of radiant barrier under different climatic conditions in the US. The developed tool is based on transient three-dimensional finite element models that were validated based on the results of an experimental field study. The results of the finite element models were used to develop a set of regression equations to predict the thermal performances of radiant barriers under a wide range of operating conditions. Although the theoretical basis behind this tool is robust and accurate, the developed tool is simple, flexible, and user-friendly to encourage its use among practitioners and homeowners with minimal background about this system and heat transfer mechanisms. It is anticipated that the developed tool will facilitate the integration of energy efficiency in residential design and construction. (c) 2012 Elsevier B.V. All rights reserved.

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FU Industry Ties Research Program; Board of Regents, State of Louisiana (ITRS); RoyOMartin Company
FX The authors would like to acknowledge the Industry Ties Research Program with the Board of Regents, State of Louisiana (ITRS) and RoyOMartin Company for their funding and support of this research.
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J9 ENERG BUILDINGS
JI Energy Build.

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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA 059ZU
UT WOS:000312745200002
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ER

PT J
AU Korjenic, A
Bednar, T
AF Korjenic, Azra
Bednar, Thomas
TI Transformation of Fundamental Parameters for Energy Demand and Indoor Temperature from Room Level to Building Level
SO JOURNAL OF BUILDING PHYSICS
LA English
DT Article
DE climate surfaces; heating energy demand; cooling energy demand; summer indoor temperatures; change of location; window size and orientation; storage capacity
ID CLIMATE
AB Because the thermal optimization of a new building must be done in the planning phase, possible thermal optimizations are sought for the building by varying several parameters. This research article is based on the research of 'climate surfaces' by Prof. Keller and Dr Burmeister at the Federal Institute of Technology in Zurich (Burmeister and Keller, 1998). The question should be resolved whether this simplified method using climate surfaces is applicable to the entire building. The most important parameters of the building have been systematically changed and their impact on energy performance during different outdoor climate changes was observed. As a result, the impacts on the following are presented and discussed: Heat energy demands, Cooling energy demands, and Summer indoor temperatures.
The results of these investigations showed that the 'multizone climate surface' method is a very practical and clear strategy for estimating the thermal behavior of a building by the correct selection of three determining parameters. Already in an early planning stage, it is possible to establish the optimal building data, at a sufficient level of detail, where energy consumption has been concerned. The study is carried out using the monthly energy balance method and dynamic simulation using 'BuildOpt' software. The objective was to establish if the much simpler monthly balance method will give sufficiently precise results for this optimization, or if a simulation must be performed. The results of the analysis indicate that the monthly balance method is inaccurate, especially for buildings with low energy demands. Subsequent studies deal with the optimization of the most important construction assembly parameters of a building for specific climates. The results of the optimization studies are presented in this article.
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PU SAGE PUBLICATIONS LTD
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J9 J BUILD PHYS
JI J. Build Phys.
PD APR
PY 2010
VL 33
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WC Construction & Building Technology
SC Construction & Building Technology
GA 576RH
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ER

PT S
AU Williams, E
Matthews, S
Breton, M
Brady, T
AF Williams, Eric
Matthews, Scott
Breton, Michael
Brady, Todd
GP IEEE Computer Society
TI Use of a computer-based system to measure and manage energy consumption in the home
SO PROCEEDINGS OF THE 2006 IEEE INTERNATIONAL SYMPOSIUM ON ELECTRONICS & THE ENVIRONMENT, CONFERENCE RECORD
SE IEEE International Symposium on Electronics and the Environment-ISEE
LA English
DT Proceedings Paper
CT 14th IEEE International Symposium on Electronics and the Environment (ISEE)/7th Electronics Recycling Summit
CY MAY 08-11, 2006
CL San Francisco, CA
SP IEEE Comp Soc, TCEE, Int Assoc Elect Recyclers
DE energy use; residences; monitoring and control systems; information technology; peak-shifting; precooling; behavioral patterns
AB Energy use in homes represents 21% of US total energy demand in 2004. Managing this sector is an important priority for addressing global warming, conserving resources and improving energy security. Much energy is wasted in delivering energy services not actually used by residents. Two examples include heating/cooling and lighting of unoccupied houses and rooms, and overheating or overcooling to make up for temperature variations. IT-enabled monitoring and control technologies have played an important role in eliminating similar kinds of inefficiencies in other sectors, so it is natural to think that these systems could have an important role in the home as well. The technology level of energy control in most homes is

AB at least 20 years old, with simple programmable thermostats still in only about a quarter of US homes. Networked thermostats, power meters and switches, and zone heating are technologies that can provide information on energy use and allow it to be controlled for distribution only when needed. In addition to direct energy savings, there is also a demand to reduce indirect needs for energy infrastructure through peak shifting, or redistributing of electricity demand more evenly throughout the day. In addition to surveying these energy management issues, this article also relates the experience of a pilot project setting up monitoring/control systems in three Sacramento homes. The design specifications of these systems combine capabilities for web-based monitoring and control and peak shifting via precooling, and load shedding. The pilot has shown that such a monitoring and control system satisfying the design parameters can be implemented via mainly off-the-shelf parts. Much work remains to be done however, to develop low-cost user friendly systems attractive to typical homeowners.
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TC 13
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U1 0
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PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1095-2020
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J9 IEEE INT SYMP ELECTR
PY 2006
BP 167
EP +
DI 10.1109/ISEE.2006.1650055
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WC Engineering, Environmental; Engineering, Electrical & Electronic
SC Engineering
GA BEV84
UT WOS:000239657400034
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ER

PT J
AU Miao, L
AF Miao, Lu
TI Examining the impact factors of urban residential energy consumption and
CO2 emissions in China - Evidence from city-level data
SO ECOLOGICAL INDICATORS
LA English
DT Article
DE Residential energy consumption; Residential CO2 emissions; Private
vehicle ownership; STIRPAT model; Population compactness
ID CARBON-DIOXIDE EMISSIONS; CLIMATE-CHANGE; STIRPAT MODEL; URBANIZATION;
GROWTH; POPULATION; INCOME; CITIES; AFFLUENCE; LEAD

AB Rapid urbanization has exerted substantial pressure on China's energy system and contributed to climate change. To find the key drivers of urban residential energy consumption and CO2 emissions, this paper uses an extended Stochastic Impacts by Regression on Population, Affluence and Technology (STIRPAT), model that employs city-level data to examine the influences of population scale, income level, population compactness and price on house-based residential energy consumption, energy-related CO2 emissions and private vehicle ownership. The empirical results indicate that factors such as population scale, affluence, and population compactness can lead to increases in residential energy consumption and CO2 emissions. In terms of transportation, income and population scale positively drive the growth of private vehicle ownership, while the fuel price negatively influences private vehicle ownership. Moreover, population scale is the most important factor in residential energy consumption and CO2 emissions. Finally, policy recommendations are suggested for China's urban development strategy and urban design and to encourage technology innovations that reduce residential energy consumption and CO2 emissions. (C) 2016 Elsevier Ltd. All rights reserved.

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U2 56
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PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1470-160X
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J9 ECOL INDIC
JI Ecol. Indic.
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PY 2017
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WC Biodiversity Conservation; Environmental Sciences
SC Biodiversity & Conservation; Environmental Sciences & Ecology
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PT J
AU Oh, SJ
Ng, KC
Thu, K
Chun, W
Chua, KJE
AF Oh, Seung Jin
Ng, Kim Choon
Thu, Kyaw
Chun, Wongee
Chua, Kian Jon Ernest
TI Forecasting long-term electricity demand for cooling of Singapore's buildings incorporating an innovative air-conditioning technology
SO ENERGY AND BUILDINGS

LA English
DT Article
DE Air conditioning; District cooling; Novel cooling technology; Electricity forecast model; Carbon footprint
ID BOTTOM-UP; DISTRICT; SYSTEMS
AB In an effort to accurately plan for investment on energy production and distribution, this paper proposes a long-term electricity consumption forecasting model for buildings' cooling by employing a high energy conservative scenario. Tile key aspect of the high energy conservative scenario is to adopt an innovative adsorbent-based dehumidifier and an indirect evaporative cooling (AD-IEC) technology as opposed to conventional mechanical vapor compression system. Bottom-up equations were developed to identify the cooling load and electricity consumption of both residential and non-residential buildings for the period 2002-2013. Based on the time-series electricity consumption, a multiple linear regression model is developed to forecast electricity demand for the future period of 2014-2030. It is found that the electricity demands for cooling in the building sectors account for31 +/- 2% of the total electricity consumption in Singapore, This study concluded that the high conservative scenario realizes the best potential of electricity saving of 21,096 GWh until 2030. Using a CO2 emission factor of 4.49 x 10(-4) metric tons CO2/kWh, the total carbon footprint saving from all power plants is estimated to be 9491,264t of CO2. This work evolves a new forecasting methodology to predict buildings' cooling energy consumption involving the use of novel cooling technologies. (C) 2016 Elsevier B.V. All rights reserved.
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FU National Research Foundation of Singapore [R-265-000-466-281]; Korean National Research Foundation [2014R1A2A1A01006421]
FX The authors gratefully acknowledged the financial support from National Research Foundation of Singapore (grant no. R-265-000-466-281) and Korean National Research Foundation (grant no. 2014R1A2A1A01006421)
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AU Yu, Z
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AF Yu, Zhun (Jerry)
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TI Advances and challenges in building engineering and data mining
applications for energy-efficient communities
SO SUSTAINABLE CITIES AND SOCIETY
LA English
DT Article
DE Data Mining; Building Energy Use; Occupant Behavior; Big Data; Review
ID FAULT-DETECTION; KNOWLEDGE DISCOVERY; NEURAL-NETWORK; CONSUMPTION;
DIAGNOSIS; PERFORMANCE; FRAMEWORK; SYSTEMS; SIMULATION; PREDICTION
AB The rapidly growing and gigantic body of stored data in the building field, coupled with the need for data analysis, has generated an urgent need for powerful tools that can extract hidden but useful knowledge of building performance improvement from large data sets. As an emerging subfield of computer science, data mining technologies suit this need well and have been proposed for relevant knowledge discovery in the past several years. Aimed to highlight recent advances, this paper provides an overview of the studies undertaking the two main data mining tasks (i.e. predictive tasks and descriptive tasks) in the building field. Based on the overview, major challenges and future research trends are also discussed. (C) 2015 The Authors. Published by Elsevier Ltd.
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TI Effect of technology-enabled time-of-use energy pricing on thermal comfort and energy use in mechanically-conditioned residential buildings in cooling dominated climates
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Building energy modeling; Response surface methodology; Thermal comfort; Time-of-use pricing
ID ARTIFICIAL NEURAL-NETWORK; MASS; MODEL; PREDICT; DEMAND; LOAD
AB The effects of automatic indoor set point temperature setbacks using smart thermostats in response to time-of-use (TOU) electricity rates structures on occupant thermal comfort are evaluated for representative single family residential buildings located in 3 climate zones with dominant cooling loads. Building energy models (BEM) of single family homes are evaluated using a full factorial experimental design to create a response surface which provides a continuous function to evaluate the impact of four design variables on long-term thermal comfort indices, including Average Percent of People Dissatisfied (Average PPD), and Percentage Outside Thermal Comfort Zone (POS). These design variables include indoor set point temperature, degrees of setback temperature in cooling mode, building thermal mass, and air exchange rate for each climate zone. These are compared to the relative energy savings resulting from TOU thermostat setbacks while considering other design variables. A second-order response surface is found to provide a reasonable fit to BEM simulation in- and out-of-sample data. The set point temperature is the most influential of the variables studied in decreasing long-term thermal comfort, while reducing HVAC electricity use. The thermostat setback has the strongest influence on thermal comfort in a hot-dry climate, while the most HVAC energy savings is able to be achieved in the mixed-humid climate zone. The results are tabulated for weighing the costs and benefits of TOU electricity rates for homes with different characteristics, in climate zones with air conditioning-dominate energy consumption.
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PT J
AU Palm, J
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Reindl, Katharina
TI Understanding energy efficiency in Swedish residential building renovation: A practice theory approach
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Renovation; Energy efficiency; Multi-family dwellings; Practice theory
ID PERFORMANCE; CONSUMPTION; SCIENCE
AB Examining renovation processes having reduced energy consumption as an explicit goal, this article considers how energy efficiency is made part of renovation processes, focusing on the planning and design phase. Interviews and participant observations of meetings have been conducted. Applying a framework developed in practice theory, we demonstrate the importance of understanding routines, technology,

meanings, and knowledge in order to understand why renovation processes repeat themselves and why a renovation practice are hard to change.

The analysis shows that the professionals were only engaged in decisions in relation to their own specialized areas, which benefited established solutions. The existing technical infrastructure, such as the HVAC shafts and the district heating system, largely determined what issues were up for discussion. It was clear that practical know-how were valued much higher than theoretical knowledge. The meaning of an energy efficient renovations for the professionals was to reduce the energy consumed as much as possible in every renovated building. With this in mind, we were surprised by how little energy efficiency was on the agenda. We can conclude that there was nothing in the studied processes that could trigger changes and dislodge the inertia of the practice. (C) 2015 Elsevier Ltd. All rights reserved.

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TI A GIS domestic building framework to estimate energy end-use demand in UK sub-city areas
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Cities; Energy; Data sets; Neighbourhood; Districts; Local energy policy; Modelling; GIS
ID RESIDENTIAL SECTOR; UNCERTAINTY; CONSUMPTION; SENSITIVITY
AB This paper presents the development, evaluation and application of a spatially referenced domestic building level framework (i.e. address level) to estimate domestic energy end-use demand baseline in sub-city areas. The paper core idea and conclusion is that unless knowledge and model estimating is available at an appropriate level, future UK local energy infrastructure planning will not be effective. Our framework innovatively combines a dataset, which includes detailed building surveys of 60,977 out of a total of 139,257 dwellings, with a normalised national dataset (i.e. the English Housing Survey) and applied to a BRE Domestic Energy Model (i.e. Cambridge Housing Model) so as to establish an energy consumption baseline for the domestic stock in localised areas of Newcastle upon Tyne. Our validation results show a poor alignment with existing observed data as published by the Department of Energy and Climate Change (DECC), particularly at neighbourhood scale. Our belief is that as spatial resolution is increased, local building and urban socio-economic and physical characteristics play a more important part in the estimation of dwelling energy consumption. Thus, we propose a taxonomy to holistically deal with the sources of uncertainty arising from these issues and the components of our framework.
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AU Berry, S
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TI Near zero energy homes - What do users think?
SO ENERGY POLICY
LA English
DT Article
DE Building energy policy; Zero energy homes; Building monitoring; Energy efficiency; Thermal comfort
ID RANDOMIZED COMMUNITY TRIAL; THERMAL COMFORT; HEALTH; PERFORMANCE; ENVIRONMENT; BUILDINGS; MORBIDITY; AUSTRALIA; MORTALITY; BENEFITS
AB With policy directions firmly moving towards net zero energy homes, what do we know about the perceptions and experiences of households who already live in homes at or near that standard? The research sets out to determine whether householders believe these buildings are thermally comfortable, and if they feel confident operating the smart technologies that help achieve the net zero energy outcome? Combining interviews from 25 households and monitored energy data from over 50 near zero energy homes, this paper examines the validity of this policy goal from the building user perspective. The evidence shows households attain high levels of thermal comfort, enjoy lower energy bills, and believe their behaviour has been influenced by the building and its energy systems. Yet many remain concerned that the building industry is unable to produce homes that maintain thermal comfort in all spaces and all seasons. The residents have also identified significant issues in the reliability and usability of the energy technologies. Whilst the policy appears valid from the end-user perspective, the case study highlights the substantial task ahead for policy makers to establish suitable commissioning and compliance processes, and develop effective energy rating tools on the path to zero energy homes. (C) 2014 Elsevier Ltd. All rights reserved.
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FU CSIRO's Intelligent Grid Cluster; Renewal SA
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TI A Survey of Energy Efficiency in Buildings and Microgrids using
Networking Technologies
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DT Article
DE Intelligent buildings; energy efficiency; microgrids; building
automation; sustainability; smart homes; smart phones; cloud computing;

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ID HOME; SYSTEMS; EVOLUTION
AB Intelligent buildings and microgrids are important parts of the future smart grid. The adoption and development process of the intelligent buildings has been slow. There are multiple technical and non-technical reasons. However, two recent trends have accelerated the research and application of the technologies related to this area. First, skyrocketing energy price and the global need for reducing fossil oil consumption for environmental sustainability combined with the fact that buildings are a significant source of energy consumption, making buildings intelligent and energy efficient will have huge impacts on the total CO2 emission and hence global sustainability. Second, rapid popularity and maturation of mobile smart phone technology and Internet technologies like cloud computing enable smart phone holders to be aware of their energy consumption and participate in controlling and running their buildings with seamless Internet connections. Cloud computing enables active interactions between the consumer-side (buildings) and the provider-side (smart grids). Hence, combining energy efficiency and networking perspectives, in this paper, we investigate the key research topics through a broad survey on the latest developments in intelligent buildings and our vision of microgrids formed by such buildings. Our aim is to draw an overall picture of the current research and potential future applications. Moreover, we further summarize and discuss in detail a series of key issues and trends that can potentially motivate and impact the adoption and development of the intelligent building and microgrid technologies in the near future.
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AU Lewandowska, A
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AF Lewandowska, Anna
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TI Comparative life cycle assessment of passive and traditional residential buildings' use with a special focus on energy-related aspects
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy consumption; Environmental impact; Buildings
ID LCA; CONSTRUCTION; METHODOLOGY
AB This article presents the results of the research project financed by the Polish Ministry of Science and Higher Education (N N309 078138) and coordinated by the Wood Technology Institute in Poznan. A key point of this project was LCA study performed for four detached single-family dwellings with a particular emphasis on the use stage. The life-cycle assessment involved various types of activity made within a hundred years of use and related to: operation (energy and water consumption), replacements and repairs, renovations and maintenance, land occupation, waste transport and waste management. Two of the four analyzed buildings met passive house standards and their energy demands in the use stage were several times lower than those of their conventional counterparts. The aim of the studies was to demonstrate whether lower nominal energy consumption is sufficient to get the best results of the environmental impact of passive buildings, or whether a type of energy used to cover the demand also plays an important role. (C) 2013 Elsevier B.V. All rights reserved.
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AU Muller, L
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TI Passive House at the crossroads: The past and the present of a voluntary standard that managed to bridge the energy efficiency gap
SO ENERGY POLICY
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DE Passive House; Technological innovation; Immutable mobile
ID BARRIERS; TECHNOLOGY; PARADOX; HOME
AB Improving energy efficiency in dwellings is generally seen as the low-hanging fruit of climate change mitigation. In particular decreased heat loss through better insulation is suggested as one of the most cost-effective means to achieve the ambitious national and international goals of climate gas reduction. However, the literature shows that a profitable technological solution is not sufficient to reach the energy goals. Aspects such as a lack of information, unobserved costs, and heterogeneity among users can compromise the success of technical innovation. Still, there are successful concepts that drive the technological development in the construction sector. The Passive House is an example for such innovations that manage to bridge the energy efficiency gap. This paper addresses the Passive House concept and standard as a success story of technological innovation. With Bruno Latour's Science in Action (1987) as a starting point, we describe the conditions under which the standard was created, the role of the network built around the Passive House Institute, and the consequences of exporting the standard. We identify success factors that have supported the diffusion of the Passive House standard and concept and discuss its possible development in the current situation which is characterized by its wide-spread adoption. (C) 2013 Elsevier Ltd. All rights reserved.
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JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
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PT J
AU Fuerst, F
van de Wetering, J
Wyatt, P
AF Fuerst, Franz
van de Wetering, Jorn
Wyatt, Peter
TI Is intrinsic energy efficiency reflected in the pricing of office leases?
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE commercial offices; eco-labelling; energy efficiency; Energy Performance Certificate; hedonic modelling; rental premium; rental values
ID TECHNOLOGY; PARADOX; MARKET; LABELS; IMPACT; GAP
AB This paper investigates whether the intrinsic energy efficiency rating of an office building has a significant impact on its rental value. A sample of 817 transactions for offices with Energy Performance Certificates (EPCs) in the UK is used to assess whether a pricing differential can be identified, depending on the energy rating. While previous analyses of this topic have typically relied on appraisal-based and/or asking rent data, the dataset used in this research contains actual contract rents as well as information on lease terms. The results indicate a significant rental premium for energy-efficient buildings. However, it is found that this premium appears to be mainly driven by the youngest cohort of state-of-the-art energy-efficient buildings. The results also show that tenants of more energy-efficient buildings tend to pay a lower service charge, but this link appears to be rather weak and limited to newer buildings. Hence, it is argued that the information contained in the EPC is still not fully taken into account in the UK commercial property market with the possible exception of both the highest and the lowest EPC ratings.
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PI ABINGDON
PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
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J9 BUILD RES INF
JI Build. Res. Informat.
PD AUG 1
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WC Construction & Building Technology
SC Construction & Building Technology
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PT J
AU Pellegrini-Masini, G
Leishman, C
AF Pellegrini-Masini, Giuseppe
Leishman, Chris
TI The role of corporate reputation and employees' values in the uptake of energy efficiency in office buildings
SO ENERGY POLICY
LA English
DT Article
DE Office buildings; Energy efficiency; Corporate social responsibility
ID SOCIAL-RESPONSIBILITY; ENVIRONMENTAL-ISSUES; PROPERTY; PERFORMANCE; DRIVERS; SUSTAINABILITY; PERSPECTIVES; BUSINESS; BARRIERS; BEHAVIOR
AB Although office market actors in the United Kingdom show a growing interest in energy efficiency, the pace of takeup of energy efficient office features is slow. Previous studies have highlighted the roles of limited direct financial costs and benefits (efficiency gaps') and market barriers in limiting the rate of technology adoption. This study provides further evidence on the importance of these factors, but the primary contribution is focused on the role of corporate reputation and on the importance of individuals' values in shaping corporate behaviour. The paper presents a theoretical framework to explain environmental decision making in firms and we present qualitative evidence drawing from sixteen semi-structured individual and group interviews with office market stakeholders in London, Glasgow and

Edinburgh. The research finds that companies, despite gradually becoming more energy conscious, still regard energy costs as a negligible part of their business costs. Nevertheless, an increasingly important driver is the reputational gain obtained by corporate businesses implementing sustainable practices. All the interviewees agreed that the pace of change in the office market is slow and that only further policy interventions will accelerate it. (C) 2011 Elsevier Ltd. All rights reserved.

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PT J
AU Sahakian, MD
AF Sahakian, Marlyne D.
TI Understanding household energy consumption patterns: When "West Is Best" in Metro Manila
SO ENERGY POLICY
LA English
DT Article
DE Sustainable consumption; Household energy; The Philippines
ID PHILIPPINES; ENVIRONMENT
AB This paper addresses the topic of energy and development through a multi-disciplinary and systemic approach that combines environmental considerations with a social understanding of consumption. The focus is on electricity usage in the home and specifically lighting and cooling. Set in the urban mega-polis

of Metro Manila, the Philippines, energy consumption is first placed in its biophysical perspective: the energy sources and electricity grid are presented, in relation to the Philippines as well as the region. The research findings then explore the social and cultural drivers behind household electricity consumption, revealing in several examples the strong influence of globalization understood here as the flow of people, remittances, images and ideas. Policy recommendations are provided, based on the research results, with concluding remarks relevant to other similar contexts. (C) 2010 Elsevier Ltd. All rights reserved.

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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Podgornik, A
Sucic, B
Blazic, B
AF Podgornik, Ales
Sucic, Boris
Blazic, Bostjan
TI Effects of customized consumption feedback on energy efficient behaviour in low-income households
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Consumption feedback; Energy behaviour; Low-income households; Smart meters; Energy awareness
ID ELECTRICITY CONSUMPTION; DOMESTIC APPLIANCES; INFORMATION; HABITS; INDICATORS; RESIDENTS; DESIGN; POLICY; MODEL
AB Smart metering and various consumption-feedback systems can be used as applicable technology to encourage end-use energy efficiency in the residential sector. Many studies have demonstrated the positive influence of socially contextualized feedback on the energy consumption of households, but not many such studies dealt with the specifics of low-income households. This paper evaluates the effect of customized consumption feedback and other information interactions on energy-behaviour patterns and energy savings in low-income households. The experimentation process was accompanied by an interactive awareness campaign, with the emphasis being on a proper understanding of the consumption feedback and other complementary energy services provided to low-income households. The feedback actions were customized to tackle the recognised needs of each specific target household, considering both the social aspects and the typology of the dwelling. The results clearly confirmed the importance of customized

information and efficiency indicators for specific household groups, with a potential to increase knowledge and develop awareness with respect to established habits and their relevance to energy behaviour. (C) 2016 Elsevier Ltd. All rights reserved.

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PT J
AU Wu, Z
Wang, B
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AF Wu, Zhou
Wang, Bo
Xia, Xiaohua
TI Large-scale building energy efficiency retrofit: Concept, model and control
SO ENERGY
LA English
DT Article
DE Building retrofit; Energy efficiency; Optimal planning; Net present value; Control
ID MULTIOBJECTIVE OPTIMIZATION; NEIGHBORHOOD FIELD; METHODOLOGY; STRATEGIES; SYSTEM
AB BEER (Building energy efficiency retrofit) projects are initiated in many nations and regions over the world. Existing studies of BEER focus on modeling and planning based on one building and one year period of retrofitting, which cannot be applied to certain large BEER projects with multiple buildings and multi-year retrofit. In this paper, the large-scale BEER problem is defined in a general TBT (time-building technology) framework, which fits essential requirements of real-world projects. The large-scale BEER is newly studied in the control approach rather than the optimization approach commonly used before. Optimal control is proposed to design optimal retrofitting strategy in terms of maximal energy savings and maximal NPV (net present value). The designed strategy is dynamically changing on dimensions of time, building and technology. The TBT framework and the optimal control approach are verified in a large BEER project, and results indicate that promising performance of energy and cost savings can be achieved in the general TBT framework. (C) 2016 Elsevier Ltd. All rights reserved.
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SC Thermodynamics; Energy & Fuels
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PT J
AU Belaid, F
Garcia, T
AF Belaid, Fateh
Garcia, Thomas
TI Understanding the spectrum of residential energy-saving behaviours:
French evidence using disaggregated data
SO ENERGY ECONOMICS
LA English
DT Article
DE Energy-saving behaviours; Residential energy use; Econometric modelling;
IRT; Lasso
ID NONCONCAVE PENALIZED LIKELIHOOD; ELECTRICITY CONSUMPTION; ORACLE
PROPERTIES; CONSERVATION; HOUSEHOLDS; DEMAND; DETERMINANTS; EFFICIENCY;
SELECTION; FRANCE
AB Analysing household energy-saving behaviours is crucial to improve energy consumption predictions and energy policy making. How should we quantitatively measure them? What are their determinants? This study explores the main factors influencing residential energy-saving behaviours based on a bottom-up multivariate statistical approach using data from the recent French PHEBUS survey. Firstly, we assess energy-saving behaviours on a one-dimension scale using IRT. Secondly, we use linear regression with an innovative variable selection method via adaptive lasso to tease out the effects of both macro and micro factors on the behavioural score. The results highlight the impact of five main attributes incentivizing energy-saving behaviours based on cross-variable analyses: energy price, household income, education level, age of head of household and dwelling energy performance. In addition, our results suggest that the analysis of the inverted U-shape impact of age enables the expansion of the energy consumption life cycle theory to energy-saving behaviours.
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PT J
AU Wells, EM
Berges, M
Metcalf, M
Kinsella, A
Foreman, K
Dearborn, DG
Greenberg, S
AF Wells, Ellen M.
Berges, Matt
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Greenberg, Stuart
TI Indoor air quality and occupant comfort in homes with deep versus conventional energy efficiency renovations
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Indoor air pollution; Conservation of energy resources; Ventilation; Carbon dioxide; Volatile organic hydrocarbons; Thermal comfort
ID ENVIRONMENTAL-QUALITY; GREEN RENOVATION; HEALTH OUTCOMES; PUBLIC-HEALTH; ASTHMA; BUILDINGS; SATISFACTION; POLLUTION; CHILDREN; IMPACT
AB Deep energy retrofits (DER) for residential housing have been proposed to reduce greenhouse gas emissions; these result in similar to 50% additional energy efficiency compared to standard, energy star (ES), renovations. However, the impact of increased energy efficiency on indoor air quality (IAQ) is poorly understood. We conducted a longitudinal study to compare IAQ and occupant comfort in 12 low income single-family homes renovated to a DER or ES standard. Quarterly visits were conducted for a median of 18 months post-renovation; IAQ was assessed in 4 rooms per visit for a total of 237 measurements. Multivariable regression models accounted for repeated measurements and controlled for house- and family-related covariates. In fully adjusted models, average difference (95% confidence interval) in IAQ parameters in DER homes versus ES homes were: temperature: -0.3 degrees C (-1.2, 0.6); relative humidity: 0.4% (-1.1, 1.8); carbon dioxide: 43.7 ppm (-18.8, 106.2); and total volatile organic compounds: 198 ppb (-224, 620). Residents in DER homes were significantly less likely to report their homes were comfortable, most likely due to initial difficulties with new heating system technology. We found no differences in IAQ between DER and ES homes; however, education is strongly recommended when incorporating new technology into residences. (C) 2015 The Authors. Published by Elsevier Ltd.
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PT J
AU Angrisani, G
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Sasso, M
AF Angrisani, Giovanni
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Sasso, Maurizio
TI Microcogeneration in buildings with low energy demand in load sharing application
SO ENERGY CONVERSION AND MANAGEMENT
LA English
DT Article
DE Microcogeneration; Dynamic simulation; Load sharing; Buildings with low energy demand; Climatic conditions
ID DYNAMIC PERFORMANCE ASSESSMENT; INTEGRATED COGENERATION SYSTEM; OPTIMIZATION; SIMULATIONS; CALIBRATION; VALIDATION; OPERATION; NETWORK; MODEL
AB The paper investigates the introduction of a MCHP (Micro Combined Heat and Power) system in buildings with low energy demand with respect to the current building stock. A load sharing approach between a multifamily residential building and an office one is taken into account. Dynamic simulations are carried out in order to evaluate the thermo-economic performance of the analyzed system. Particular attention is given to the estimation of the electric load of the different users, as the economic profitability of a MCHP system is strongly influenced by the amount of self-consumed electricity. In order to analyze the influence of climatic conditions, two different geographical locations in Italy (Naples and Turin, having 1034 and 2617 heating degree days, respectively) are considered. The results of this study indicate that the installation of MCHP systems in buildings with low energy demand allows to increase the percentage of self-consumed electricity reducing the bidirectional electricity flow between the users and the external grid, as well as the impact on the grid itself due to the large diffusion of distributed generation systems. Moreover this study shows that the load sharing approach between users with different load profile leads to better energy, environmental and economic results with respect to a conventional system. The climatic conditions play an important role on the MCHP operational hours and hence on the thermo-economic performance of the system. The primary energy saving of the system located in Turin is equal to 8.8% with respect to 6.2% of the system located in Naples. Also the environmental performance, evaluated in terms of

equivalent CO2 avoided emissions, are better in Turin (8.3%) than in Naples (6.7%). The economic analysis shows acceptable values of the pay-back period in presence of economic support mechanisms. The findings of this study show that the introduction of a MCHP system in load sharing approach leads to thermo-economics advantages even considering the lower heating needs of well-insulated buildings. (C) 2015 Elsevier Ltd. All rights reserved.
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PT J
AU Kavousian, A
Rajagopal, R
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AF Kavousian, Amir
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TI Ranking appliance energy efficiency in households: Utilizing smart meter data and energy efficiency frontiers to estimate and identify the determinants of appliance energy efficiency in residential buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Home energy efficiency; Appliance energy efficiency; Stochastic Energy Efficiency Frontier (SEEF); Smart meter interval data; Stepwise regression; Home energy analytics; Energy efficiency ranking
ID ELECTRICITY; DEMAND
AB This paper offers a novel method to rank residential appliance energy efficiency utilizing energy efficiency frontiers. The method is validated using a real-world case study of 4231 buildings in Ireland. Our results show that structural factors have the largest impact on energy efficiency, followed by socioeconomic factors and behavioral factors. For example, households with high penetration of efficient lightbulbs and double-glazed windows were on average 4 and 3.5% more efficient than others. Households with the head of household having higher education are on average 1.3% more efficient than their peers. Finally, households that track their energy savings are on average 0.4% more efficient than others.
Furthermore, installing heater timers, wall insulation, and living in owned residences were correlated with higher efficiency. Generally, families with kids who have full-time employment and are highly-educated are more efficient compared to families with no kids, or families with retirees or unemployed members. This result has important implications for both targeting and messaging of energy efficiency programs.
Some behavioral factors demonstrated significant impact on appliance energy efficiency. For instance, households that expressed interest in making major energy-saving lifestyle changes scored higher efficiency ranks on average. Conversely, households that expressed doubt about their motivation to save energy ranked lower in efficiency. This finding validates the role of educational programs to increase awareness about energy efficiency and its importance.
In short, our results show that a data-driven analysis of a population is needed to develop a balanced view of the drivers of energy efficiency, and to devise a targeted approach to improve homes' energy efficiency.

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AF Lopes, Marta A. R.
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TI Towards more effective behavioural energy policy: An integrative modelling approach to residential energy consumption in Europe
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
ID PROBLEM STRUCTURING METHODS; FUZZY COGNITIVE MAPS; ELECTRICITY CONSUMPTION; SAVING BEHAVIOR; MAPPING APPROACH; SOCIAL-SCIENCE; HUMAN-VALUES; END-USER; EFFICIENCY; SECTOR
AB Energy behaviours represent an important underexploited resource in the context of promoting end-use energy efficiency, namely in the residential sector. However, addressing the multidimensional nature of energy behaviours is a complex task and more effective behaviour change interventions and policies grounded on comprehensive approaches are required. An integrative intervention to explore the influence of usage energy behaviours on energy consumption was developed through an innovative combination of modelling techniques. A real-world case study was utilised to generate contextualised understanding. This intervention supported problem structuring methods as pertinent tools to be utilised in complex human-centred energy research, such as energy behaviours, by enabling the development of tailored methodologies which minimise the human bias. It further confirmed real-world behaviour change interventions should involve the different energy stakeholders and be designed to be flexible and adaptive. Results confirmed variables associated with different dimensions significantly impact energy consumption. In this case study the promotion of residential energy efficiency includes both structural and energy behavioural actions, namely a better insulation of the dwellings and encouraging specific usage energy behaviours. These results support the need to consider an integrative perspective when addressing energy behaviours and designing effective behavioural change interventions and energy efficiency policies. (C) 2015 Elsevier Ltd. All rights reserved.
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PT J
AU Papachristos, G
AF Papachristos, George
TI Household electricity consumption and CO2 emissions in the Netherlands:
A model-based analysis
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Households; Electricity consumption; Bottom up modelling
ID ENERGY-CONSUMPTION; RESIDENTIAL SECTOR; BUILDING STOCK; FEEDBACK;
BEHAVIOR; INTERVENTION; TECHNOLOGIES; PERSPECTIVE; TRANSITION; IMPACTS
AB Twenty percent of the total energy consumption in the Netherlands comes from household electricity consumption. This comes from household electric appliances whose number has grown in recent years. The paper explores the effect of smart meter introduction, appliance efficiency and consumer behaviour on

reducing electricity consumption in the Netherlands. It does so by combining two perspectives: a sociotechnical approach and a bottom up simulation approach. The range of scenarios explored through simulation in the paper provides an understanding of the interplay between efficiency, smart meter diffusion and consumer behaviour. The results show their effect on electricity consumption and suggest that further effort is required to control and reduce it. Insights from the paper suggest that future studies should disaggregate with respect to a number of factors. (C) 2014 Elsevier B.V. All rights reserved.

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NR 83
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Z9 12
U1 1
U2 29
PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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JI Energy Build.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA AY3PI
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PT J
AU Feng, YP
Wu, Y
Liu, CB
AF Feng Yan-ping
Wu Yong
Liu Chang-bin
TI Energy-efficiency supervision systems for energy management in large public buildings: Necessary choice for China
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency; Public buildings; Supervision
AB Buildings are important contributors to total energy consumption accounting for around 30% of all energy consumed in China. Of this, around two-fifths are consumed within urban homes, one-fifth within public buildings, and two-fifths within rural area. Government office buildings and large-scale public buildings are the dominant energy consumers in cities but their consumption can be largely cut back through improving efficiency. At present, energy management in the large public sector is a particular priority in China. Firstly, this paper discusses how the large public building is defined, and then energy performance in large public buildings is studied. The paper also describes barriers to improving energy efficiency of large public buildings in China and examines the energy-efficiency policies and programs adopted in United States and European Union. The energy-efficiency supervision (EES) systems developed to improve operation and maintenance practices and promote energy efficiency in large public sector are described. The benefits of the EES systems are finally summarized. (C) 2009 Elsevier Ltd. All rights reserved.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Energy Policy
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PY 2009
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IS 6
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 448AK
UT WOS:000266233300003
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PT S
AU Williams, ED
Matthews, HS
AF Williams, Eric D.
Matthews, H. Scott
TI Scoping the potential of monitoring and control technologies to reduce energy use in homes
SO PROCEEDINGS OF THE 2007 IEEE INTERNATIONAL SYMPOSIUM ON ELECTRONICS & THE ENVIRONMENT, CONFERENCE RECORD
SE IEEE International Symposium on Electronics and the Environment-ISEE
LA English
DT Proceedings Paper
CT 15th International Symposium on Electronics and the Environment (ISEE)
CY MAY 07-10, 2007
CL Orlando, FL
SP IEEE Comp Soc TCEE
DE energy use; residences; monitoring and control technologies
AB This scoping study takes a broad look at how Information Technology-enabled monitoring and control systems in residences could play a role in mitigating energy use. Managing the residential sector is an important priority for addressing energy use, as use in homes represents 21 % of US total energy demand, up 16% from 1994. Much energy is apparently wasted in delivering energy services not actually used by residents. These include heating/cooling of unoccupied houses and rooms, overheating or overcooling to make up for temperature variations, leakage current due to appliances in standby or off mode, and purchase of needlessly energy intensive models of appliances. The results of our initial rough estimate is that around 40% residential energy use is used to deliver these types of "unused" energy services. IT-enabled monitoring and control technologies have played an important role in eliminating similar kinds of waste in other sectors, so it is natural to think that these systems could have an important role in the home as well. The technology level of energy control in homes is at least 20 years old, with simple programmable thermostats still in only about a quarter of US homes. Networked thermostats, power meters and switches, and zone heating are technologies that can provide information on energy use and allow energy use to be controlled for distribution only when needed We estimate that monitoring and control systems could save from 3-26% of residential energy use. The lower end corresponds to use of a programmable thermostat and the upper to an integrated system including monitoring and control of appliances, plus zone heating/cooling. We propose that these results provide renewed motivation to investigate the promotion of smart home energy technologies.
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FX This research was funded in part by Intel Corporation.
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NR 10
TC 11
Z9 11
U1 0
U2 3
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1095-2020
BN 978-1-4244-0861-0
J9 IEEE INT SYMP ELECTR
PY 2007
BP 239
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DI 10.1109/ISEE.2007.369401
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WC Engineering, Environmental; Engineering, Industrial
SC Engineering
GA BGN15
UT WOS:000248562400046
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PT J
AU Makonin, S
Ellert, B
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AF Makonin, Stephen
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Bajic, Ivan V.
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TI Electricity, water, and natural gas consumption of a residential house in Canada from 2012 to 2014
SO SCIENTIFIC DATA
LA English
DT Article; Data Paper
AB With the cost of consuming resources increasing (both economically and ecologically), homeowners need to find ways to curb consumption. The Almanac of Minutely Power dataset Version 2 (AMPds2) has been released to help computational sustainability researchers, power and energy engineers, building scientists and technologists, utility companies, and eco-feedback researchers test their models, systems, algorithms, or prototypes on real house data. In the vast majority of cases, real-world datasets lead to more accurate models and algorithms. AMPds2 is the first dataset to capture all three main types of consumption

(electricity, water, and natural gas) over a long period of time (2 years) and provide 11 measurement characteristics for electricity. No other such datasets from Canada exist. Each meter has 730 days of captured data. We also include environmental and utility billing data for cost analysis. AMPds2 data has been pre-cleaned to provide for consistent and comparable accuracy results amongst different researchers and machine learning algorithms.

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PU NATURE PUBLISHING GROUP
PI LONDON
PA MACMILLAN BUILDING, 4 CRINAN ST, LONDON N1 9XW, ENGLAND
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J9 SCI DATA
JI Sci. Data
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WC Multidisciplinary Sciences
SC Science & Technology - Other Topics
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PT J
AU Wang, ZH
Han, B
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AF Wang, Zhaohua
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Lu, Milin
TI Measurement of energy rebound effect in households: Evidence from residential electricity consumption in Beijing, China
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Energy efficiency; Rebound effect; Energy input-output
ID EFFICIENCY IMPROVEMENTS; EMPIRICAL-EVIDENCE; UK HOUSEHOLDS; UNITED-STATES; US HOUSEHOLDS; DEMAND; COUNTRIES; BACKFIRE; POLICY; PRICE
AB Energy efficiency improvement policies have special significance for carbon emissions reduction and the mitigation of the effects of climate change. However the energy rebound effect caused by technological progress will indirectly increase energy consumption. The magnitude of the rebound effect largely determines the effectiveness of energy efficiency in mitigating energy consumption. This study reviews the main theory behind estimated methods of energy rebound effect measurement, focuses on constructing a double logarithm energy demand model and an error correction model of the asymmetric demand responses of electricity price changes to empirically analyse the direct rebound effect on residential electricity use in Beijing. It integrates consumer's demand theory with the embodied electricity of household spending from a seven-sector environmental energy-input-output (E-I-O) analysis to estimate the indirect rebound effect. The three income-elasticity, weight change, and proportional re spending scenario simulation results show that: residential electricity use in Beijing exhibits a partial rebound effect, and the long-term direct and indirect rebound effects are 46% to 56%, and the short-term direct rebound effect is 24% to 37%. Finally, the direct and indirect energy rebound effect for various income groups needs further research. An appropriate policy mix should be adopted to mitigate effectively the rebound effect in China's current lower energy price and lower energy efficiency market. (C) 2015 Elsevier Ltd. All rights reserved.
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FU National Natural Science Foundation of China [71173017, 71573016, 71521002]; State Key Development Program of Basic Research of China [2012CB95570003]
FX This study is supported by the National Natural Science Foundation of China (Ref. nos. 71173017 and 71573016, 71521002) and State Key Development Program of Basic Research of China (Ref. no. 2012CB95570003). The authors also want to thank Prof. Yiming Wei for his comment and suggestion.

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PI OXFORD
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JI Renew. Sust. Energ. Rev.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
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PT J
AU Gentile, N
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AF Gentile, Niko
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TI Lighting control systems in individual offices rooms at high latitude:
Measurements of electricity savings and occupants' satisfaction
SO SOLAR ENERGY
LA English
DT Article
DE Lighting control systems; Occupancy strategy; Daylight harvesting;
Energy saving
ID ENERGY SAVINGS; BUILDINGS; PERFORMANCE; PATTERNS
AB An efficient lighting control systems (LCS) should take advantage of the natural light available, but this presents some technical challenges as well as user related issues. So far, the assessment of lighting energy consumption of LCS has been based on technical features rather than the occupants' acceptance. This article presents the results of a monitoring study in a real life setting. It provides some recommendations based on the human and technical aspects of LCS in small scale applications. Four identical peripheral office rooms located in Lund, Sweden, were equipped with four different LCS: manual switch at the door, presence detector, daylight dimming with absence detector and LED task lamp. Each occupant performed ordinary office tasks for two weeks in each room in April May 2013. A subjective evaluation concerning the general lighting experience and the appreciation of the LCS was carried out. The results indicate that the manual switch with absence detector was greatly appreciated and it accomplished good energy performances (75% savings compared to the presence detector). The daylight-linked LCS achieved only slightly higher savings (79%), due to relatively high standby losses. The desk lamp achieved 97% savings, but the lighting conditions were considered unacceptable by the office workers. In general, the participants in this study perceived all automatic controls as stressful. (C) 2016 Elsevier Ltd. All rights reserved.
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AU Rahut, DB
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TI Household energy choice and consumption intensity: Empirical evidence from Bhutan
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
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DE Energy choice; Switch; Clean energy; Firewood; Household; Bhutan
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AB This paper uses data from three Bhutan Living Standard surveys (BLSS 2003, BLSS 2007, and BLSS 2012) to examine the trends and patterns of household energy consumption, and identify and analyze the factors that influence household energy choices, consumption intensity and the per capita household expenditure on energy, sources in Bhutan. During the last decade significant numbers of Bhutanese households have switched to cleaner energy sources. Empirical results show that a household's choice of cleaner energy sources is driven by income level and household wealth, the age, gender and education of the household heads, access to electricity, and location. Education and income have a differential role on the choice of clean or dirty fuel; wealthier and more educated households use and rely more on clean sources of energy like electricity and liquid petroleum gas while poorer households use and rely on dirty fuel such as fuelwood and kerosene. The study shows that female-headed households are more likely to choose cleaner fuels and, above all, the availability of a clean and cost-effective source of energy within proximity to the household is an important factor in the adoption of clean energy. Several models using a variety of alternative independent variables, such as proxies for education and wealth, were estimated and confirmed the robustness of the results. (C) 2015 Elsevier Ltd. All rights reserved.
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AB In spite of the large potential and existing efforts to foster energy efficiency in the residential sector, much remains to be achieved. This may be partially due to the many barriers and market failures faced by energy efficiency, which are even greater in this sector. In particular, informational failures seem to be pervasive and relevant in this area, Addressing these issues requires specific policy instruments and strategies. This paper reviews the empirical evidence on the effectiveness of such instruments, focusing on energy certificates, feedback programs, and energy audits. Results show that energy certificates and feedback programs can be effective, but only if they are carefully designed, whereas the evidence about the effectiveness of energy audits is mixed. In addition, the paper points out the large potential for new instruments as well as combinations of existing ones.

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DE Smart meters; Older people; Fuel poverty; Attitudes and behaviours
ID FUEL POVERTY; TECHNOLOGY; ADOPTION; DEMAND; HOMES; POOR; COLD
AB Smart grids, smart metering and in-home displays (IHD) are expected to contribute to demand side management partly by increasing user knowledge whilst improving comfort, safety and the ability to cope with increasing costs. With an increasingly ageing population, the awareness and views of older people on energy use, technology, smart meters, smart grids are becoming progressively more important. Their behaviours regarding energy and technology use differ from the majority as they are usually living on low incomes and are at risk of fuel poverty. It is therefore important to understand their acceptance, engagement or resistance to smart metering, IHDs and external control of home appliances and heating.

Their willingness and capacity to change time- use behaviours and reduce consumption is crucial. A study of older tenants in rural Scotland is presented. Sensors and IHDs were installed to measure and display electricity costs and consumption of large appliances and the electricity supply for each house, and show internal household and external temperatures. Householder's use of energy, habits and routine, strategies for keeping warm and attitudes towards technology, smart metering, IHDs and direct external control of appliances and heating were explored through interviews. Conclusions identify significant implications for future research and policy. (C) 2015 Elsevier Ltd. All rights reserved.

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PT J
AU Diaz-Rainey, I
Ashton, JK
AF Diaz-Rainey, Ivan
Ashton, John K.
TI Investment inefficiency and the adoption of eco-innovations: The case of household energy efficiency technologies
SO ENERGY POLICY
LA English
DT Article
DE Eco-innovation; Investment inefficiency; Energy efficiency; Innovation adoption; Innovation diffusion; Efficiency gap
ID UK HOUSEHOLDS; INDUCED DIFFUSION; SOCIAL NETWORKS; MODEL; REGRESSION; MARKET; POLICY

AB This paper examines the factors determining household adoption of energy efficiency eco-innovations. We do so by testing hypotheses grounded in diffusion and finance theory and the literature on the barriers to energy efficiency. Using two large surveys of UK households, we explore the adoption of nine technologies. Our results indicate 'investment inefficiency' amongst household adopters occurs for two reasons. First, contrary to notions of rational choice, we find a negative relationship between the investment return of technologies and their level of diffusion. Second, we show adopters of these technologies display characteristics broadly consistent with diffusion theory, contradicting the prediction of finance theory that investment return, not individual characteristics, should drive adoption. We also find that policy has played a role in inducing the diffusion of these technologies and that tenure and spill-over effects are important in adoption. Finally, adoption is motivated more by a desire to save money than by environmental concern. We conclude by giving examples of how our research can lead to better policy timing and targeting. (c) 2015 Elsevier Ltd. All rights reserved:

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PT J
AU Liu, WL
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TI Public participation in energy saving retrofitting of residential buildings in China
SO APPLIED ENERGY
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DE Residential building retrofit; Public participation; Energy saving performance; Energy technology; Behavior
ID NORTHERN HEATING REGION; EFFICIENCY RETROFIT; BUILT ENVIRONMENT; POLICY
AB Retrofitting existing residential buildings has been claimed as one crucial way to reduce energy consumption and greenhouse gas emissions within the Chinese residential sector. In China's government-dominated retrofitting projects, the participation of residents is often neglected. The objective of this paper is to assess the influence level of public participation (before, during and after retrofit) on energy saving by comparing three Beijing neighborhoods with different retrofitting models: a central government-led model, a local government-led model, and an old neighborhood retrofit Model. In the three cases data were collected through interviews with neighborhood workers and residents. The results show that residents' involvement in pre-retrofit activities, in technology selection and in the use of technology differs greatly among the three cases. This study concludes that in order to improve the effectiveness of energy saving interventions, the motives, intentions and living habits of residents need to be given more consideration when designing and implementing retrofitting. By highlighting the importance of public participation this paper contributes to energy saving policy development in China.
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TI Conceptual Modeling of the Impact of Smart Cities on Household Energy Consumption
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CL Redondo Beach, CA
DE Smart city; Information and Communication Technology; Energy Behavior; Behavior Change; Conceptual Systems Model; CLIOS Model
ID SOCIAL COGNITIVE THEORY; BEHAVIOR-CHANGE; INFORMATION
AB Smart cities provide citizens with information on various urban services and allow them to track the impact of their resource consumption on the overall sustainability of their city. The premise of smart cities is that with improved access to information on resource consumption, residents make better use of those resources, resulting in increased sustainability of the city.
This paper explores the influence of the smart city technologies on individuals' resource consumption behavior, in particular on energy consumption, aiming at achieving environmentally sustainable development. This approach combines systems thinking with existing social science theories, such as cognitive and learning theories, to explore the impact of smart city information on individual decision-making and behavioral change. Using a CLIOS (complex, large-scale, interconnected, open, and sociotechnical) model, a conceptual soft systems model, the paper explores the impact of smart city technologies on behavioral change of households with regards to energy consumption. (C) 2014 The Authors. Published by Elsevier B.V.
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AU Gluch, P
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Raisanen, Christine
TI Knowledge sharing and learning across community boundaries in an arena for energy efficient buildings
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Energy efficiency; Inter-organisational learning; Knowledge sharing; Mediating objects; Renovation of residential housing
ID BOUNDED SOCIOTECHNICAL EXPERIMENTS; PROJECT ORGANIZATIONS; INNOVATION; COMMUNICATION; PERSPECTIVE; TRANSITION; MOBILITY
AB Within the field of sustainable development, collaborative and interdisciplinary actions are imperative for the development and implementation of proactive holistic renovation solutions. In an attempt to enhance cross-disciplinary and inter-organisational knowledge sharing, a project aimed at developing an arena for sharing knowledge pertaining to energy-efficient renovations of multi-family buildings was initiated. The authors have followed the development and implementation of this knowledge arena over a period of three years. The aim of this paper is to understand how knowledge sharing between different professional

groups and practices may be facilitated: in this case between various research organisations, municipal housing companies, energy suppliers and governmental organisations. Specific focus has been on identifying mechanisms for interaction and knowledge sharing between actors that normally do not meet in their everyday practice. The theoretical approach adopted concerns social processes related to the sharing of knowledge in and between organisations and professional groups and individuals. Findings show that in the arena knowledge was mainly shared within a pilot project where researchers and practitioners were jointly engaged in the planning and renovation of a building. Interaction within the arena was enabled by the individuals' mutual willingness to adapt and attempt to translate the disciplinary discourses and modes of communication of researchers and of practitioner specialists. Moreover, the motivation to share knowledge was related to their expectations of, and invested interest in, various arena activities. By empirically highlighting the facilitators and hindrances for knowledge-sharing in an arena for cleaner production, the paper contributes to increased understanding of inter-disciplinary communication and collaborative interaction. (C) 2012 Elsevier Ltd. All rights reserved.

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Z9 10
U1 0
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PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0959-6526
J9 J CLEAN PROD
JI J. Clean Prod.
PD JUN
PY 2013
VL 48
BP 232
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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PT J
AU Kouveletsou, M
Sakkas, N
Garvin, S
Batic, M
Reccardo, D
Sterling, R
AF Kouveletsou, Maria
Sakkas, Nikos
Garvin, Stephen
Batic, Marko
Reccardo, Daniela
Sterling, Raymond
TI Simulating energy use and energy pricing in buildings: The case of electricity
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy simulation; Energy use; Electricity pricing; Building energy performance
ID ARTIFICIAL NEURAL-NETWORKS; CONSUMPTION; SYSTEMS
AB The paper presents a methodology that has been developed and implemented for the simulation of electricity use (kWh) as well as electricity pricing (c(sic)/kWh) in buildings. In the simulation, electricity pricing has been treated as dependent on electricity use as energy pricing tariffs usually discriminate between specific electricity consumption zones, time periods, etc. Pricing and electricity use, together, may then provide an estimation of the building electric energy cost (sic). The simulation runs on an hourly resolution allowing to highlight some potential wasteful and costly practices in energy use and management and providing insight to user behavior, which has been a key driver for its development. The

key aspects of the simulation approach are presented and its use is demonstrated in two different buildings in Greece and Italy. The methodology is now adapted to allow for neural network based, real time training, which will also be briefly introduced. (C) 2012 Elsevier B.V. All rights reserved.
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FU European Commission [246745]
FX The work presented in this paper is partly funded by the European Commission within the 7th Framework Programme (ENERGY WARDEN Project, Contract No.: 246745).
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PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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J9 ENERG BUILDINGS
JI Energy Build.
PD NOV
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Kok, N
McGraw, M
Quigley, JM
AF Kok, Nils
McGraw, Marquise
Quigley, John M.
TI The diffusion over time and space of energy efficiency in building
SO ANNALS OF REGIONAL SCIENCE
LA English
DT Article
ID ENVIRONMENTAL-REGULATION; TECHNOLOGY DIFFUSION; PANEL-DATA; INNOVATION; ECONOMICS
AB Awareness of global warming and the extent of greenhouse gas emissions have focused more attention upon energy efficiency in building. Moreover, the inventory of "green" office space in the United States has increased dramatically since the introduction of rating schemes that attest to the energy efficiency or sustainability of commercial buildings. In some metropolitan areas, the supply of certified office buildings has more than doubled in the last decade, and there are a few metropolitan areas where "green" office space now accounts for more than a quarter of the total office stock. In this paper, we analyze the diffusion of buildings certified for energy efficiency across US property markets. Using a panel of 48 metropolitan areas observed over the last fifteen years, we trace the diffusion of green building practices across the country. We then model the geographic patterns and dynamics of building certification, relating industry composition, changes in economic conditions, characteristics of the local commercial property market, and the presence of human capital, to the cross-sectional variation in energy-efficient building technologies and the diffusion of those technologies over time. Understanding the determinants and the rate at which energy-efficient building practices diffuse over space and time is important for designing policies to affect resource consumption in the built environment.
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U2 38
PU SPRINGER
PI NEW YORK
PA 233 SPRING ST, NEW YORK, NY 10013 USA
SN 0570-1864
J9 ANN REGIONAL SCI
JI Ann. Reg. Sci.
PD APR
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SI SI
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DI 10.1007/s00168-011-0494-9
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WC Economics; Environmental Studies; Geography
SC Business & Economics; Environmental Sciences & Ecology; Geography
GA 900NI
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PT J
AU Gutierrez, E
Adenso-Diaz, B
Lozano, S
Gonzalez-Torre, P
AF Gutierrez, Ester
Adenso-Diaz, Belarmino
Lozano, Sebastian
Gonzalez-Torre, Pilar
TI Lifetime of household appliances: empirical evidence of users behaviour
SO WASTE MANAGEMENT & RESEARCH
LA English
DT Article
DE Household behaviour; electrical and electronic equipment; lifetime;
survival analysis; competing risks
ID COMPETING RISKS; CUMULATIVE INCIDENCE; MODEL; REPLACEMENT; INFERENCE;
CRT
AB The household appliance industry is one of the most important sectors from both the economic and environmental point of view. A greater understanding of the way in which consumers of these items behave would help to better plan the recycling needs as a function of previous purchase figures. This paper presents the findings of a field survey of Spanish consumer habits with respect to different common household appliances as regards replacement time and the reasons for replacing these appliances. The

methodology used is based on survival analysis; specifically, a competing risks model. A Cox proportional hazards model is also used for the sake of comparison. Our results show that as the number of people and/or persons under 18 years in the household increases, the lifetimes of some types of appliance decrease significantly. Competing risk model shows that the probability of replacing the refrigerator due to malfunction and technological obsolescence increases with the increase of family members with a higher education. We also provide the cumulative incidence function for different appliances, which can be used to forecast future demands and electrical and electronic waste generation.

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JI Waste Manage. Res.
PD JUN
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WC Engineering, Environmental; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
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PT J
AU Sahakian, MD
Steinberger, JK
AF Sahakian, Marlyne D.
Steinberger, Julia K.
TI Energy Reduction Through a Deeper Understanding of Household Consumption
Staying Cool in Metro Manila
SO JOURNAL OF INDUSTRIAL ECOLOGY
LA English
DT Article
DE emerging economy; energy conservation; household electricity; industrial
ecology; the Philippines; sustainable consumption
ID SUSTAINABLE CONSUMPTION; PHILIPPINES; ENVIRONMENT; CITIES
AB This article proposes a multidisciplinary and systemic approach to sustainable consumption that combines environmental considerations of energy usage from a life cycle perspective with a social understanding of consumption grounded in economic anthropology. The goal is to understand both consumption patterns and drivers, with a focus on household energy used for cooling in the metropolitan region of Manila in the Philippines. For different socioeconomic groups, cooling devices also deliver social and cultural services, such as socializing or adhering to Western fashion trends. This article argues for the need to address these aspects if reductions in household energy usage are to become possible. The limits of individual-choice theories are rendered apparent, with examples of how institutional and structural conditions lock in consumption patterns and restrict household choices. The notion that emerging economies might be able to "leapfrog" over the environmental errors of more industrialized countries is also raised and critiqued.
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PU WILEY-BLACKWELL
PI MALDEN
PA COMMERCE PLACE, 350 MAIN ST, MALDEN 02148, MA USA
SN 1088-1980
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JI J. Ind. Ecol.
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VL 15
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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PT J
AU Gabreyohannes, E
AF Gabreyohannes, Emmanuel
TI A nonlinear approach to modelling the residential electricity consumption in Ethiopia
SO ENERGY ECONOMICS
LA English
DT Article
DE Nonlinearity; SETAR model; STR model; Generalized impulse response function; Asymmetry
ID NUISANCE PARAMETER; HYPOTHESIS; TRANSITION
AB In this paper an attempt is made to model, analyze and forecast the residential electricity consumption in Ethiopia using the self-exciting threshold autoregressive (SETAR) model and the smooth transition regression (STR) model. For comparison purposes, the application was also extended to standard linear models. During the empirical presentation of both models, significant nonlinear effects were found and linearity was rejected. The SETAR model was found out to be relatively better than the linear autoregressive model in out-of-sample point and interval (density) forecasts. Results from our STR model showed that the residual variance of the fitted STR model was only about 65.7% of that of the linear ARX model. Thus, we can conclude that the inclusion of the nonlinear part, which basically accounts for the arrival of extreme price events, leads to improvements in the explanatory abilities of the model for electricity consumption in Ethiopia. (C) 2009 Elsevier B.V. All rights reserved.
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PT J
AU Jia, MD
Srinivasan, RS
Raheem, AA
AF Jia, Mengda
Srinivasan, Ravi S.
Raheem, Adeeba A.
TI From occupancy to occupant behavior: An analytical survey of data acquisition technologies, modeling methodologies and simulation coupling mechanisms for building energy efficiency
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Occupant behavior; Model application; Modeling; Building energy efficiency
ID WINDOW OPENING BEHAVIOR; RESIDENTIAL BUILDINGS; COMFORT MANAGEMENT; COMMERCIAL BUILDINGS; PREDICTIVE CONTROL; STOCHASTIC-MODELS; PATTERN DETECTION; OFFICE OCCUPANTS; CONSUMPTION; VALIDATION
AB Energy consumption and indoor environment of buildings are proved to be largely influenced by the presence and behaviors of occupants. The uncertainty caused by occupant behaviors accounts. for a significant discrepancy between the predicted and actual energy usage. In a real world, building system operations and control will be directly affected by occupant behavior, which may lead to over thirty percent waste against building's designed performance. Therefore, the capability to seamlessly integrate occupant behavior in energy simulation tools and building management systems in the future is clearly important to optimize building energy use while maintaining the same level of services. However, research has not reached the phase that occupant behaviors could be effectively modeled. Thus, the traditional schedule based approach is not adequate to satisfy the needs of building efficiency. In this paper, a thorough survey of occupant behavior modeling and simulation state-of-the-art technologies and methodologies for building energy efficiency is conducted. The paper first identifies and discusses the significance and application scale of building occupant behavior model. Based on the information collected, some recent data acquisition technologies for behavior-related research and occupant behavior modeling approaches are summarized. The advantages and limitations of these modeling methods are compared and analyzed, as well as appropriate recommendations are made for the future research. The paper finally outlines the findings and potential development areas in the field of occupant behavior modeling for energy efficient buildings.
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TI Understanding Australian household water-related energy use and identifying physical and human characteristics of major end uses
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Water; Energy; Material flow analysis; Greenhouse gas emissions; Residential; Demand management
ID GREENHOUSE-GAS EMISSIONS; APARTMENT BUILDINGS; HOT-WATER; CONSUMPTION; CONSERVATION; EFFICIENCY; HEATERS; LIFE; DETERMINANTS; PERFORMANCE
AB Residential resource use efficiency and management is a subject of interest to a number of fields spanning the physical and social sciences. Energy use for residential water heating in Australia is some five to eleven times more than the energy required to deliver urban water services. However, little is known about which activities within households contribute most significantly to water-related energy use (WRE). This work quantifies WRE use in individual households, and identifies household characteristics which contribute significantly to variation. Empirical data were collected through in-home audits, interviews and high-resolution end-use water flow meters for five households in Melbourne, and two in Brisbane, Australia. This was used to characterise 139 parameters describing household occupancy characteristics, behaviours, technologies, and structural and environmental aspects of influence. Mathematical material flow analysis (MMFA) modelling was conducted for individual water and energy use subsystems within each household. WRE use ranged from 7 to 21 kWh hh(-1) d(-1) (13-24% of total household energy use in Melbourne and 76-79% in Brisbane). Detailed end use analysis of the five Melbourne households showed that shower use (11-61% WRE), hot water system efficiency losses (8-31% WRE) and clothes washer usage (4-17% WRE) contributed most to differences in WRE between households. Findings highlighted shower use as a consistent influence on WRE across households, and suggest further investigation of shower programs as a potentially effective demand management measure for both water and energy in households. The work highlights the importance of consistent messaging for both water and energy efficiency, and suggests that a focus on both human and technical characteristics of households is needed for effective management of combined water and energy use. (C) 2016 Elsevier Ltd. All rights reserved.
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Feng, Wei
TI Comparative study of commercial building energy-efficiency retrofit policies in four pilot cities in China
SO ENERGY POLICY
LA English
DT Article
DE Existing commercial building; Energy efficiency retrofit; Incentive policy; Technical solution; Cost-benefit; Barrier
ID TIANJIN
AB The energy efficiency of existing commercial buildings is more challenging to regulate and improve than the energy efficiency of new constructions. In 2011 and 2012, the Chinese Government selected four cities-Shanghai, Tianjin, Shenzhen, and Chongqing- to implement pilot commercial building energy efficiency retrofit program. Based on site surveys and expert interviews in these pilot cities, this research conducted a comparative analysis on incentive policies of local city level. The analysis results show that policy designs of existing commercial buildings should be further improved. The aspects that influence the implementation effect in the future, such as subsidy level, installments, and business model promotion, should be specified in the policy clauses. Referring to the technical solution and cost-benefit in Chongqing, we found that lighting system is the most common retrofit objects while envelope system is the least common one. And the subsidy incentive is greatest for educational buildings, followed by office buildings. In the end, we further discussed the problems and obstacles in commercial building retrofit market, and provided a series of recommendations. (C) 2015 Elsevier Ltd. All rights reserved.
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FU National Natural Science Foundation of China [71173011]; Ministry of Housing and Urban-Rural Development [10401020908]; China Scholarship Council [201407090017]
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AU Izadyar, N
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AF Izadyar, Nima
Ghadamian, Hossein
Ong, Hwai Chyuan
Moghadam, Zeinab
Tong, Chong Wen
Shamshirband, Shahaboddin
TI Appraisal of the support vector machine to forecast residential heating demand for the District Heating system based on the monthly overall natural gas consumption
SO ENERGY
LA English
DT Article
DE Residential natural gas demand; DHS (District heating system); Estimation; Wavelet and firefly algorithms (FFAs); SVM (Support vector machine)
ID PARTICLE SWARM OPTIMIZATION; FIREFLY ALGORITHMS; DISCRETE OPTIMIZATION; NEURAL-NETWORKS; NORTHERN SPAIN; ERROR MEASURES; LEAST-SQUARES; CUCKOO SEARCH; REGRESSION; CLASSIFICATION
AB DHS (District Heating System) is one of the most efficient technologies which has been used to meet residential thermal demand. In this study, the most accurate forecasting of the residential heating demand is investigated via soft computing method. The objective of this study is to obtain the most accurate prediction of the residential heating consumption to employ forecasting result for designing optimum DHS system as a possible substitute of a pipeline natural gas in BAHARESTAN Town. For this purpose, three Support Vector Machine (SVM) models namely SVM coupled with the discrete wavelet transform (SVM-Wavelet), the firefly algorithm (SVM-FFA) and using the radial basis function (SVM-RBF) were analyzed. The estimation and prediction results of these models were compared with two other soft computing methods (ANN (Artificial Neural Network) and GP (Genetic programming)) by using three statistical indicators i.e. RMSE (root means square error), coefficient of determination (R-2) and Pearson coefficient (r). Based on the experimental outputs, the SVM-Wavelet method can lead to slightly accurate forecasting of the monthly overall natural gas demand. (C) 2015 Elsevier Ltd. All rights reserved.
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FU Ministry of Higher Education, Malaysia; University of Malaya, Kuala Lumpur, Malaysia [HIRG: UM.C/HIR/MOHE/ENG/06 (D000006-16001), SATU: RU022H-2014]
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AU Dineen, D
Rogan, F
Gallachoir, BPO
AF Dineen, D.
Rogan, F.
Gallachoir, B. P. O.
TI Improved modelling of thermal energy savings potential in the existing residential stock using a newly available data source
SO ENERGY
LA English
DT Article
DE Residential; Energy; Archetype; Model; Retrofit; Bottom-up
ID DOMESTIC ENERGY; BUILDING STOCK; FUEL POVERTY; IRELAND; SECTOR; CONSUMPTION; EFFICIENCY; COMFORT; OWNERSHIP; BENEFIT
AB This paper presents a novel bottom up approach to modelling the energy savings potential of energy efficiency improvement measures to be applied through retrofit of the existing dwelling stock. It takes advantage of a newly available, rich dataset on the construction characteristics of the 2011 housing stock in Ireland. The methodological innovation centres on the use of wall construction type in the modelling and analysis. While Ireland is the focus, this approach is applicable to any EU member state for which data on dwelling characteristics exists from surveys carried as part of Energy Performance Certificate calculations. The model is calibrated to the national energy balance for 2011 by varying the internal temperature assumptions. Sensitivity analysis is performed on the effects of internal temperature and rebound. The paper also highlights some limitations posed by data availability on the accuracy and sophistication of models that can currently be developed, specifically in the Irish case. (C) 2015 Elsevier Ltd. All rights reserved.
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PT J
AU Ma, JJ
Liu, LQ
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AF Ma, Jia-Jun
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Xie, Bai-Chen
TI Exploring the critical factors and appropriate polices for reducing energy consumption of China's urban civil building sector
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Civil building sector; Energy saving potential; Hybrid input-output model; Scenario analysis
ID LIFE-CYCLE; PUBLIC BUILDINGS; EMBODIED ENERGY; EFFICIENCY STANDARDS; HOT SUMMER; HONG-KONG; CONSTRUCTION; IMPACTS; IMPLEMENTATION; ENVIRONMENT
AB The embodied and operating energy consumption of the civil building sector accounts for more than 30% of the national consumption. It is of great significance to probe the energy saving potential of the building sector and to explore the critical factors responsible for its energy saving practice, which may greatly benefit carbon emission reduction in the process of urbanization. In this paper, we develop a series of formulations to calculate both embodied and operating energy based on hybrid energy input-output model. Taking 2011-2050 as the study period, we combined the embodied and operating energy and designed six scenarios to comprehensively quantify the impacts of three factors: new building floor areas, energy efficiency standards and its implementation rate on the energy saving potential. Furthermore, sensitivity analysis was conducted to dissect the influence of the corresponding factors. The results show that improved standards and less new building floor areas will be the most effective ways to reduce energy consumption and that the best energy saving practice can save up to 20 billion tons of coal equivalent (tce) during the study period. The focus of policy reforms may be varied according to the times and regions. Energy saving technology development and more emphasis on key areas will reduce building energy consumption significantly in the short term, while household lifestyle changes, as well as improved building energy efficiency, should be given a higher priority in the long run. (C) 2014 Elsevier Ltd. All rights reserved.
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PT J
AU Hicks, AL
Theis, TL
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TI Emergent Effects of Residential Lighting Choices Prospects for Energy Savings
SO JOURNAL OF INDUSTRIAL ECOLOGY
LA English
DT Review
DE agent-based modeling (ABM); complex systems; life cycle assessment (LCA); light emitting diodes; lighting; rebound
ID ARTIFICIAL BEE COLONY; LIFE-CYCLE ASSESSMENT; INDUSTRIAL ECOLOGY; DISCRETE-CHOICE; OPTIMIZATION; TECHNOLOGIES; CONSUMPTION; COMPLEXITY; EVOLUTION; CENTURIES
AB Artificial lighting has allowed the decoupling of human activities from natural daylight hours. Electricity utilized for artificial lighting accounts for 18.8% of U.S. electricity consumption. Compact fluorescent lamp (CFL) and light-emitting diode (LED) options are more efficient and have longer lifetimes than conventional incandescent bulbs, but the question remains about the actual energy savings likely to be realized through more efficient lighting delivery systems. This uncertainty influences the rate of adoption and use of efficient lighting technology (and thus the extent and time lags of efficiency gains). Once adopted, gains in efficiency can lead to rebound effects that eliminate these gains and, paradoxically, lock society into increased use of energy. In this study, an agent-based model and complex systems approach is used to understand how available information and perceptions of different lighting options influence adoption and use, and the potential impact of the rebound effect to reduce the energy savings of energy-efficient lighting options in a residential setting. Individual households and their decisions are modeled to create overall population-level consumption data. The multifunctionality of LED lighting may cause consumers to use significantly more light, creating the potential for both rebound and backfire to occur. The results indicate that the adoption of CFL and LED lighting will decrease residential energy consumption if consumers continue to use the same amount or slightly more light; however, when an expansion of lit spaces is included or a large increase in lighting usage occurs, energy consumption will increase and, over time, reduce or completely erode energy savings.
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PI HOBOKEN
PA 111 RIVER ST, HOBOKEN 07030-5774, NJ USA
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JI J. Ind. Ecol.
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DI 10.1111/jiec.12281
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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PT J
AU Gokce, HU
Gokce, KU
AF Goekce, H. Ufuk
Goekce, K. Umut
TI Multi dimensional energy monitoring, analysis and optimization system for energy efficient building operations
SO SUSTAINABLE CITIES AND SOCIETY
LA English
DT Article
DE Energy efficiency; Data Warehouse technologies; Wireless sensor networks
AB Monitoring, analysis and optimization of buildings' energy consumption is of central importance for the renovation and energy-efficient operation of buildings since it allows the identification and correction of inefficient energy usage. However, the monitoring and control systems adoption for building management and control applications is hampered by the unavailability of appropriate tool environments. This paper addresses the need for integration concepts, holistic monitoring, analysis methodologies, multi dimensional decision support and scenario based control strategies through the seamless integration of ubiquitous sensing infrastructures, service oriented architectures, BIM tools and Data Warehouse technologies. The developed system is demonstrated and validated in the Environmental Research Institute (ERI) building located on the campus of National University of Ireland-University College Cork. (C) 2013 Elsevier B.V. All rights reserved.
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JI Sust. Cities Soc.
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PT J
AU Ultra, C
Boso, A
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Espluga, Josep
Prades, Ana
TI A qualitative study of users' engagement with real-time feedback from in-house energy consumption displays
SO ENERGY POLICY
LA English
DT Article
DE Real-time feedback; Qualitative study; Energy attitudes and behaviors
ID BEHAVIOR
AB Recent developments in feedback technologies and smart meters have advanced the introduction of energy consumption displays in the home. This could facilitate a significant amount of energy saving for the maximum number of homeowners. But empirical studies show that achieved savings in electricity consumption from in-house displays range approximately from 0 to 20%. In order to qualitatively explore the factors underlying such variation in the achieved saving, this paper studies how a small sample of householders interacted with the feedback from an energy consumption display. Following a heuristic model based on prior energy-related behavioral research, we explore the effects of the in-home display on household electricity. Results indicate that saving might be moderated by the level of users engagement with the display, preceded by user's motivation to save energy, prior attitudes and, importantly, the level of involvement generated by the intervention. (C) 2013 Elsevier Ltd. All rights reserved.
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FU FP7 PACHELBEL Project (Policy Addressing Climate Change & Learning about Consumer Behaviour and Everyday Life) [FP7/2008-1]
FX This research work was supported by the FP7 PACHELBEL Project (Policy

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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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PT J
AU Noonan, DS
Hsieh, LHC
Matisoff, D
AF Noonan, Douglas S.
Hsieh, Lin-Han Chiang
Matisoff, Daniel
TI Spatial Effects in Energy-Efficient Residential HVAC Technology Adoption
SO ENVIRONMENT AND BEHAVIOR
LA English
DT Article
DE HVAC; energy efficiency; adoption behavior; spatial dependence
ID NETWORK EXTERNALITIES; DIFFUSION; CONSERVATION; SECTOR
AB If your neighborhood adopts greener, energy-efficient residential heating, ventilating, and air conditioning (HVAC) systems, will your proenvironmental behavior become contagious, spilling over into adjacent neighborhoods' HVAC adoptions? Objective data on more than 300,000 detailed single-family house sale records in the Greater Chicago area from 1992 to 2004 are aggregated to census block-group neighborhoods to answer that question. Spatial lag regression models show that spatial dependence or "contagion" exists for neighborhood adoption of energy-efficient HVACs. Specifically, if 625 of 726 homes in a demonstration neighborhood upgraded to green HVAC, data of this study predict that at least 98 upgrades would occur in adjacent neighborhoods, more than doubling their baseline adoption rates. This spatial multiplier substantially magnifies the effects of factors affecting adoption rates. These results have important policy implications, especially in the context of new standards for neighborhood development, such as Leadership in Energy and Environmental Design (LEED) or Low-Impact Development standards.
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PT J
AU Guta, DD
AF Guta, Dawit Diriba
TI Application of an almost ideal demand system (AIDS) to Ethiopian rural residential energy use: Panel data evidence
SO ENERGY POLICY
LA English
DT Article
DE Fuel choice; Residential energy use; Almost ideal demand system
ID HOUSEHOLD MODEL; INDIA; CONSUMPTION; COOKING; CHINA
AB It is well known that poor rural households in low-income economies are reliant on traditional fuels to meet basic domestic energy needs, but little is known about the specific underlying socio-economic drivers of residential fuel choices in Ethiopia. I used the linear approximation almost ideal demand system (LAAIDS) with normalized prices to compute expenditure elasticity and a multinomial logit model (MLM) to examine household fuel use. The LAAIDS model result showed that expenditure was elastic for modern fuels, but inelastic for traditional fuels. Regression results from the MLM indicated that fuel choice behaviour of rural households could be more accurately described as 'fuel stacking' behaviour as opposed to the 'energy ladder' hypothesis. In rural areas household fuel choice may be constrained by limited access

to commercial fuels and efficient cook stoves, supply dependency and affordability, consumer preferences and a web of other intricate factors. Rural households had less incentive for fuel switching due to underlying factors and the availability of fuel wood without direct financial cost. With continued deforestation and receding forests, households are expected to develop inter fuel substitution and switching behaviour conditional on access to modern energy technologies. (C) 2012 Elsevier Ltd. All rights reserved.
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PT S
AU Xie, Y
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TI Evaluation of Residential Energy-Saving Buildings Based on Grey Relational Analysis Method
SO 2012 INTERNATIONAL WORKSHOP ON INFORMATION AND ELECTRONICS ENGINEERING
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CT International Workshop on Information and Electronics Engineering (IWIEE) / International Conference on Information, Computing and Telecommunications (ICICT)
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CL Harbin, PEOPLES R CHINA
SP Harbin Univ Sci & Technol, Int Sci & Engn Res Ctr, Harbin Engn Univ, NE Forestry Univ, Harbin Normal Univ, HeiLongJing Univ, NE Petr Univ, Harbin Univ, China Commun Magazine, Co., Ltd
DE Energy-saving building; Design selection; Grey relational analysis; Evaluation
AB Energy-saving design is the key factor for buildings, and there is no unified approach that can effectively assess the energy efficiency of residential design. On the basis of the characteristics of complexity and the uncertainty of optimal selection for energy-saving building designs, grey relational analysis model in energy-saving buildings multi-designs selection application has been put forward in this paper. The index system of influencing energy-saving buildings design selection is determined. Application model and procedures of the grey relational analysis method are introduced. According to the degree how close it is with the ideal dot, the optimal design is easy to be selected out. Through the optimization analysis design selection for energy-saving building designs, it is proved that the optimal design selection for energy-saving buildings based on grey relational analysis has the strong recognition judgment ability. It is convenient, quantitative, and strict. It provided a possible new way for evaluation of energy-saving building design selecting. (C) 2011 Published by Elsevier Ltd. Selection and/or peer-review under responsibility of Harbin University of Science and Technology.
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NR 4
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1877-7058
J9 PROCEDIA ENGINEER
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WC Engineering, Mechanical
SC Engineering
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UT WOS:000314346403035
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PT J
AU Ashina, S
Nakata, T
AF Ashina, Shuichi
Nakata, Toshihiko
TI Quantitative analysis of energy-efficiency strategy on CO2 emissions in the residential sector in Japan - Case study of Iwate prefecture
SO APPLIED ENERGY
LA English
DT Article
DE energy efficiency; rural energy policy; residential sector
ID COGENERATION PLANTS; MANAGEMENT; SYSTEMS; DEMAND; DESIGN; TECHNOLOGIES; CONSERVATION; CONVERSION; MODEL
AB This study examines the economics of energy-efficiency strategies for reducing CO2 emissions in the residential sector in Japan from the perspective of regional characteristics. For this study, the residential sector in Iwate prefecture was selected as representative of rural areas in Japan. In order to promote purchases of energy-efficient consumer appliances, the prefectural government is presumed to reimburse purchasers a part of the cost difference between energy efficient and conventional appliances. This paper begins with a discussion of the prefecture's financial support for purchasers of energy efficient appliances and assumes that the payments come from prefectural government funds. This paper then looks at the effect of a carbon-tax refund on the reduction Of CO2 emissions. The results show that, if half of the households use energy-efficient appliances, then CO, emissions in the residential sector in the year 2020 will decreases from the BAU scenario, 0.726 Mt-C to 0.674 Mt-C. However, the Iwate prefectural government expends $105 million annually, which is 1.5% of the total tax revenue in the year 2003. The carbon-tax refund effectively encourages further reductions in CO2 emissions. Under the $20/tC carbon tax, proposed by the Ministry of the Environment, the carbon-tax refund leads to a reduction in residential CO2 emissions from 0.726 Mt-C to 0.712 Mt-C. (C) 2007 Elsevier Ltd. All rights reserved.
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*JAP MIN ENV, 2005, IMPL CARB TAX JAP
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U1 0
U2 6
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SN 0306-2619
J9 APPL ENERG
JI Appl. Energy
PD APR
PY 2008
VL 85
IS 4
BP 204
EP 217
DI 10.1016/j.apenergy.2007.07.012
PG 14
WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA 260OV
UT WOS:000253020500004
DA 2018-05-03
ER

PT J
AU Tyler, SR
AF Tyler, SR

TI Household energy use in Asian cities: Responding to development success
SO ATMOSPHERIC ENVIRONMENT
LA English
DT Article
DE household; cooking fuels; electricity; developing countries; urbanization
ID ELECTRICITY
AB In the past 10-15 years, gains in household income and urban development in many countries in Asia have led to significant shifts in household use of fuels away from traditional, biomass-based household fuels to modern, fossil fuels. These results suggest that, while the global atmospheric emissions implications need further analysis, the local air quality effects of urban household fuel use changes have been positive. These changes also demonstrate improvements in living conditions, particularly for poor women and children most affected by indoor air quality. However, for electricity use, where there is evidence of dramatic increases in household consumption, the longer term implications for atmospheric emissions are more troubling. Rapid demand growth in the urban household sector is contributing to huge increases in thermal electric generating capacity needs in Asia. Improving technologies of electricity use in the household sector appears to be easily achievable and could be stimulated through market and policy mechanisms which have been used elsewhere. These measures offer the prospect of real environmental and economic gains without sacrificing lifestyle advantages of electrical appliance use in households.
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NR 15
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U2 7
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SN 1352-2310
J9 ATMOS ENVIRON
JI Atmos. Environ.
PD MAR
PY 1996
VL 30
IS 5
BP 809
EP 816
DI 10.1016/1352-2310(94)00353-X
PG 8
WC Environmental Sciences; Meteorology & Atmospheric Sciences
SC Environmental Sciences & Ecology; Meteorology & Atmospheric Sciences
GA TP451

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PT J
AU GARCIA, RA
MANEGDEG, F
RANESES, NO
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MANEGDEG, F
RANESES, NO
TI HOUSEHOLD ENERGY-CONSUMPTION SURVEYS IN 3 PHILIPPINE CITIES
SO ENERGY
LA English
DT Article
AB We present findings of a household energy-consumption survey conducted between September 1989 and June 1990 in three urban areas chosen to encompass wide variations in population size, levels of industrialization, climate conditions, and cultural practices. Nine hundred households were surveyed (300 in each of the cities) with respect to patterns of fuel use, fuel expenses, physico-socio-economic and environmental characteristics, and levels of appliance ownership. We found that household energy-consumption in these three Philippine cities is dominated by modem fuels, although traditional fuels still contribute a significant portion of total household-energy use. The shift toward more efficient, modem fuels has occurred gradually alongside expanding urbanization and household incomes. High costs inhibit a speedier transition to more efficient fuels and appliances. Analysis of past and current trends suggests that energy use in urban households in the Philippines will most likely rise over the next decade in light of expected population increases, economic growth and the global trend towards acquisition of more and larger appliances.
RP GARCIA, RA (reprint author), UNIV PHILIPPINES,COLL ENGN,ENERGY & ENVIRONM ENGN SYST & POLICY ANAL RES GRP,QUEZON,PHILIPPINES.
CR 1985, PHILIPPINE NATIONAL
NR 1
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Z9 9
U1 0
U2 1
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD, ENGLAND OX5 1GB
SN 0360-5442
J9 ENERGY
JI Energy
PD MAY
PY 1994
VL 19
IS 5
BP 539
EP 548
DI 10.1016/0360-5442(94)90050-7
PG 10
WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
GA NJ769
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FN Clarivate Analytics Web of Science
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PT J

AU Ma, MD
Yan, R
Du, YJ
Ma, XR
Cai, WG
Xu, PP
AF Ma, Minda
Yan, Ran
Du, Yongjie
Ma, Xianrui
Cai, Weiguang
Xu, Pengpeng
TI A methodology to assess China's building energy savings at the national level: An IPAT-LMDI model approach
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE National building energy savings (NBES); National building energy consumption (NBEC); China's existing buildings; Building energy-efficiency (BEE) policy; IPAT model; LMDI decomposition
ID CO2 EMISSION; LONG-TERM; DECOMPOSITION; CONSUMPTION; REDUCTION; MITIGATION; INDUSTRY; GROWTH
AB National building energy savings (NBES) plays an essential role in policymaking of China's building energy-efficiency (BEE) work. Numerous factors, such as technological progress and users' behavior, affect NBES while most of them are unquantifiable. One missing possibility along this direction is that there is currently no method to calculate China's NBES by summarizing all driving factors. To arrive at a solution, we proposed a concept of comparable building energy consumption per unit area and a method of China's NBES calculation based on an extended version of IPAT model (I = PAT, I = Human Impact, P = Population, A = Affluence, T = Technology) and LMDI decomposition (Logarithmic Mean Divisia Index, LMDI). Calculation revealed that China's NBES in "The 10th Five Year Plan" period (2001-2005), "The 11th Five Year Plan" period (2006-2010), and the first four years of "The 12th Five Year Plan" period (2011-2014) was 165, 158, and 127 million tce, respectively. Based on these calculation results, we checked NBES data then successfully proved the validity of this calculation method. Furthermore, after comparing the calculated NBES with the official planned NBES, we found that China surpassed its BEE targets. In the third stage of China's BEE work (2006-2015), the implementation of BEE policies obtained good results. (C) 2016 Elsevier Ltd. All rights reserved.
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OI Cai, Weiguang/0000-0002-0783-2016
FU Social Science and Humanity on Young Fund of the Ministry of Education P.R. China [15YJC630003]; National Natural Science Foundation of P.R. China [71403033]; Fundamental Research Fund for the Central Universities of P.R. China [106112015CDJXY030009]
FX We thank all the anonymous reviewers for their invaluable and constructive comments on an earlier draft of this manuscript and hence their contribution to the substantial revisions made since that time. We also deeply appreciate Prof. Liyin Shen's substantial help for this revised manuscript. The study was supported by the Social Science and Humanity on Young Fund of the Ministry of Education P.R. China (No. 15YJC630003), National Natural Science Foundation of P.R. China (No. 71403033), and the Fundamental Research Fund for the Central Universities of P.R. China (No. 106112015CDJXY030009).
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JI J. Clean Prod.
PD FEB 1
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology

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PT J
AU Timilsina, GR
Hochman, G
Fedets, I
AF Timilsina, Govinda R.
Hochman, Gal
Fedets, Iryna
TI Understanding energy efficiency barriers in Ukraine: Insights from a survey of commercial and industrial firms
SO ENERGY
LA English
DT Article
DE Energy efficiency; Technology; Adoption; Barriers; Ukraine
ID MANUFACTURING SMES; DRIVING FORCES; ADOPTION; CONSERVATION; INVESTMENTS; MANAGEMENT; BUILDINGS; SECURITY; MODELS; CHINA
AB Improvement of energy efficiency is an important element of energy policy for a sustainable supply of energy in Ukraine. However, the country is facing several challenges to the large-scale deployment of energy efficient technologies. We conducted a two-stage quota sample survey of 509 commercial and industrial firms of all regions of Ukraine to understand the barriers to energy efficiency improvements. Our study finds that more than two-thirds of the commercial and industrial firms in the country view improvement of energy efficiency very important to their business. However, due to several barriers they are unable to realize the improvements of energy efficiency. Among the 19 potential barriers investigated in the study, the survey results show that high upfront investment requirement, lack of government policies to support energy efficiency improvements, higher cost of capital, and lack of information and awareness are the most critical barriers to the improvement of energy efficiency in the industrial and commercial sectors in Ukraine. (C) 2016 Published by Elsevier Ltd.
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FU World Bank's Knowledge for Change Program (KCP) [P133056]
FX The authors appreciate two anonymous referees for their constructive comments. The financial support of the World Bank's Knowledge for Change Program (KCP) (P133056) is acknowledged. The views and interpretations herein are the authors and should not be attributed to the World Bank Group or the organizations with which it is affiliated. The authors are also thankful to the Institute for Economic Research and Policy Consulting, Kiev, Ukraine, for undertaking the survey.
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Z9 8
U1 1
U2 11
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Energy
PD JUL 1
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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PT J
AU Ramos, A

Labandeira, X
Loschel, A
AF Ramos, Ana
Labandeira, Xavier
Loeschel, Andreas
TI Pro-environmental Households and Energy Efficiency in Spain
SO ENVIRONMENTAL & RESOURCE ECONOMICS
LA English
DT Article
DE Energy efficiency; Investment; Behavior; Habits
ID SPLIT INCENTIVES; WARM CLIMATES; COLD HOUSES; ATTITUDES; BEHAVIOR; DEMAND; CONSUMPTION; ECONOMICS; PARADOX; POLICY
AB The residential building sector is a major driver of current and future energy consumption and associated emissions, which can be potentially mitigated through significant energy-efficiency (EE) improvements in both emerging and developed countries. Yet, there are several persistent barriers that hinder the attainment of EE improvements in this area. Using data from a 2008 national representative survey of Spanish households, this paper is interested in the determinants of EE-related decisions. In particular, a discrete-choice model empirically analyzes whether pro-environmental households are more likely to invest in EE and to adopt daily energy-saving habits. We show that households with eco-friendly behaviors are more likely to investment in well-differentiated EE measures as well as to steer daily habits towards energy savings. However, no effects are found for households with environmental attitudes based on stated willingness to pay to protect the environment. In addition to this, households belonging to higher income groups and education levels are more likely to invest in EE but not to adopt energy-saving habits; while households with older members are less likely to invest in EE and show fewer eco-friendly habits.
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U2 22
PU SPRINGER
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PA 233 SPRING ST, NEW YORK, NY 10013 USA
SN 0924-6460
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WC Economics; Environmental Studies
SC Business & Economics; Environmental Sciences & Ecology
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PT J
AU Marechal, K
Holzemer, L
AF Marechal, Kevin
Holzemer, Laurence
TI Getting a (sustainable) grip on energy consumption: The importance of household dynamics and 'habitual practices'

SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Energy consumption; Practice theories; Habits; Grips; Energy-saving tools
AB Considering the insufficient results achieved so far by energy-saving policies, the stance of this paper is to depart from an 'expert' view and base the analysis on those energy-related practices that are meaningful to practitioners (e.g., showering, cooking, listening to music). The framework described in this paper builds on the concept of habitual practices. Its rationale is to provide a precise characterisation of household energy-related practices allowing for a good understanding of their content together with a clearer picture of how they are formed and sustained over time. This constitutes a necessary step prior to reflecting on the type of interventions that could influence practices towards more sustainable configurations. The notion of 'grips' is then introduced with the aim of putting this characterisation into a form that is more operational for policy-makers. Grips are elements that have to be '(de-) activated' for supporting a targeted behavioral change. Identifying grips can enrich the characterization of consumption profiles and then be used as a dialogue interface between those profiles and the design of innovative energy-saving tools. This scheme is then applied within a dynamic perspective of the change process whereby a new practice has to be triggered, sustained and stabilized.
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Z9 8
U1 2
U2 2
PU ELSEVIER SCIENCE BV
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WC Environmental Studies
SC Environmental Sciences & Ecology
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PT J
AU Yu, BY
Tian, YM
Zhang, JY
AF Yu, Biying
Tian, Yaming
Zhang, Junyi
TI A dynamic active energy demand management system for evaluating the effect of policy scheme on household energy consumption behavior
SO ENERGY
LA English
DT Article
DE Household energy consumption behavior; Policy scheme; DAEDMS (Dynamic active energy demand management system); Timing effect; Dynamic simulation
ID ENVIRONMENTAL ATTITUDES; CONSERVATION; EMISSIONS; DETERMINANTS; EFFICIENCY; REDUCTION; IMPACT
AB To reduce the continuously increasing energy consumption in the household sector, including residential and private transport sectors, it is important to design a proper policy scheme to regulate household energy demand. However, determining how to evaluate the collective effect of multiple countermeasures in one policy scheme on household energy related behavior is very challenging; furthermore, the potential interactions between policies due to the timing effect cannot be overlooked. Under these concerns, this study provides a quantitative methodology by developing a DAEDMS (dynamic active energy demand management system) that can evaluate the overall effects of urban planning, soft policies for improving

household/individual awareness, technology-improvement/rebate policies, market end-use diffusion control, and social-interaction oriented policies. The timing effect is directly incorporated by allowing the free setting of the execution period for each policy. Building on this demand management system, the quantified policy schemes and the pathways that can reach the target of energy conservation become straightforward, providing helpful support for policy planning. Besides, the variant effectiveness of policy schemes due to different policy timings admonishes the policy makers to realize that the current fragmented regime of policy making between different departments is undesirable for capturing the genuine effect of all of the policies. (C) 2015 Elsevier Ltd. All rights reserved.
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WC Thermodynamics; Energy & Fuels
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PT J
AU Vandevyvere, H
Nevens, F
AF Vandevyvere, Han
Nevens, Frank
TI Lost in Transition or Geared for the S-Curve? An Analysis of Flemish
Transition Trajectories with a Focus on Energy Use and Buildings
SO SUSTAINABILITY
LA English
DT Article
ID SUSTAINABLE CITIES; CLIMATE-CHANGE; URBAN; GOVERNANCE; ENVIRONMENT;
CHALLENGES; INNOVATION; PATHWAYS; SUBURBS; POLICY
AB In recent years, many cities have adopted action plans to become climate neutral in the coming decades. Hereby, a strong motivational factor has been the goal to realize a win-win situation in the long term: climate neutrality and sustainable functioning are not only beneficial for the environment, but are equally beneficial for society and for the economy if well-integrated trajectories are adopted. Nevertheless, as actors across the fields start to implement these plans, many practical obstacles have arisen. These barriers are typical of a systemic transition: dominant practices are characterized by path dependencies, vast institutional frameworks and vested interests that are hard to break through. At the same time, relevant initiatives typically show some elements of uncertainty and a long term return, factors that make it difficult to attract financial investments. The present article addresses the state of the art for current transition experiments in the region of Flanders, Belgium, focusing on actions related to energy and buildings in cities. A brief overview of the state of affairs in several cities and provinces is presented, and some important opportunities and bottlenecks are identified. The resultant findings are tested against the framework of transition theory and related literature on the subject. Subsequently, a set of possible strategies to overcome the above mentioned barriers is formulated. These strategies focus on effectively mobilizing actors and investments.
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U2 16

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PA POSTFACH, CH-4005 BASEL, SWITZERLAND
SN 2071-1050
J9 SUSTAINABILITY-BASEL
JI Sustainability
PD MAR
PY 2015
VL 7
IS 3
BP 2415
EP 2436
DI 10.3390/su7032415
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences;
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SC Science & Technology - Other Topics; Environmental Sciences & Ecology
GA CE5AZ
UT WOS:000351843400008
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PT J
AU Wijaya, ME
Tezuka, T
AF Wijaya, Muhammad Ery
Tezuka, Tetsuo
TI Measures for improving the adoption of higher efficiency appliances in Indonesian households: An analysis of lifetime use and decision-making in the purchase of electrical appliances
SO APPLIED ENERGY
LA English
DT Article; Proceedings Paper
CT 4th International Conference on Applied Energy (ICAE)
CY JUL 01-04, 2012
CL Suzhou, PEOPLES R CHINA
DE Appliance lifetime; Decision-making; Energy efficiency; Households; Indonesia
ID CONSUMPTION
AB One approach to decreasing electricity consumption is to facilitate the replacement of older appliances with new, higher-efficiency. The objectives of this paper are to compare and analyse the replacement of appliances in two cities of Indonesia - Yogyakarta and Bandung - that are characterised by different cultural backgrounds, ethnicities, and decision-making processes in the household purchase of electrical appliances. A questionnaire survey method was employed to obtain information on behavioural economics and human psychosocial variables such as attitudes, beliefs and perceived benefits regarding the replacement and purchase of electrical appliances. The results show that refrigerators in Yogyakarta have a longer lifetime than in Bandung. However, in Bandung, air conditioners, electric fans, rice cookers, and water pumps have a longer lifetime than in Yogyakarta. These differences in the lifetime of appliances can be attributed to the cultural differences within the two cities that are reflected in the manner in which people use electrical appliances as well as to their lack of knowledge regarding appliance operation. An analysis of the factors influencing the purchase of appliances indicated that people in Yogyakarta show a greater awareness of the benefits of adopting higher-efficiency appliances than do persons in Bandung. The following suggestions could be implemented to improve the strategy of encouraging the adoption of higher-efficiency appliances: (1) in Yogyakarta, energy labelling could be applied to assist customers in understanding the rate of energy consumption of selected appliances; (2) in Bandung, the store sales staff could be trained to adapt their promotional messages to persuade people to purchase high-efficiency appliances and to promote the adoption of higher-efficiency models; and (3) the price of appliances could

be correlated with the rate of energy consumption, and the total lifetime cost of use should be displayed in the store and included in promotional materials. (C) 2013 Elsevier Ltd. All rights reserved.
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PU ELSEVIER SCI LTD
PI OXFORD
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SN 0306-2619
EI 1872-9118
J9 APPL ENERG
JI Appl. Energy
PD DEC
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SI SI
BP 981
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DI 10.1016/j.apenergy.2013.02.036
PG 7
WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA 285FA
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PT J
AU Azevedo, IL
Morgan, MG

Palmer, K
Lave, LB
AF Azevedo, Ines Lima
Morgan, M. Granger
Palmer, Karen
Lave, Lester B.
TI Reducing US Residential Energy Use and CO2 Emissions: How Much, How Soon, and at What Cost?
SO ENVIRONMENTAL SCIENCE & TECHNOLOGY
LA English
DT Article
ID INDIVIDUAL DISCOUNT RATES; GREENHOUSE-GAS EMISSIONS; CLIMATE-CHANGE; SUPPLY CURVES; EFFICIENCY; TECHNOLOGIES; BUILDINGS; DURABLES; BARRIERS; PURCHASE
AB There is growing interest in reducing energy use and emissions of carbon dioxide from the residential sector by deploying cost-effectiveness energy efficiency measures. However, there is still large uncertainty about the magnitude of the reductions that could be achieved by pursuing different energy efficiency measures across the nation. Using detailed estimates of the current inventory and performance of major appliances in U.S. homes, we model the cost, energy, and CO2 emissions reduction if they were replaced with alternatives that consume less energy or emit less CO2. We explore trade-offs between reducing CO2, reducing primary or final energy, or electricity consumption. We explore switching between electricity and direct fuel use, and among fuels. The trade-offs between different energy efficiency policy goals, as well as the environmental metrics used, are important but have been largely unexplored by previous energy modelers and policy-makers. We find that overnight replacement of the full stock of major residential appliances sets an upper bound of just over 710 X 10(6) tonnes/year of CO2 or a 56% reduction from baseline residential emissions. However, a policy designed instead to minimize primary energy consumption instead of CO2 emissions will achieve a 48% reduction in annual carbon dioxide emissions from the nine largest energy consuming residential end-uses. Thus, we explore the uncertainty regarding the main assumptions and different policy goals in a detailed sensitivity analysis.
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FU center for Climate and Energy Decision Making [SES-0949710]; Electricity and Environment Program at Resources for the Future
FX We thank Erica Myers for developing the algorithm to infer unit energy consumption and investments and retirements by type of end-use equipment, Conrad Coleman and Pedro Ferreira for programming assistance, and Elisabeth Anne Gilmore for programming assistance on RREEM. We also thank Jay Apt, John Cymbalsky and Paulo Ferrao, and the Carnegie Mellon Electricity Industry Center (CEIC) for thoughtful advice and comments. The work was supported by the center for Climate and Energy Decision Making (SES-0949710), both through a cooperative agreement between the National Science Foundation and Carnegie Mellon University, by the Electricity and Environment Program at Resources for the Future, and a gift to that program from Exelon Corporation.
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NR 50
TC 8
Z9 8
U1 2
U2 60
PU AMER CHEMICAL SOC
PI WASHINGTON
PA 1155 16TH ST, NW, WASHINGTON, DC 20036 USA
SN 0013-936X
J9 ENVIRON SCI TECHNOL
JI Environ. Sci. Technol.
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WC Engineering, Environmental; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA 112LP
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PT J
AU Bruhns, H
Wyatt, P
AF Bruhns, Harry
Wyatt, Peter
TI A data framework for measuring the energy consumption of the non-domestic building stock
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE building stock; consumption; data; database; energy statistics; energy; evidence-based policy; framework
ID ENGLAND; WALES; CLASSIFICATION; MODEL
AB The transition to a low-carbon economy urgently demands better information on the drivers of energy consumption. UK government policy has prioritized energy efficiency in the built stock as a means of carbon reduction, but the sector is historically information poor, particularly the non-domestic building stock. This paper presents the results of a pilot study that investigated whether and how property and energy consumption data might be combined for non-domestic energy analysis. These data were combined in a 'Non-Domestic Energy Efficiency Database' to describe the location and physical attributes of each property and its energy consumption. The aim was to support the generation of a range of energy-efficiency statistics for the industrial, commercial and institutional sectors of the non-domestic building stock, and to provide robust evidence for national energy-efficiency and carbon-reduction policy development and monitoring. The work has brought together non-domestic energy data, property data and mapping in a 'data framework' for the first time. The results show what is possible when these data are integrated and the associated difficulties. A data framework offers the potential to inform energy-efficiency policy formation and to support its monitoring at a level of detail not previously possible.
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PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
SN 0961-3218
J9 BUILD RES INF
JI Build. Res. Informat.
PY 2011
VL 39
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DI 10.1080/09613218.2011.559704
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WC Construction & Building Technology
SC Construction & Building Technology
GA 748QJ
UT WOS:000289405200002
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PT J
AU Musti, S
Kortum, K
Kockelman, KM
AF Musti, Sashank
Kortum, Katherine
Kockelman, Kara M.
TI Household energy use and travel: Opportunities for behavioral change
SO TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT
LA English
DT Article
DE Household energy consumption; Transport energy; Climate change;
Greenhouse gas emissions
AB This study examines personal travel decisions and residents' opinions on energy policy options in the Austin metropolitan area. The vast majority of respondents recognized global warming as a problem, and most agreed that lifestyle changes are needed to combat climate change. Many also believe that climate change can be combated by application of stricter policies in the areas of vehicle technology, fuel economy, and building design. Results of the study illuminate the importance of home-zone attributes on vehicle ownership, vehicle miles, and emissions. Most households agree that energy regulations should be pursued to curb global climate change, and most prefer caps on consumption over taxation. The results suggest that substantial US energy and greenhouse gas savings are likely to come from vehicle fuel-economy regulation, rebates on relatively fuel-efficient vehicle purchases, caps on maximum household energy use, and long-term behavioral shifts. (C) 2010 Elsevier Ltd. All rights reserved.
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FU Southwest Region University Transportation Center [169202]
FX This research was financially supported by the Southwest Region University Transportation Center's Project # 169202. The survey instrument for this paper was created and many responses were obtained

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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 1361-9209
J9 TRANSPORT RES D-TR E
JI Transport. Res. Part D-Transport. Environ.
PD JAN
PY 2011
VL 16
IS 1
BP 49
EP 56
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WC Environmental Studies; Transportation; Transportation Science & Technology
SC Environmental Sciences & Ecology; Transportation
GA 676DG
UT WOS:000283889700007
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PT J
AU Lv, SL
Wu, Y
AF Lv Shilei
Wu Yong
TI Target-oriented obstacle analysis by PESTEL modeling of energy efficiency retrofit for existing residential buildings in China's northern heating region
SO ENERGY POLICY
LA English
DT Article

DE EERFERB; Obstacle; PESTEL
AB According to the "Comprehensive Work Program of Energy Efficiency and Emission Reduction" of the Chinese government, during the period of the "11th Five-Year Plan", 1.5 x 10(8) m(2) of existing residential buildings in China's northern heating region are to be retrofitted for energy efficiency. However, at present, this "Energy Efficiency Retrofit for Existing Residential Buildings" (EERFERB) faces many obstacles. Under the current working and market system, both the central and local governments and the energy supply companies can not push on this work smoothly. Using both the results of the annual national special inspection of building energy efficiency and some case analyses, this paper examines the necessity for energy efficiency retrofit, along with the relationships among the various Political, Economic, Social, Technological, Environmental and Legal (PESTEL) factors affecting it. Furthermore, organizational, financial and technical support systems are explored to promote the development of retrofit. Finally, some primary principles to be followed toward the implementation of EERFERB are suggested. (C) 2008 Elsevier Ltd. All rights reserved.
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XU XL, 2008, CONSTRUCTION SCI TEC, V7, P33
NR 4
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Z9 8
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U2 39
PU ELSEVIER SCI LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
PD JUN
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DI 10.1016/j.enpol.2008.11.039
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 448AK
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PT J
AU Xu, MJ
Hu, ZG
Wu, JY
Zhou, YH
AF Xu, Minjie
Hu, Zhaoguang
Wu, Junyong
Zhou, Yuhui
TI A hybrid society model for simulating residential electricity

consumption
SO INTERNATIONAL JOURNAL OF ELECTRICAL POWER & ENERGY SYSTEMS
LA English
DT Article
DE Residential electricity consumption; Multi-agent systems (MAS); Power price policy; Electricity saving; Social influence model
ID FUNCTIONAL FORMS; DEMAND; PATTERNS; DESIGN
AB In this paper, a hybrid social model of econometric model and social influence model is proposed for evaluating the influence of pricing policy and public education policy on residential habit of electricity using in power resources management. And, a hybrid society simulation platform based on the proposed model, called residential electricity consumption multi-agent systems (RECMAS), is designed for simulating residential electricity consumption by multi-agent system. RECMAS is composed of consumer agent, power supplier agent, and policy maker agent. It provides the policy makers with a useful tool to evaluate power price policies and public education campaigns in different scenarios. According to an influenced diffusion mechanism, RECMAS can simulate the residential electricity demand-supply chain and analyze impacts of the factors on residential electricity consumption. Finally, the proposed method is used to simulate urban residential electricity consumption in China. (C) 2008 Elsevier Ltd. All rights reserved.
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NR 17
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Z9 10
U1 0
U2 8
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0142-0615
J9 INT J ELEC POWER
JI Int. J. Electr. Power Energy Syst.
PD DEC
PY 2008
VL 30
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WC Engineering, Electrical & Electronic
SC Engineering
GA 386CL
UT WOS:000261859800002
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PT J
AU Zadeh, SMS
AF Zadeh, S. M. Sadegh
TI An energy efficiency plan for the Iranian building sub-sector
SO ENERGY POLICY
LA English
DT Article
DE energy efficiency; integrated energy network; least cost planning
AB The objective of this paper is to develop a 25-year least cost plan for energy management in the Iranian building sub-sector. For this purpose, an energy flow optimization from the point where the final energy is delivered to consumers, until the useful energy and energy services point is investigated. This will help to select the most economically feasible technologies as well as energy carriers considering all technical and social constraints. Based on the optimization results, absorption cooling for the regions where natural gas network is available, grades A and B evaporative coolers and air conditioners for those areas where there is no gas service, gas fired heating systems, wall insulation, double-glazed windows, equipments and appliances with highest energy labelling grade and compact and non-compact fluorescent lamps are among the selections. The results of the sensitivity analysis indicates that if the cost of natural gas network development to the regions where there is no gas will result in the tripling rate of the actual cost of the natural gas, in those areas, the priority should be still given to the consumption of gas. The proposed energy efficiency plan results in 27%, 54% and 10% saving in energy consumption, energy cost and investment cost, respectively. (c) 2006 Elsevier Ltd. All rights reserved.
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J9 ENERG POLICY
JI Energy Policy
PD FEB
PY 2007
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IS 2
BP 1164
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Paudel, S
Elmitri, M
Couturier, S
Nguyen, PH
Kamphuis, R
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Le Corre, O
AF Paudel, Subodh
Elmitri, Mohamed
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Le Corre, Olivier
TI A relevant data selection method for energy consumption prediction of low energy building based on support vector machine
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Building energy consumption; Prediction; Low energy building; Support vector machine; Online and offline learning
ID ARTIFICIAL NEURAL-NETWORKS; LOAD; MODEL; OPTIMIZATION; PERFORMANCE; SIMILARITY; SYSTEM
AB Low energy buildings (LEBs) are being considered as a promising solution for the built environment to satisfy high-energy efficiency standards. The technology is based on lowering the overall heat transmission coefficient value (U-value) of the buildings envelope and increasing a heat capacity thus creating a higher thermal inertia. However, LEB introduces a large time constant compared to conventional building due to which it slows the rate of heat transfer between interior of building and outdoor environment and alters the indoor climate regardless of sudden changes in climatic conditions. Therefore, it is challenging to estimate and predict thermal energy demand for such LEBs.

This work focuses on artificial intelligence (AI) model to predict energy consumption of LEB. Two kinds of Al modeling approaches: "all data" and "relevant data" are considered. The "all data" uses all available training data and "relevant data" uses a small representative day dataset and addresses the complexity of building non-linear dynamics by introducing past day climatic impacts behavior. This extraction is based on dynamic time warping pattern recognition methods. The case study consists of a French residential LEB. The numerical results showed that "relevant data" modeling approach that relies on small

representative data selection has higher accuracy (R-2=0.98; RMSE = 3.4) than "all data" modeling approach (R-2 = 0.93; RMSE = 7.1) to predict heating energy load. (C) 2016 Elsevier B.V. All rights reserved.
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FU Ecole des Mines de Nantes; Eindhoven University of Technology; Veolia Recherche et Innovation (VERI)
FX This research has been done in collaboration with Ecole des Mines de Nantes, Eindhoven University of Technology and Veolia Recherche et Innovation (VERI), funded through Erasmus Mundus Joint doctoral programme SELECT+, the support of which is gratefully acknowledged.
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U1 0
U2 19
PU ELSEVIER SCIENCE SA
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PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Eleftheriadis, S
Mumovic, D
Greening, P
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Mumovic, Dejan
Greening, Paul
TI Life cycle energy efficiency in building structures: A review of current developments and future outlooks based on BIM capabilities
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE BIM; LCA; Energy efficiency; Sustainable structures; Building systems
ID EMBODIED ENERGY; OFFICE BUILDINGS; THERMAL MASS; ENVIRONMENTAL ASSESSMENT; INFORMATION MODEL; COST ESTIMATION; DESIGN; CONSTRUCTION; CONCRETE; OPTIMIZATION
AB The continuous developments of Building Information Modelling.(BIM) in Architecture, Engineering and Construction (AEC) industry supported by the advancements in material resourcing and construction processes could offer engineers the essential decision-making procedures to leverage the raising demands for sustainable structural designs. This article brings together the theory of Life Cycle Assessment (LCA) and the capabilities of BIM to survey the current developments in the energy efficiency of structural systems. In addition, the article explores the engineering dimensions of common decision-making procedures within BIM systems including optimisation methods, buildability and safety constraints and

code compliance limitations. The research presents critical expositions in both engineering and sustainable energy domains. The article then argues that future innovations in the sustainable decision making of buildings' structures would require BIM-integrated workflows in order to facilitate the conflicting nature of both energy efficient and engineering performance indexes. Finally, the study puts forward a series of research guidelines for a consolidated decision paradigm that utilises the capabilities of BIM within the engineering and sustainable energy domains in a synergistic manner. (C) 2016 Elsevier Ltd. All rights reserved.

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PT J
AU Strengers, Y
Nicholls, L
Maller, C
AF Strengers, Yolande
Nicholls, Larissa
Maller, Cecily
TI Curious energy consumers: Humans and nonhumans in assemblages of household practice
SO JOURNAL OF CONSUMER CULTURE
LA English
DT Article
DE Consumers; energy consumption; distributed agency; social practices; assemblages
ID AGENTIC CAPACITIES; AGENCY
AB In international energy policy, programmes and consumer research, a dominant ideal consumer is emerging. This consumer is typically a human adult who has the agency to make autonomous, functional and rational decisions about his or her household's energy consumption. This article seeks to disrupt this dominant anthropocentric conceptualisation of the consumer and provide new ways of knowing and potentially intervening in the lives of energy consumers. Drawing on qualitative research conducted with householders living in Sydney, Australia, and theories of practice, materiality and agency from sociology and science and technology studies, we seek to understand consumers as human and nonhuman actants operating in distributed assemblages of practice. We explore the implications of conceptualising non-traditional consumers of energy, such as babies, pets, pests and pool pumps, as performers of or materials in practices that consume energy. Our analysis provides new ways of potentially intervening in patterns of energy consumption. We argue that policy makers need to refocus their attention on finding routes into assemblages of practice to achieve change. We conclude by calling for further exploration and recognition of the myriad curious consumers found in households.
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FU TransGrid; Ausgrid; Endeavour Energy
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support and assistance with the research. The views expressed in this paper do not necessarily represent the views of TransGrid, Ausgrid or Endeavour Energy. The authors also thank the two anonymous reviewers for their insightful feedback, and the curious consumers who generously gave their time to assist with this research.

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AU Atalla, TN
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AF Atalla, Tarek N.
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TI Modelling residential electricity demand in the GCC countries
SO ENERGY ECONOMICS
LA English
DT Article
DE GCC residential electricity demand; Structural time series model; Impact of weather and exogenous underlying energy demand trend (UEDT)
ID UNDERLYING ENERGY DEMAND; PANEL COINTEGRATION ANALYSIS; ASYMMETRIC PRICE RESPONSES; DYNAMIC REGRESSION-MODELS; TRANSPORT OIL DEMAND; CLIMATE-CHANGE; CONSUMPTION; TRENDS; UK; SEASONALITY
AB This paper aims at understanding the drivers of residential electricity demand in the Gulf Cooperation Council countries by applying the structural time series model. In addition to the economic variables of GDP and real electricity prices, the model accounts for population, weather, and a stochastic underlying energy demand trend as a proxy for efficiency and human behaviour. The resulting income and price elasticities are informative for policy makers given the paucity of previous estimates for a region with particular political structures and economies subject to large shocks. In particular, the estimates allow for a sound assessment of the impact of energy related policies suggesting that if policy makers in the region wish to curtail future residential electricity consumption they would need to improve the efficiency of appliances and increase energy using awareness of consumers, possibly by education and marketing campaigns. Moreover, even if prices were raised the impact on curbing residential electricity growth in the region is likely to be very small given the low estimated price elasticities-unless, that is, prices were raised so high that expenditure on electricity becomes such a large proportion of income that the price elasticities increase (in absolute terms). (C) 2016 King Abdullah Petroleum Studies and Research Center (KAPSARC). Published by Elsevier B.V.
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World Bank, 2014, WORLD DEV IND 2014
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TI Information and Communications Technologies (ICTs) for energy efficiency in buildings: Review and analysis of results from EU pilot projects
SO ENERGY AND BUILDINGS
LA English
DT Review
DE Information and Communication; Technology; European Union; Energy efficiency; Energy savings; Energy management system; Public building
ID OPTIMIZATION; CONSUMPTION; PREDICTION; MANAGEMENT; ALGORITHM; SYSTEM
AB Information and Communications Technologies (ICTs) can play a potential role in improving the energy performance of buildings by the implementation of effective solutions that take advantage of the energy interactions between all the elements included in a building.
A revision of the 105 pilots implemented or under implementation in 18 projects in the area of ICTs for energy efficiency in buildings located in 23 European countries, through 88 cities with different types of climates, buildings and technologies have been carried out through documentary and field analysis of the energy, economic and social project results. These results have been extrapolated to assess the potential energy savings which could be expected at the EU level by implementing the solutions proposed by the projects.
By the implementation of the different ICT solutions, buildings have achieved more than 20% energy savings. Pilots have demonstrated that the effectiveness of the ICT solution does not depend directly on the different climates where the solutions are implemented, but on several factors, such as the level of motivation, perceived thermal comfort, quality of social interaction and communication and ICT support.

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FU European Commission - DG Communications Networks, Content Technology [SMART 2013/0073]
FX This paper was developed from the results obtained in the framework of the study "SMART 2013/0073 - reducing energy consumption in buildings with ICT - analysis of data from EU pilot projects" financed by the European Commission - DG Communications Networks, Content & Technology and executed by CIRCE.
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TI Event-Driven User-Centric Middleware for Energy-Efficient Buildings and Public Spaces
SO IEEE SYSTEMS JOURNAL
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DT Article
DE Ambient intelligent; energy efficiency; event-driven middleware; Internet of things; pervasive computing; smart buildings; ubiquitous computing; user-centered development; web services
ID AMBIENT INTELLIGENCE
AB In this paper, the design of an event-driven usercentric middleware for monitoring and managing energy consumption in public buildings and spaces is presented. The main purpose is to increase energy efficiency in buildings and public spaces, thus reducing consumption. To achieve this, the proposed service-oriented middleware has been designed to be event based, also exploiting the user behavior patterns of people who live and work in buildings. Furthermore, it allows an easy integration of heterogeneous technologies in order to enable a hardwareindependent interoperability between them. Moreover, a heating ventilation and air conditioning (HVAC) control strategy has been developed, and the whole infrastructure has been deployed in a real-world case study consisting of a historical building. Finally, the results will be presented and discussed.
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J9 IEEE SYST J
JI IEEE Syst. J.
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TI Influence of household air-conditioning use modes on the energy performance of residential district cooling systems
SO BUILDING SIMULATION
LA English
DT Article
DE AC usage model; load distribution; residential district cooling system; uncertainty analysis; energy performance
ID BUILDING SIMULATION; THERMAL COMFORT; CONSUMPTION INFORMATION; OCCUPANT BEHAVIOR; EFFICIENCY; DEST; OPTIMIZATION; VERIFICATION; METHODOLOGY; TECHNOLOGY
AB During technical evaluations of cooling systems in residential buildings, it is necessary to consider the influence of the household air-conditioning (AC) use modes. In other words, how the occupants control the AC, for instance, when it is turned on, what the temperature setting is, and how long it is used. Field measurements and spot interviews indicate that AC usage by residents should be environmental, event and random related. A reduced-order AC conditional probability (CP) model was developed in this study to describe AC usage. The AC CP model was integrated with a building energy modeling program (BEMP) to reflect the interaction of the AC operation and the indoor environment. With consideration of stochastic AC use modes, the uncertainty of user compositions was studied. Additionally, simulation results revealed that AC use modes and user compositions can cause up to a 4.5-fold difference in the system efficiency of district cooling systems. The Lorenz curve and Gini coefficient were applied in this study to describe the load distribution in a quantitative manner. Through a comparison with the constant schedule definition model, the study also identified inclusion of the stochastic feature of AC use modes and their compositions in simulations as being important to the technical evaluation of district cooling systems.
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FU Natural Science Foundation of Beijing, China [8142022]
FX This research is supported by the Natural Science Foundation of Beijing, China (No. 8142022).
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SC Thermodynamics; Construction & Building Technology
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AU Torriti, J
Hanna, R
Anderson, B
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AF Torriti, Jacopo
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TI Peak residential electricity demand and social practices: Deriving flexibility and greenhouse gas intensities from time use and locational data
SO INDOOR AND BUILT ENVIRONMENT
LA English
DT Article
DE Demand side response; Load shifting; Peak demand; Residential electricity demand; Time-use
ID ENERGY-CONSUMPTION; GENDER; POLICY; WORK; OCCUPANCY; COUNTRIES; IMPACTS; SQUEEZE; MODELS; SECTOR
AB Peak residential electricity demand takes place when people conduct simultaneous activities at specific times of the day. Social practices generate patterns of demand and can help understand why, where, with whom and when energy services are used at peak time. The aim of this work is to make use of recent UK time use and locational data to better understand: (i) how a set of component indices on synchronisation, variation, sharing and mobility indicate flexibility to shift demand; and (ii) the links between people's activities and peaks in greenhouse gases' intensities. The analysis is based on a recent UK time use dataset, providing 1-min interval data from GPS devices and 10-min data from diaries and questionnaires for 175 data days comprising 153 respondents. Findings show how greenhouse gases' intensities and flexibility to shift activities vary throughout the day. Morning peaks are characterised by high levels of synchronisation, shared activities and occupancy, with low variation of activities. Evening peaks feature low synchronisation, and high spatial mobility variation of activities. From a network operator perspective, the results indicate that periods with lower flexibility may be prone to more significant local network loads due to the synchronisation of electricity-demanding activities.
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FU Engineering and Physical Sciences Research Council as part of the RCUK

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FX This work was supported by the Engineering and Physical Sciences Research Council [grant number EP/K011723/1] as part of the RCUK Energy Programme and by EDF as part of the R&D ECLEER Programme.
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PA 1 OLIVERS YARD, 55 CITY ROAD, LONDON EC1Y 1SP, ENGLAND
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WC Construction & Building Technology; Engineering, Environmental; Public, Environmental & Occupational Health
SC Construction & Building Technology; Engineering; Public, Environmental & Occupational Health
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AF Revel, Gian Marco
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Schmitt, Katrin
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TI COST-EFFECTIVE TECHNOLOGIES TO CONTROL INDOOR AIR QUALITY AND COMFORT IN ENERGY EFFICIENT BUILDING RETROFITTING
SO ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL
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CT 18th International Conference on Trade Fair of Material & Energy Recovery and Sustainable Development
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HO Ecomondo
DE energy efficiency; gas sensor; HVAC control; indoor air quality; thermal comfort
ID SPORTS FACILITIES; ENVIRONMENTS; RISK
AB This paper presents a toolset for the efficient control of the indoor air quality and thermal comfort in retrofitted buildings. The refurbishment of existing buildings, compliant to actual regulations, often leads to airtightness and the consequent poor conditions for the occupants that could cause low productivity and even sickness. For this reason, the CETIEB (Cost Effective Tools for Better Indoor Environment in Retrofitted Energy Efficient Buildings) project developed innovative low-cost solutions to monitor and control the indoor air quality and thermal comfort. Among the technologies developed, this paper presents ad-hoc sensors for the monitoring of Total Volatile Organic Components (TVOC), CO2 and thermal comfort together with a control logic that, using measured data, provides the optimal rules to actuate the control devices (ventilation, heating/cooling, windows opening, shutters operation and so on). The application and validation of the integrated solution, monitoring plus control logic, was performed in a laboratory building to compare the performance of the proposed solution with the traditional system employed in buildings. The results turned out to show sensors performances comparable with commercial solutions but with a significant reduction of costs. Moreover, the application of the integrated solution showed an improvement of the indoor air quality and comfort with a 15% of energy saving, compared to the traditional thermostatic control.
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FX This work is co-founded by the European Commission within the FP7 European Project CETIEB (Cost - Effective Tools for Better Indoor Environment in Retrofitted Energy Efficient Buildings), Grant agreement no: 285623.
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Yang, Yunkai
TI Improving benefit-cost analysis to overcome financing difficulties in promoting energy-efficient renovation of existing residential buildings in China
SO APPLIED ENERGY
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DT Article
DE Financing; Benefit-cost analysis; Cost-effectiveness; Win-win
ID NORTHERN HEATING REGION; ECONOMIC-ANALYSIS; RETROFIT; CONSUMPTION; PERFORMANCE; SAVINGS; SYSTEM; SECTOR; WINTER; AREAS
AB Energy-efficient renovation of existing residential buildings is an important energy policy in China, but financing difficulties seriously hinder the promotion of the policy. In this article, novel indices based on benefit-cost analysis are presented to overcome the barriers. Firstly, benefit-cost analysis is expanded to include the ratio of energy-saving benefit to investment cost (EnIR), the ratio of environmental benefit to investment cost (EvIR), and the ratio of economic benefit to investment cost (EcIR). The above ratios are applied to determine the optimum plans with the highest cost-effectiveness for the buildings to be renovated. Secondly, according to the actual situation regarding both the government and residents, EnIR is modified to the ratio of energy-saving benefit from the retrofit plan to the part of the investment cost undertaken by the government (EnIgR), EvIR to the ratio of environmental benefit from the retrofit plan to the part of the investment cost undertaken by the government (EvIgR), and EcIR to the ratio of economic benefit from the retrofit plan to the part of the investment cost undertaken by residents (EcIrR). The

modified ratios can increase awareness of residents in respect of their individual benefits from the adoption of the optimum plans, and can attract them to co-invest. Through these two steps, financing difficulties could be eased or even no longer considered as obstacles to some extent. The ratios are applied to a case study building in Hangzhou. Based on the results, a "win-win" model, consistent with market principles, is developed, in which both the government and residents can co-invest and co-benefit. The model has proven to be an effective decision-making tool in promoting the building renovation policy in China. (C) 2014 Elsevier Ltd. All rights reserved.

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PT J
AU Kavousian, A
Rajagopal, R
AF Kavousian, Amir
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TI Data-Driven Benchmarking of Building Energy Efficiency Utilizing Statistical Frontier Models
SO JOURNAL OF COMPUTING IN CIVIL ENGINEERING
LA English
DT Article
DE Energy efficiency; Stochastic processes; Benchmark; Data analysis; Energy efficiency; Stochastic ranking; Data-driven benchmarking; Data envelopment analysis; Energy-efficient frontier
ID CONSERVATION; INDICATORS; NETWORK
AB Frontier methods quantify the energy efficiency of buildings by forming an efficient frontier (best-practice technology) and by comparing all buildings against that frontier. Because energy consumption fluctuates over time, the efficiency scores are stochastic random variables. Existing applications of frontier methods in energy efficiency either treat efficiency scores as deterministic values or estimate their uncertainty by resampling from one set of measurements. Availability of smart meter data (repeated measurements of

energy consumption of buildings) enables using actual data to estimate the uncertainty in efficiency scores. Additionally, existing applications assume a linear form for an efficient frontier; i.e.,they assume that the best-practice technology scales up and down proportionally with building characteristics. However, previous research shows that buildings are nonlinear systems. This paper proposes a statistical method called stochastic energy efficiency frontier (SEEF) to estimate a bias-corrected efficiency score and its confidence intervals from measured data. The paper proposes an algorithm to specify the functional form of the frontier, identify the probability distribution of the efficiency score of each building using measured data, and rank buildings based on their energy efficiency. To illustrate the power of SEEF, this paper presents the results from applying SEEF on a smart meter data set of 307 residential buildings in the United States. SEEF efficiency scores are used to rank individual buildings based on energy efficiency, to compare subpopulations of buildings, and to identify irregular behavior of buildings across different time-of-use periods. SEEF is an improvement to the energy-intensity method (comparing kWh/sq.ft.): whereas SEEF identifies efficient buildings across the entire spectrum of building sizes, the energy-intensity method showed bias toward smaller buildings. The results of this research are expected to assist researchers and practitioners compare and rank (i.e.,benchmark) buildings more robustly and over a wider range of building types and sizes. Eventually, doing so is expected to result in improved resource allocation in energy-efficiency programs.

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AU Kleinschafer, J
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Morrison, Mark
TI Household norms and their role in reducing household electricity consumption
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DT Article
DE Decision making; efficiency champion; environment
ID SOCIAL-INFLUENCE; DECISION-MAKING; BEHAVIOR
AB Researchers have only recently begun to investigate the role of the norms of the household or family group in energy-efficiency decisions. These researchers have demonstrated that these norms can influence the behaviour and attitudes of children within the household. We contribute to their findings by providing a characterization of the use of household norms in household decisions about electricity efficiency. For our qualitative research, we conducted focus groups with three different household types: (1) share houses/young couples with no children; (2) households with children; and (3) empty nest/elderly households in three regional centres in New South Wales, Australia (total of 76 respondents in nine focus groups). Specifically, we found that household norms were evident in the decision-making process through rules and expectations about behaviour and the use of sanctions to enforce or shaped that behaviour. We identified several drivers of household norms including a household member taking the

role of efficiency champion' and the occurrence of critical incidents in the household. In addition, we found that household members try to establish household norms to socialize household members with the goal of the intergenerational transmission of desirable behaviours. Based on these observations, we conclude that household members employ norms to regulate and reduce their electricity consumption, and as a mechanism for consumer socialization. As such, our findings are important for marketers and policy makers tasked with regulating household consumption.

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TI Energy saving in existing buildings by an intelligent use of

interoperable ICTs
SO ENERGY EFFICIENCY
LA English
DT Article
DE Interoperability; Middleware; Wireless Sensor and Actuator Networks; Building management system; Building information modelling; Energy awareness and efficiency
AB In this paper, we report a methodology, developed in the context of Smart Energy Efficient Middleware for Public Spaces European Project, aimed at exploiting ICT monitoring and control services to reduce energy usage and CO2 footprint in existing buildings. The approach does not require significant construction work as it is based on commercial-off-the-shelf devices and, where present, it exploits and integrates existing building management systems with new sensors and actuator networks. To make this possible, the proposed approach leverages upon the following main contributions: (a) to develop an integrated building automation and control system, (b) to implement a middleware for the energy-efficient buildings domain, (c) to provide a multi-dimensional building information modelling-based visualisation, and (d) to raise people's awareness about energy efficiency. The research approach adopted in the project started with the selection, as case studies, of representative test and reference rooms in modern and historical buildings chosen for having different requirements and constraints in term of sensing and control technologies. Then, according to the features of the selected rooms, the strategies to reduce the energy consumptions were defined, taking into account the potential savings related to lighting, heating, ventilation, and air conditioning (HVAC) systems and other device loads (PC, printers, etc.). The strategies include both the control of building services and devices and the monitoring of environmental conditions and energy consumption. In the paper, the energy savings estimated through simulation, for both HVAC and lighting, are presented to highlight the potential of the designed system. After the implementation of the system in the demonstrator, results will be compared with the monitored data.
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PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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TI On the potential trade-offs between energy supply and end-use technologies for residential heating
SO ENERGY POLICY
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DE Energy efficiency; District heating; CO2 emissions
ID SWEDISH BUILDING SECTOR; CONSERVATION; EFFICIENCY; SYSTEMS; BIOMASS; EXAMPLE; FUELS
AB In Sweden, where district heating accounts for a significant share of residential heating, it has been argued that improvements in end-use energy efficiency may be counter-productive since such measures reduce the potential of energy efficient combined heat and power production. In this paper we model how the potential trade-offs between energy supply and end-use technologies depend on climate policy and energy prices. The model optimizes a combination of energy efficiency measures, technologies and fuels for heat supply and district heating extensions over a 50 year period. We ask under what circumstances improved end-use efficiency may be cost-effective in buildings connected to district heating? The answer hinges on the available technologies for electricity production. In a scenario with no alternatives to basic condensing electricity production, high CO2 prices result in very high electricity prices, high profitability of combined heat and power production, and little incentive to reduce heat demand in buildings with district heating. In contrast, in a scenario where electricity production alternatives with low CO2 emissions are available, the electricity price will level out at high CO2 prices. This gives heat prices that increase with the CO2 price and make end-use efficiency cost-effective also in buildings with district heating. (c) 2013 Elsevier Ltd. All rights reserved.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0301-4215
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J9 ENERG POLICY
JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 202QW
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PT J
AU Sovacool, BK
AF Sovacool, Benjamin K.
TI Security of energy services and uses within urban households
SO CURRENT OPINION IN ENVIRONMENTAL SUSTAINABILITY
LA English
DT Review
ID CONSUMPTION; CHALLENGE; SYSTEMS
AB This article explores how the security of energy services and uses differs according to the socio-demographic nature of households. The article begins by defining energy services and distinguishing them from primary energy, end-use energy, and useful energy. It then proposes an 'energy services ladder' that tracks the primary fuels and technologies, services and end-uses they provide, and broader driving factors associated with energy use at lower-income, middle-income, and upper-income households, with energy security vulnerabilities. The article does not analyze rural energy services, energy services for commercial firms or industries, indirect energy services, or potential gains from future energy transitions. The final part of the article offers implications for energy policy and energy studies.
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TC 7
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U1 1
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PU ELSEVIER SCI LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Curr. Opin. Environ. Sustain.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences
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PT S
AU Pantong, K
Chirarattananon, S
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AF Pantong, K.
Chirarattananon, S.
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BE Yupapin, PP
PivsaArt, S
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TI Development of Energy Conservation Programs for Commercial Buildings based on Assessed Energy Saving Potentials
SO 9TH ECO-ENERGY AND MATERIALS SCIENCE AND ENGINEERING SYMPOSIUM
SE Energy Procedia
LA English
DT Proceedings Paper
CT 9th Eco-Energy and Materials Science and Engineering Symposium
CY MAY 25-27, 2011

CL Chiang Rai, THAILAND
DE Building energy code; Building energy labeling; Energy efficiency;
Energy conservation program
ID THAILAND
AB Thailand is a developing country whose energy demand is continuously increasing. However, Thailand has limited energy resources, and half of the energy consumed is imported. Buildings account for the largest sector, which shares 53% of total electrical energy consumption in Thailand. Over half of this consumption is due to the large commercial buildings. This study aims to propose energy conservation programs focusing on these large commercial buildings. The energy consumption data were extracted from various sources to develop the building performance models, which were then employed to project its energy consumption for the next 20 years (2030). The analysis shows that the energy consumption from the large commercial buildings in 2030 will nearly double the consumption in the base year (2010) if there is no energy conservation program implemented. However, implementation of the proposed programs of building energy code (BEC) and building energy labeling (BEL) integrated with a rolling plan of the program revision show technically a high potential for savings of electrical energy up to 50% from the total consumption in 2030. Implementation of a program for high efficiency stove and burner can help save additional LPG for cooking and fuel oil for water heating 40% from the total fuel demand in 2030. (C) 2011 Published by Elsevier Ltd. Selection and/or peer-review under responsibility of CEO of Sustainable Energy System, Rajamangala University of Technology Thanyaburi (RMUTT).
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CR Chan AT, 2005, ENERG BUILDINGS, V37, P631, DOI 10.1016/j.enbuild.2004.09.018
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NR 11
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Z9 7
U1 0
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PU ELSEVIER SCIENCE BV
PI AMSTERDAM
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SC Energy & Fuels; Materials Science
GA BYG26
UT WOS:000298549900009
OA gold
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PT J
AU Li, YG
Zhuang, Z
Liu, JP
AF Li Yuguo
Zhuang Zhi
Liu JiaPing
TI Chinese kangs and building energy consumption
SO CHINESE SCIENCE BULLETIN
LA English
DT Article
DE Building energy efficiency; rural energy; home heating; Chinese kang; elevated kang; indoor air quality
AB Chinese kangs are an integrated system for cooking, sleeping and heating in rural Northern China with more than 2000 years history. In 2004 there were 67 million Chinese kangs used by 44 million rural families or 174 million people. Chinese kangs store surplus heat from stove during cooking and releases it later for both home heating and localized bed heating. Such a widely used heating system has been rarely studied. Understanding kangs is important for developing new effective home heating systems for better energy efficiency and improving indoor air quality in Northern China. In this paper, we review and present some preliminary results from our field measurement and mathematical modeling, and discuss the development of Chinese kangs as related to future energy consumption in rural homes, and building energy consumption in China in general. We suggest that transition and new technologies for rural home heating in Northern China, i.e. the future of Chinese kangs, should be considered as the top priority in managing future building energy consumption in China.
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FU Research Grants Council of the Hong Kong Special Administrative Region, China [HKU 7154/05E]; National Natural Science Foundation of China 2007 Young Researcher Award [50729803]; International Energy Agency Annex 44; Integrating Environmentally Responsive Elements in Buildings
FX Supported by the grant from the Research Grants Council of the Hong Kong Special Administrative Region, China (Grant No. HKU 7154/05E) and National Natural Science Foundation of China 2007 Young Researcher Award (Grant No. 50729803) The work is also a part of the International Energy Agency Annex 44 project on Integrating Environmentally Responsive Elements in Buildings.
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PA 16 DONGHUANGCHENGGEN NORTH ST, BEIJING 100717, PEOPLES R CHINA
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J9 CHINESE SCI BULL
JI Chin. Sci. Bull.
PD MAR
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WC Multidisciplinary Sciences
SC Science & Technology - Other Topics
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PT J
AU Rackes, A
Waring, MS
AF Rackes, Adams
Waring, Michael S.
TI Alternative ventilation strategies in US offices: Comprehensive assessment and sensitivity analysis of energy saving potential
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Energy efficiency measures; Building energy simulation; Economizer; Demand controlled ventilation; Supply air temperature reset; Heating, ventilation, and air-conditioning; (HVAC)
ID INDOOR AIR-QUALITY; DEMAND-CONTROLLED VENTILATION; BUILDING PERFORMANCE; COMMERCIAL BUILDINGS; SEQUENCE GENERATOR; SIMULATION; MODELS; SYSTEM
AB Mature technologies exist to reduce the heating, ventilation, and air-conditioning (HVAC) energy associated with ventilation and use ventilation proactively to save energy. This study investigated the energy use impacts in U.S. office buildings of multiple alternative ventilation strategies that combined: economizing, demand controlled ventilation (DCV), supply air temperature reset (SR), and/or a doubled ventilation rate. We used energy simulations in a Monte Carlo analysis, sampling 17 building inputs and varying locations to match the climate zone distribution of the U.S. office stock. Results indicated the possibility for significant savings compared to a baseline that ventilated constantly at a minimum rate in both a small office type with a constant air volume (CAV) HVAC system and a medium office type with a variable air volume (VAV) system. In 95% of instances, HVAC source energy savings were 5-25% in the small-CAV office (median: 11%) and 6-42% in the medium-VAV office (median: 27%). In the small-CAV office, DCV typically saved the most energy, usually from heating, and heating degree days and occupant density were decisive influences. In the medium-VAV office, economizing and SR were most important,

DCV usually only had minor impacts, and zone temperature setpoints, along with climate indicators, were the critical influences. Other than infiltration, envelope characteristics did not strongly influence energy impacts. The untapped primary energy savings of alternative ventilation strategies over the 74% of U.S. office floorspace reasonably represented by our modeling was estimated at 36 TWh per year, with an annual value of U.S. $1.25 billion. (C) 2017 Elsevier Ltd.
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NR 54
TC 6
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U1 8
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PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Build. Environ.
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SC Construction & Building Technology; Engineering
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PT J
AU Hargreaves, A
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Steemers, K
AF Hargreaves, Anthony
Cheng, Vicky
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Leach, Matthew
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TI Forecasting how residential urban form affects the regional carbon
savings and costs of retrofitting and decentralized energy supply
SO APPLIED ENERGY
LA English
DT Article; Proceedings Paper
CT 3rd International Conference on Sustainable Thermal Energy Management
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CY JUL 07-08, 2015
CL Newcastle upon Tyne, ENGLAND

DE Building-scale; Sustainable technologies; Housing typologies; Urban modelling; Decarbonisation of supply

ID LAND-USE; SYSTEM MODELS; HOUSING STOCK; CONSUMPTION; UK; SUSTAINABILITY; TECHNOLOGY; SCENARIOS; TRANSPORT; PARADIGM

AB Low carbon energy supply technologies are increasingly used at the building and community scale and are an important part of the government decarbonisation strategy. However, with their present state of development and costs, many of these decentralised technologies rely on public subsidies to be financially viable. It is questionable whether they are cost effective compared to other ways of reducing carbon emissions, such as decarbonisation of conventional supply and improving the energy efficiency of dwellings. Previous studies have found it difficult to reliably estimate the future potential of decentralised supply because this depends on the available residential space which varies greatly within a city region. To address this problem, we used an integrated modelling framework that converted the residential density forecasts of a regional model into a representation of the building dimensions and land of the future housing stock. This included a method of estimating the variability of the dwellings and residential land. We present the findings of a case study of the wider south east regions of England that forecasted the impacts of energy efficiency and decentralised supply scenarios to year 2031. Our novel and innovative method substantially improves the spatial estimates of energy consumption compared to building energy models that only use standard dwelling typologies. We tested the impact of an alternative spatial planning policy on the future potential of decentralised energy supply and showed how lower density development would be more suitable for ground source heat pumps. Our findings are important because this method would help to improve the evidence base for strategies on achieving carbon budgets by taking into account how future residential space constraints would affect the suitability and uptakes of these technologies. (C) 2016 The Authors. Published by Elsevier Ltd.

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PT J
AU Barnes, E
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AF Barnes, Elizabeth
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TI Small buildings, big impacts: The role of small commercial building
energy efficiency case studies in 2030 Districts

SO SUSTAINABLE CITIES AND SOCIETY
LA English
DT Article
DE Small commercial buildings; Building energy efficiency; Case study
AB Small commercial buildings, or those comprising less than 50,000 square feet of floor area, make up 90% of the total number of buildings in the United States. Though these buildings currently account for less than 50% of total energy consumption in the U.S., this statistic is expected to change as larger commercial buildings become more efficient and thus account for a smaller percentage of commercial building energy consumption. This paper describes the efforts of a multi-organization collaboration and their demonstration partners in developing a library of case studies that promote and facilitate energy efficiency in the small commercial buildings market as well as a case study template that standardized the library. Case studies address five identified barriers to energy efficiency in the small commercial market, specifically, lack of: (1) access to centralized, comprehensive, and consistent information about how to achieve energy targets, (2) reasonably achievable energy targets, (3) access to tools that measure buildings' progress toward targets, (4) financial incentives that make the reduction effort attractive, and (5) effective models of how disparate stakeholders can collaborate in commercial centers to reach targets. The case study library can be organized by location, building type, project size, energy savings, end uses impacted, and retrofit measures. This paper discusses the process of developing the library and case study template. Finally, the paper presents next steps for the library and explores energy savings potential its widespread use. (C) 2016 Elsevier Ltd. All rights reserved.
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FU U.S. Department of Energy [FOA 0000829]
FX This work was funded by an award from the U.S. Department of Energy's FOA 0000829, "Better Buildings - Commercial Energy Efficiency Solutions," specifically, the "Small Commercial 2030 District Program and Toolkit" project led by the Lawrence Berkeley National Laboratory. Any opinions, findings, conclusions, or recommendations expressed in this paper are those of the writers and do not necessarily reflect the views of the Lawrence Berkeley National Laboratory or the United States Department of Energy.
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SC Construction & Building Technology; Science & Technology - Other Topics; Energy & Fuels
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TI Combined energy hub optimisation and demand side management for buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy hub modelling; Demand side management; Optimisation; Linear programming
ID SUPPLY-SYSTEMS; OPTIMAL-DESIGN; GENETIC ALGORITHM; DECISION-SUPPORT; LOAD MANAGEMENT; NETWORK; ELECTRICITY; OPERATION; STORAGE; UTILITY
AB The deployment of innovative energy management (EM) approaches based on systematic modelling and optimisation techniques has received an increasing amount of attention in the last decade. This has been often prompted by more stringent energy policy objectives aiming at reducing carbon emissions, phasing out nuclear plants and promoting overall energy efficiency, while containing both capital and operating costs. In this respect the energy hub concept has proven to be a popular approach for operating technologies and units comprising diversified energy carriers, small-scale production units, storage devices and converter systems. Additionally, developments in communication network and control infrastructure afford the possibility, at least in principle, to actively steer and adjust the load on the demand side of the energy balance, leading to the formulation of demand side management (DSM) techniques. This paper proposes an EM solution that combines the features and advantages of both of the aforementioned approaches, i.e. the energy hub framework and DSM methods. The key idea is to combine the supply-side characteristics of energy hubs with the demand side flexibility yielded by the deployment of DSM schemes. This combined approach is validated on an existing building complex by formalizing its energy supply system as an integrated hub and by modelling its heating demand based on thermodynamic principles. Numerical results based on this experimental setup are presented, illustrating that the combined approach can lead to overall savings typically exceeding 10% compared to a baseline scenario where no EM solution is applied, i.e. where only a rule-based heuristic is employed to control the available energy assets, and underscoring the advantages brought by a systematically integrated modelling and optimisation approach. The proposed solution is thus of interest for a broad host of installations in the residential and commercial domain, and for the latter a specific real-world example has been explicitly

considered and analysed. The obtained results are encouraging and warrant further analysis and investigation. (C) 2016 Elsevier B.V. All rights reserved.
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FU European Union (FP7 EPIC-HUB project) [600067]; Ministry of Education, Science and Technological Development of Republic of Serbia [TR-32010]
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AU Guo, F
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AF Guo, Fei
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TI Analysis of achievable residential energy-saving potential and its implications for effective policy interventions: A study of Xiamen city in southern China
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Energy-saving potential; Energy consumption projection; Policy evaluation; Residential buildings; China
ID APARTMENT BUILDINGS; CONSERVATION; EFFICIENCY; COST
AB This paper explores opportunities for effective policy intervention for residential energy savings in southern China, by analyzing achievable potential of residential energy savings in the city of Xiamen as a case study. In contrast to static technical and economic potential analyses, the achievable potential analysis is based on dynamic energy consumption projections, which consider two real-world factors: (1) gradual ramping-up adoption process of advanced technical measures; and (2) consumers' adoption of these measures. A bottom-up type Residential Energy Consumption (REC) projection model specifically tailored for southern China was developed in this paper, based on the general logic and calculation principles utilized in the U.S. EIA's "National Energy Modeling System (NEMS)," and the adoption theory of advanced technical measures proposed by Kastovich. This REC projection model was then used as a policy analysis tool to quantitatively evaluate the impact of various policies on residential energy savings in the case study city of Xiamen. The analysis of the Xiamen case shows that although there is a significant technical potential for residential energy savings in the city (about 20.9-24.9%), the maximum achievable potential (MAP) in 2020 is only about 8.3-8.4% of that year's business-as-usual baseline consumption. Moreover, with existing policies only about one-fourth to half of the calculated MAP is likely to be achieved by 2020. These findings indicate that in order to realize a larger share of achievable potential for

residential energy savings in China, additional and more effective polices are needed. (C) 2016 Elsevier Ltd. All rights reserved.

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PT J
AU Jones, RV
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AF Jones, Rory V.
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TI Determinants of high electrical energy demand in UK homes: Appliance ownership and use
SO ENERGY AND BUILDINGS
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DT Article
DE Electricity consumption; Appliance ownership; Appliance use; Domestic buildings; Odds ratio
ID HOUSEHOLD ELECTRICITY; CONSUMPTION; CLIMATE; MODELS; TRENDS; USAGE

AB This paper provides an analysis of the appliance ownership and use factors contributing to high electrical energy demand in UK homes. The data were collected during a large-scale, city-wide survey, carried out in Leicester, UK, in 2009-2010. Annual electricity consumption and appliance ownership and use were established for 183 dwellings and an odds ratio analysis used to identify the factors that led to high electricity consumption. Many of the appliance ownership and use factors have not previously been studied for the UK domestic sector. The results of this study should be of key interest to government policy makers and energy supply companies interested in the underlying drivers of the highly positively skewed distribution of UK domestic electricity use. The study identifies those appliances that could be targeted for technical improvements or subjected to campaigns to encourage more energy efficient use in order to reduce electricity consumption among high demand households. This paper builds on earlier work by the current authors which identified the households (socio-demographic and dwelling characteristics) most likely to be high electricity consumers. The current work provides the basis for advice and guidance to those households that would enable them to, over time, reduce their electricity use. (C) 2016 The Authors. Published by Elsevier B.V.

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FU 4M Project: Measurement, Modelling, Mapping and Management: An Evidence-Based Methodology for Understanding and Shrinking the Urban Carbon Footprint; Engineering and Physical Sciences Research Council (EPSRC) under the Sustainable Urban Environments programme [EP/F007604/1]
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Sheikhi, A
Rayati, M
Ranjbar, AM
AF Sheikhi, Aras
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Ranjbar, Ali Mohammad
TI Demand side management for a residential customer in multi-energy systems
SO SUSTAINABLE CITIES AND SOCIETY
LA English
DT Article

DE Residential customer; Demand side management; Multi-energy system (MES); Reinforcement learning

ID SMART ENERGY HUBS; ELECTRICITY; OPERATION; FUTURE; UNCERTAINTY; CONSUMPTION; SIMULATION; NETWORKS; DESIGN; GAME

AB Today, as a consequence of the growing installation of efficient technologies, e.g. micro-combined heat and power (micro-CHP), the integration of traditionally separated electricity and natural gas networks has been attracting attentions from researchers in both academia and industry. To model the interaction among electricity and natural gas networks in distribution systems, this paper models a residential customer in a multi-energy system (MES). In this paper, we propose a fully automated energy management system (EMS) based on a reinforcement learning (RL) algorithm to motivate residential customers for participating in demand side management (DSM) programs and reducing the peak load in both electricity and natural gas networks. This proposed EMS estimates the residential customers' satisfaction function, energy prices, and efficiencies of appliances based on the residential customers' historical actions. Simulations are performed for the sample model and results depict how much of each energy, i.e. electricity and natural gas, the residential customer should consume and how much of natural gas should be converted in order to meet electricity and heating loads. It is also shown that the proposed RL algorithm reduces residential customer energy bill and electrical peak load up to 20% and 24%, respectively. (C) 2016 Elsevier Ltd. All rights reserved.

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PT J
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AF Taniguchi, Ayako
Inoue, Takuya
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Yamaguchi, Yohei
Shimoda, Yoshiyuki
Takami, Akinobu
Hanaoka, Kanako
TI Estimation of the contribution of the residential sector to summer peak demand reduction in Japan using an energy end-use simulation model
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Electricity load curve; Residential electricity demand; Bottom-up type simulation model; Electricity saving measures; Behavioral change
ID INHABITANTS; PREDICTION; BUILDINGS; BEHAVIOR
AB The effect of electricity peak demand reduction by electricity saving measures in the Japanese residential sector on the power system scale during summer was evaluated through the use of a simulation model developed by the, authors. In order to simulate the electricity peak demand on the power system scale, the model was improved so as to (1) represent the household distribution and residential stock on the power

system scale and (2) improve the temporal resolution of the simulation. The proposed model is a bottom-up type model that simulates residential electricity demand based on occupant behavior considering numerous factors, such as family composition, residence floor area, and building insulation level. Therefore, the proposed model can be used to evaluate both occupant behavioral changes and energy conservation technologies. As a result, we determined that the most influential behavioral measure in reducing summer peak demand is turning off the lights. The peak demand reduction effect when 5% of households turned off the lights was 13 MW, which is equivalent to approximately 0.2% of the residential electricity demand during the daytime in summer in the Kansai region. The model also clarified differences in the electricity savings for each countermeasure among several family composition categories. (C) 2015 Elsevier B.V. All rights reserved.

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PT J
AU Galvin, R
Terry, N
AF Galvin, Ray
Terry, Nicola
TI Selling energy savings in the United Kingdom: A case study of top-down pro-environmental behaviour change in commercial office buildings
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Energy saving; Commercial office buildings; Building energy management; Selling energy savings
ID EFFICIENCY; CONSUMPTION; COMMUNITIES; PROPERTY; BARRIERS; SCIENCE; SECTOR
AB Energy saving in commercial office buildings is often frustrated by the complex organisational nature of the communities with a stake in building energy performance. While policy support and landlords' sustainability aspirations can give impetus towards energy saving, most consumption and savings potential is in the hands of the tenant firms. Relevant research is often framed in terms of barriers and drivers of energy saving, where reasons for lack of saving are explored. This study takes an alternative approach. It offers two case studies of central London office buildings owned by different firms with large international building fleets, both of whom have a core business commitment to sustainability and are reporting significant energy savings in these buildings. Using qualitative interviews with the top-down agents who are charged with making savings happen, the study explores the reasons savings are being made despite the kinds of barriers found more generally. It finds sustainability agendas are being driven by highly motivated agents, skilled in the art of persuasion, with strong personal relationship skills, an indefatigable positive attitude, and the flexibility to change strategies where needed. The metaphor of 'selling energy savings' is coined to frame this approach. (C) 2015 Elsevier Ltd. All rights reserved.
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AU Bonnington, O
AF Bonnington, Oliver
TI The Indispensability of Reflexivity to Practice: The Case of Home Energy Efficiency
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LA English
DT Article
DE climate change; cold-related morbidity; home energy efficiency; morphogenesis; reflexivity; social practice
ID SOCIAL PRACTICE; CONSUMPTION; POLICY; DIFFUSION; HABITUS; GAP
AB This article offers new theoretical and empirical insights into decision-making with regard to the domestication and incorporation of home energy efficiency (HEE) artefacts. These items, such as insulation and heating systems, are currently of high social, political and environmental importance. Researchers

investigating energy consumption and related topics have recently turned to theories of practice - especially that proposed by Shove and colleagues which treat humans as 'carriers'. In contrast, this article uses realist social theory to afford a pivotal role to reflexivity in practice. Individual case studies, derived from in-depth interviews, are used to explore Archer's communicative, autonomous and meta-reflexive modes. And, at the same time, Archer's distinction between natural, practical and social orders of reality is used to show the importance of embodied and practical knowledge in HEE practices. As such, this article takes the theoretical focus in this research area beyond dispositions and attitudes, and argues that the way artefacts are domesticated in the course of householders' pursuit of that which matters most to them may have significant social implications that contemporary forms of practice theory seem unable to account for. Sustainability policy, therefore, should be sensitive to the concerns of householders and the indispensability of reflexivity to home energy efficiency practices.

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AU Wang, QS
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AF Wang, Qingsong
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TI Structural Evolution of Household Energy Consumption: A China Study
SO SUSTAINABILITY
LA English
DT Article
ID DECOMPOSITION ANALYSIS; MULTIVARIATE-ANALYSIS; POLICY; REQUIREMENTS; PERSPECTIVE; EMISSIONS; COUNTRIES; EFFICIENT; UK
AB Sustainable energy production and consumption is one of the issues for the sustainable development strategy in China. As China's economic development paradigm shifts, household energy consumption (HEC) has become a focus of achieving national goals of energy efficiency and greenhouse gas reduction. The information entropy model and LMDI model were employed in this study in order to analyse the structural evolution of HEC, as well as its associated critical factors. The results indicate that the information entropy of HEC increased gradually, and coal will be reduced by clean energies, such as natural gas and liquefied petroleum gas. The information entropy tends to stabilize and converge due to rapid urbanization. Therefore, from the perspective of environmental protection and natural resource conservation, the structure of household energy consumption will be optimized. This study revealed that residents' income level is one of the most critical factors for the increase of energy consumption, while the energy intensity is the only driving force for the reduction of HEC. The accumulated contribution of these two factors to the HEC is 240.53% and -161.75%, respectively. It is imperative to improve the energy efficiency in the residential sector. Recommendations are provided to improve the energy efficiency-related technologies, as well as the standards for the sustainable energy strategy.
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FU National Natural Science Foundation [41301640, 41471461]; Award Fund for Young Scientists of Shandong Province [BS2012SF015]; Shandong University [IFYT1401, IFYT14010]; Humanities & Social Sciences Project of Shandong Province [14-ZZ-JG-02]; Soft Science Research Plan of Shandong Province [2014RKE27057, 2014RKE27058]; Development Program of Application-Oriented Talent Training for Environmental Engineering Specialty, Shandong Province
FX This research is supported by National Natural Science Foundation (41301640, 41471461), the Award Fund for Young Scientists of Shandong Province (BS2012SF015), the Innovation Fund of Shandong University (IFYT1401, IFYT14010), the Humanities & Social Sciences Project of Shandong Province (14-ZZ-JG-02), the Soft Science Research Plan of

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PU MDPI AG
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PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
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J9 SUSTAINABILITY-BASEL
JI Sustainability
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BP 3919
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences; Environmental Studies
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AU Poznaka, L
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AF Poznaka, Liga
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BE Valtere, S
TI Analysis of electricity user behavior: case study based on results from extended household survey
SO INTERNATIONAL SCIENTIFIC CONFERENCE ENVIRONMENTAL AND CLIMATE TECHNOLOGIES, CONECT 2014
SE Energy Procedia
LA English
DT Proceedings Paper
CT International Scientific Conference on Environmental and Climate Technologies (CONECT)
CY OCT 14-16, 2014
CL Riga, LATVIA
SP Riga Tech Univ, Inst Energy Syst & Environm

DE Smart meters; household energy consumption; electricity; behavior; multiple regression; pilot project; survey; re-survey
ID ENERGY-CONSUMPTION; SMART GRIDS; DETERMINANTS; PREDICTION; OCCUPANTS; CLIMATE
AB Greater emphasis on the individual consumers' engagement in energy efficiency has been integrated into the concept of a comprehensive European energy policy. Households, as well as the people living there are very different and one of the important factors is to assess a consumer's behavioral aspects. Conducting surveys is the most common way to obtain this type of information. Our research is based on JSC "Latvenergo" pilot project "Promoting energy efficiency of household using smart technologies" (further - pilot project) where 500 Latvian households were installed with smart meters at the beginning of 2013. The first results have shown that the average electricity consumption in the target group decreased by 23 %. In order to explain the results, research was carried out by analyzing 1) what kind of behavioral and motivation factors influenced changes in electricity consumption; and 2) to what extent changes in electricity consumption were affected by smart meters. Three multiple linear regression models were tested on the basis of first survey data of 430 households and 8 selected households, who were re-interviewed in March - April, 2014. The results show that changes in electricity consumption are not influenced only by technical aspects, but also by users' psychological aspects, such as subconscious and belonging to the social group. (C) 2015 The Authors. Published by Elsevier Ltd.
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PT J
AU Hope, AJ
Booth, A
AF Hope, Alexander John
Booth, Alexander
TI Attitudes and behaviours of private sector landlords towards the energy efficiency of tenanted homes
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency; Energy policy; Green Deal; Housing; Rented sector
ID REHABILITATION PROGRAM; EXISTING BUILDINGS; CLIMATE-CHANGE; GREEN DEAL; UK; POLICY; DWELLINGS; BARRIERS; ENGLAND
AB The UK's housing stock generates approximately 27% of the country's total annual carbon emissions. In light of the legally binding targets to reduce carbon emissions, new housing is subject to a tightening of regulations governing energy demand and efficiency resulting in a gradual improvement in carbon emissions. The question is how to achieve the deep carbon emission reductions from existing domestic properties, of which 75% will still be in use in 2050. Government has sought to provide incentives to homeowners to improve the energy efficiency of their households, and mandate improvements in socially rented housing using a range of fiscal measures, most recently the 'Green Deal'. There has however been little consideration of the 18% of UK households who privately rent their home, a tenure that is growing fast. The aim of this research is to investigate the factors that influence private sector landlords when considering energy efficiency improvements to their tenanted homes. The results indicate that government policy has consistently failed to engage private sector landlords in the issue of energy efficiency and thus measures must be taken to understand the motivations of landlords in order to design effective incentives and interventions. (C) 2014 Elsevier Ltd. All rights reserved.
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Z9 6
U1 0
U2 19
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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ER

PT J
AU Qiu, YM
AF Qiu, Yueming
TI Energy Efficiency and Rebound Effects: An Econometric Analysis of Energy Demand in the Commercial Building Sector
SO ENVIRONMENTAL & RESOURCE ECONOMICS
LA English
DT Article
DE Electricity and natural gas demand; Energy efficiency; Heckman selection model; Price elasticity; Rebound effect
ID MICROECONOMETRIC APPROACH; ELECTRICITY DEMAND; SELECTION BIAS; DIFFUSION
AB It is widely recognized that the adoption of energy saving innovations can induce an increase in the usage of the corresponding technologies and thus can possibly increase energy consumption. Among other concerns is that uncertainties regarding the magnitude of this "rebound effect" can deter policy makers from promoting energy efficiency. This paper analyzes the rebound effects of the adoption of energy efficient technologies in commercial buildings. Based upon a structural model of technology adoption and subsequent energy demand at the building level, the empirical results are that energy efficiency can reduce electricity use by about 35 % and natural gas consumption by about 50 %.
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NR 48
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U1 1
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PU SPRINGER
PI NEW YORK

PA 233 SPRING ST, NEW YORK, NY 10013 USA
SN 0924-6460
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J9 ENVIRON RESOUR ECON
JI Environ. Resour. Econ.
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PT S
AU Aderohunmu, F
Balsamo, D
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Brunelli, D
AF Aderohunmu, Femi
Balsamo, Domenico
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BE Langendoen, K
Hu, W
Ferrari, F
Zimmerling, M
Mottola, L
TI Long Term WSN Monitoring for Energy Efficiency in EU Cultural Heritage Buildings
SO REAL-WORLD WIRELESS SENSOR NETWORKS, REALWSN 2013
SE Lecture Notes in Electrical Engineering
LA English
DT Proceedings Paper
CT 5th International Workshop on Real-World Wireless Sensor Networks (REALWSN)
CY SEP 19-20, 2013
CL Como, ITALY
SP Politecnico Milano Dipartimento Elettronica Informazione Bioingegneria
AB Historic buildings are a distinctive and invaluable characteristic of numerous European cities, and living symbols of Europe's rich cultural heritage. However, today, EU cultural heritage buildings are contributing huge percentage to the greenhouse gas emissions. This has led to the increasing of wireless sensor network (WSN) deployments aimed at monitoring and improving the energy efficiency of these historic buildings. In this chapter we show a long term, low cost, passive distributed environmental monitoring system that promotes energy-efficient retrofitting in historic buildings. We focus on the design and implementation of an innovative technological framework, and on the hardware and software development of the solution. The presented system provides real-time feedback for the civil engineers for prompt intervention via remote interfaces.
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FU EU 7th Framework Programme
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PT J

AU Hall, N
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AF Hall, Nina
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TI Increasing Energy-Saving Actions in Low Income Households to Achieve Sustainability
SO SUSTAINABILITY
LA English
DT Article
DE energy consumption; behaviour change; low-income; Australia; bridge sustainability
ID CONSERVATION; BEHAVIOR
AB Residential energy consumption contributes up to one-fifth of total greenhouse gas emissions in Australia. Low-income households could benefit from energy efficiency behaviour change programs with anticipated "bridge sustainability" outcomes of environmental and financial benefits and increased well-being, but participation rates from this demographic are often low. The EnergySavers energy behaviour change program was designed for Australian low-income households. A variety of information materials were delivered in structured discussions over a five month period in 2012, with 139 low-income participants in two Australian cities in different climate zones. This article identifies which energy-saving actions low income households are already undertaking and, after completing the program, which actions were most commonly adopted. Participants reported that their participation in the program increased their energy-saving actions, increased their control over energy consumption, and that they disseminated their new knowledge through their social networks. Findings identified the importance of group discussion within demographic groups for information uptake and adoption of new energy behaviours. The housing situation, home population and language background were found to have a significant influence on the uptake of new behaviours. The results also suggest that the program would benefit from amendments to the actions and assessment prior to national roll-out to ensure that effective and long term bridge sustainability can be achieved.
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OI Romanach, Lygia/0000-0003-4437-2124; Hall, Nina/0000-0002-5410-6332; Cook, Stephanie/0000-0002-0053-7276
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U1 2
U2 39
PU MDPI AG
PI BASEL
PA POSTFACH, CH-4005 BASEL, SWITZERLAND
SN 2071-1050
J9 SUSTAINABILITY-BASEL
JI Sustainability
PD NOV
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences; Environmental Studies
SC Science & Technology - Other Topics; Environmental Sciences & Ecology
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PT J
AU Gokce, HU
Gokce, KU
AF Goekce, Hasan Ufuk
Goekce, Kamil Umut
TI Holistic system architecture for energy efficient building operation
SO SUSTAINABLE CITIES AND SOCIETY
LA English
DT Article
DE Energy efficient buildings; Integrated and intelligent control; Data Warehouse Technology; BIM
AB Buildings account for almost 40% of the total energy usage and 30% of the total CO2 emissions in Europe. Environmental, legislative and economical drivers require more efficient and accurate energy management of buildings. Current building management systems do not have the capabilities of energy specific monitoring and management. In order to address these issues, in this paper, the Holistic Multi-Dimensional Information Management System will be described with its components: Data Warehouse Core, Extraction, Transformation and Loading (ETL) tool and Information Representation tools. The purpose of the developed system is to store, integrate, analyse complex data sets from multiple data and

AB information sources such as wired/wireless sensing devices (e.g. sensor and meter readings) and Building Information Modelling (BIM) Tools (e.g. Autodesk Revit Architecture and MEP). The developed system is demonstrated and validated in the Environmental Research Institute (ERI) Building located on the campus of National University of Ireland-University College Cork. (C) 2012 Elsevier B.V. All rights reserved.
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PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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PT J
AU Gabriel, M
Watson, P
AF Gabriel, Michelle
Watson, Phillipa
TI From Modern Housing to Sustainable Suburbia: How Occupants and their Dwellings are Adapting to Reduce Home Energy Consumption
SO HOUSING THEORY & SOCIETY
LA English
DT Article
DE Sustainable; Adaptation; Material culture; Technology
AB In this paper, we examine how occupants and their dwellings adapt to reduce home energy consumption. Our analysis is informed by recent studies which emphasize the materiality of the home, as well as the impact of technological change within the home. Such approaches are important in clarifying the relationship between home design and home practices, as well as understanding processes of change such as sustainable home adaptation. Drawing on people's experiences of installing solar hot water systems, we found that sustainable home adaptation was not a straightforward process whereby occupant aspirations were delivered through building adaptation, but rather adaptation arose from the differing capacities and practices of occupants and their buildings, and how these were negotiated over time. In particular, we found that successful adaptations were dependent on the integration of the occupant's "folk knowledge" of their home along with the "technical knowledge" provided by tradespeople, suppliers or the occupant themselves. In contrast to mid-century Australian housing new sustainable modes of living demand: working knowledge of the dwelling, reflection on home practices, and case-specific adjustments of dwellings that reflect the needs and capacities of occupants.
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FX The research on which this article is based was supported by funding from the Department of Infrastructure, Energy and Resources, Tasmanian Government. The authors would like to thank colleagues at the University of Tasmania, staff at Sustainable Living Tasmania, and participants of the Housing Theory Symposium held in Hobart, March 2012 for all their advice and assistance. The authors would also like to thank two anonymous reviewers for their insightful comments on drafts of this article. Finally, the authors sincerely thank the research participants who were so generous in providing us with their thoughtful reflections and their valued time.
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PU ROUTLEDGE JOURNALS, TAYLOR & FRANCIS LTD
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PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXFORDSHIRE, ENGLAND
SN 1403-6096
EI 1651-2278
J9 HOUS THEORY SOC
JI Hous. Theory Soc.
PY 2013
VL 30
IS 3
BP 219
EP 236
DI 10.1080/14036096.2013.775183
PG 18
WC Environmental Studies; Planning & Development; Urban Studies
SC Environmental Sciences & Ecology; Public Administration; Urban Studies
GA AQ7VR
UT WOS:000343027800002
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Shames, I.
Scotton, F.
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Sandberg, H.
Johansson, K. H.
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BE Lee, VCS
Ong, KL
TI Towards More Efficient Building Energy Management Systems
SO 2012 SEVENTH INTERNATIONAL CONFERENCE ON KNOWLEDGE, INFORMATION AND CREATIVITY SUPPORT SYSTEMS (KICSS 2012)
LA English
DT Proceedings Paper
CT 7th IEEE International Conference on Knowledge, Information and Creativity Support Systems (KICSS)
CY NOV 08-10, 2012
CL Melbourne, AUSTRALIA
SP IEEE, IEEE Comp Soc, IEEE Syst, Man & Cybernet Soc
AB As a first step towards developing efficient building energy management techniques, in this paper, we first study the energy consumption patterns of heating, ventilation and cooling (HVAC) systems across the KTH Royal Institute of Technology campus and we identify some possible areas where energy consumption can be made less wasteful. Later, we describe a test-bed where wireless sensor networks are used to collect data and eventually control the HVAC system in a distributed way. We present some of the data, temperature, humidity, and CO2 measurements, that are collected by the aforementioned network and compare them with the measurements collected by the legacy sensors already in place. In the end we present a preliminary result on modelling the dynamics of the temperature, humidity, and CO2 using the data gather by the sensor network. We check the validity of the model via comparing the out put of the system with measured data. As a future work we identify the possibility of using the models obtained here for model based control, and fault detection and isolation techniques.
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Z9 6

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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-0-7695-4861-6
PY 2012
BP 118
EP 125
DI 10.1109/KICSS.2012.21
PG 8
WC Computer Science, Information Systems; Engineering, Electrical &
Electronic
SC Computer Science; Engineering
GA BFP45
UT WOS:000320869400018
DA 2018-05-03
ER

PT J
AU Ma, HR
Riera-Palou, X
Harrison, A
AF Ma, Hongrui
Riera-Palou, Xavier
Harrison, Andrew
TI Development of a new tank-to-wheels methodology for energy use and green
house gas emissions analysis based on vehicle fleet modeling
SO INTERNATIONAL JOURNAL OF LIFE CYCLE ASSESSMENT
LA English
DT Article
DE Fleet; Methodology; Modeling; Tank-to-Wheels; Transport statistics;
Vehicle; Well-to-Wheels
ID ADVISER
AB Background, aim and scope Tank-to-Wheels (TtW) makes the largest contribution to the total Well-to-Wheels (WtW) energy consumption and greenhouse gas (GHG) emissions from fossil-derived transportation fuels. The most commonly adopted TtW methodologies to obtain vehicle energy consumption, energy efficiency, and GHG emissions used to date all have significant limitations. A new TtW methodology, which combines micro-scale virtual vehicle simulation with macro-scale fleet modeling, is proposed in this paper. The models capabilities are demonstrated using a case study based on data from the passenger car sector in Great Britain.

Methods A simplified internal combustion engine model was developed in-house to simulate engine behaviors across a wide range of engine capacities and technologies. Vehicle simulation was then carried out using the efficiency map output by the simplified engine model for any given gasoline or diesel engine; the simulation was validated for 37 vehicles available on the UK market in terms of their vehicle-certification fuel consumption, with a discrepancy generally within 3%. Real-world fleet and driving data from the Great Britain's car fleet was extracted from the Transport Statistics Great Britain (TSGB) database between 2001 and 2007TSGB 2001-2007. A virtual fleet was constructed with the validated virtual vehicles to represent the real-world passenger car fleet in terms of its composition and operating characteristics. This fleet model was shown to match the real-world fleet-averaged fuel consumption within 3% for the gasoline fleet and within 6% for the diesel fleet. Finally, several scenarios were analyzed using the validated fleet model, covering a projection for 2008, driving pattern, lubrication, and fuel. The vehicle-to-vehicle variation was found to be significant in some scenarios, indicating that a fleet-based methodology would be more rigorous and flexible.

Discussion Energy consumption and CO2 emission figures from previous, well-recognized Europe-oriented studies (e.g., the 2008 JRC/EUCAR/CONCAWE study) were significantly lower than the TSGB real-world results based on the new TtW methodology. It is apparent that using a single vehicle to represent the whole fleet could be misleading; in particular, the relative energy efficiency and CO2

emission of diesel over gasoline cars might follow a different trend with time for the real-world fleet from that shown in previous studies.

Conclusions Future WtW studies can benefit from the modeling toolset and methodology reported herein in a number of ways:

TtW analysis can be carried out

thoroughly-on a fleet basis

independently-involving less proprietary information

impartially-not concentrating on a specific vehicle model

and flexibly-allowing detailed analysis of physics, chemistry, and vehicle component performance.

When comparing different WtW energy pathways, e.g., gasoline vs. diesel passenger cars or natural gas vs. bio-diesel fuelled busses, the absolute aggregate fleet impact can be investigated-conclusions based on a single vehicle may overlook vehicle-to-vehicle variations and potentially mislead policy making.

Using the virtual fleet database as a platform, a large number of scenarios can be analyzed and detailed impact of fuels properties, vehicle technologies and driving patterns on WtW results investigated. The models will evolve in time together with the researchers' knowledge base and data base.

Recommendations and perspectives The virtual engine/vehicle/fleet model developed in this work can readily be expanded and upgraded in the future, in terms of model details, coverage, and data quality. The methodology itself is generically applicable to any defined fleet (passenger cars, commercial vehicles, etc.) with any operating characteristics at any given timeframe from any geographic region. Various subjects and their implications for fleet energy consumption and GHG emissions could be studied including, but not restricted to, the following:

Fuels-injector/valve cleanliness, anti-knock properties, dieselization, bio-components, gaseous fuels etc.

Engine/vehicle technology-friction and weight reduction, advanced combustion, hybridization etc.

Driving pattern-vehicle loading, gear-shifting schedule, tire maintenance, cold start, etc.

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SN 0948-3349
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J9 INT J LIFE CYCLE ASS
JI Int. J. Life Cycle Assess.
PD MAY
PY 2011
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DI 10.1007/s11367-011-0268-8
PG 12
WC Engineering, Environmental; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA 750QC
UT WOS:000289562100001
DA 2018-05-03
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PT J
AU Dai, XZ
Wu, Y
Di, YQ
Li, QY
AF Dai, Xuezhi
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Di, Yanqiang
Li, Qiaoyan
TI Government regulation and associated innovations in building energy-efficiency supervisory systems for large-scale public buildings in a market economy
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency supervision; Government regulation; Common benefit community
AB The supervision of energy efficiency in government office buildings and large-scale public buildings is the main embodiment for government implementation of Public Administration in the fields of resource saving and environmental protection. Aimed at improving the current situation of lack of government administration in building energy efficiency, this paper proposes the concept of "change and redesign of governmental supervision in building energy efficiency", repositioning the role of government supervision. Based on this theory and other related theories in regulation economic and modern management, this paper analyzes and researches the action and function of all level governments in execution of the supervisory system of building energy efficiency in government office buildings and large-scale public buildings. This paper also defines the importance of government supervision in energy-efficiency system. Finally, this paper analyzes and researches the interaction mechanism between government and owners of different type buildings, government and energy-efficiency service institution with gambling as main features. This paper also presents some measurements to achieve a common benefit Community in implementation of building energy-efficiency supervisory system.
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SN 0301-4215
J9 ENERG POLICY
JI Energy Policy
PD JUN
PY 2009
VL 37
IS 6
BP 2073
EP 2078
DI 10.1016/j.enpol.2009.02.008
PG 6
WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 448AK
UT WOS:000266233300005
DA 2018-05-03
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PT J
AU Durrenberger, G
Patzel, N
Hartmann, C
AF Durrenberger, G
Patzel, N
Hartmann, C
TI Household energy consumption in Switzerland
SO INTERNATIONAL JOURNAL OF ENVIRONMENT AND POLLUTION
LA English
DT Article; Proceedings Paper
CT 2nd International Symposium on Energy Consumption and its Environmental Impact
CY JUN, 1999
CL PATERWOLDE, NETHERLANDS
DE energy; household; lifestyles; material flux analysis; modelling; technological change
AB Households consume more energy embodied in goods and services than they consume with energy carriers. Thus, energy assessments need to address both direct consumption and indirect consumption via commodities. This paper first presents a conceptual framework for describing and analysing the direct and indirect energy use of households. The framework is based on material flux analysis and differentiates between four household activities: feeding, housing, transporting and consuming. Secondly, Swiss data on household energy consumption are presented and discussed in the context of household size, technology and consumption behaviour. It is shown that these factors considerably shape per capita energy demand. The third part presents energy projections based on trend assumptions for demographic and technological developments for the next 30 years. When zero growth per capita in commodities consumption is assumed, overall energy demand will increase by about 5%, mainly due to strong increases in gasoline demand. When the growth rate of commodities consumption exceeds 0.3% per year, embodied energy demand will offset efficiency gains achieved by technological improvements in the economic and domestic sectors and will fuel overall energy growth.
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SN 0957-4352
J9 INT J ENVIRON POLLUT
JI Int. J. Environ. Pollut.
PY 2001
VL 15
IS 2
BP 159
EP 170
DI 10.1504/IJEP.2001.000599
PG 12
WC Environmental Sciences
SC Environmental Sciences & Ecology
GA 394ZR
UT WOS:000166554700004
DA 2018-05-03
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PT J
AU Yoshino, H
Hong, TZ
Nord, N
AF Yoshino, Hiroshi
Hong, Tianzhen
Nord, Natasa
TI IEA EBC annex 53: Total energy use in buildings Analysis and evaluation methods
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Real energy use; Occupant behavior; Energy modeling; Performance evaluation; Energy data definition; Energy monitoring
ID OCCUPANT BEHAVIOR
AB One of the most significant barriers to achieving deep building energy efficiency is a lack of knowledge about the factors determining energy use. In fact, there is often a significant discrepancy between designed and real energy use in buildings, which is poorly understood but are believed to have more to do with the role of human behavior than building design. Building energy use is mainly influenced by six factors: climate, building envelope, building services and energy systems, building operation and maintenance, occupants' activities and behavior, and indoor environmental quality. In the past, much research focused on the first three factors. However, the next three human-related factors can have an influence as

significant as the first three. Annex 53 employed an interdisciplinary approach, integrating building science, architectural engineering, computer modeling and simulation, and social and behavioral science to develop and apply methods to analyze and evaluate the real energy use in buildings considering the six influencing factors. Outcomes from Annex 53 improved understanding and strengthen knowledge regarding the robust prediction of total energy use in buildings, enabling reliable quantitative assessment of energy-savings measures, policies, and techniques. (C) 2017 Elsevier B.V. All rights reserved.

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FX LBNL's participation in Annex 53 was supported by the Assistant Secretary for Energy Efficiency and Renewable Energy of the United States Department of Energy under Contract No. DE-ACO205CH11231.

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SN 0378-7788
EI 1872-6178
J9 ENERG BUILDINGS
JI Energy Build.
PD OCT 1
PY 2017
VL 152
BP 124
EP 136
DI 10.1016/j.enbuild.2017.07.038
PG 13
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA FH9PV
UT WOS:000411545100013

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TI A survey on energy consumption and energy usage behavior of households and residential building in urban China
SO ENERGY AND BUILDINGS
LA English
DT Article
DE China urbanization; Residential building; Household energy consumption; Energy use behavior; Questionnaire survey; International comparison
ID PERFORMANCE
AB Building performance, equipment efficiency, and occupant behavior play important roles in China urban residential building energy conservation. An online survey was conducted in 2015 to study the urban residential energy and usage behavior. A total of 4964 Chinese urban households participated in the survey, answering questions about their family composition, buildings, energy use and conservation behaviors, and reactions to specific energy conservation policies. The results suggest that the general trend in Chinese urban households is larger unit sizes (on average, 109 m(2) per household) and smaller families. The average electricity consumption of urban residential buildings is 1690 kWh per year per household in 2015 and it continues to grow as home electronics become more widespread and the demand for higher quality of life increases. China urban residential buildings energy use has the following characteristics: steady growth in size and energy consumption of the buildings associated with rapid urbanization, decentralized and individual equipment with diversified energy usage behavior, and relatively low energy consumption level compared to other countries. In addition to the current energy efficiency programs, China should focus on energy consumption and intensities target of building sector, and the key for urban residential building energy efficiency is to retain traditional behaviors and lifestyles, as well as promoting outcome-based energy conservation policies and technology systems to improve indoor environment and comfort. (C) 2017 Elsevier B.V. All rights reserved.
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RI Yan, Da/M-8147-2017
FU Natural Science Foundation of China [51521005]; China Ministry of Housing and Urban-Rural Development; Ministry of Science & Technology, under U.S.-China Clean Energy Research Center for Building Energy Efficiency [2016YFE0102300-05]
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SN 0378-7788
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J9 ENERG BUILDINGS
JI Energy Build.
PD AUG 1
PY 2017
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BP 366
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DI 10.1016/j.enbuild.2017.03.064
PG 13
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA EZ4TI
UT WOS:000404705000029
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TI A multi-regional based hybrid method for assessing life cycle energy use of buildings: A case study
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Multi-regional input-output model; Construction industry; Life cycle energy use; Buildings
ID INPUT-OUTPUT-ANALYSIS; CHINA CONSTRUCTION-INDUSTRY; GREENHOUSE-GAS EMISSION; RESIDENTIAL BUILDINGS; CO2 EMISSIONS; CARBON FOOTPRINT; OFFICE BUILDINGS; WORLD-ECONOMY; CONSUMPTION; TRADE
AB Although sustainable development in the construction industry has attracted much attention, relevant studies on the regional scale analysis of industrial energy performance are still rare in China, especially for Guangdong province, which is currently on the frontier and fast track of national low-carbon development. In response, this study integrates a multi-regional input-output method with field based operational data to quantify the total embodied energy consumption and energy transfers from the construction industry and assess the life cycle energy use of residential and office buildings in Guangdong Province. The results show that the embodied energy consumption of the provincial construction industry is localization dominant and fossil fuel oriented, which accounts for approximately 18.6% of the total regional energy consumption. The geographical connection and resource characteristic are the two factors that influence the interregional energy transmissions induced by construction activities in Guangdong province. The result of uncertainty analysis indicates that the mean value of energy intensities simulated by Monte Carlo simulation is highly consistent with the deterministic results. It is crucial to improve the accuracy of the input-output analysis by providing sufficient economic information. At last, a number of recommendations are given through the technology, product, and management aspects at the industrial and building levels. The local government and construction department can benefit from implementing such environment-friendly, technology innovative and multi-disciplinary solutions in the full-process management and improvement of energy reduction of buildings.
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OI Shen, Qiping/0000-0002-3111-2019
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PT J
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TI TOWARDS SUSTAINABILITY THROUGH ENERGY EFFICIENT BUILDINGS` DESIGN: SEMANTIC LABELS
SO ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
LA English
DT Article
DE sustainability; energy efficiency; BIM; early design; semantic technology; design rules
AB When designing buildings, it is a challenge to take into account Energy Efficiency in the early design stage. This is especially difficult for hospital designs, because these buildings comprise many different room types and functions. This greatly increases the number of design directions available. Choices made early on in the design process have a large impact on the final performance of the building. However, the lack of detailing available in early designs makes it hard to evaluate them in terms of Key Performance Indicators. The Semantic Labels developed as part of the STREAMER project provide a way to address this problem, by allowing structured capture of the most relevant aspects of the Program of Requirements. Using this method, design rules can be applied to early building designs to detect and correct inconsistencies or suboptimal solutions. Also, using default values for label values, an early design can already be evaluated using simulation tools. The Semantic labels describe standard values for Construction (floor height and strength, accessibility), Hygiene class (from public spaces to operational theatres), Equipment (electric power requirements, safety), User profile (when the room is used), Comfort class (like daylight) and Access security (who can enter). Design rules may express conditions like the preferred spatial separation between rooms, or whether rooms should be placed at outer walls, but may also highlight incompatibilities in e.g. access requirements and user profiles. The Early Design Configurator, also under development as part of the STREAMER project, uses the Semantic Labels to allow automatic conversion of a Programme of Requirements, into an initial Building Information Modeling (BIM) design proposal that respects the design rules.
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TI Building Information Modelling for analysis of energy efficient industrial buildings - A case study
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DE BIM; BEM; Industrial construction; Thermal simulation
ID BIM; SIMULATION; PERFORMANCE; DESIGN; FRAMEWORK
AB Industrial buildings demand higher amount of energy than other building typologies, thus powerful modelling and simulation tools for energy-optimisation and identification of synergies-potentials between the building envelope, building services and production systems are needed.
Building Information Modelling (BIM), as emerging technology, bears promise to support processes integration thus enabling life-cycle management of buildings. BIM model serves as a joint knowledge database where data transfer between various models is possible; thereby enabling follow up studies, such as cost, thermal and structural analysis.
Adoption of BIM to BEM (building energy modelling) approach is particularly interesting for optimisation of industrial facilities. Multiple layers of interacting complex systems (building, services and machine floor layout) require careful modelling and control of geometry in terms of collisions, various adaptions due to the short product-life-cycles, as well as integrated energy performance analysis along interacting systems.
This paper explores the potentials and deficits of the modelling, analysis and optimisation of energy efficient industrial buildings using BIM to BEM methodology, by means of case study research of two industrial facilities. Varying needs concerning the Level of Development and semantic differences in the modelling procedures of part-taking disciplines (architecture, structural engineering or analysis) were identified as problems; as well as time pressure as one of the main reasons for defects of building models. The identified deficits represent various types of uncertainties related to the integrated energy modelling, as BIM to BEM can be referred to. We conclude that as a first step of integrated modelling, an uncertainty-analysis should be carried out, and strategies how to deal with these developed. In order to minimise BIM to BEM uncertainties, not only interoperability issues of the software has to be improved (modelling uncertainty), but moreover, the redefinition of the design process and enhancement of individual capabilities is necessary (process uncertainty). (C) 2016 Elsevier Ltd. All rights reserved.
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PT J
AU Liu, HX
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TI Energy substitution, efficiency, and the effects of carbon taxation:
Evidence from China's building construction industry
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Energy substitution; Energy efficiency decomposition; Carbon taxation;
Building construction industry; Translog cost function
ID ECONOMIC VIABILITY ANALYSIS; WASTE RECYCLING PLANT; INTERFUEL
SUBSTITUTION; TECHNICAL CHANGE; INTERFACTOR/INTERFUEL SUBSTITUTION; CO2
EMISSIONS; DEMAND; TECHNOLOGY; TAX; TRANSPORT
AB As buildings are constructed to be more energy-efficient and environmental friendly, the building construction industry, which is a basic and leading industry of the national economy development, has become one of the key sectors for energy conservation and emission reduction in China. This paper aims at quantifying both inter-factor and inter-energy substitution for China's building construction industry and investigate the main driving forces behind energy efficiency changes as well as the CO2 abatement effect of a uniform carbon tax in this sector. The model is established employing provincial pooled data over 2003-2012 in China by regions; hence, results between different regions are compared. The main findings indicate that: (i) energy and non-energy are substitutes whereas individual energy inputs are complementary in China's building construction industry. The substitution effect varies across regions due to different factor endowments and marketization levels. (ii) Energy price increase and construction scale expansion leads to energy efficiency improvement while substitution and technology present negative influences on energy efficiency. (iii) Approximately 3% of the CO2 emissions in China's building construction industry can be reduced by carbon taxation based on the integrated own-and cross-price elasticities of each energy.

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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 J CLEAN PROD
JI J. Clean Prod.
PD JAN 10
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
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PT J
AU Jagger, P
Perez-Heydrich, C
AF Jagger, Pamela
Perez-Heydrich, Carolina
TI Land use and household energy dynamics in Malawi
SO ENVIRONMENTAL RESEARCH LETTERS
LA English
DT Article
DE biomass; Africa; energy; cookstoves; woodfuels; deforestation; land use change
ID COOKSTOVES; POVERTY; MODEL; FUELS
AB Interventions to mitigate household air pollution (HAP) from cooking with solid fuels often fail to take into account the role of access to freely available woodfuels in determining fuel choice and willingness to adopt clean cooking technologies, key factors in mitigating the burden of HAP. Weuse national-scale remote sensing data on land use land cover change, and population representative data from two waves of the Malawi Living Standards Measurement Survey to explore the relationship between land use change and the type of fuel households use, time spent collecting fuel, and expenditures on fuel, hypothesizing that land use dynamics influence household-level choice of primary cooking fuel. Wefind considerable heterogeneity with respect to regeneration and deforestation/ degradation dynamics and evidence of spatial clustering. Wefind that regeneration of forests and woodlands increases the share of households that collect fuelwood, whereas deforestation and degradation lead households to purchase fuelwood. Wealso find that a relatively large share of land under woody savannah or degraded forest (versus fully stocked forest) increases fuel collection time. Areas with regeneration happening at broader scale experience increases in fuel expenditures. Our findings have implications for the spatial targeting of interventions designed to mitigate HAP.
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FU Eunice Kennedy Shriver National Institute of Child Health and Human Development [K01HD073329]; Fogarty International Center [R25 TW009340]; National Heart, Lung and Blood Institute [R25 TW009340]
FX This research was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (K01HD073329) and the Fogarty International Center and National Heart, Lung and Blood Institute (R25 TW009340). We are grateful to the Carolina Population Center (P2C HD050924) at The University of North Carolina at Chapel Hill for general support. We also wish to thank the National Statistical Office of Malawi for their willingness to share IHS2 and IHS3 data with us. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the sponsoring agency.
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PA TEMPLE CIRCUS, TEMPLE WAY, BRISTOL BS1 6BE, ENGLAND
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WC Environmental Sciences; Meteorology & Atmospheric Sciences
SC Environmental Sciences & Ecology; Meteorology & Atmospheric Sciences
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PT J
AU Gandhi, P
Brager, GS
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Brager, Gail S.
TI Commercial office plug load energy consumption trends and the role of occupant behavior
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Plug loads; Occupant behavior; Gamification
ID INTERVENTION
AB This study evaluates the energy patterns of 137 individual plug loads (desktops, laptops, monitors, and task lights) collected in a California office building over two years, and the effects of a behavior-based intervention on a subset of these devices to reduce plug load energy consumption. An analysis of the data reveals that desktops consume the most power per person and demonstrate the widest range of power consumption, and that occupants are more likely to turn equipment off before a longer break from the office than overnight during the week. Much of the literature on reducing commercial plug loads is focused on technology-based solutions, while the literature on changing occupant behavior is focused on residential occupants. Multiple studies show that non-financial incentives, such as games, can motivate behavior change. An online sustainability game, Cool Choices, was initiated on-site with 30 occupants, where players competed on teams to earn points for completing resource-saving actions. The analysis revealed that because occupants were already engaging in relevant energy saving behaviors (e.g. turning equipment off at the end of the day), there was limited opportunity for further behavior-based reductions. This study highlights the need for additional research in commercial buildings examining how to motivate occupant behavior change through non-financial incentives. (C) 2016 Elsevier B.V. All rights reserved.
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Choices team, and the UC Office of the President.
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PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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PT J
AU Zhang, HY
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TI Challenges of green consumption in China: a household energy use perspective
SO ECONOMIC SYSTEMS RESEARCH
LA English
DT Article
DE Household energy use; urbanization; lifestyle change; structural decomposition analysis; China
ID STRUCTURAL DECOMPOSITION ANALYSIS; CARBON-DIOXIDE EMISSIONS; GROWING CO2 EMISSIONS; RESIDENTIAL BUILDINGS; RESOURCE CONSUMPTION; URBAN CONSTRUCTION; LABOR PRODUCTIVITY; EMPIRICAL-ANALYSIS; POLICY; DRAGON
AB To encourage economic progress, China's government has been pushing domestic consumption as a substitute for its waning growth in investment and exports. It has also been promoting greener policies for growth, of which green consumerism is a prime component. By examining the economy through the lens of household energy consumption, this paper lays out the challenges the nation must overcome through green consumption. We explore the trends in household energy use and decompose energy used indirectly by households into six factors: changes in total population, urbanization rate, energy efficiency, interindustry input mix, household consumption preferences, and per capita household consumption level. Doing so yields insights into how progress in industrial technology, household income, urbanization, and lifestyles has affected energy use in the production of goods and services used by households. It also offers policy suggestions on how China might guide lifestyle changes to effect green consumption.
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FU National Science Foundation of China [71433007, 71403118]; Clean Development Mechanism Project of China's National Development and Reform Commission [2013056]
FX This research was supported by the National Science Foundation of China [grant numbers 71433007 and 71403118] and the Clean Development Mechanism Project of China's National Development and Reform Commission [grant number 2013056].
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PT J
AU Boomsma, C
Goodhew, J
Goodhew, S
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AF Boomsma, Christine
Goodhew, Julie
Goodhew, Steve
Pahl, Sabine
TI Improving the visibility of energy use in home heating in England:
Thermal images and the role of visual tailoring
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Energy efficiency; Tailoring; Visualisation; Communication
ID CLIMATE-CHANGE; BEHAVIOR; INTERVENTIONS; CONSERVATION; CONSUMPTION;
FEEDBACK; COMMUNICATION; DESIGN
AB This study examined the use of thermal imaging as a communication tool that allows householders to 'see' where a building is losing heat. We tested the effect of tailored and non-tailored thermal images on energy beliefs, behavioural intentions and a simple self-report behaviour question in an English field study. Householders received tailored thermal images of their home, thermal images of other homes with typical problems for the area ('non-tailored'), or information on the same typical problems in text format. A post-intervention survey (N = 233) indicated that showing occupants any thermal image (tailored or non-tailored) led to higher vividness when recalling the communication, compared to text-only information. Householders engaged with the reports to a greater extent when they were personal to their home: the tailored thermal images were more likely to be shared with others and led to stronger energy saving intentions and reporting energy efficiency behaviour compared to non-tailored reports. This is a promising approach integrating technology and social science knowledge and methods. (C) 2016 Elsevier Ltd. All rights reserved.
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FU UK government's Department for Energy and Climate Change as part of the 'Cheaper Energy Together competition'; Engineering and Physical Sciences Research Council under Transforming Energy Demand in Buildings though Digital Innovation (TEDDI) [EP/K002465/1]
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TI Electricity demand and basic needs: Empirical evidence from China's households
SO ENERGY POLICY
LA English
DT Article
DE Electricity; Household; Basic needs; Quantile regression
ID ENERGY POVERTY; TRANSITION; COUNTRIES; LESSONS; ACCESS; MARKET; REFORM; MODEL; COST; COAL
AB An increasing block tariff (IBT) has been implemented nationwide in the residential sector in China since 2012. However, knowledge about IBT design is still limited, particularly how to determine the electricity volume for the first block of an IBT scheme. Assuming the first block should be set based on some measure of electricity poverty; we attempt to model household electricity demand such that the range of basic needs can be established. We show that in Chinese households there exists a threshold for electricity consumption with respect to income, which could be considered a measure of electricity poverty, and the threshold differs between rural and urban areas. For rural (urban) families, electricity consumption at the level of 7th (5th) income decile households can be considered the threshold for basic needs or a measure of electricity poverty since household electricity demand in rural (urban) areas does not respond to income changes until after 7th (5th) income decile. Accordingly, the first IBT block for some provinces (e.g., Beijing) appears to have been set at a level that is too high. Over time however, given continued rapid growth, the IBT will begin to better reflect actual basic needs. (C) 2015 Elsevier Ltd. All rights reserved.
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AF Mutani, Guglielmina
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BE Masoero, MC
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TI Characterization of building thermal energy consumption at the urban scale
SO 71ST CONFERENCE OF THE ITALIAN THERMAL MACHINES ENGINEERING ASSOCIATION (ATI 2016)
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HO Politecnico Torino
DE building stock; urban; energy modeling; GIS; space heating
ID SECTOR
AB The ongoing urban transition toward decarbonized energy systems has raised the attention on local energy planning practices. Besides the multiple actors involved in the planning process, the complexity of the urban energy systems requires the elaboration of heterogeneous data. In such contest, the paper introduces and compares two GIS-based methodologies for supporting the spatial characterization of the local residential built environment in terms of building distribution and space heating energy consumption. Starting from the assessment of residential consumption, a third method for the characterization of non-residential building thermal energy consumption is proposed. From a bottom-up perspective, in both residential models all the buildings are geo-referenced and clustered according to their thermo-physical characteristics. From a top-down perspective, energy balance data are used to calibrate the bottom-up results and to match the total building loads. The procedure, tested on the city of Turin as case study, allows assessing the energy use of buildings and to create urban energy maps.
The energy spatial characterization of a territory is the basis for performing short and long-term scenarios analysis. Results of this method can be useful to: i. decision maker to understand the current state of the territorial energy consumption to identify critical energy intense areas; ii. citizens for visualising their energy consumption and iii. researchers for setting up the basis of further urban analysis. (C) 2016 The Authors. Published by Elsevier Ltd.

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TI Residential energy efficiency standards in Australia: where to next?
SO ENERGY EFFICIENCY
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DT Article
DE House energy regulation; Zero carbon homes; Energy efficiency; Performance-based regulation
ID ZERO-ENERGY; PUBLIC-HEALTH; HOMES; PERSPECTIVE; MORBIDITY; MORTALITY; CARBON
AB Increasing the energy and carbon efficiency of homes has been at the forefront of international climate change mitigation policy. In Australia, recent policy action led to the introduction of minimum energy efficiency standards for new homes within the Building Code of Australia in 2003, with subsequent stringency increases in 2006 and 2010. Although not yet reflecting international best regulatory practice, these standards represent substantial progress in addressing the energy and carbon emission impact of new homes, yet there are a number of energy policy challenges that highlight the need for further change. This paper documents the history of house energy standards in Australia and examines the post-occupancy evidence of that policy outcome. The paper examines international and domestic issues pointing to a possible future direction for Australian house energy regulation, highlighting the key drivers for change. In particular, we investigate the concepts of net zero carbon and net zero energy homes which have recently been adopted internationally, examining the technical and economic evidence that would support such a policy position in Australia.
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TI Household preferences for energy saving measures: Approach of discrete choice models
SO ENERGY AND BUILDINGS
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DT Article
DE Rationality; Heterogeneity; Buildings; Discrete choice models; Energy policy
ID MULTINOMIAL LOGIT MODEL; WILLINGNESS-TO-PAY; SPECIFICATION TESTS; MARKET FAILURES; EFFICIENCY GAP; CONSERVATION; POLICY; DETERMINANTS; BEHAVIOR; INVESTMENTS
AB The aim of this paper is crystallized around the research of the energy saving measures adoption's determinants in the residential sector. Using data from the latest survey of the Tunisian Company of Electricity and Gas, we study the specifications of discrete choice models to the characteristics of three different electrical purposes: the Solar Water Heaters, the Low-Energy Bulbs and the classes of energy efficient refrigerators. The results suggest the strong heterogeneity of households, making the effect of energy policies a bit obvious. However, by adopting a perfect rationality, these households give importance to the enrichment of electricity prices and gains in energy savings, as far as the importance of the changes in equipments' price. Subsequently, we urge policy makers to create mechanisms of balancing the grants of conventional energies by increasing the grants on energy efficient equipments' purchasing prices.
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AU Sesana, MM
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TI Geomapping methodology for the GeoCluster Mapping Tool to assess deployment potential of technologies for energy efficiency in buildings
SO SUSTAINABLE CITIES AND SOCIETY
LA English
DT Article
DE Energy efficiency; Geocluster methodology; Building technologies
ID CLUSTER-ANALYSIS; DECISION-MAKING; POLICY; SYSTEMS; REQUIREMENTS; INFORMATION
AB Energy efficiency in buildings will play a major role in responding to EU climate change and energy-saving policies, if sustainable actions are to be trigged at large scale involving EU, all Member States and their regional and local authorities.
The objective of this paper is to explain the Geocluster methodology developed within the European "GE20" project aimed at developing a general framework for the assessment of the effectiveness of building technologies for energy efficiency. The research aimed to locate similarities across the EU countries by combining parameters and indicators structures in homogeneous layers and sub-layers (i.e. building technology, context, policies and regulations, climatic conditions, social aspects) in order to develop a repository to be used as source of data for a dynamic geo-database web service. The assessment has been performed on two selected technologies, thermal insulation for envelope retrofitting and solar cooling, respectively, for two pilot areas: Benelux and Mediterranean arc. The final goal was to create an Open Source geo-portal named GeoCluster Mapping Tool, based on international standards in the GIS domain, which implements the methodology developed and becomes a decision-making tool for private or public parties.
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PT J
AU Yang, S
Shipworth, M
Huebner, G
AF Yang, Shu
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Huebner, Gesche
TI His, hers or both's? The role of male and female's attitudes in explaining their home energy use behaviours
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Couples' attitudes; Home heating usage; Maximum temperature; Heating duration
ID THERMAL COMFORT; INTERNAL TEMPERATURES; GENDER-DIFFERENCES; CONSUMPTION; SPACE; DETERMINANTS; CONSERVATION; HOUSEHOLDS; KNOWLEDGE; ENGLAND
AB Building energy research has historically overlooked the role of attitudes, instead focusing on building and socio-demographic influences. Even when attitudes are measured, usually, the attitudes of just one household member are measured even though household energy consumption is the result of actions of all household members. This research explored first whether attitudes could help explain heating usage and second whether the attitudes of a couple could explain more of the variability in heating behaviour than the attitudes of one partner. The attitudes towards home heating energy use (i.e. attitudes towards thermal comfort, economical with energy, industry and technology's role and individual's role) of 128 English couples were used in this study. Together with building and sodo-demographics, attitudes were examined to explain heating temperatures and durations, which were derived from temperature sensors placed in the homes in 2007-2008. The results showed that attitudes helped explain heating temperatures and durations, even when building and socio-demographic variables were controlled. Economical with energy was the most highly identified influence on heating behaviours, with thermal comfort a close second. In households that included a couple, combined attitudes of both partners explained heating usage behaviours more accurately than the attitudes of either male or female only.
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FU Carbon Trust [GR/S94377/01]; EPSRC [GR/S94377/01]; China Scholarship Council (CSC); University College London
FX The data is drawn from the CaRB Home Energy Survey conducted as part of the Carbon Reduction in Buildings project (GR/S94377/01), which was jointly funded by the Carbon Trust and the EPSRC. The authors would like to thank David Shipworth, Kevin Lomas, Steven Firth, Andrew Wright, and Mike Gentry for their contributions in creating the data set. We would also like to thank the China Scholarship Council (CSC) and University College London for the UCL-CSC Research Student Visit Award that funded the first author's year as a visiting PhD student at the UCL Energy Institute.
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PT J
AU Hosgor, E
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TI Virtual home energy auditing at scale: Predicting residential energy efficiency using publicly available data
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Residential; Energy efficiency; Predictive modeling; PRISM; Publicly available data
ID LOW-INCOME; ELECTRICITY; CONSERVATION; BUILDINGS; RETROFIT; BEHAVIOR; POLICY
AB In this study we model and examine the energy efficiency profile of individual single-family houses from Gainesville, Florida, in our sample (n = 7091). For this we use Princeton Scorekeeping Method (PRISM) which processes historical weather data and monthly utility usage data as inputs using an iterative regression approach to compute three energy efficiency parameters: (1) baseload consumption for enduses which do not change with weather, e.g., lighting, refrigerator, water heater; (2) heating/cooling slope which is a function of the building shell insulation and the efficiency of the heating/cooling unit; (3) reference temperature, i.e., the outside temperature at which the house turns on heating/cooling. These parameters make up the normalized annual consumption (NAC). We then proceed to regress these parameters against the publicly available data to study the extent we can extract statistical insight for residential energy efficiency profiling using publicly available information (n = 5243). These regression models are to pave a path to creating energy efficiency "reservoir maps" across individual homes and reducing the information barrier to energy efficiency adoption. (C) 2015 Elsevier B.V. All rights reserved.
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TI A semantic service-oriented platform for energy efficient buildings
SO CLEAN TECHNOLOGIES AND ENVIRONMENTAL POLICY
LA English
DT Article
DE Sustainability; Energy efficiency; Service-oriented computing; Construction; Buildings; Energy optimisation
ID CLIMATE-CHANGE; BEHAVIOR
AB The construction industry is under pressure to increase the sustainability of its practices to meet UK commitments for reducing energy consumption and alleviating climate change. The research uses a mixed-method approach drawn from recent studies to explore the readiness, maturity and level of engagement of construction stakeholders in adopting the UK government sustainability agenda. Limited positive energy practices and sustainability regulatory awareness, combined with information provision deficiencies, form some of the key barriers to sustainable construction faced by industry. A service-oriented platform that provides integrated access to sustainability resources in the form of interactive, dynamic and user-oriented services that fully exploit latest advances in computing technologies is proposed to address these barriers. In this paper, we specifically elaborate on how a service-oriented system can be efficiently used for performing (near) real-time energy optimisation in buildings, greatly contributing to engaging construction stakeholders with sustainability practices. The solution disseminates energy efficient practices and provides support for building managers in implementing energy efficient optimisation plans. The solution is tested and validated through a number of energy efficiency scenarios developed as part of the EU FP7 SportE2 project.
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NR 37
TC 5
Z9 5
U1 1
U2 12
PU SPRINGER
PI NEW YORK
PA 233 SPRING ST, NEW YORK, NY 10013 USA
SN 1618-954X
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J9 CLEAN TECHNOL ENVIR
JI Clean Technol. Environ. Policy
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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PT S
AU Chin, J
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AF Chin, Jacky
Lin, Shu-Chiang
BE Bordea, G
TI Investigating Users' Perspectives in Building Energy Management System with an extension of Technology Acceptance Model: A Case Study in Indonesian Manufacturing Companies
SO THIRD INFORMATION SYSTEMS INTERNATIONAL CONFERENCE 2015
SE Procedia Computer Science
LA English
DT Proceedings Paper
CT 3rd Information Systems International Conference
CY NOV 02-04, 2015
CL Surabaya, INDONESIA
DE Building Energy Management System; Technology Acceptance Model; Structural Equation Modeling
ID OPTIMIZATION; EFFICIENCY
AB This study investigates factors that may influence users' perspectives in utilizing energy management system. An extended model of the Technology Acceptance Model (TAM) with two external factors, compatibility (C) and technology complexity (TC), was developed to evaluate the implementation of the Building Energy Management System (BEMS) in Indonesia's manufacturing industries. 258 questionnaires were analyzed via the structural equation modeling and the result shows that both C and TC influence user's intention to use BEMS through the user's attitude, perceived usefulness and perceived ease of use. The findings can be served as guidelines for design improvements of similar energy management systems. (C) 2015 The Authors. Published by Elsevier B.V.
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NR 24
TC 5
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U1 0
U2 1
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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AU Laicane, I
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AF Laicane, Ilze
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Blumberga, Andra
Rosa, Marika
BE Valtere, S
TI Evaluation of household electricity savings. Analysis of household electricity demand profile and user activities
SO INTERNATIONAL SCIENTIFIC CONFERENCE ENVIRONMENTAL AND CLIMATE TECHNOLOGIES, CONECT 2014
SE Energy Procedia
LA English
DT Proceedings Paper
CT International Scientific Conference on Environmental and Climate Technologies (CONECT)
CY OCT 14-16, 2014
CL Riga, LATVIA
SP Riga Tech Univ, Inst Energy Syst & Environm
DE Smart meters; household electricity consumption; user behavior; demand side management

ID BOTTOM-UP APPROACH; RESIDENTIAL SECTOR; ENERGY SAVINGS; LOAD PROFILES; CONSUMPTION; MODEL

AB To achieve reduction in electricity consumption, it is vital to have current information about household electricity use. This allows to draw user behaviour profile based on household electricity demand for a specific time of the day. Activities involving the use of electricity for certain purposes, time of use survey and smart metering data of a four people family were analysed in this study. Household energy efficiency performance till 2020 was evaluated based on increase of equipment energy efficiency driven by technological progress. The results of energy efficiency evaluation for particular household shows that 1219 kWh savings can be achieved due to improvements of energy performance of some mostly used appliances until 2020 (i.e., reduction in electricity consumption of 13 % if compared to present scenario). However, the results imply that user behaviour change is also important to implement the measures associated with energy efficiency improvements in households. (C) 2015 The Authors. Published by Elsevier Ltd.

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AU Groesser, SN
AF Groesser, Stefan N.
TI Co-evolution of legal and voluntary standards: Development of energy efficiency in Swiss residential building codes
SO TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE
LA English
DT Article
DE Co-evolution; Innovation diffusion; Feedback; Causal model; Standard; System structure; Innovation ecosystem; System dynamics; Energy efficiency
ID 2000 W SOCIETY; INNOVATION DIFFUSION; SYSTEM DYNAMICS; PUBLIC-POLICY; MULTILEVEL PERSPECTIVE; TECHNOLOGY DIFFUSION; EXISTING BUILDINGS; TECHNICAL CHANGE; SECTOR; TRANSITIONS
AB Improving the level of energy efficiency required by building codes for refurbishments and new construction is a powerful lever for reducing greenhouse gas emissions. This paper explores how technological, social, political, and economic factors interact and shape the evolution of the energy efficiency in building codes. Existing approaches to the evolution of standards focus primarily on adopting individual or multiple technologies or products, but only peripherally explore the feedback dynamics between innovation, diffusion, and standardization (IDS.)(2) To fill this void, I draw on the revelatory case of Switzerland, because the Swiss standards have continuously improved since 1970, whereas in many other countries improvements have stagnated after the recovery from peaks in energy prices. The paper's contribution is, first, a qualitative, structural model which endogenously formalizes the IDS-dynamics of standard improvement. I find that the co-evolution of voluntary and legal building codes have enabled a continuous improvement of the standards even in the absence of economic pressures. And second, I use the model for policy analysis, which indicates that several obvious policies might cause policy resistance and could result in uneconomical, counter-intuitive outcomes. Policy interventions have to dynamically balance the speed of innovation and the ability of system agents to change. (C) 2014 Elsevier Inc. All rights reserved.
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AU Fensel, A
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TI End-user interfaces for energy-efficient semantically enabled smart homes
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DT Article
DE Smart home; Semantics; Energy efficiency; User interfaces
ID WEB
AB The need for energy efficient technological solutions is becoming ever more prevalent in today's world. However, current advances are failing to offer end-consumers with a flexible solution that can be widely implemented in domestic or business environments. This is particularly relevant at the user interface level where energy consumers should be allowed to easily engage in effective energy saving technology. With the help of semantically linked data, we aim to actively assist end-consumers in making well-informed decisions in order to successfully control their energy consumption. By integrating smart metering and home automation functionality, our SESAME system offers end-consumers energy-efficient and cost-cutting options for their homes or businesses. The developed SESAME system conceptualizes, demonstrates and evaluates a variety of innovative end-consumer services, here focusing specifically on their user interface paradigms. In this paper, we present three types of interactive participatory user interfaces, all of which enable users to interact with the house automation settings modelled as semantic rules, as well their evaluation in user studies based on the demonstrator system. We show that the proposed interfaces have the potential for broad acceptance, and provide a detailed analysis of the effectiveness of their varying design principles and features.
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FU FFG COIN within SESAME; FFG COIN within SESAME-S; Austrian government;

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FX This work is supported by the FFG COIN funding line, within the SESAME and SESAME-S projects. FTW is supported by the Austrian government and the City of Vienna within the competence centre programme COMET. The authors thank the whole SESAME project team for their valuable contributions-especially colleagues from Experimental Factory of Scientific Engineering (EZAN), Russia, for the SESAME hardware development and E-Smart Systems d.o.o., Serbia, for the development of the HAN interfaces, as well as Amy Strub for the editing and English proofreading of this paper.
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U2 21
PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
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J9 ENERG EFFIC
JI Energy Effic.
PD AUG
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental

Sciences & Ecology
GA AL7TM
UT WOS:000339338500007
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PT S
AU Masoudifar, N
Hammad, A
Rezaee, M
AF Masoudifar, Nassim
Hammad, Amin
Rezaee, Mandana
BE Tolk, A
Yilmaz, L
Diallo, SY
Ryzhov, IO
TI MONITORING OCCUPANCY AND OFFICE EQUIPMENT ENERGY CONSUMPTION USING REAL-TIME LOCATION SYSTEM AND WIRELESS ENERGY METERS
SO PROCEEDINGS OF THE 2014 WINTER SIMULATION CONFERENCE (WSC)
SE Winter Simulation Conference Proceedings
LA English
DT Proceedings Paper
CT Winter Simulation Conference
CY DEC 07-10, 2014
CL Savannah, GA
ID BUILDINGS
AB Buildings are one of the major energy consumers because of the need to meet occupants requirements. The commercial/institutional sector accounted for 14% of total energy consumption in Canada in 2009 while office buildings consumed 35% of this amount. Auxiliary equipment used 19% of the total energy consumed in office buildings. Previous studies showed the impact of occupancy behavior on IT equipment energy consumption. This paper proposes a new method for monitoring occupant behavior and energy consumption of IT equipment. Analyzing the resulting data can help evaluating the occupancy behavior impact on energy saving. Two wireless sensor technologies are investigated to collect the required data and to build an occupancy behavior estimation profile: Ultra-Wideband Real-Time Location System for occupancy location monitoring and Zigbee wireless energy meters for monitoring the energy consumption of IT equipment. The occupancy behavior estimation profile can be used to reduce energy consumption based on real-time occupants' information.
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NR 22
TC 5
Z9 5
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 0891-7736
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J9 WINT SIMUL C PROC
PY 2014
BP 1108
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WC Computer Science, Information Systems; Computer Science,
Interdisciplinary Applications; Computer Science, Theory & Methods
SC Computer Science
GA BG4XP
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PT J
AU Suter, JF
Shammin, MR
AF Suter, Jordan F.
Shammin, Md Rumi
TI Returns to residential energy efficiency and conservation measures: A
field experiment
SO ENERGY POLICY
LA English
DT Article
DE Energy efficiency; Field experiment; Residential energy
ID SOCIAL NORMS; BILLING DATA; CONSUMPTION; DEMAND; FEEDBACK; GAP
AB Residential energy conservation is a key component of contemporary energy, and climate change policy in the US and elsewhere. Comparisons of the relative effectiveness of measures aimed at reducing residential energy consumption are made challenging, however, by the endogeneity of technology and energy use decisions. In this paper we describe a novel small-scale field experiment that uses randomized treatments to estimate the returns to three types of energy conservation measures in institutionally owned homes. The results from the experiment indicate considerable reductions in natural gas consumption associated with the installation of attic insulation and the provision of incentives for conservation. The results are supported by observations of ambient indoor temperature data, which show that households receiving incentives significantly reduce their temperature settings especially when coupled with access to a programmable thermostat. The study will ideally provide guidance for institutions and communities considering energy efficiency measures and for future researchers designing randomized experiments to study residential energy use.
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NR 25
TC 5
Z9 5
U1 1
U2 24
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0301-4215
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J9 ENERG POLICY
JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 202QW
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PT J
AU Bladh, M
AF Bladh, Mats
TI Energy efficient lighting meets real home life
SO ENERGY EFFICIENCY

LA English
DT Article
DE Lighting; LED; Acceptance; Household; Path dependence; Phase-out; Energy saving; Rebound effect
ID BARRIERS; TECHNOLOGIES; DRIVERS
AB Will the phase-out of inefficient lighting in the European Union (EU) lower consumption of residential electricity significantly? Will light-emitting diode (LED) light replace other technologies for lighting in the near future? Implementation of the phase-out decision in the EU will push demand for efficient lighting technologies. One of the most efficient types, light-emitting diodes, promises even greater reductions than CFLs. However, in order to reap the gains from LEDs they must replace existing lamps and luminaires. This paper reports the findings from tests of LED lights in real homes. It points at the limits of the LED technology at sale in the market today, and the risk for a rebound effect. This paper also addresses the more general issue of theoretical development in the area of residential use of electricity. A "frame of interpretation" is presented inwhich the use of the lighting set in a home is the foundation. From this, sociotechnical and pathdependent aspects on technical and cultural inertia and marginal change can be developed.
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U1 1
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PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
J9 ENERG EFFIC
JI Energy Effic.
PD MAY
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
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UT WOS:000293068200008
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PT S
AU Siew, CC
Che-Ani, AI
Tawil, NM
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AF Siew, C. C.
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Mohd-Tahir, M.
BE Tawil, NM
Ani, AIC
Hamid, MY
Radzuan, NAM
TI Classification of Natural Ventilation Strategies in Optimizing Energy Consumption in Malaysian Office Buildings
SO 2ND INTERNATIONAL BUILDING CONTROL CONFERENCE
SE Procedia Engineering
LA English
DT Proceedings Paper
CT 2nd International Building Control Conference
CY JUL 11-12, 2011
CL Penang, MALAYSIA
DE Natural ventilation; Physical Passive Designs; Multiple Regression Analysis
ID PERFORMANCE; ENVIRONMENT; SYSTEM
AB Buildings have been defined as one of the major contributors to environmental problems in construction and operation stages. Intensive researches have been conducted to intensify green building designs by using alternative sustainable construction technologies and operation approaches in order to reduce energy use, and at the same time, to maximize the utility of natural resources. One of the strategies that are widely applied in the building operation recently is to optimize the potential usage of natural ventilation within an interior building space. This paper explores literally the conceptual approaches of classifying physical passive designs to optimize the application of natural ventilation within building zones. Through these findings, the categories of physical designs can be classified in five major groups, which are Air Wells, Facade Designs, Ventilation Openings, Corridors and Shadings, and Blockage and Partitions. (C) 2010 Published by Elsevier Ltd. Selection and/or peer-review under responsibility of Universiti Teknologi MARA Perak and Institution of Surveyor Malaysia (ISM).
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U2 4
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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SC Construction & Building Technology; Engineering
GA BYU56
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OA gold
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PT J
AU Newsham, GR
Mancini, S
Marchand, RG
AF Newsham, Guy R.
Mancini, Sandra

Marchand, Roger G.
TI Detection and acceptance of demand-responsive lighting in offices
SO LEUKOS
LA English
DT Article
DE demand response; load shedding; energy management; comfort
AB Participants (N = 33) in an office laboratory were exposed to an initial baseline electric lighting level of 400 lx on the desktop. The electric lighting was dimmed smoothly over 10 seconds. During the dim, and for 30 seconds afterwards, the participant performed a computer-based proofreading task. The participants indicated if they had noticed the change, and whether the lighting conditions were acceptable. This was repeated over multiple trials, with dimming from 0 to 80 percent, and with or without daylight. The level of dimming not noticed by occupants was 20 percent with no daylight, 40 percent with relatively low prevailing daylight, and 60 percent with high prevailing daylight (or, alternatively, an amount which represents 20 percent of total light level). The level of dimming that resulted in conditions that were still acceptable was 40 percent with no or low daylight, and 80 percent with high prevailing daylight. These results may be used to develop guidelines for using lighting in demand response actions. They suggest that dimming lights can contribute large electricity demand reductions during periods of grid stress without major inconvenience to occupants.
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TENNER AD, 1997, P 8 EUR LIGHT C AMST, P131
NR 24
TC 5
Z9 5
U1 0
U2 2
PU ILLUMINAT ENG SOC NORTH AMER
PI NEW YORK
PA 120 WALL ST, 17TH FL, NEW YORK, NY 10005-4001 USA
SN 1550-2724
J9 LEUKOS
JI Leukos

PD JAN
PY 2008
VL 4
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BP 139
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PG 18
WC Construction & Building Technology; Optics
SC Construction & Building Technology; Optics
GA 271EC
UT WOS:000253770700002
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ER

PT J
AU Santisirisomboon, J
Limmeechokchai, B
Chungpaibulpatana, S
AF Santisirisomboon, J
Limmeechokchai, B
Chungpaibulpatana, S
TI An assessment of energy efficiency programs in Thai commercial and industrial sectors
SO ENERGY SOURCES
LA English
DT Article
DE demand-side management; emission control; emissions mitigation; end-use model; energy demand analysis and forecasting; least-cost electricity generation planning
AB An assessment of benefits of the implementation of demand-side management (DSM) and energy efficiency programs to the commercial and industrial sectors in Thailand is presented, and the corresponding impacts on power-generation expansion planning and emissions are discussed The reference building models were simulated to capture energy consumption patterns of the medium and large commercial buildings in Thailand. Nine subsectors in the industrial sector classified according to the international standard codes, are modeled and analyzed through the technoeconomic approach. Scenarios of the energy efficiency programs in Thailand are applied to the commercial and industrial sectors to investigate the potential of energy savings. Control technologies of airborne emissions from the utilization of fossil fuels in the power sector are also applied. Finally, a least-cost electricity expansion model is used to generate new generation plans. Features of the resultant plans include a significant reduction in the required power capacity addition and airborne emissions of fossil-fired power plants compared to a reference plan.
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*EL GEN AUTH THAIL, 1997, 9701 EGAT PDP
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*NAT EC SOC DEV BO, 1999, NAT INC THAIL 1998
*NAT EN POL OFF, 1997, STRAT EN DEV 8 NAT
*THAIL ENV I, 1997, THAIL NAT GREENH GAS
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PU TAYLOR & FRANCIS INC
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA 371CZ
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PT J
AU de la Cruz-Lovera, C
Perea-Moreno, AJ
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Antonio Alvarez-Bermejo, Jose
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TI Worldwide Research on Energy Efficiency and Sustainability in Public Buildings
SO SUSTAINABILITY
LA English
DT Article
DE energy saving; energy efficiency; sustainability; building
ID THERMAL COMFORT; H-INDEX; MANAGEMENT; FUTURE; ARCHITECTURE; CONSUMPTION; STRATEGIES; COUNTRIES; CLIMATE; SYSTEMS
AB The present study details the significant contribution that different international institutions have made to the field of sustainability and energy efficiency, with a focus on public buildings. This has been achieved by making use of the database Scopus, by applying bibliometric techniques and by analyzing the contents of articles published from 1976 to 2016. All the materials included in the analysis have been reported from Scopus. Several key aspects of the publications have been considered such as document type, language, subject area, journal type and keywords. Sustainable Development, Sustainability, Energy Conservation, Energy Efficiency and Buildings have been verified as the most used keywords. The obtained contributions have been classified geographically and by institution, with the United States, the United Kingdom, China, Australia and Italy being the leading research countries and Hong Kong Polytechnic University, Delft University of Technology and Tsinghua University the top contributing institutions. The most active categories in those fields are engineering, social sciences and environmental issues in that order. It can be assumed that the study of sustainability and energy efficiency across all its dimensions is of great interest for the scientific community. The global environmental issue has led many countries to incorporate a wide range of Energy Efficiency (EE) strategies in order to reduce energy consumption in public buildings, a highly valued aspect by European Union energy labelling.

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PU MDPI AG
PI BASEL

PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
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J9 SUSTAINABILITY-BASEL
JI Sustainability
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PT J
AU Muresan, AA
Attia, S
AF Muresan, Adina Ana
Attia, Shady
TI Energy efficiency in the Romanian residential building stock: A literature review
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Energy policy; Passive house; Thermal comfort; Thermal insulation; Fuel poverty; Sustainable renovation
ID INTERMITTENTLY HEATED BUILDINGS; REQUIREMENTS; INSULATION; MODEL
AB The building sector in Romania is dominated by residential buildings that are old and have poor thermal performance. As a member of the European Union, Romania has to reach the objectives imposed by the Directive 2009/28/EC and to fulfill the requirements of the Energy Performance of Buildings Directive (EPBD) by year 2020. The implementation of these concepts in Romania consists into thermal rehabilitation of the existing buildings, applying the latest thermal performance characteristics in new buildings and establishing the certificate of energy performance. The following paper presents the literature review of the state of building energy performance in Romania. The purpose of the literature review analysis is to provide a snapshot on the existing building energy efficiency and future perspectives on the implementation of high performance buildings in Romania. The implementation of concepts such as the Passive House (PH), nearly Zero Energy Buildings (nZEB) and Net Zero Energy Buildings (NZEB) are discussed in order to help the decision makers to achieve the 2020 objectives. The results of the reviewed publications and case studies are classified under three categories: policy and regulations, technology and feasibility. Finally a holistic perspective on the Strength, Weakness, Opportunities and Threats (SWOTs) of energy efficiency in Romania's residential building sector is presented.
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NR 32
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PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Renew. Sust. Energ. Rev.
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PT S
AU Shi, J

Yu, NP
Yao, WX
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Yao, Weixin
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Capozzoli, A
Serra, V
TI Energy efficient building HVAC control algorithm with real-time occupancy prediction
SO 8TH INTERNATIONAL CONFERENCE ON SUSTAINABILITY IN ENERGY AND BUILDINGS, SEB-16
SE Energy Procedia
LA English
DT Proceedings Paper
CT 8th International Conference on Sustainability in Energy and Buildings (SEB)
CY SEP 11-13, 2016
CL Politecnico Torino, Turin, ITALY
HO Politecnico Torino
DE Energy efficient building; HVAC; Occupancy prediction; MPC; Logistic regression
ID CLIMATE CONTROL; BEHAVIOR
AB A large amount of energy is wasted through inefficient operation of heating, ventilation, and air conditioning (HVAC) system due to the lack of reliable building occupancy measurement and prediction. To mitigate this problem, an innovative change-point logistic regression model is developed to provide an accurate forecast of building occupancy. A novel building HVAC control algorithm is then developed by embedding the occupancy prediction model into the model predictive control (MPC) framework. The occupancy-based MPC algorithm tries to minimize building electricity consumption and maximize building occupants' comfort at the same time. A penalty factor is introduced which allows building occupants to determine the optimal trade-off between comfort and energy efficiency. Numerical simulation results show that the proposed HVAC control strategy with real-time occupancy prediction not only reduces electricity consumption but also improves building occupants' comfort. Published by Elsevier Ltd.
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FU National Science Foundation (NSF) [1637258]; Department of Energy (DOE) [DE-OE0000840]
FX The authors would like to thank Dr. Bing Dong from UTSA for sharing residential building occupancy data. This work was supported by National Science Foundation (NSF) under award #1637258 and Department of Energy (DOE) under award #DE-OE0000840.
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NR 23
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AU Zhao, D
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TI Interaction effects of building technology and resident behavior on energy consumption in residential buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficiency; High-performance housing; Building construction technology; Building systems; Human-environmental interaction
ID COMMERCIAL BUILDINGS; FEEDBACK; INFORMATION; REGRESSION; CLIMATE; IMPACT; TOOL; HOT; US
AB Buildings account for a significant portion of energy consumption and carbon emissions around the world and increasingly scholars and practitioners are re-thinking strategies that mitigate use. This paper

reports an empirical study aimed at identifying the relationship between building technology and resident behavior and the joint effects on energy consumption in residential buildings. Unlike previous work that isolated effects of technology or behavior on energy consumption, this study investigates their interactions. The researchers collected technical and behavioral data from more than 300 residential units and performed data analysis using energy simulation and multivariate regression techniques. Results identify the interaction effects between building technology and resident behavior and provide quantifiable evidence supporting the hypothesis that "building technology and resident behaviors interact with each other and ultimately affect home energy consumption." Findings indicate four important resident behaviors that directly correlate to energy consumption and two that indirectly correlate to energy consumption. The research also indicates that only 42% of technological advances directly contribute to home energy efficiency, suggesting that the achievable impact on energy savings depends on both technical advances and behavioral plasticity. (C) 2016 Elsevier B.V. All rights reserved.

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PT J
AU Taillandier, F
Mora, L
Breysse, D
AF Taillandier, Franck
Mora, Laurent
Breysse, Denys
TI Decision support to choose renovation actions in order to reduce house energy consumption - An applied approach
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Decision support; Energy performance; House renovation; Multicriteria decision-making
ID INSULATION MATERIALS; BUILDING RENOVATION; GENETIC ALGORITHM; DESIGN OPTIMIZATION; BEHAVIOR; TOOL; TECHNOLOGY; ACCEPTANCE; MODEL; SUSTAINABILITY
AB This paper focuses on improving the thermal performances of a set of houses built around 1970 and aims to develop a method for decision support regarding the choice of renovation solutions. The approach goes through two steps based on a multicriteria analysis. The first step allows the owner to choose a work package that meets his expectations at best. The second step is to specify the selected works by providing more detailed technical solutions, like defining the type of insulation (glass wool, sheep wool, etc.). The solution assessment on the various criteria is performed according to models, expert values or rules set by

the experts involved in the project. One of the major challenges of the decision tool is to enable a merging of the project stakeholder points of view, based on a deep interaction between experts and owners. The output is not limited to the prescription of a renovation solution but enriches the house owner reflection in order to guide her/him into the whole renovation process. The article presents the approach, the method and an application to a house. (C) 2016 Elsevier Ltd. All rights reserved.

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FU Aquitaine region (France)
FX The ARD-FOURMI tool is the collective result of the FOURMINERGIE project team work. The authors thank all those who participated in the project, including VALOREM (project leader), NOBATEK (thermal simulation), Michel Sarrazin (construction economist), Alexandra Georgeoliani (architect) and co-operators of the association "Des fourmis dans le compteur" who actively participated in the creation and improvement of the tool, the Aquitaine region (France) that funded the project and the Creand cluster.

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TC 4
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AF Kenway, Steven J.
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TI Household analysis identifies water-related energy efficiency opportunities
SO ENERGY AND BUILDINGS
LA English
DT Article
ID CITIES; FLOW; METABOLISM; EMISSIONS; MODEL
AB Water heating accounts for around one third of household direct energy use. This energy demand is some four times greater than lighting. Here we use detailed monitoring and modelling of seven individual households to quantify major factors. Using normalized sensitivity results we demonstrate (i) high variability and (ii) a large and consistent influence of shower duration, flow rate, frequency and temperature along with hot water system efficiency, adult population, and the temperature of cold water. A 10% change in these factors influenced 0.1-0.9 kWh/hh-person, equivalent to a 2-3% of total household energy use. We draw on 5399 shower events from a further 94 households, and 491 shower temperature measurements to understand the scope for changes to the households. Individual parameters variation guided by these larger datasets demonstrated shower duration and flow rate offer most scope for change. The work helps guide city-scale analysis of household water-related energy demand. It also supports the tailoring of behavioural and technological water-efficiency programs towards those with strongest potential to influence energy. Strong interaction between parameters suggests that programs aiming to influence water-related energy need to be aware of how this interplay either amplifies, or diminishes, the intended energy savings. Crown Copyright (C) 2016 Published by Elsevier B.V. All rights reserved.
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FU Australian Research Council; Smart Water Research Fund [LP120200745, DE160101322]
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U2 5
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PT J
AU Xie, Q
Ouyang, HB

Gao, X
AF Xie, Qing
Ouyang, Hongbing
Gao, Xiang
TI Estimation of electricity demand in the residential buildings of China based on household survey data
SO INTERNATIONAL JOURNAL OF HYDROGEN ENERGY
LA English
DT Article; Proceedings Paper
CT 4th International Conference on Energy Engineering and Environment Engineering (ICEEEE),
CY APR 15-16, 2016
CL Hong Kong, PEOPLES R CHINA
DE Electricity demand estimation; Building & appliance; Family features; Indoor thermal comfort; Principal component analysis; Multiple linear regression
ID THERMAL COMFORT; ENERGY DEMAND; CONSUMPTION; OPTIMIZATION; TURKEY
AB This study proposes an innovative hybrid model for estimation of residential electricity demand based on the three categories of variables as building & appliances, family features and householders' evaluation about indoor thermal comfort. The principal component analysis method and multiple linear regression method are used in the model. The empirical results indicate that the thermal environment rated as neutral or slightly warm by householder has a positive coefficient with residential electricity demand. And building & appliances, especially the sets of split air conditioner, equipment operation time and room area have significant impact on residential electricity demand. However, the influences of family features related variables on household electricity consumption are limited in short run, wherein income has a certain effect on household electricity consumption. This study delivered the energy management strategy implications that the insulated building envelop should be further implemented and the government should guide householder to install energy-efficient home appliances and set the indoor temperature within a proper range.
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PT J
AU Gabe-Thomas, E
Walker, I
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AF Gabe-Thomas, Elizabeth
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TI Householders' Mental Models of Domestic Energy Consumption: Using a Sort-And-Cluster Method to Identify Shared Concepts of Appliance Similarity
SO PLOS ONE
LA English
DT Article
ID CLIMATE-CHANGE POLICY; SOCIAL-CHANGE; AWARENESS; FEEDBACK; BEHAVIOR
AB If in-home displays and other interventions are to successfully influence people's energy consumption, they need to communicate about energy in terms that make sense to users. Here we explore householders' perceptions of energy consumption, using a novel combination of card-sorting and clustering to reveal shared patterns in the way people think about domestic energy consumption. The data suggest that, when participants were asked to group appliances which they felt naturally 'went together', there are relatively few shared ideas about which appliances are conceptually related. To the extent participants agreed on which appliances belonged together, these groupings were based on activities (e.g., entertainment) and location within the home (e.g., kitchen); energy consumption was not an important factor in people's categorisations. This suggests messages about behaviour change aimed at reducing energy consumption might better be tied to social practices than to consumption itself.
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PU PUBLIC LIBRARY SCIENCE
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PA 1160 BATTERY STREET, STE 100, SAN FRANCISCO, CA 94111 USA
SN 1932-6203
J9 PLOS ONE
JI PLoS One
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WC Multidisciplinary Sciences
SC Science & Technology - Other Topics
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PT J
AU Abdessalem, T
Labidi, E
AF Abdessalem, Tahar
Labidi, Etidel
TI Economic analysis of the energy-efficient household appliances and the rebound effect
SO ENERGY EFFICIENCY
LA English
DT Article
DE Rebound effect; Energy efficiency; Appliances; Energy services; General equilibrium; Elasticity of substitution
ID GENERAL EQUILIBRIUM-ANALYSIS; CONSUMPTION; IMPACT; VIEW; SUSTAINABILITY; FALLACIES; DEBATE
AB Many strategies, such as improving energy efficiency, were identified as solutions to reduce energy consumption and carbon emissions. Nonetheless, the presence of a rebound effect could lead to a decrease in potential energy savings and carbon reductions resulting from technological advances in energy consumption. This study focuses on direct and indirect rebound effects on households' behavior. We examine the situation where consumers demand two types of energy services and explore how their choices are affected by changes in the efficiency of providing these services-and, importantly, the consequent implications for energy use. We employ a (narrowly construed) general equilibrium methodology in an attempt to provide a complete picture of the interactions in play in a theoretically confined setting. We limit the general equilibrium problem to two categories of energy appliances but include consideration of the production side of the equation and consequent budget implications, thus "closing" the system in a general equilibrium sense. We find that rebound magnitudes (both indirect and direct) are large.

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SN 1570-646X
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J9 ENERG EFFIC

JI Energy Effic.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA DL6DH
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PT J
AU Jensen, T
Holtz, G
Baedeker, C
Chappin, EJL
AF Jensen, Thorben
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Baedeker, Carolin
Chappin, Emile J. L.
TI Energy-efficiency impacts of an air-quality feedback device in residential buildings: An agent-based modeling assessment
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficiency; Ventilation behavior; Behavior change; Diffusion; Agent-based modeling
ID SOCIAL-INFLUENCE; CONSUMPTION; BEHAVIOR; VENTILATION; INTERVENTIONS; INFORMATION; OCCUPANCY; SAVINGS
AB A key factor to energy-efficiency of heating in buildings is the behavior of households, in particular how they ventilate rooms. Energy demand can be reduced by behavioral change; devices can support this by giving feedback to consumers on their behavior. One such feedback device, called the 'CO2 meter', shows indoor air-quality in the colors of a traffic light to motivate so called 'shock ventilation', which is energy efficient ventilation behavior. The following effects of the 'CO2 meter' are analyzed: (1) the effect of the device on ventilation behavior within households, (2) the diffusion of 'CO2 meter' to other households, and (3) the diffusion of changed behavior to households that do not adopt a 'CO2 meter'. An agent-based model of these processes for the city of Bottrop (Germany) was developed using a variety of data sources. The model shows that the 'CO2 meter' would increase adoption of energy-efficient ventilation by c. 12% and reduce heating demand by c. 1% within 15 years. Technology diffusion was found to explain at least c. 54% of the estimated energy savings; behavior diffusion explains up to 46%. These findings indicate that the 'CO2 meter' is an interesting low-cost solution to increase the energy-efficiency in residential heating.
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U1 3
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PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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JI Energy Build.
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Terry, N
Palmer, J
AF Terry, Nicola
Palmer, Jason
TI Trends in home computing and energy demand
SO BUILDING RESEARCH AND INFORMATION
LA English
DT Article
DE energy consumption; energy demand; energy monitoring; energy use behaviour; household appliances; plug loads; information and communications technologies (ICTs); trends
ID INSIGHTS
AB Household energy demand due to domestic computer usage has changed beyond recognition over the past thirty years. Computers are now used in most homes, almost every day and laptop ownership has overtaken traditional desktop computers. Mobile devices give access to services that in the past required desktops, and they are usually more energy efficient. Today's computers usually rely on wireless routers that are often run all day. The effect of these changes on electricity use in the home has been profound. At least 60% more electricity was used for UK home computing in 2012 than in 1990. The implications of recent changes in information technology use are assessed for domestic electricity use and carbon emissions, using data from the Household Electricity Survey (HES) - the most detailed survey of electricity consumption in UK homes. On average, routers use twice as much energy per day as the laptops they serve. Laptops also draw power at a different time of day compared with desktop computers - which has implications for generation. Policy and practical recommendations are made for reducing energy use for information technology, including the estimated energy savings that could be achieved if UK routers met the US Energy Star standard for energy efficiency.
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PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
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PT J
AU Vogel, J
Lundqvist, P
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Arias, J

AF Vogel, Jonas Anund
Lundqvist, Per
Blomkvist, Par
Arias, Jaime
TI Problem areas related to energy efficiency implementation in Swedish multifamily buildings
SO ENERGY EFFICIENCY
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DT Article
DE Energy efficiency; Barriers; Buildings; Sweden; Interview study
ID TRANSACTION COSTS; BARRIERS; CONSERVATION; TECHNOLOGY; FRAMEWORK; POLICIES; GAP
AB This paper investigates problem areas related to energy efficiency implementation in Swedish multifamily buildings. The paper first presents a generic list of (theoretical) problem areas identified through a literature survey. Using a qualitative approach, the paper also investigates if the problem areas identified in the literature also have an impact on the Swedish building sector. Results from the interview study reveal a strong coherence between problem areas in the literature and those expressed by the interviewees. However, this paper identifies seven novel challenges that cannot be derived from the list of barriers in the literature. Moreover, results reveal that as many as 12 problem areas have their origin in national factors such as agreement structures, incentive schemes, and cost calculation methods.
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PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA DC1RC
UT WOS:000368993200006
DA 2018-05-03
ER

PT J
AU Viani, F
AF Viani, Federico

TI A DECISION SUPPORT SYSTEM BASED ON WIRELESS POWER METERING FOR ENERGY SAVING IN SMART BUILDINGS
SO MICROWAVE AND OPTICAL TECHNOLOGY LETTERS
LA English
DT Article
DE smart metering; wireless sensor networks; game theory; energy saving
AB Energy saving in smart buildings is addressed through an innovative approach based on game theory (GT). Starting from the measurement of the users' consumptions performed with wireless smart meters interconnected to the appliances, the collected data are processed by a control unit to evaluate the optimal load profiles and to suggest to the users the most convenient schedule of appliances. This is yielded by mathematically solving a multiplayer game throughout GT principles. The objective is that of reaching the Nash equilibrium in which all the players are not interested in changing their situation/status (i.e., the appliance scheduling) as every deviation would be suboptimal. Results from numerical simulations are reported to assess the performance of the proposed GT-based method, while preliminary experimental tests are performed to show the potentialities of the system in real conditions. (C) 2015 Wiley Periodicals, Inc.
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Wood AJ, 1996, POWER GENERATION OPE
NR 10
TC 4
Z9 4
U1 0
U2 4
PU WILEY-BLACKWELL
PI HOBOKEN
PA 111 RIVER ST, HOBOKEN 07030-5774, NJ USA
SN 0895-2477
EI 1098-2760
J9 MICROW OPT TECHN LET
JI Microw. Opt. Technol. Lett.
PD DEC
PY 2015
VL 57
IS 12
BP 2750
EP 2752
DI 10.1002/mop.29432
PG 4
WC Engineering, Electrical & Electronic; Optics
SC Engineering; Optics
GA CX0LT
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ER

PT J
AU Arens, E
Zhang, H
Hoyt, T
Kaam, S
Bauman, F
Zhai, YC
Paliaga, G
Stein, J
Seidl, R
Tully, B
Rimmer, J
Toftum, J
AF Arens, Edward
Zhang, Hui
Hoyt, Tyler
Kaam, Soazig
Bauman, Fred
Zhai, Yongchao
Paliaga, Gwelen
Stein, Jeff
Seidl, Reinhard
Tully, Brad
Rimmer, Julian
Toftum, Jorn
TI Effects of diffuser airflow minima on occupant comfort, air mixing, and building energy use (RP-1515)
SO SCIENCE AND TECHNOLOGY FOR THE BUILT ENVIRONMENT
LA English
DT Article
ID TEMPERATURE; QUALITY
AB There is great energy-saving potential in reducing variable air volume box minimum airflow set-points to about 10% of maximum. Typical savings are on the order of 10%-30% of total HVAC energy, remarkable for an inexpensive controls set-point change that properly maintains outside air ventilation. However, there has long been concern whether comfort and room air mixing are maintained under low flows through diffusers, and this concern has prompted variable air volume minima to be typically set at 20%-50% of maximum. RP 1515 evaluated occupants' thermal comfort and air quality satisfaction in operating buildings under both conventional and reduced minimum variable air volume flow set-points, and measured the air diffusion performance index and air change effectiveness for typical diffuser types in the laboratory. The hypotheses were that lowered flow operation would not significantly reduce comfort or air quality and that HVAC energy savings would be substantial. The hypotheses were almost entirely confirmed for both warm and cool seasons. But beyond this, the reduction of excess airflow during low-load periods caused occupants' cold discomfort in the warm season to be halved, a surprising improvement. It appears that today's widespread overcooling of buildings can be corrected without risk of discomfort by lowering conventional variable air volume minimum flow set-points.
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FU ASHRAE [030341-003]; California Energy Commission (CEC) [500-99-013,

BOA-POB-244-B65]; CBE at University of California, Berkeley
FX This study was jointly funded by ASHRAE (award number 030341-003), the California Energy Commission (CEC contract number 500-99-013, work authorization number BOA-POB-244-B65), and the CBE at University of California, Berkeley.
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NR 28
TC 4
Z9 4
U1 0
U2 6
PU TAYLOR & FRANCIS INC
PI PHILADELPHIA
PA 530 WALNUT STREET, STE 850, PHILADELPHIA, PA 19106 USA
SN 2374-4731
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J9 SCI TECHNOL BUILT EN
JI Sci. Technol. Built Environ.
PD NOV 17
PY 2015
VL 21
IS 8
BP 1075
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WC Thermodynamics; Construction & Building Technology; Engineering, Mechanical
SC Thermodynamics; Construction & Building Technology; Engineering
GA CV8SG

UT WOS:000364557400002
DA 2018-05-03
ER

PT J
AU Estiri, H
AF Estiri, Hossein
TI The indirect role of households in shaping US residential energy demand patterns
SO ENERGY POLICY
LA English
DT Article
DE Energy demand; Energy policy; Indirect effects; Residential sector; Covariance structure analysis
ID ELECTRICITY CONSUMPTION; URBAN FORM; MODEL; SECTOR; CONSERVATION; CITY; DETERMINANTS; DENSITY; IMPACT; SCALE
AB About a quarter of US energy demand is for domestic use. Yet an understanding of the processes, determinants, and consequences of household energy demand remains elusive. Conventional energy policy has overwhelmingly focused on improving energy efficiency of the buildings. This research applies a non-linear methodology and an interdisciplinary approach to household energy demand. Using data from the US residential sector (2009 Residential Energy Consumption Survey), this research performs Covariance Structure Analysis to isolate direct and indirect effects of household and housing characteristics on total annual domestic energy use. Outcomes uncover some of households' indirect effects on energy demand, which in this research mainly happen through household effects on building characteristics, highlighting the indirect role of household choices in shaping residential energy demand patterns. To maximize its efficiency in reducing energy demand and GHG emissions, this paper suggests that in addition to investing in energy efficient technologies, energy policy should incorporate indirect effects of household choices on the configuration of their future homes. (C) 2015 Elsevier Ltd. All rights reserved.
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NR 53
TC 4
Z9 4
U1 0
U2 5
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
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PY 2015
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BP 585
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA CV4OJ
UT WOS:000364246100053
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PT J
AU Noonan, DS
Hsieh, LHC

Matisoff, D
AF Noonan, Douglas S.
Hsieh, Lin -Han Chiang
Matisoff, Daniel
TI Economic, sociological, and neighbor dimensions of energy efficiency adoption behaviors: Evidence from the U.S residential heating and air conditioning market
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Energy efficiency; Green buildings; Technology adoption; Housing
ID TECHNOLOGY ADOPTION; HOUSING-MARKET; CONSUMPTION; ELECTRICITY; POLICY; CONSERVATION; BUILDINGS; DIFFUSION; KNOWLEDGE; GEOGRAPHY
AB This study identifies factors that affect the adoption behavior for residential Heating, Ventilating, and Air Conditioning (HVAC) systems, including a spatial and temporal contagion effect, house characteristics, and other economic and contextual factors. The study draws on a dataset of house sale records in the greater Chicago area, spanning 1992- 2004. First-differenced models and restricting the sample to new construction allow separate identification of adoption determinants for homeowners and for developers, respectively. We show that attributes of the building stock and demographics influence adoption decisions of both homeowners and developers. This includes a strong influence of square footage, a modest spatial clustering effect for existing homes, a consistent deterrent effect of higher property tax rates, and a positive influence of neighborhood education levels. Adoption decisions for existing homeowners appear to be driven by different factors than sellers of newly constructed homes. Adoption coincided with multistory homes for developers, and neighbor adoption rates predicted adoption by existing homeowners but not developers. The results highlight the need for more research into the social context of energy efficiency investment. (C) 2015 Elsevier Ltd. All rights reserved.
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TC 4
Z9 4
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U2 0
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 2214-6296
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J9 ENERGY RES SOC SCI
JI Energy Res. Soc. Sci.
PD NOV
PY 2015
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BP 102
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PG 12
WC Environmental Studies
SC Environmental Sciences & Ecology
GA V3Y7J
UT WOS:000218708600011
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ER

PT J
AU Scott, MJ
Daly, DS
Hathaway, JE
Lansing, CS
Liu, Y
McJeon, HC
Moss, RH
Patel, PL
Peterson, MJ
Rice, JS
Zhou, YY
AF Scott, Michael J.
Daly, Don S.
Hathaway, John E.
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Liu, Ying
McJeon, Haewon C.
Moss, Richard H.
Patel, Pralit L.
Peterson, Marty J.
Rice, Jennie S.
Zhou, Yuyu
TI Calculating impacts of energy standards on energy demand in US buildings with uncertainty in an integrated assessment model
SO ENERGY
LA English
DT Article
DE Building-energy demand; Integrated assessment models; Uncertainty analysis
ID CLIMATE-CHANGE; POLICY; EFFICIENCY; TECHNOLOGY; MITIGATION; BENEFITS; CHINA; PRICE
AB In this paper, an IAM (integrated assessment model) uses a newly-developed Monte Carlo analysis capability to analyze the impacts of more aggressive U.S. residential and commercial building-energy codes and equipment standards on energy consumption and energy service costs at the state level, explicitly recognizing uncertainty in technology effectiveness and cost, socioeconomics, presence or absence of carbon prices, and climate impacts on energy demand. The paper finds that aggressive building-energy codes and equipment standards are an effective, cost-saving way to reduce energy consumption in buildings and greenhouse gas emissions in U.S. states. This conclusion is robust to significant uncertainties in population, economic activity, climate, carbon prices, and technology performance and costs. (C) 2015 Elsevier Ltd. All rights reserved.
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FU U.S. Department of Energy (DOE) [DE-AC05-76RL01830]
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WC Thermodynamics; Energy & Fuels
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PT J
AU Zvingilaite, E
Jacobsen, HK
AF Zvingilaite, Erika
Jacobsen, Henrik Klinge
TI Heat savings and heat generation technologies: Modelling of residential investment behaviour with local health costs
SO ENERGY POLICY
LA English
DT Article
DE Energy savings; Externalities; Modelling; Residential heating; Rebound
ID ENERGY EFFICIENCY; EXTERNAL COSTS; ELECTRICITY-GENERATION; BUILDING SECTOR; POWER-SYSTEM; INTERNALIZATION; OPTIMIZATION; CONSUMPTION; BENEFITS; DEMAND
AB The trade-off between investing in energy savings and investing in individual heating technologies with high investment and low variable costs in single family houses is modelled for a number of building and consumer categories in Denmark. For each group the private economic cost of providing heating comfort is minimised. The private solution may deviate from the socio-economical optimal solution and we suggest changes to policy to incentivise the individuals to make choices more in line with the socioeconomic optimal mix of energy savings and technologies.
The households can combine their primary heating source with secondary heating e.g. a woodstove. This choice results in increased indoor air pollution with fine particles causing health effects. We integrate health cost due to use of woodstoves into household optimisation of heating expenditures.
The results show that due to a combination of low costs of primary fuel and low environmental performance of woodstoves today, included health costs lead to decreased use of secondary heating. Overall the interdependence of heat generation technology- and heat saving-choice is significant. The total optimal level of heat savings for private consumers decrease by 66% when all have the option to shift to the technology with lowest variable costs. (C) 2014 Elsevier Ltd. All rights reserved.
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FX The presented study is part of the research in Centre for Energy, Environment and Health, financed by The Danish Strategic Research Program on Sustainable Energy under Contract no. 2104-06-0027.
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JI Energy Policy
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PT S
AU Mehdi, G
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BE Howlett, RJ
TI Electricity consumption constraints for smart-home automation: An overview of models and applications
SO SUSTAINABILITY IN ENERGY AND BUILDINGS: PROCEEDINGS OF THE 7TH INTERNATIONAL CONFERENCE SEB-15
SE Energy Procedia
LA English
DT Proceedings Paper
CT 7th International Conference on Sustainability and Energy in Buildings (SEB)
CY JUL 01-03, 2015
CL Lisbon, PORTUGAL
SP KES Int, Univ Nova Lisbon, UNINOVA Res Inst
DE energy; agents; modeling; constraints; residential loads; smart-home
AB The global energy consumption challenge can largely be addressed by adoption of smart-home autonomous agents, allowing adaptive scheduling of electronic devices - for household and businesses alike. The realization of this smart architecture necessitates the agents need to know their decision space, in order to schedule different devices according to their individual constraints. Some of these constraints can be set by the owner, for example, timelines for washing machine or charging electric vehicles, not necessitating a smart agent. However, most appliances are subject to physical constraints, for example, washing machine being non-interruptible, and consequently, the modeling of the decision space is non-trivial. This paper gives an overview of smart-agent based models for different electric devices and appliances using their individual non-trivial energy consumption constraints, and proposes solutions for appliance optimization and scheduling. (C) 2015 The Authors. Published by Elsevier Ltd.
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AU Opris, I
Costinas, S
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TI The Household Energy Consumer in a Smart Metering Environment
SO 2015 9TH INTERNATIONAL SYMPOSIUM ON ADVANCED TOPICS IN ELECTRICAL ENGINEERING (ATEE)
LA English
DT Proceedings Paper
CT 9th International Symposium on Advanced Topics in Electrical Engineering (ATEE)
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CL Univ Politehnica Bucharest, Fac Elect Engn, Bucharest, ROMANIA
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HO Univ Politehnica Bucharest, Fac Elect Engn
DE smart metering; household energy consumer; EU policy; attitude of electricity consumer
AB Present time is characterized by important changes, determined by significant advances in technology. The modern society is information oriented, technology dependent and collaborative-network active. The paper discusses the existing conditions of the transition period from the old meters to the smart meters, in terms of its impact and considering the different types of electricity consumers. It also addresses the future perspectives of the smart meters implementation in the context of actual technological changes. As the young Web 2.0 generation is moving into adulthood, smart metering systems will be more easily accepted and their use will have a better consumer feedback. To obtain the most benefits from smart metering systems, the household energy consumer must be actively involved in the planning process from its early stages, to become both a real actor in shaping the future implementation and an aware customer who adopts good demand side behaviour.
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AU Soares, N
Pereira, LD
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da Silva, PP
AF Soares, Nelson
Pereira, Luisa Dias
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da Silva, Patricia Pereira
TI Energy efficiency of higher education buildings: a case study
SO INTERNATIONAL JOURNAL OF SUSTAINABILITY IN HIGHER EDUCATION
LA English
DT Article
DE Sustainability; Energy efficiency; Higher education; Energy audit; Green campus; Sustainable behaviours
ID BUSINESS EDUCATION; BUILT ENVIRONMENT; SUSTAINABILITY; MANAGEMENT; BEHAVIOR
AB Purpose - This paper aims to propose an energy efficiency plan (with technical and behavioural improvement measures) for a Portuguese higher education building - the Teaching Building of the Faculty of Economics of the University of Coimbra (FEUC).
Design/methodology/approach - The study was developed in the context of both the "Green Campus - Challenge for Energy Efficiency in Higher Education" and the Energy for Sustainability Initiative of the University of Coimbra, Portugal. An energy audit was conducted based on the analysis of the energy consumption profiles. A monitoring campaign was carried out to measure and disaggregate the electricity consumption. The consumption of natural gas and water were also assessed. The building envelope and the heating and lighting systems were also evaluated. Some patterns of energy-environmental behaviours of the academic community were investigated through a Web-based survey.
Findings - The energy efficiency plan contemplates short-term tangible/intangible actions. It also considers the investment and payback period of the tangible measures. The implementation of three improvement measures in the lighting system would lead to a consumption reduction of about 26,123 kWh/year, avoiding the emission of 3,704 KgCO2/year, for an initial cost of (sic)9,920 (payback period of 3.7 years).
Research limitations/implications - Results are restricted to the case study and there are limitations in their generalisation outside of their context. However, they show some broadly implications and trends that have relevance for the higher education sector. This paper highlights the importance of engaging students, faculty and technical staff for working together on the assessment of the energy efficiency of the buildings where they study and work.
Social implications - The higher education sector holds important functions in educating the next generation of professionals for a sustainable culture. The categories of activities described in this paper are good examples of what can be done within the academic community for acting towards sustainability. The results also pointed out that making users aware of their energy consumption is a priority towards the energy efficiency in higher education buildings.
Originality/value - Reductions on energy consumption are expected if the energy efficiency plan would be implemented. The results of the behavioural study were presented to the FEUC's board of directors to be integrated in the "Good Practices Manual on Water and Energy Management".
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FU Portuguese Foundation for Science and Technology (FCT) [SFRH/BD/51640/2011]; FCT [SFRH/BD/77105/2011, SFRH/BD/76357/2011, PEst-C/EEI/UI0308/2011]; Energy for Sustainability Initiative of the University of Coimbra; project Energy and Mobility for Sustainable Regions - EMSURE [CENTRO-07-0224-FEDER-002004]
FX The first author acknowledges the support provided by the Portuguese Foundation for Science and Technology (FCT) under the PhD scholarship SFRH/BD/51640/2011 in the framework of the MIT-Portugal Program. The second and the third authors acknowledge the support provided by FCT under the PhD scholarships SFRH/BD/77105/2011 and SFRH/BD/76357/2011, respectively. This study was partially supported by FCT under the project grant PEst-C/EEI/UI0308/2011 and the Energy for Sustainability Initiative of the University of Coimbra. It was also supported by the project Energy and Mobility for Sustainable Regions - EMSURE (CENTRO-07-0224-FEDER-002004).
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U2 31
PU EMERALD GROUP PUBLISHING LIMITED
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PA HOWARD HOUSE, WAGON LANE, BINGLEY BD16 1WA, W YORKSHIRE, ENGLAND
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J9 INT J SUST HIGHER ED
JI Int. J. Sustain. High. Educ.
PY 2015
VL 16
IS 5
BP 669
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DI 10.1108/IJSHE-11-2013-0147
PG 23
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Education & Educational Research
SC Science & Technology - Other Topics; Education & Educational Research
GA CQ4KG
UT WOS:000360573000005
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PT J
AU Garcia-Navarro, J
Gonzalez-Diaz, MJ
Valdivieso, M
AF Garcia-Navarro, J.
Gonzalez-Diaz, M. J.
Valdivieso, M.
TI Assessment of construction costs and energy consumption resulting from house energy ratings in a residential building placed in Madrid: "Precost&e Study"
SO INFORMES DE LA CONSTRUCCION
LA Spanish
DT Article
DE Energy efficiency; energy rating; construction cost; economic impact; passive architecture
ID CONSERVATION; PERFORMANCE; EFFICIENCY; DESIGN; SHAPE
AB This paper presents a case study that relates the energy efficiency of a building, its construction costs and its energy consumption. The variation of the energy performance of the dwellings -and its energy rating- is made through changes in the envelope and the energy production systems. This theoretical study was conducted during the years 2009-2010 on the project of a residential block of apartments located in Madrid. The paper develops a methodology to evaluate the energy efficiency variations in a project and its economic implications. This will enable developers and architects to assess how the adoption of active and passive solutions affects the energy rating of a building, its energy consumption and its construction costs. The relationship between the orientation of housing and its energy rating, and the characteristics of the calculation programs used is also analyzed.
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NR 19
TC 4
Z9 4
U1 0
U2 9
PU INST CIENCIAS CONSTRUCCION EDUARDO TORROJA
PI MADRID
PA SERRANO GALVACHE, 4, 28033 MADRID, SPAIN
SN 0020-0883
EI 1988-3234
J9 INF CONSTR
JI Inf. Constr.
PD JUL-SEP
PY 2014
VL 66
IS 535
AR e026
DI 10.3989/ic.13.052
PG 10
WC Construction & Building Technology
SC Construction & Building Technology
GA AQ8YB
UT WOS:000343125000001
OA gold
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PT B
AU Alhamoud, A
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Gottron, Christian
Steinmetz, Ralf
BE Aschenbruck, N
Kanhere, S
Akkaya, K
TI SMARTENERGY.KOM: An Intelligent System for Energy Saving in Smart Home
SO 2014 IEEE 39TH CONFERENCE ON LOCAL COMPUTER NETWORKS WORKSHOPS (LCN WORKSHOPS)
LA English
DT Proceedings Paper
CT 39th Annual IEEE Conference on Local Computer Networks (LCN)
CY SEP 08-11, 2014
CL Edmonton, CANADA
SP IEEE, IEEE Comp Soc, Tech Comm Comp Commun, Alberta Innovates, TELUS
AB Over the last twenty years, energy conservation has always been of great importance to individuals, societies and decision makers around the globe. As a result, IT researchers have shown a great interest in providing efficient, reliable and easy-to-use IT services which help users saving energy at home by making use of the current advances in Information and Communications Technology (ICT). Driven by the aforementioned motivation, we developed SMARTENERGY.KOM, our framework for realizing energy efficient smart homes based on wireless sensor networks and human activity detection. Our work is based on the idea that most of the user activities at home are related to a set of electrical appliances which are necessary to perform these activities. Therefore, we show how it is possible to detect the user's current activity by monitoring his tine-grained appliance-level energy consumption. This relation between activities and electrical appliances makes it possible to detect appliances which could be wasting energy at home. Our framework is organized in two components. On one hand, the activity detection framework which is responsible for detecting the user's current activity based on his energy consumption. On the other hand, the EnergyAdvisor framework which utilizes the activity detection for the purpose of recognizing the appliances which are wasting energy at home and informing the user about optimization potential.
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PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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PY 2014
BP 685
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WC Computer Science, Theory & Methods; Engineering, Electrical & Electronic
SC Computer Science; Engineering
GA BC4GQ
UT WOS:000352496500025
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PT S
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Renne, D
TI Lighting control systems in peripheral offices rooms at high latitude:
measurements of electricity savings and users preferences
SO 2013 ISES SOLAR WORLD CONGRESS
SE Energy Procedia
LA English
DT Proceedings Paper
CT ISES Solar World Congress (SWC)
CY NOV 03-07, 2013
CL Cancun, MEXICO
SP ISES
DE Lighting control systems; human factor; daylight-linked system; energy
saving
AB An efficient lighting control systems (LCS) should take advantage of the natural light available, but this presents some technical challenges as well as user related issues. So far, the assessment of lighting energy consumption of LCS has been based on technical features rather than the occupants' acceptance.
This article presents the results of a monitoring study providing some recommendations based on the human and technical aspects of LCS in small scale applications.
Four identical peripheral office rooms located in Lund, Sweden, were equipped with four different LCS: manual switch at the door, presence detector, daylight dimming with absence detector and LED task lamp. Each occupant performed ordinary office tasks for two weeks in each room in April-May 2013. A subjective evaluation concerning the general lighting experience and the appreciation of the LCS was carried out.
The results indicate that the manual switch was greatly appreciated and it accomplished good energy performances (75% savings compared to the presence detector). The daylight-linked LCS achieved only slightly higher savings (79%), due to relatively high parasitic losses, but did not guarantee an optimal light environment. The desk lamp achieved 97% savings, but the lighting conditions were considered

unacceptable by the office workers. In general, the participants in this study perceived all automatic controls as stressful. (C) 2014 The Authors. Published by Elsevier Ltd.
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Z9 4
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PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2014
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BP 1987
EP +
DI 10.1016/j.egypro.2014.10.063
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WC Energy & Fuels
SC Energy & Fuels

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Hanebutte, U
AF Hu, Huafen
Huang, Yonghong
Milenkovic, Milan
Miller, Chad
Hanebutte, Ulf
GP IEEE
TI Personalized Sensing towards Building Energy Efficiency and Thermal Comfort
SO PROCEEDINGS OF THE 2014 INTERNATIONAL JOINT CONFERENCE ON NEURAL NETWORKS (IJCNN)
SE IEEE International Joint Conference on Neural Networks (IJCNN)
LA English
DT Proceedings Paper
CT International Joint Conference on Neural Networks (IJCNN)
CY JUL 06-11, 2014
CL Beijing, PEOPLES R CHINA
SP IEEE
DE building energy efficiency; sensor-enhanced IT; personal energy feedback; personal sensing architecture; data analytics; occupancy profile
AB The emergence of Information Technology (IT) based sensing has received increasing attention and acceptance in buildings due to its noninvasive nature and its ability in delivering real-time and potentially highly personalized feedback to building energy and comfort management. This study presents results of a pilot deployment experiment on such an IT-based sensing system - Personal Office Energy Monitor (POEM) developed by Intel Labs.
The pilot study shows that with appropriate analytic methods the POEM sensor data could be transferred into valuable inputs to building management system (BMS). This study applies building science principle based models as the first step to calculate intermediate building performance indices based on raw measurement data. The intermediate performance indices are then further analyzed in order to reveal potential means to improve a building's operational energy efficiency and occupant comfort. Results demonstrate that POEM sensor data could lead to energy saving opportunities through localized comfort management, plug load sensing and scheduling, and occupancy based building control. As an IT platform-integrated and occupant centered sensing system, POEM provides a convenient, low-cost, and efficient sensing solution to the next generation of smart buildings, featured by its ability in assisting BMS to improve operational building energy efficiency without compromising occupants' thermal comfort and indoor environmental quality.
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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2161-4393
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J9 IEEE IJCNN
PY 2014
BP 1963
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PG 7
WC Computer Science, Artificial Intelligence; Engineering, Electrical & Electronic; Telecommunications
SC Computer Science; Engineering; Telecommunications
GA BE4BF
UT WOS:000371465702009
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PT S
AU Cheng, Z
Shein, WW
Tan, YS
Lim, AO
AF Cheng, Zhuo
Shein, Wai Wai
Tan, Yasuo
Lim, Azman Osman
GP IEEE
TI Energy Efficient Thermal Comfort Control for Cyber-Physical Home System
SO 2013 IEEE INTERNATIONAL CONFERENCE ON SMART GRID COMMUNICATIONS (SMARTGRIDCOMM)
SE International Conference on Smart Grid Communications
LA English
DT Proceedings Paper
CT IEEE International Conference on Smart Grid Communications (SmartGridComm)
CY OCT 21-24, 2013
CL Vancouver, CANADA
SP IEEE, IEEE Commun Soc
AB Technology advances allow us to design smart home system for the purpose to achieve high demands on occupants' comfort. In this research, we focus on the thermal comfort control (TCC) system to build an

energy efficient thermal comfort control (EETCC) algorithm, which is based on the cyber-physical systems (CPS) approach. By optimizing the actuators; air-conditioner, window and curtain, our proposed algorithm can acquire the desired comfort level with high energy efficiency. Through the raw data from experiments, we evaluate and verify our proposed algorithm in the cyber-physical home system environment by using MATLAB/Simulink software.
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Z9 4
U1 0
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PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2373-6836
BN 978-1-4799-1526-2
J9 INT CONF SMART GRID
PY 2013
BP 797
EP 802
PG 6
WC Computer Science, Hardware & Architecture; Computer Science, Theory & Methods; Engineering, Electrical & Electronic; Telecommunications
SC Computer Science; Engineering; Telecommunications
GA BJT39
UT WOS:000330174800134
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PT J
AU Pagliarini, G
Rainieri, S
AF Pagliarini, Giorgio
Rainieri, Sara
TI Restoration of the building hourly space heating and cooling loads from the monthly energy consumption

SO ENERGY AND BUILDINGS
LA English
DT Article
DE Hourly heating and cooling loads; Integrated multi-energy systems in buildings; BCHP; Building energy modelling; Multivariate regression inverse modelling
ID COMMERCIAL BUILDINGS; SELECTION; GENERATION; REGRESSION; SAVINGS; DEMAND; MODEL
AB The assessment of integrated multi-energy systems in buildings may require the knowledge of the energy use for building space heating and cooling with a temporal precision of at least 1 h. To assist the overall system optimisation, a parameter estimation procedure, which allows to restore the hourly space heating and cooling loads from the monthly energy consumption is here presented. The innovative aspect of the suggested approach lies in the possibility offered by a steady-state inverse modelling procedure to restore the short term heating and cooling loads of a building by using as input aggregated energy consumption data and the short term behaviour of the climatic variables. The effectiveness of the procedure, based on a non-linear multivariate regression approach, has been assessed with synthetic data calculated by means of the TRNSYS 16 software. Climatic data from Meteonorm assisted the simulations for four European locations. Wall construction, glazing portion, internal both sensible and latent heat gain, air change rate, time scheduling of plant operation have been considered. The hourly space heating or cooling loads were restored with a coefficient of determination included between 0.74 and 0.96. The satisfactory results obtained suggest that the estimation procedure can be extended to restore the hourly energy use for space heating and cooling from the utility bills of existing buildings. (c) 2012 Elsevier B.V. All rights reserved.
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SEEM JE, 1991, ASHRAE TRAN, V97, P710
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U1 1
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PU ELSEVIER SCIENCE SA
PI LAUSANNE

PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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J9 ENERG BUILDINGS
JI Energy Build.
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Hester, N
Li, K
Schramski, JR
Crittenden, J
AF Hester, Nathan
Li, Ke
Schramski, John R.
Crittenden, John
TI Dynamic modeling of potentially conflicting energy reduction strategies for residential structures in semi-arid climates
SO JOURNAL OF ENVIRONMENTAL MANAGEMENT
LA English
DT Article
DE Energy-saving measures; Structural insulated panels; Energy performance modeling; Sustainable residential design
ID CONSUMPTION; BUILDINGS; SECTOR
AB Globally, residential energy consumption continues to rise due to a variety of trends such as increasing access to modern appliances, overall population growth, and the overall increase of electricity distribution. Currently, residential energy consumption accounts for approximately one-fifth of total U.S. energy consumption. This research analyzes the effectiveness of a range of energy-saving measures for residential houses in semi-arid climates. These energy-saving measures include: structural insulated panels (SIP) for exterior wall construction, daylight control, increased window area, efficient window glass suitable for the local weather, and several combinations of these. Our model determined that energy consumption is reduced by up to 6.1% when multiple energy savings technologies are combined. In addition, pre-construction technologies (structural insulated panels (SIPS), daylight control, and increased window area) provide roughly 4 times the energy savings when compared to post-construction technologies (window blinds and efficient window glass). The model also illuminated the importance variations in local climate and building configuration; highlighting the site-specific nature of this type of energy consumption quantification for policy and building code considerations. Published by Elsevier Ltd.
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WC Environmental Sciences
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PT J
AU Foley, HC
Freihaut, J
Hallacher, P
Knapp, C
AF Foley, Henry C.
Freihaut, James
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TI THE GREATER PHILADELPHIA INNOVATION CLUSTER FOR ENERGY-EFFICIENT
BUILDINGS: A NEW MODEL FOR PUBLIC-PRIVATE PARTNERSHIPS
SO RESEARCH-TECHNOLOGY MANAGEMENT
LA English

DT Article
DE Energy efficiency; Building retrofit technology; Private-public partnership; Business-university partnership
AB OVERVIEW: The Greater Philadelphia Innovation Cluster (GPIC) for Energy-Efficient Buildings is breaking new ground on how public-private research partnerships are conducted. A consortium of public, private, and academic institutions is working under the guidance of seven federal agencies to transform the fragmented building retrofit environment into a systems solution industry while boosting energy efficiency, creating jobs, and stimulating private investment. GPIC is unique in that it is researching not only cutting-edge technology and tools but also the policies, financial models, workforce training programs, and intellectual property agreements to support the technology. Both the technology and the accompanying frameworks will be demonstrated and deployed regionally and nationally
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FU Greater Philadelphia Innovation Cluster for Energy Efficient Buildings, an energy innovation hub; Department of Energy [DE-EE0004261]; agency of the United States Government
FX This material is based upon work supported by the Greater Philadelphia Innovation Cluster for Energy Efficient Buildings, an energy innovation hub sponsored by the Department of Energy under Award Number DE-EE0004261.; This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer; or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof
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NR 5
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PU INDUSTRIAL RESEARCH INST, INC
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PT J
AU Berl, A
Race, N
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de Meer, H
AF Berl, Andreas
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Ishmael, Johnathan
de Meer, Hermann
TI Network virtualization in energy-efficient office environments
SO COMPUTER NETWORKS
LA English
DT Article
DE Energy efficiency; Office environment; Virtualization; Peer-to-peer;
Power management; Resource sharing
ID FUTURE HOME ENVIRONMENTS
AB The rising costs of energy and world-wide desire to reduce CO2 emissions has led to an increased concern over the energy efficiency of information and communication technology. Whilst much of this concern has focused on data centres, office environments (and the computing equipment that they contain) have also been identified as a significant consumer of energy. Office environments offer great potential for energy savings, given that computing equipment often remains powered for 24 h per day, and for a large part of this period is underutilised or idle. This paper proposes an energy-efficient office management approach based on resource virtualization, power management, and resource sharing. Evaluations indicate that about 75% energy savings are achievable in office environments without a significant interruption of provided services. A core element of this office management is a peer-to-peer network that interconnects office hosts, achieves addressing and mediation, and manages energy efficiency within the office environment. Several peer-to-peer approaches are suggested and discussed in this paper. Two of the approaches are evaluated, based on a discrete-event simulation. (C) 2010 Elsevier B.V. All rights reserved.
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PT J
AU Ben-David, T
Rackes, A
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Waring, Michael S.
TI Alternative ventilation strategies in US offices: Saving energy while enhancing work performance, reducing absenteeism, and considering outdoor pollutant exposure tradeoffs

SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Indoor air quality (IAQ); Healthy buildings; Energy efficiency; Multi-criteria decision-making; Building energy simulation; Economizer controls
ID INDOOR AIR-QUALITY; DEMAND-CONTROLLED VENTILATION; BUILDING SYNDROME SYMPTOMS; LONG-TERM EXPOSURE; RESIDENTIAL BUILDINGS; SCIENTIFIC LITERATURE; COMMERCIAL BUILDINGS; PARTICULATE MATTER; SEQUENCE GENERATOR; CO2 CONCENTRATIONS
AB Mechanical ventilation can improve occupant productivity, use or save energy, and increase outdoor-to-indoor pollutant transport. This work explores those impacts for eight ventilation strategies, relative to a baseline constant mechanical ventilation rate (VR) of 9.4 L/s/occ, in two representative offices. Strategies were unique combinations of airside economizing, demand-controlled ventilation, and supply air temperature reset, along with doubling the baseline VR. These were evaluated within a Monte Carlo analysis that varied climate and outdoor pollution, along with 19 building parameters. Energy modeling, empirical correlations, and indoor air quality (IAQ) modeling were used to quantify outcomes of: (i) energy use; (ii) profitable IAQ impacts, e.g. work performance; and (iii) negative IAQ health impacts due to indoor particle and ozone exposure. 'Win-win' strategies were defined as those that saved energy and increased work performance, and these always included an economizer. Relative to the baseline, the win-win strategies: increased annual geometric mean VRs by 5-10 L/s/occ; reduced mechanical system energy consumption by 12-27% (saving $1-1.75/m(2)/year); increased work performance by 0.5%; eliminated 5 h of absenteeism per year; and increased indoor PM2.5 by 0.5 mu g/m(3) and ozone by 3 ppb. A sensitivity analysis identified infiltration and climate as the largest outcome drivers. Median annual benefits for small-to-medium-large offices in the U.S. (similar to 75% of office floorspace) were $28 billion for implementing the win-win strategy with the greatest energy savings, and $55 billion for implementing the win-win strategy with the greatest work performance increase. Particle exposure tradeoffs were mitigated by use of efficient filters. (C) 2017 Elsevier Ltd. All rights reserved.
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FU U.S. National Science Foundation (NSF) [1511151]; U.S. NSF Graduate Research Fellowship [1002809]
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Zhao H., 2016, INDOOR AIR
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PT J
AU Fan, H
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TI Statistical analysis of drivers of residential peak electricity demand
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Peak demand; Residential; Electricity demand; Energy demand; Smart grid;
Peak load; Influence; Factors
ID ENERGY DEMAND; CONSUMPTION; MODEL; LOAD; CLIMATE; AUSTRALIA; PROFILES;
SECTOR; IMPACT

AB Growth in peak electricity demand poses considerable challenges for utilities seeking to ensure secure, reliable yet affordable energy provision. A better understanding of the key drivers of residential peak electricity demand could assist in better managing peak demand growth through options including demand-side participation and energy efficiency programs. However, such analysis has often been constrained by the limited data available from standard household metering, as well as typically low direct engagement by utilities with households regarding their energy use. This paper presents a study analysing and modeling residential peak demand in the greater Sydney region using data from Australia's largest Smart Grid study to date. The dataset includes household level half hour consumption matched to surveyed information including housing type, demographics and appliance ownership. A range of statistical and modeling techniques are applied to determine key drivers for household demand at times of network peaks. The analysis and model quantify how different factors drive residential peak demand on hot summer days. Key drivers identified include air-conditioning ownership, the number of household occupants, swimming pool ownership, and clothes dryer usage. Finally, the model is used to investigate the potential aggregate network peak implications of changes in household demographics and appliance ownership. Crown Copyright (C) 2017 Published by Elsevier B.V. All rights reserved.

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AU Asensio, OI
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TI The effectiveness of US energy efficiency building labels
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ID SIZED MANUFACTURING FIRMS; DEMAND-SIDE MANAGEMENT; CAUSAL INFERENCE; PROPENSITY SCORE; PROGRAM-EVALUATION; HOUSING-MARKET; CONSERVATION; ECONOMICS; BEHAVIOR; ADOPTION
AB Information programs are promising strategies to encourage investments in energy efficiency in commercial buildings. However, the realized effectiveness of these programs has not yet been estimated on a large scale. Here we take advantage of a large sample of monthly electricity consumption data for 178,777 commercial buildings in Los Angeles to analyse energy savings and emissions reductions from three major programs designed to encourage efficiency: the US Department of Energy's Better Buildings Challenge, the US Environmental Protection Agency's Energy Star program and the US Green Building Council's Leadership in Energy and Environmental Design (LEED) program. Using matching techniques, we find energy savings that range from 18% to 30%, depending on the program. These savings represent a reduction of 210 million kilowatt-hours or 145 kilotons of CO2 equivalent emissions per year. However, we also find that these programs do not substantially reduce emissions in small and medium sized buildings, which represent about two-thirds of commercial sector building emissions.
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TI Thermal comfort or money saving? Exploring intentions to conserve energy among low-income households in the United States
SO ENERGY RESEARCH & SOCIAL SCIENCE
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DT Article
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ID ENVIRONMENTAL CONCERN; PLANNED BEHAVIOR; RESIDENTIAL BUILDINGS; CLIMATE-CHANGE; HOT SUMMER; CHINA STATUS; GROUP NORMS; CONSUMPTION; ATTITUDES; DETERMINANTS
AB Low-income households comprise an important, but often-neglected, target population for energy reduction in the U.S. residential sector. Previous research of this population tends to emphasize demographic and economic factors with little consideration of social-psychological variables. This paper utilized the theory of planned behavior (TPB) to investigate how demographics, climate zones, and a set of social-psychological variables, including energy concern, bill consciousness, frugality attitude, and thermal comfort (needs for coolness and warmness) influenced energy conservation intentions among 248 low-income households across the U.S. Results indicated that the three TPB variables alone (attitudes toward energy-conservation, subjective norms, and perceived behavioral control) had positive effects on energy conservation intentions. Attitudes toward energy-conservation and perceived behavioral control remained as the strongest predictors after accounting for other variables. Meanwhile, bill consciousness positively predicted energy conservation intentions, whereas needs for warmness and coolness negatively predicted intentions. Gender and climate zones predicted intentions when other variables were not included in the model. This study provides important insights on low-income households' energy-conservation intentions, as well as the antecedents and potential barriers, which provide useful recommendations for future energy policy initiatives. Published by Elsevier Ltd.
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TI Comparison of two residential Smart Grid pilots in the Netherlands and in the USA, focusing on energy performance and user experiences
SO APPLIED ENERGY
LA English
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DE Electricity consumption; Electricity generation; End-users; Smart Grids; Residential applications
ID CONSUMPTION; CLIMATE; DEMAND
AB Two residential Smart Grid pilots, PowerMatching City, Groningen (NL) and Pecan Street, Austin Texas (USA) have been compared regarding their energy performance and the experiences of users in these pilots. The objective of the comparison was to gain new insights that could support the successful deployment of future residential Smart Grids.

Measured data on electricity generation and electricity consumption of households in 2013 and 2014 were evaluated. Existing reports with results of surveys of users were also analyzed.

The energy performance revealed that the average domestic electricity consumption of households in PowerMatching City was lower compared to Pecan Street (2.6 GW h versus 10.1 GW h). At the same time, households in Pecan Street generated a higher amount of electricity compared to PowerMatching City (6.8 GW h versus 1.14 GW h). Households in Pecan Street consumed on average, 8% less electricity with respect to the USA average household domestic electricity consumption of 10.9 GW h; while households in PowerMatching City consumed 19% less electricity compared to the Dutch average household domestic electricity consumption of 3.1 GW h.

Households in PowerMatching City appeared to have a higher potential to contribute to electricity demand and supply balancing, because their electricity consumption from the grid was largely reduced with increased self-generation.

User experiences revealed that end-users in both pilots preferred technologies that automatically shift their energy use, since this requires minimal effort from them.

We conclude that the pattern of households' electricity generation and consumption in Smart Grid pilot projects, and their contribution to peak load balancing in the electricity network is largely influenced by

existing Smart Grid set-ups, local climate and related needs for heating and cooling, the average capacity of installed energy generating technologies and the prevailing energy behavior. (C) 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.orgflicenses/by/4.0/).

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TI Discovering residential electricity consumption patterns through smart-meter data mining: A case study from China
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ID CLUSTER VALIDITY INDEX; LOAD PROFILES; ENERGY-CONSUMPTION; GRID ENVIRONMENT; BIG DATA; K-MEANS; FUZZY; RECOGNITION; ALGORITHMS; MODEL
AB With the increasing penetration of information and communication technologies (ICTs) in energy systems, traditional energy systems are being digitized. Advanced analysis of the energy production and consumption data and data-driven decision support can be combined to promote the fortnation and development of smart energy systems. Smart grids are a specific application of smart energy systems. Different electricity consumption patterns of residential users can be discovered and extracted by clustering analysis of the electricity consumption data collected by smart meters and other data acquisition terminals in a smart grid. This research explores daily electricity consumption patterns of low-voltage residential users in China. The service architecture of smart power use and the structure of electric energy data acquisition system of the State Grid Corporation of China (SGCC) are introduced and a process model for mining daily electricity consumption data is presented. The analysis is based on the fuzzy c-means (FCM) clustering method and a fuzzy cluster validity index (PBMF). A case study of Kunshan City, Jiangsu Province, China is presented, using the daily electricity consumption data of 1312 low-voltage users within a month. (C) 2017 Elsevier Ltd. All rights reserved.
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AB This study examined the impact of electricity generation by fuel source type and electricity consumption on carbon emissions to assess the role of climatic variability and energy efficiency (EE) in the United States. Despite high levels of greenhouse gas emissions, residential electricity consumption continues to increase in the United States and fossil fuels are the primary fuel source of electricity generation. 97.2% of the variability in carbon emissions in the electricity industry was explained by electricity generation from coal and residential electricity consumption. The relationships between residential electricity consumption, short-term climatic variability, long-term climatic trends, short-term reduction in electricity from EE programs, and long-term trends in EE programs was examined. This is the first study of its nature to examine these relationships across the 48 contiguous United States. Inter-year and long-term trends in cooling degree days, or days above a baseline temperature, were the primary climatic drivers of residential electricity consumption. Cooling degree days increased across the majority of the United States during the study period, and shared a positive relationship with residential electricity consumption when findings were significant. The majority of electricity reduction from EE programs was negatively related to

residential electricity consumption where findings were significant. However, the trend across the majority of states was a decrease in electricity reduction from EE while residential electricity consumption increased. States that successfully reduced consumption are discussed, in addition to the potential use of communication theory to design interventions aimed at improving EE program success. (C) 2016 Published by Elsevier Ltd.

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U2 28
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SN 0306-2619
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J9 APPL ENERG
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WC Energy & Fuels; Engineering, Chemical
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PT J
AU Poruschi, L
Ambrey, CL
AF Poruschi, Lavinia
Ambrey, Christopher L.
TI On the confluence of city living, energy saving behaviours and direct residential energy consumption
SO ENVIRONMENTAL SCIENCE & POLICY
LA English
DT Article
DE Australia; Cities; Direct energy consumption; Energy saving behaviours; Household Energy Consumption Survey; Pro-environmental behaviours

ID COMPACT CITIES; CONSERVATION; DETERMINANTS; EXPENDITURES; APPLIANCES; ATTITUDES; CLIMATE; POLICY; GROWTH
AB The purpose of this study is to shed light on the connection between income, dwelling type, tenure type and city living, in terms of both a household's energy saving behaviours and direct residential energy consumption. This study employs data from the Household Energy Consumption Survey, Australia. Using a seemingly unrelated regression (SUR) system of equations the results reveal some key mechanisms which may allow householders to realise lower levels of energy consumption and hence lower carbon emissions. The results indicate that there are characteristics unique to living in a city that are linked to higher levels of direct residential energy consumption. On a number of measures (e.g. household income, tenure type and dwelling type), the results point to a lower likelihood of engaging in energy saving behaviours in cities. Also, depending on the number of energy saving behaviours, these actions have the potential to more than offset higher direct residential energy consumption of householders residing in separate houses. Coupled with these findings renters, a more vulnerable social group, are found to be significantly disadvantaged, suffering from a much lower adaptive capacity. Specifically, householders who rent their home are 77% less likely to have solar electricity. A result which may reflect differences in access to opportunity. Further, householders who rent are less likely to engage in energy saving actions. A finding which may reflect difference in ontological security and the greater psychological burden associated with undertaking energy saving behaviours (a barrier) borne by renters not shared with home owners. (C) 2016 Elsevier Ltd. All rights reserved.
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PT J
AU Trencher, G
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Takagi, T
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AF Trencher, Gregory
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Sprigings, Zoe
Nishida, Yuko
Yarime, Masaru
TI Innovative policy practices to advance building energy efficiency and retrofitting: Approaches, impacts and challenges in ten C40 cities

SO ENVIRONMENTAL SCIENCE & POLICY
LA English
DT Article
DE Building energy efficiency; Retrofitting; City climate governance; Policy innovation; C40
ID CLIMATE POLICY; TRADE PROGRAM; PERSPECTIVE; DIFFUSION
AB This study examines ten programmes to advance energy efficiency and retrofitting of existing, private sector buildings in C40 cities in Asia-Pacific and USA. We set out to identify differing policy approaches, together with potential impacts and implementation challenges for each. Findings unearthed six policy models - both mandatory and voluntary - with unique impacts and challenges. We demonstrate that innovation occurs without new policy inventions and largely by necessity, as new features are added and generic models are adapted to local circumstances. Our sample demonstrated experimentation with benchmarking in the USA, comprehensive regulation in Asia, and voluntary approaches in Australia. Overall, environmental impacts are particularly slow to emerge and plagued with attribution challenges. We found limited evidence of benchmarking programme effectiveness in reducing energy consumption in the short-term, but some indication of mid-term outcomes. Driven by unique local circumstances, the cap-and-trade model stood out by fostering large, sustained and attributable GHG emission reductions and retrofitting. Market and social impacts are highly significant across all programmes, highlighting needs to consider non-environmental impacts in policy evaluation. We emphasise the complementary potential of voluntary and regulatory approaches to advancing energy efficiency and climate resilience. We also underscore the potential for reporting or benchmarking programmes to later transition to models mandating performance improvements, such as cap-and-trade. (C) 2016 Elsevier Ltd. All rights reserved.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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PT J
AU Wang, T
Li, XD
Liao, PC
Fang, DP
AF Wang, Tao
Li, Xiaodong
Liao, Pin-Chao
Fang, Dongping

TI Building energy efficiency for public hospitals and healthcare facilities in China: Barriers and drivers
SO ENERGY
LA English
DT Article
DE Barriers and drivers; Energy efficiency; Hospitals; Healthcare facilities; China; Stakeholders
ID CONSERVATION; PERFORMANCE; CHALLENGES; POLICIES; SYSTEMS; SAVINGS; SECTOR; HVAC
AB Maximizing energy efficiency within HHFs (hospitals and healthcare facilities) is a major challenge in the field of energy conservation. This paper studies the key barriers to the implementation of energy efficient technologies in China's public HHFs. For this purpose, a preliminary survey was conducted at the Beijing Municipal Health Bureau in order to assess the energy conservation efforts being made at 20 public HHFs. In the survey, a list of specific barriers to energy efficiency was created and HHF staffs were asked to rank these barriers in the order of importance. The results show that the economic incentives, appropriate technology, as well as enforceable laws and regulations are insufficiently supported by the government, have become the most significant obstacles to the improvement of energy efficiency. To remedy this, policymakers should take a multipronged approach which addresses the hospitals, projects, and technical and operating procedures in order to encourage the full participation and support of all stakeholders involved. Specifically, the government should offer multilevel economic incentives and reward policies; establish practical mandatory targets for building energy efficiency; provide demonstrable best practices in terms of the project, techniques, and operating procedures; and promote awareness of the importance of property risk management.
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FX We wish to acknowledge the Natural Science Foundation of China (Grant No. 71401191, No. 51378297) for their financial support of this research, and also the Fundamental Research Funds for the Central Universities.
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
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PT J
AU Abushnaf, J
Rassau, A
Gornisiewicz, W
AF Abushnaf, Jamal
Rassau, Alexander
Gornisiewicz, Wlodzimierz
TI Impact on electricity use of introducing time-of-use pricing to a
multi-user home energy management system
SO INTERNATIONAL TRANSACTIONS ON ELECTRICAL ENERGY SYSTEMS
LA English
DT Article
DE home energy management; time of use; controllable load; multiple

inhabitants
ID DEMAND RESPONSE; LOAD CONTROL
AB Home energy management system technology can provide a smart and efficient way of optimizing energy usage in residential buildings. This paper presents a home energy management system algorithm that monitors and controls household appliances based on time-of-use (TOU) energy pricing models while accounting for multiple inhabitants sharing a home and its appliances. This algorithm helps to manage and schedule usage by prioritizing multiple users with preferred usage patterns. Two different scenarios will be implemented to develop and test the influence of a multiple-users and load priority (MULP) algorithm on reducing energy consumption, energy cost and carbon footprint. In the first scenario, TOU pricing and different demand limits are used, while the second scenario focuses on the TOU pricing with different demand limits combined with the MULP model. Simulation results show that the combination of the MULP model and the TOU pricing leads to significant reductions in user payments and total energy consumption. Copyright (C) 2015 John Wiley & Sons, Ltd.
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NR 23
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Z9 3
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PU WILEY-BLACKWELL
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PA 111 RIVER ST, HOBOKEN 07030-5774, NJ USA
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JI Int. Trans. Electr. Energy Syst.
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WC Engineering, Electrical & Electronic
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PT J
AU Ornetzeder, M
Wicher, M
Suschek-Berger, J
AF Ornetzeder, Michael
Wicher, Magdalena
Suschek-Berger, Juergen
TI User satisfaction and well-being in energy efficient office buildings:
Evidence from cutting-edge projects in Austria
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficiency; Office buildings; Well-being; User satisfaction;
Survey; Case studies; Sociomaterial perspective
ID THERMAL COMFORT; PERFORMANCE; TECHNOLOGIES; ENVIRONMENTS; BEHAVIOR;
FIELD; GAP
AB This paper aims to improve our knowledge of energy use and well-being in energy efficient office buildings. It explores the interrelations between forms and patterns of energy use on the one hand and user satisfaction, comfort, and well-being on the other hand. Findings are derived from qualitative and quantitative data collected in a recently finished research project in Austria. Fieldwork consisted of two qualitative case studies as well as an online-based survey amongst users of energy efficient office buildings. In addition, secondary data from energy-monitoring research was used to underpin the analysis. The results show that extremely low levels of energy use in office buildings can be aligned with high levels of well-being. Based on empirical findings the paper argues that both well-being and energy performance in office buildings are the result of a complex, on-going and intertwined process that involves various material and social elements.
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FU Austrian Ministry for Transport, Innovation and Technology
FX This work was supported by the Austrian Ministry for Transport, Innovation and Technology. All authors contributed equally in the preparation of this manuscript. We would like to thank all of the interview partners from the two case-study buildings and our colleagues Peter Franz, Daniela Freitag, Julia Haslinger, Albert Pilger, Harald Rohracher, Susanne Schidler, Erich Schober, Anita Thaler, Wibke Tritthart.
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U2 14
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JI Energy Build.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA DJ7CM
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ER
FN Clarivate Analytics Web of Science
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PT J
AU Sanseverino, ER
Scaccianoce, G
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Carta, M
Sanseverino, RR
AF Sanseverino, Eleonora Riva

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TI Smart Cities and Municipal Building Regulation for Energy Efficiency
SO INTERNATIONAL JOURNAL OF AGRICULTURAL AND ENVIRONMENTAL INFORMATION SYSTEMS
LA English
DT Article
DE Energy Efficiency in Buildings; Municipal Building Regulation; Smart City; Smart Planning Protocol; Sustainable Urban Planning
AB The "Smart Cities & Communities Initiative" of the Strategic Energy Technology Plan is the strategic European response to lead cities and regions to a carbon free future. In this contest energy efficiency in buildings has a crucial role and must be considered in a holistic approach to the urban planning. In order to implement the minimum requirements stated by the European Directive about the Energy Performance of Buildings, and in order to consider different planning layers with the view to a smart city planning, local regulations are a key factor aiming at sustainable territorial planning. This paper investigates the possibility to draft a basic structure of Municipal Building Regulations in order to guide local administrators and technicians and to limit discretionary power of bureaucracy. The paper is organized as follows. First, a review of the most common practices for building regulations in Europe is proposed, then the basic structure of a municipal building regulation for the city of Palermo (Southern Italy) accounting for sustainability is discussed.
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U2 2
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PT J
AU Oliveira, MHD
Rebelatto, DAD
AF da Fonseca Oliveira, Mario Henrique
do Nascimento Rebelatto, Daisy Aparecida
TI The evaluation of electric energy consumption in the Brazilian residential sector: A technological improvement proposal in order to increase its efficiency
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Electricity; Energy efficiency; Econometrics
ID PERFORMANCE

AB In light of Brazil's socio-economic development in the last 20 years, the population has greater access to consumer goods, hence impacting the escalating growth in electricity demand, thereby resulting in the need for substantial investments in electricity generation and transmission. In contrast, government institutions have not taken effective measures to increase the energy efficiency of the most impactful energy-consuming appliances, which would reduce the need for energy investments. Through econometric models, Brazil's residential electricity consumption was projected up to 2030 and it is predicted that results can be achieved if through tax exemption, the government can promote the use of more energy-efficient technologies. Through an economic and financial evaluation, our study analyzes the potential effects of a decrease in tax revenues for the State in light of lower investment needs in energy generation and distribution. (C) 2015 Elsevier Ltd. All rights reserved.
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NR 47
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Z9 3
U1 1
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PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Renew. Sust. Energ. Rev.
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PY 2015
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels
GA CL7HA
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PT J
AU Wang, XH
Zhu, LY
Qian, YT
Tang, LB
AF Wang Xiaohua
Zhu Liyun
Qian Yuting
Tang Libin
TI RURAL HOUSEHOLD ENERGY CONSUMPTION IN JIANGSU PROVINCE OF CHINA
SO ENERGY & ENVIRONMENT
LA English
DT Article
DE Rural energy; Biomass energy; Energy consumption; Energy policy
ID ECONOMIC-DEVELOPMENT; TRANSITION; REGION
AB Rural household energy consumption is an important component of the national total energy consumption. This has major implications for rural society, economy, and the environment. Jiangsu province is located in the economically developed coastal area, and assuming further social and economic development in its rural regions, commercial energy will become increasingly essential for rural households. By studying and analyzing change across time and region in southern, central and northern Jiangsu, we hope to contribute to the understanding of the change in rural household energy consumption in both China and the developing countries in general. Using questionnaires, household energy consumption and related problems were investigated in nine typical counties in Jiangsu province to show the large differences in the level of per capita rural household consumption and the structure of useful energy consumption in the typical areas. The current household consumption per capita is 396.93 kgce in a typical rural areas, with straw consumption contributing 38.73%, and electricity 32.96%. The structural differences of energy consumption and the percentage of commercial energy of useful heat in southern, central and northern Jiangsu were also investigated, as was the relationship between energy consumption

and household net income. The study should help in building a balanced system of energy demand and supply and utilizeing biomass resources on a large scale.
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FU Management Office of the China Renewable Energy Scale-up Program (CRESP)
FX This paper is based on "Assessment for Jiangsu Provincial Biomass Energy Resources and Study on the Development Planning" supported by The Management Office of the China Renewable Energy Scale-up Program (CRESP). I would like to thank many experts and organizations for great support to this research.
CR Barnes DF, 2011, ENERG POLICY, V39, P894, DOI 10.1016/j.enpol.2010.11.014
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PU MULTI-SCIENCE PUBL CO LTD
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WC Environmental Studies
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PT J
AU Azizi, NSM
Wilkinson, S
Fassman, E
AF Azizi, Nurul Sakina Mokhtar
Wilkinson, Suzanne
Fassman, Elizabeth
TI Strategies for improving energy saving behaviour in commercial buildings in Malaysia
SO ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT
LA English
DT Article
DE Malaysia; Energy efficiency; Management; Green buildings; Building services; Energy saving behaviour
ID PERFORMANCE
AB Purpose - The purpose of this paper is to investigate the level of energy saving behaviour between green and conventional office buildings in Malaysia to determine if people in green buildings perform better energy saving behaviour than people in conventional buildings. The paper specifically focused on use of technology, computer usage and potential energy savings from that use. The paper then examines what strategies are used to encourage energy saving behaviour for building occupants.
Design/methodology/approach - Questionnaires were distributed to occupants in the buildings to evaluate the extent of energy saving behaviour practiced, and identify potential strategies to encourage energy saving behaviour.
Findings - The findings show better energy saving behaviour practice in green buildings and the paper show why this is the case. The recommended strategies to encourage energy saving behaviour are discussed, and include means of raising education awareness on energy efficiency among the occupants. This can be done through distribution of guidelines, posters, pamphlets and e-mails. Occupants can also be given live updates on the energy usage of the building. Briefing on the objectives and goals of the organisation's commitment to energy efficiency can be given to newly employed staff. As seen in this paper, these multiple strategies have shown to be successful in encouraging energy saving behaviours.
Originality/value - To date, energy saving behaviour has been given less focus in improving green building performance. There is limited research that compares energy saving behaviour between green and conventional commercial buildings in Malaysia. The findings provide a better understanding on occupants' behaviour in energy conservation and suggest strategies for future recommendation.
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AU Di Giuda, GM
Villa, V
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AF Di Giuda, Giuseppe Martino
Villa, Valentina
Piantanida, Paolo
BE Perino, M
TI BIM and energy efficient retrofitting in school buildings
SO 6TH INTERNATIONAL BUILDING PHYSICS CONFERENCE (IBPC 2015)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 6th International Building Physics Conference (IBPC)
CY JUN 14-17, 2015
CL Torino, ITALY
SP ATI Piemonte, PolitecnicoTorino, Dept Energy
DE BIM; schools; energy efficiency
AB The aim of the research project presented in this paper is to experiment actions to improve the existing school building management and maintenance through a technological and process innovation based on the Building Information Modeling (BIM). In the field of refurbishment and reuse of existing buildings, some of the most sensible and specific sectors are investigated, particularly focusing on energy efficiency, structural improvement, up-to-date information on completed works and quality control. The project's goal is to take advantage of the information technologies, beginning from software interoperability, and defining a new working philosophy that should use the BIM also in the monitoring, managing and maintenance phases. This will result in an advanced drafting of the design standards for refurbishment/reuse of public buildings by a hierarchic data structure (Preliminary Requirements). The optimization of the process will lead to a complete building modeling (architecture, structure, facilities, deterioration) in order to describe both the residual building performance and the outgoings of the refurbishment design (Final BIM Requirements). The research has been validated by on-field application (school buildings). (C) 2015 The Authors. Published by Elsevier Ltd.
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AU Timma, L
Bariss, U
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Blumberga, D
AF Timma, Lelde
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Blumberga, Andra
Blumberga, Dagnija
BE Yan, J
Shamim, T
Chou, SK
Li, H
TI Outlining innovation diffusion processes in households using system dynamics. Case study: energy efficiency lighting
SO CLEAN, EFFICIENT AND AFFORDABLE ENERGY FOR A SUSTAINABLE FUTURE
SE Energy Procedia
LA English
DT Proceedings Paper
CT 7th International Conference on Applied Energy (ICAE)
CY MAR 28-31, 2015
CL Abu Dhabi, U ARAB EMIRATES
DE behavioural science; demand side management; households energy use; innovation diffusion; technology adoption; system dynamics
ID ENVIRONMENTAL BEHAVIOR
AB Various innovations have reached a mature state, but they diffuse slowly. The aim of our research is to propose the model of innovation diffusion for energy efficiency solutions in households. The methodology used combines empirical study with system dynamics modelling. As the case study light emitting diodes (LEDs) is studied. Although the system dynamics model was based on the one specific innovation diffusion process, its general application to other products and services is possible, since the developed model is white-box and can be used for further research of other processes. (C) 2015 The Authors. Published by Elsevier Ltd.
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PT S
AU Vogel, JA
Lundqvist, P
Arias, J
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TI Categorizing barriers to energy efficiency in buildings
SO CLEAN, EFFICIENT AND AFFORDABLE ENERGY FOR A SUSTAINABLE FUTURE
SE Energy Procedia
LA English
DT Proceedings Paper
CT 7th International Conference on Applied Energy (ICAE)

CY MAR 28-31, 2015
CL Abu Dhabi, U ARAB EMIRATES
DE Energy efficiency; barriers; categorizing; sociotechnical system; multifamily buildings; Sweden
ID FRAMEWORK; GAP
AB Introducing new technologies in buildings in Sweden have historically been connected with great portions of scepticism, hence influencing the speed of acceptance of new technologies. The speed is slow even though technologies are tested, evaluated, proven to make an impact, and economic efficient. In order to understand acceptance of energy efficient technologies in multifamily buildings and to identify the origin of barriers to energy efficiency this paper investigates barriers as consequences of the current system structure in the Swedish building sector. The study views the Swedish building sector as a sociotechnical system built from technical artefacts, institutions, and actors, thus often deeply embedded in our societies. The Swedish building sector is well structured, resulting in that innovation and development occurring outside of the existing sociotechnical regime might not be recognized as feasible investments. In order to identify the structures enabling barriers to energy efficiency adoption this paper aims at developing a framework for categorizing barriers depending on their structural origin. The categorization framework is inspired by theories of sustainable innovation journeys and of soft systems and distinguishes between three decision-levels for barriers to energy efficiency: Project level, Sector level and Contextual level. By implementing the proposed categorization framework it becomes obvious that problem areas in the building sector are not connected to any specific structural level. However, results in this study reveal that most barriers originate in the Contextual level, which implies that energy and sustainability are not yet key aspects when forming and transforming contextual preconditions on how to design and build multifamily buildings in Sweden. (C) 2015 The Authors. Published by Elsevier Ltd.
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PT J
AU Brooks, E
Law, A
Huang, LJ
AF Brooks, Elizabeth
Law, Andrew
Huang, Lingjiang
TI A comparative analysis of retrofitting historic buildings for energy efficiency in the UK and China
SO DISP
LA English
DT Article
ID RESIDENTIAL BUILDINGS; REFURBISHMENT; MANAGEMENT; POLICIES
AB In the UK retrofitting, or 'retrospective refitting' has become a central strategy in reducing energy inefficiency and carbon emissions. However, whilst implementation has increased, research shows that there are still several problematic barriers to the full implementation and embedding of energy efficiency retrofit policies. Likewise, international ecological commentators, developers and policy-makers have also pointed to the growth of retrofitting ideas and policies in modernising nations such as China; however, as investigations are beginning to show, the full implementation of retrofitting practices in modernising countries is also difficult, with local policy-makers and developers showing much more interest in newbuild, as opposed to retrofitting existing buildings and/or heritage sites. Taking the UK and China as two key examples of earlier and more recent retrofitting cultures, this paper reflects on the different barriers to retrofitting historical buildings for energy efficiency in these countries and explores the potential drivers for retrofitting in each of these contexts.
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AU Scott, MJ
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Daly, Don S.
Zhou, Yuyu
Rice, Jennie S.
Patel, Pralit L.
McJeon, Haewon C.
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Kim, Son H.
Eom, Jiyong
Clarke, Leon E.
TI Evaluating sub-national building-energy efficiency policy options under uncertainty: Efficient sensitivity testing of alternative climate, technological, and socioeconomic futures in a regional integrated-assessment model
SO ENERGY ECONOMICS
LA English
DT Article
DE Climate change; Mitigation and adaptation; Integrated-assessment; Sensitivity analysis; Design of computer experiments; Integrated-assessment modeling
ID SYSTEM MODEL; TRANSPORTATION; MITIGATION; SIMULATION; FRAMEWORK; US
AB Improving the energy efficiency of building stock, commercial equipment, and household appliances can have a major positive impact on energy use, carbon emissions, and building services. Sub-national regions such as the U.S. states wish to increase energy efficiency, reduce carbon emissions, or adapt to climate change. Evaluating sub-national policies to reduce energy use and emissions is difficult because of the large uncertainties in socioeconomic factors, technology performance and cost and energy and climate policies. Climate change itself may undercut such policies. However, assessing all of the uncertainties of large-scale energy and climate models by performing thousands of model runs can be a significant modeling effort with its accompanying computational burden. By applying fractional-factorial methods to the GCAM-USA 50-state integrated-assessment model in the context of a particular policy question, this paper demonstrates how a decision-focused sensitivity analysis strategy can greatly reduce computational burden in the presence of uncertainty and reveal the important drivers for decisions and more detailed uncertainty analysis. (C) 2014 Elsevier B.V. All rights reserved.
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JI Energy Econ.
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AU Ghadi, YY
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Chou, SK
Desideri, U
Li, H
TI Potential of Saving Energy Using Advanced Fuzzy Logic Controllers in Smart Buildings in Subtropical Climates in Australia
SO INTERNATIONAL CONFERENCE ON APPLIED ENERGY, ICAE2014
SE Energy Procedia
LA English
DT Proceedings Paper
CT 6th International Conference on Applied Energy (ICAE)
CY MAY 30-JUN 02, 2014
CL Taipei, TAIWAN
DE Subtropical; Building management Systems (BMS); Controllers; Fuzzy base controllers
ID MODEL
AB Subtropical Regions in Australia are associated with high demand for air conditioning throughout the long Summer which leads to a high energy consumption and consequently high greenhouse gas (GHG) emissions which has a high negative impact on the environment. Using conventional controllers in Building Management Systems (BMS) whose functions are based on ON/OFF, temperature control and in some cases humidity control is not the ultimate solution to save energy. The reason behind the above fact is that, conventional controllers do not take into account real time events such as the number of occupants, indoor air quality (IAQ), natural light illuminations and etc dislike Fuzzy logic based controllers. In the last decade there is a high interest in researching Fuzzy logic based controllers as they have the ability to save energy while maintaining indoor comfort level. In this article a general review on Fuzzy logic based controllers is presented, focusing on the role of technology in saving energy, and its potential in subtropical Central Queensland, Australia. The issues of past and present techniquesare highlighted and discussed accordingly.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
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AU Mekhilef, S
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AF Mekhilef, S.
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TI Techno-economic evaluation of energy efficiency measures in high rise residential buildings in Malaysia
SO CLEAN TECHNOLOGIES AND ENVIRONMENTAL POLICY
LA English
DT Article
DE High rise building; Energy savings; Lighting energy
ID EXERGY ANALYSIS; SECTOR; INDUSTRIES; SAVINGS; DESIGN
AB In this paper, a survey was conducted on a residential condominium to estimate energy use by different household appliances along the lighting energy estimation in public areas. It has been found that about 2.17 GWh of energy is used in the condominium annually by different types of household appliances and lightings in public areas. As there is significant potential to reduce the energy used, different energy savings measures have been applied and energy savings, bill savings, life cycle cost analysis have been estimated and presented in this paper. It has been found that a cumulative amount of 2.4 GWh of energy can be saved for about 10 years with the implementation of different energy savings strategies proposed for appliances and lighting in public areas. However, good maintenance practices and good energy management practices should be employed continuously to maintain high energy efficiency and high performance of the equipment used and the entire building. It has been found that some of the measures like reducing air conditioning load and reducing heat gain through window tinting are economically very viable as payback period is very short. More advantageously, some of the measures can be implemented without investing significant cost. Ultimately, a key driver in the success of energy efficiency is the education and attitude of the stakeholders in the building industry, and end users who are committed to practice energy saving measures.
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FU [UM.C/HIR/MOHE/ENG/24]
FX The authors would like to acknowledge the HIR-MOHE Project. The research has been carried out under the Project No. UM.C/HIR/MOHE/ENG/24.
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U2 16
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PI NEW YORK
PA 233 SPRING ST, NEW YORK, NY 10013 USA
SN 1618-954X
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J9 CLEAN TECHNOL ENVIR
JI Clean Technol. Environ. Policy
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SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
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AF Peruzzini, Margherita
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BE CamarinhaMatos, LM
Scherer, RJ
TI Smart Home Information Management System for Energy-Efficient Networks
SO COLLABORATIVE SYSTEMS FOR REINDUSTRIALIZATION
SE IFIP Advances in Information and Communication Technology
LA English
DT Proceedings Paper
CT 14th IFIP WG 5.5 Working Conference on Virtual Enterprises (PROVE-VE)
CY SEP 30-OCT 02, 2013
CL Dresden, GERMANY
SP IFIP WG 5 5 Co Operat Infrastructure Virtual Enterprises & Electronic Business, Soc Collaborat Networks, Tech Univ Dresden, New Univ Lisbon, UNINOVA
DE Energy-efficient networks; Interoperable smart home systems (SHS); Internet of Things (IoT); Virtual Enterprise (VE); Energy-control services
ID DESIGN
AB Energy efficiency of smart]home systems imposes the intelligent management of a huge quantity of data and the collaboration between multiple stakeholders. Indeed, thanks to recent developments in ICT (Information and Communication Technologies) and IoT (Internet of Things), it is possible to achieve

higher performances and offer new energy-control services. However, data must be not only retrieved but also translated into significant information and related to interoperable tasks. This paper focuses on smart home energy control and defines a methodology to improve smart home information management in order to create an extended energy-efficient network comprehending the distributed manufacturing enterprise as well as the energy utility and the consumers. The case study focuses on a sub-set of interoperable smart devices and shows how to apply the proposed information management model to make an extended virtual enterprise provide energy-control services.
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NR 16
TC 3
Z9 3
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WC Computer Science, Information Systems; Computer Science, Interdisciplinary Applications; Engineering, Industrial; Operations Research & Management Science
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PT J
AU Senatla, M
AF Senatla, Mamahloko
TI Energy demand projections and relevance of income dynamics in Gauteng's

residential sector
SO JOURNAL OF ENERGY IN SOUTHERN AFRICA
LA English
DT Article
DE LEAP; final energy demand; income dynamics; scenarios; household mobility
ID EFFICIENCY
AB Energy modelling serves as a crucial tool for informing both energy policy and strategy development. But the modelling process is faced with both sectoral energy data and structural challenges. Among all the sectors, the residential sector usually presents a huge challenge to the modelling profession due to the dynamic nature of the sector. The challenge is brought by the fact that each an every household in a region may have different energy consumption characteristics and the computing power of the available models cannot incorporate all the details of individual household characteristics. Even if there was enough computing power within the models, energy consumption is collected through surveys and as a result only a sample of a region is captured. These challenges have forced energy modellers to categorise households that have similar characteristics. Different researchers choose different methods for categorising the households. Some researchers choose to categorise households by location and climate, others choose housing types while others choose quintiles. Currently, there is no consensus on which categorisation method takes precedence over others.

In these myriad ways of categorising households, the determining factor employed in each method is what is assumed to be the driver of energy demand in that particular area of study. Many researchers acknowledge that households' income, preferences and access to certain fuels determine how households use energy. Although many researchers recognise that income is the main driver of energy demand in the residential sector, there has been no energy modelling study that has tried to categorise households by income in South Africa. This paper chose to categorise households by income because income is taken to be the main driver of energy demand in the urban residential sector. Gauteng province was chosen as a case study area for this paper. The Long-range Energy Alternatives Planning System (LEAP) is used as a tool for such analysis.

This paper will further reveal how the dynamics of differing income across the residential sector affects total energy demand in the long run. The households in Gauteng are classified into three income categories high, middle and low income households. In addition to different income categories, the paper further investigates the energy demand of Gauteng's residential sector under three economic scenarios with five energy demand scenarios. The three economic scenarios are first economic scenario (ECO1), second economic scenario (ECO2) and third economic scenario (ECO3). The most distinguishing factor between these economic scenarios is the mobility of households from one income band to the next.

The model results show that electricity demand will be high in all the three economic scenarios. The reason for such high electrical energy demand in all the economic scenarios compared to other fuels is due to the fact that among all the provinces, Gauteng households have one of the highest electricity consumption profiles. ECO2 showed the highest energy demand in all the five energy demand scenarios. This is due to the fact that the share of high income households in ECO2 was very high, compared to the other two economic scenarios. The favourable energy demand scenarios will be the Energy Efficiency and MEPS scenarios due to their ability to reduce more energy demand than other scenarios in all the three economic scenarios.

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U2 8
PU UNIV CAPE TOWN, ENERGY RES CENTRE
PI RONDEBOSCH
PA PRIVATE BAG, 6TH FLR, MENZIES BLDG, UPPER CAMPUS, RM 6 46, RONDEBOSCH, 7701, SOUTH AFRICA
SN 1021-447X
J9 J ENERGY SOUTH AFR
JI J. Energy South. Afr.
PD NOV
PY 2011
VL 22
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WC Energy & Fuels
SC Energy & Fuels
GA 868HP
UT WOS:000298514600004
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PT S
AU Murakami, Y
Terano, M
Obayashi, FT
Honma, M
AF Murakami, Yoshifumi
Terano, Masaaki
Obayashi, Fun-Tiaki
Honma, Mutuo

BE Smith, MJ
Salvendy, G
TI Development of cooperative building controller for energy saving and comfortable environment
SO HUMAN INTERFACE AND THE MANAGEMENT OF INFORMATION: INTERACTING IN INFORMATION ENVIRONMENTS, PT 2, PROCEEDINGS
SE Lecture Notes in Computer Science
LA English
DT Proceedings Paper
CT Symposium on Human Interface and the Management of Information held at HCI International 2007
CY JUL 22-27, 2007
CL Beijing, PEOPLES R CHINA
DE energy saving; cooperative control; venetian blind
AB The purpose of automatic controllers for building services (air conditioning system, lighting and blinds system) is to save energy in the whole building while keeping occupants' comfort. Nevertheless, most of automatic controllers don't optimally operate from the viewpoint of total energy efficiency and occupants' satisfactions. The main reason is that each controller operates, neglecting states of other controllers and therefore, control point of each controller always doesn't correspond to best control point in the whole building system. In this study, we propose an innovative controller that communicates with other controllers to control building equipments optimally from the viewpoint of total energy efficiency and occupants' satisfactions. The developed controller functions as an agent in the control system, which can voluntarily collect available information from other controllers and decide set points to enhance total efficiency in cooperation with one another. Therefore, this controller is called as "cooperative controller". Several types of cooperative controllers have been developed and experimentally applied to an actual building located in Japan (Sogo et. al. 2002, Honma et. al. 2002, Terano et. al. 2002). In this paper, cooperative control using daylight, major example in series of cooperative control system, is reported. Daylight is useful to reduce energy consumption of lighting, however, it has not been widely used. The main reason is that as incoming daylight has complex effects on thermal and visual environment, it is difficult to optimally control amount of daylight. To solve this problem, we propose cooperative control system that can control amount of daylight effectively to optimize total energy efficiency and occupants' comfort. A series of numerical experiments was conducted to confirm effect of cooperative control system on improvement of total energy efficiency and indoor environment. The results showed that this cooperative control system could save energy use rate of almost 10% compared with no cooperative control system. In addition, in order to use in practice, cooperative controller is designed to apply an actual building easily and keep stability even in the other controllers' troubles.
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CR ASHRAE, 1995, ANSI ASHRAE STANDARD, P135
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NR 10
TC 3
Z9 3
U1 0
U2 1

PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 0302-9743
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J9 LECT NOTES COMPUT SC
PY 2007
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WC Computer Science, Information Systems; Computer Science, Theory & Methods; Telecommunications
SC Computer Science; Telecommunications
GA BGM91
UT WOS:000248534500118
DA 2018-05-03
ER

PT J
AU Granderson, J
Agogino, A
AF Granderson, J
Agogino, A
TI Intelligent office lighting: Demand-responsive conditioning and increased user satisfaction
SO LEUKOS
LA English
DT Article
DE daylighting; energy efficiency; influence diagrams; intelligence; demand response; user satisfaction; wireless sensing and actuating
AB Commercial daylighting systems have been shown to save up to 45 percent in electricity consumption when properly commissioned, and installed in areas with significant amounts of daylight. In practice however, these systems are greatly under-leveraged. This paper details the development of an intelligent commercial lighting system designed to overcome user dissatisfaction, lost energy savings due to simple control algorithms, and high retrofit costs. An influence diagram decision framework is used to optimize demand responsive actuation decisions, resulting in improvements in user satisfaction and energy efficiency compared to existing daylighting systems. Further, the system utilizes wireless sensing and actuating technology to relieve much of the expense associated with retrofitting.
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NR 19
TC 3
Z9 3
U1 0
U2 2
PU ILLUMINAT ENG SOC NORTH AMER
PI NEW YORK
PA 120 WALL ST, 17TH FL, NEW YORK, NY 10005-4001 USA
SN 1550-2724
J9 LEUKOS
JI Leukos
PD JAN
PY 2006
VL 2
IS 3
BP 185
EP 198
DI 10.1582/LEUKOS.2006.02.03.003
PG 14
WC Construction & Building Technology; Optics
SC Construction & Building Technology; Optics
GA 038SY
UT WOS:000237247900004
DA 2018-05-03
ER

PT J
AU Johnsen, TA
Unander, FF
AF Johnsen, TA
Unander, FF
TI Norwegian residential energy demand: Coordinated use of a system engineering and a macroeconomic model
SO MODELING IDENTIFICATION AND CONTROL
LA English
DT Article
DE energy; economy; general equilibrium model; linear programming model
AB In Norway, the system engineering model MARKAL and the macroeconomic model MSG-EE are both used in studies of national CO2 controlling strategies, MARKAL is a linear programming model that calculates a composite set of technologies necessary to meet demand and environmental constraints at minimised total energy expenditure. MSG-EE is an applied general equilibrium model including the link between economic activity, energy demand and emissions to air. MSG-EE has a theory consistent description of the link between income, prices and energy demand, but the representation of technological improvements is simple. MARKAL has a sophisticated description of future energy technology options, but includes no feedback to the general economy. A project for studying the potential for a coordinated use of these two models was initiated and funded by the Norwegian Research Council (NFR). This paper gives a brief presentation of the two models. Results from independent model calculations show that MARKAL gives a signficant lower residential energy demand than MSG-EE does. This is explained by major differences in modelling approach. A first attempt of coordinating the residential energy demand in the models is reported. This attempt shows that implementing results from MARKAL in MSG-EE for the residential sector alone gives little impact on the general economy. A further development of an iteration procedure between the models should include all energy using sectors.
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UNANDER F, 1993, IFEKRE92008 I EN
NR 7
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Z9 3
U1 0
U2 3
PU MIC
PI TRONDHEIM
PA DIV ENG CYBERNETICS, 7034 TRONDHEIM, NORWAY
SN 0332-7353
J9 MODEL IDENT CONTROL
JI Model. Identif. Control
PD JUL
PY 1996
VL 17
IS 3
BP 183
EP 192
DI 10.4173/mic.1996.3.2
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WC Automation & Control Systems; Computer Science, Cybernetics
SC Automation & Control Systems; Computer Science
GA VJ378
UT WOS:A1996VJ37800002
OA gold
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PT J
AU De Lauretis, S
Ghersi, F
Cayla, JM
AF De Lauretis, Simona
Ghersi, Frederic
Cayla, Jean-Michel
TI Energy consumption and activity patterns: An analysis extended to total time and energy use for French households
SO APPLIED ENERGY
LA English
DT Article
DE Time use; Household consumption; Energy consumption; Household heterogeneity
ID LIFE-STYLE; ELECTRICITY CONSUMPTION; SOCIO-DEMOGRAPHICS; BUILDING FACTORS; EMISSIONS; MODEL; ALLOCATION; INTENSITY; BEHAVIORS; ATTITUDES
AB Household lifestyles, and activity patterns in particular, greatly influence household energy use. In this paper we analyse the disparities in current activity patterns and related energy consumptions and expenditures of households, for a comprehensive set of everyday activities covering 24 h. Thanks to detailed data on energy consumption by end use, we are able to allocate the total of household energy consumptions to the appropriate activities. We comment on average energy and expenditure intensities of time uses of the total population as well as of income, household-composition and housing-type subgroups. Income, an obvious driver of energy and expenditure intensities, is revealed to influence time use as well. Household composition and housing type are also associated with substantial variations in activity patterns and in the energy and expenditure intensities of activities, even within a given income

group. Indeed, sometimes the variations associated with income are smaller than the variations associated with other variables. We therefore underline the importance of household disaggregation in household energy analyses, to properly account for such disparities.

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NR 37
TC 2
Z9 2
U1 2
U2 2
PU ELSEVIER SCI LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 APPL ENERG
JI Appl. Energy
PD NOV 15
PY 2017
VL 206
BP 634
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DI 10.1016/j.apenergy.2017.08.180
PG 15
WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
GA FN1RH
UT WOS:000415768400055
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ER

PT J
AU Magalhaes, SMC
Leal, VMS
Horta, IM
AF Magalhaes, Sara M. C.
Leal, Vitor M. S.
Horta, Isabel M.
TI Modelling the relationship between heating energy use and indoor temperatures in residential buildings through Artificial Neural Networks considering occupant behavior
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Heating energy use; Indoor temperatures; Residential buildings; Artificial neural networks; Modeling
ID REGRESSION-MODELS; STATISTICAL-MODEL; OFFICE BUILDINGS; UNITED-STATES; CONSUMPTION; PERFORMANCE; DEMAND; SPACE; VALIDATION; DESIGN
AB The heating energy demand stated in energy performance certificates (EPC) and in other instruments used in the of evaluation of building's energy performance is usually determined assuming very specific (reference) indoor behavioral/heating patterns. Particularly, they tend to assume that households heat (nearly) the entire house to a "comfort" temperature during (nearly) all the heating season. However, several field studies have shown that there are major niches of the housing stock which do not follow this pattern (even the majority, in some geographical areas). Considering this matter, it would be interesting to build models able to estimate heating energy use values resultant from occupation and heating patterns different from those considered as "reference".

This work aimed at producing tools to assess the relationship between heating energy use and indoor temperatures at different levels of occupant behavior (in terms of where, when and at what temperature households heat their dwellings). This relationship was expressed through models while still takes advantage of the information from the certificates.

The work developed artificial neural networks (ANN) that characterize the relationship between heating energy use, indoor temperatures and the heating energy demand under reference conditions (typically available from energy rating/certificates) in the residential buildings, for different occupant behaviors heating patterns. Theoretically, these models can be applicable to any national geographical context.

The data for building the ANNs was obtained from dynamic thermal building simulations using ESP-r, considering a large number of housing types and hypothetical occupation and heating patterns (i.e., which parts of the house are heated, when and at what temperature). From the analysis performed, it was possible to conclude that the developed ANN models proved to perform well (R-2 > 0.93) in estimating either heating energy use or indoor temperature, both at an individual and at the building stock level.

This work may have important contributions in the energy planning practices regarding the residential building stock.

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OI Leal, Vitor/0000-0001-8396-2907; Horta, Isabel/0000-0001-9436-6107
FU North Regional Coordination and Development Committee; Portuguese Foundation for Science and Technology [SFRH/BD/51591/2011]
FX This work has been done under the "Energy Efficiency in the Built Environment" project and funded by the North Regional Coordination and Development Committee. The authors acknowledge the financial support from the Portuguese Foundation for Science and Technology though the doctoral grant (SFRH/BD/51591/2011) under the MIT Portugal program. The authors would also like to express their gratitude to colleagues Ana Ferreira by her support crucial to the design of the building models used in thermal simulations.
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NR 56
TC 2
Z9 2
U1 11
U2 12
PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
SN 0378-7788
EI 1872-6178
J9 ENERG BUILDINGS
JI Energy Build.
PD SEP 15
PY 2017
VL 151
BP 332
EP 343
DI 10.1016/j.enbuild.2017.06.076
PG 12
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA FG3AY
UT WOS:000410010400029
DA 2018-05-03
ER

PT J
AU Clancy, JM
Curtis, T
O'Gallachoir, BP
AF Clancy, J. M.
Curtis, T.
O'Gallachoir, B. P.
TI What are the factors that discourage companies in the Irish commercial sector from investigating energy saving options?
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficiency; Commercial sector; Barriers; Logit model
ID MEDIUM-SIZED ENTERPRISES; EFFICIENCY GAP; DRIVING FORCES; MISSING DATA;

BARRIERS; INVESTMENTS; MARKET; INDUSTRY; FIRMS; CONSERVATION

AB To implement an energy saving measure, companies must first decide to investigate the options available. Representative survey data shows that almost half of companies in the Irish commercial sector do not take this step. This paper explores the barriers and drivers of this. Two logit models are fit to data to estimate the influence of variables, representing company and building characteristics, on the likelihoods of a company investigating either a fabric upgrade or a behaviour change measure.

Companies are more likely to investigate a fabric upgrade that: own the building they operate from, make energy related decisions locally, have more than 10 employees, have had a recent renovation, accept longer paybacks, and apply a case by case approach to budget decisions. Hotels and offices were found to have a higher likelihood of investigating fabric options. Lack of knowledge of building floor area reduced the likelihood of investigation of both fabric upgrade and behavioural options. Much of the previous research is concerned with the final adoption of measures; this analysis adds additional insights by identifying the factors that determine if a company is likely to investigate the options available. (C) 2017 Elsevier B.V. All rights reserved.

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TI Current software barriers to advanced model-based control design for energy-efficient buildings
SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Energy-efficient buildings; Advanced model-based control design; Software; Tools; FMI
ID MULTIZONE BUILDINGS; RESEARCH CHALLENGES; PREDICTIVE CONTROL; SIMULATION; SYSTEMS
AB Fast and easy advanced model-based control design for energy-efficient multi-zone buildings is crucial for optimal energy savings, and this strongly depends on the availability and capability of advanced simulation and control design software and tools. In this paper, first a state-of-the-art review of the commonly used major software and tools by the community is done with respect to the barriers they present to advanced model-based control design for energy-efficient buildings. Next, the relevant novel concept of Functional Moke-up Interface is reviewed and the associated advances up to date are summarized. Finally, a set desired control-oriented features for new generation tools are given towards better solutions for energy-efficient building control designs.
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AU Hussain, A
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AF Hussain, Akhtar
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TI Optimal Energy Management of Combined Cooling, Heat and Power in Different Demand Type Buildings Considering Seasonal Demand Variations
SO ENERGIES
LA English
DT Article
DE building microgrids (BMGs); energy management; energy prosumer; microgrid operation; combined cooling; heat and power; thermal energy storage
ID TRI-GENERATION; SYSTEM; OPTIMIZATION; TECHNOLOGIES; MICROGRIDS; COST
AB In this paper, an optimal energy management strategy for a cooperative multi-microgrid system with combined cooling, heat and power (CCHP) is proposed and has been verified for a test case of building microgrids (BMGs). Three different demand types of buildings are considered and the BMGs are assumed to be equipped with their own combined heat and power (CHP) generators. In addition, the BMGs are also connected to an external energy network (EEN), which contains a large CHP, an adsorption chiller (ADC), a thermal storage tank, and an electric heat pump (EHP). By trading the excess electricity and heat energy with the utility grid and EEN, each BMG can fulfill its energy demands. Seasonal energy demand variations have been evaluated by selecting a representative day for the two extreme seasons (summer and winter) of the year, among the real profiles of year-round data on electricity, heating, and cooling usage of all the three selected buildings. Especially, the thermal energy management aspect is emphasized where, bi-lateral heat trading between the energy supplier and the consumers, so-called energy prosumer concept, has been realized. An optimization model based on mixed integer linear programming has been developed for minimizing the daily operation cost of the EEN while fulfilling the energy demands of the BMGs. Simulation results have demonstrated the effectiveness of the proposed strategy.
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TI Modelling weather effects for impact analysis of residential time-of-use electricity pricing
SO ENERGY POLICY
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DT Article
DE Time-of-use pricing; Effect of weather on residential electricity demand; Regression models
ID DISTRIBUTED LAG; NONLINEAR MODELS; LOAD; TEMPERATURE; CUSTOMERS; DEMAND
AB Analyzing the impact of pricing policies such as time-of-use (TOU) is challenging in the presence of confounding factors such as weather. Motivated by a lack of consensus and model selection details in prior work, we present a methodology for modelling the effect of weather on residential electricity demand. The best model is selected according to explanatory power, out-of-sample prediction accuracy, goodness of fit and interpretability. We then evaluate the effect of mandatory TOU pricing in a local distribution company in southwestern Ontario, Canada. We use a smart meter dataset of over 20,000 households which is particularly suited to our analysis: it contains data from the summer before and after the implementation of TOU pricing in November 2011, and all customers transitioned from tiered rates to TOU rates at the same time. We find that during the summer rate season, TOU pricing results in electricity conservation across all price periods. The average demand change during on-peak and mid-peak periods is 2.6% and 2.4% respectively. Changes during off-peak periods are not statistically significant. These TOU pricing effects are less pronounced compared to previous studies, underscoring the need for clear, reproducible impact analyses which include full details about the model selection process.
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ER

PT J
AU Curtis, J
Walton, A
Dodd, M
AF Curtis, Jim
Walton, Andrea
Dodd, Michael
TI Understanding the potential of facilities managers to be advocates for
energy efficiency retrofits in mid-tier commercial office buildings
SO ENERGY POLICY

LA English
DT Article
DE Facilities management; Buildings; Decision-making; Government programs
ID BEHAVIOR; BARRIERS; INDUSTRY; POLICIES; SECTOR
AB Realising energy efficiency opportunities in new commercial office buildings is an easier task than retrofitting older, mid-tier building stock. As a result, a number of government programs aim to support retrofits by offering grants, upgrades, and energy audits to facilitate energy efficiency opportunities. This study reports on a state government program in Victoria, Australia, where the uptake of such offerings was lower than expected, prompting the program team to consider whether targeting facilities managers (FMs), rather than building owners, might be a better way of delivering the program. The influences and practices of FMs that impact on their ability to be advocates for energy efficiency were explored. The results revealed that complex building ownership arrangements, poor communication skills, isolation from key decision making processes, a lack of credible business cases and information, split incentives, and the prospect of business disruptions can all impact on FMs' ability to drive organizational change. Future program efforts should continue to interrogate the social context of retrofits in mid-tier buildings, including other influences and influencers beyond FMs, and adapt accordingly.
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FX The authors would like to thank the Facility Management Association of Australia for assisting with the research and providing feedback on drafts of this paper. We also wish to thank Sustainability Victoria for funding this research.
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PT J
AU Girod, B
Stucki, T
Woerter, M
AF Girod, Bastien
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Woerter, Martin
TI How do policies for efficient energy use in the household sector induce energy-efficiency innovation? An evaluation of European countries
SO ENERGY POLICY
LA English
DT Article
DE Policy evaluation; Energy efficiency; Technological change; Demand-pull
ID ENVIRONMENTAL-POLICY; TECHNOLOGICAL-CHANGE; PRODUCTIVITY GROWTH; PANEL-DATA; CONSERVATION; PATENTS; MODELS; HYPOTHESIS; DIFFUSION; PROGRAMS
AB Research on innovation induced by climate-mitigation policy has been focused predominantly on the supply side of the energy system. Despite considerable climate-mitigation potential on the demand side, less attention is given to the innovation effect of policies addressing the household sector. Based on a comprehensive data set, including 550 policy measures over 30 years (1980-2009) and covering 21 European countries, we find based on econometric estimations that policies targeting efficient energy use in the household sector significantly increase the number of patented energy-efficiency inventions. A

comparison of the different policy types reveals a particularly strong influence from financial subsidies and energy labels. The results indicate that policies supporting early market adoption of energy-efficient technologies are effective in fostering innovation.

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PT J
AU Seebauer, S
Wolf, A
AF Seebauer, Sebastian
Wolf, Angelika
TI Disentangling household and individual actors in explaining private electricity consumption
SO ENERGY EFFICIENCY
LA English
DT Article
DE Conservation behaviour; Energy saving; Intra-household interaction; Explanatory model; Regression analysis
ID PLANNED BEHAVIOR; ENERGY-CONSERVATION; PAST BEHAVIOR; HABIT; DETERMINANTS; INTENTIONS
AB Previous research often regard household and individual as synonymous actors, although the overall household electricity consumption is the aggregate of diverging actions by individual household members. We disentangle the impact of actor-specific predictors on household and individual electricity consumption, employing regression models to data of 204 Austrian multi-person households. Predictors add more to the explained variance of household and individual electricity consumption if they are located at the same actor level as the dependent variable. While household electricity consumption is best predicted by the household context and value/knowledge factors, individual electricity consumption depends foremost on habit and whether a person stays at home during the day. The study exemplifies that future research and interventions need to decompose actor levels to better understand and target the drivers of private electricity consumption. Methodological challenges in measuring individual and household consumption behaviour are discussed.
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FU University of Graz; Austrian Climate and Energy Fund
FX Open access funding provided by University of Graz. This work was funded by the Austrian Climate and Energy Fund and was conducted in the program 'New Energies 2020. Grateful thanks go to two anonymous reviewers for valuable comments.
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PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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J9 ENERG EFFIC
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PT J
AU Lim, TH
De Kleine, RD
Keoleian, GA
AF Lim, Tae Hwan
De Kleine, Robert D.
Keoleian, Gregory A.
TI Energy use and carbon reduction potentials from residential ground source heat pumps considering spatial and economic barriers
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Heat pump; HVAC; Market penetration; Energy efficiency; GHG abatement; Retrofit; Residential building
AB Ground source heat pump (GSHP) systems are significantly more energy efficient than conventional heating and cooling systems, but they have suffered from low market penetration. This study analyzes the implications of and barriers to nation-wide GSHP retrofits in U.S. single-family houses based on national databases of housing units and home energy use. Our model estimates maximum annual savings of 1.26 quads (1.33 EJ) of energy, $7.1 billion in energy costs, and abatement of 64.8 million tons of CO(2)eq. Economics is the major barrier as typical GSHPs cost $164 less to operate annually but cost $8990 more to install than the conventional alternative HVAC systems. Spatial and economic constraints exclude 7.7% and 89% of homes respectively, leaving only 10% of homes suitable for retrofit. Applying these two constraints, savings reduce to 0.15 quads (0.16 EJ), $3.0 billion in energy costs, and abatement of 12.1 million tons of CO2eq. A 30% federal tax credit helps increase the percentage of GSHP-suitable homes from 10% to 30% while reducing the average payback period from 9.1 to 4.8 years among those homes.

More effective policies to lower high cost premiums would be needed to promote large-scale GSHP implementations. (C) 2016 Elsevier B.V. All rights reserved.
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U1 3
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PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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J9 ENERG BUILDINGS
JI Energy Build.
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Boomsma, C
Goodhew, J
Pahl, S
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AF Boomsma, Christine
Goodhew, Julie
Pahl, Sabine
Jones, Rory V.
TI The feasibility of saving energy in challenging organisational contexts:
Testing energy visualisation in a social services office in the United
Kingdom
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Energy use; Feedback; Visualisation; Workplace behaviour
ID RESEARCH AGENDA; CLIMATE-CHANGE; FEEDBACK; BEHAVIOR; CONSERVATION;
CONSUMPTION; ENGAGEMENT; FIELD; REDUCTION; VIVIDNESS
AB The workplace offers opportunities for energy savings, but few studies have evaluated the effect of energy feedback in offices. This paper reports a case study of an energy visualisation intervention among social care staff. The research examined the role of feedback design (simple graphs vs. visualisation) and discusses the feasibility of implementing a near real-time visual feedback intervention into a work setting

with staff keenly aware of their primary job roles. The findings show a staff sample with positive beliefs towards energy saving, but bounded by low feelings of self-efficacy, weak social norms, and perceived barriers in the office. Feedback may have supported feelings of collective efficacy and encouraged staff to talk with colleagues about ways to save energy. But engagement with feedback - and energy use in general - was limited. Energy use was embedded in other concerns and issues, such as a strong team culture and wider problems in the building. The case study highlights the complexities of energy-related behaviours in the workplace and the role visualising energy could play in this context. Engagement will be a key challenge in achieving successful feedback initiatives; we provide recommendations to tackle this challenge and identify areas for future research. (C) 2016 Elsevier Ltd. All rights reserved.

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FU eViz Project, a consortium of four UK universities; Engineering and Physical Sciences Research Council [EP/K002465/1]
FX The electricity monitoring set-up and data used in this studywere provided by William Box at Carnego Systems. The authors would also like to thank Alex Hurth and Clare Mains for their help in setting up the field study. This research was funded through the eViz Project, a consortium of four UK universities (eviz.org.uk) funded by the Engineering and Physical Sciences Research Council under Transforming Energy Demand in Buildings through Digital Innovation (TEDDI) [grant number EP/K002465/1].

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SC Environmental Sciences & Ecology
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PT J
AU Braungardt, S
Elsland, R
Eichhammer, W
AF Braungardt, Sibylle
Elsland, Rainer
Eichhammer, Wolfgang
TI The environmental impact of eco-innovations: the case of EU residential electricity use
SO ENVIRONMENTAL ECONOMICS AND POLICY STUDIES

LA English
DT Article
DE Environmental innovation; Energy efficiency; Environmental impact of innovation; Energy modelling
ID ENERGY EFFICIENCY
AB Even though environmental innovations are generally considered a key element towards a green growth strategy, especially for the case of energy efficiency innovations, the impact on climate goals has been subject to a long-running debate. On the one hand, energy efficiency innovations provide a huge cost-effective CO2 reduction potential. On the other hand, increasing energy efficiency implies cost reductions which in turn may lead to increased consumption due to the so-called rebound effect. Our study investigates the long-term environmental impact of energy efficiency innovations on the EU-27 residential electricity demand (excluding heating systems) using a detailed bottom-up modelling approach. Assuming a rebound effect of 10 %, we show that the diffusion of energy efficiency technologies with current policy levels provides savings of around 140 TWh and additional 270 TWh may be saved through additional policy measures accelerating the diffusion and development of new technologies until 2030. By contrast, assuming a (rather pessimistic) rebound effect of 40 %, the savings are reduced to around 95 and 180 TWh until 2030, respectively. We conclude that there is a clear case for ambitious policies to support energy efficiency innovations for the residential sector, which ideally should be complemented by measures to limit the rebound effect.
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NR 27
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Z9 2
U1 2
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PU SPRINGER
PI NEW YORK

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SN 1432-847X
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J9 ENVIRON ECON POLICY
JI Environ. Econ. Policy Stud.
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WC Economics
SC Business & Economics
GA DO7PQ
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Kallus, C
AF Cetin, Kristen Sara
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BE Chong, O
Parrish, K
Tang, P
Grau, D
Chang, J
TI Data-Driven Methodology for Energy and Peak Load Reduction of Residential HVAC Systems
SO ICSDEC 2016 - INTEGRATING DATA SCIENCE, CONSTRUCTION AND SUSTAINABILITY
SE Procedia Engineering
LA English
DT Proceedings Paper
CT International Conference on Sustainable Design, Engineering and Construction (ICSDEC)
CY MAY 18-20, 2016
CL Arizona State Univ, Coll Avenue Commons, Tempe, AZ
SP Amer Soc Civil Engineers Architectural Engn Inst
HO Arizona State Univ, Coll Avenue Commons
DE Residential Buildings; Smart Grid; Data Analytics; HVAC Systems
AB Residential buildings in the United States are responsible for the consumption of approximately 38% of electricity, and for much of the fluctuations in the power demands on the electric grid, particularly in hot climates. Residential Heating, Ventilation, and Air Conditioning (HVAC) systems are one of the largest electricity users of homes in these regions. "Smart" technologies, including electric grid-connected devices and home energy monitoring systems are increasingly available and installed in buildings, enabling new, data-driven methodologies for the operation of smarter, more sustainable building systems. This research investigates the use of residential energy use data and smart connected thermostat data to continuously monitor the health and performance of residential HVAC systems. Using field-collected HVAC energy consumption and performance data to develop a process-history based model, the results of this research suggest that the use of this methodology can save up to 6% of annual energy use of residential buildings.
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PU ELSEVIER SCIENCE BV
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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PT S
AU Ekstrom, T
Blomsterberg, A
AF Ekstrom, Tomas
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BE Kurnitski, J
TI Renovation of Swedish single-family houses to passive house standard -
Analyses of energy savings potential
SO Sustainable Built Environment Tallinn and Helsinki Conference SBE16
Build Green and Renovate Deep
SE Energy Procedia
LA English
DT Proceedings Paper
CT SBE16 Tallinn and Helsinki Conference on Build Green and Renovate Deep
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CL Tallinn, ESTONIA
SP Finnish Assoc Civil Engineers RIL, Estonian Assoc Civil Engineers EEL
DE deep renovation; energy retrofit; detailed energy simulations; single-family houses
AB A third of Sweden's two million single-family houses were built in the period 1961-1980, and many of them are in need of renovation. These houses have a high energy use and are in technical terms fairly homogenous. This investigation evaluates the theoretical energy savings potential of renovating houses from this period. Four reference houses were selected and simulated using common renovation measures. The results indicate that most of the existing single-family housing stock will likely not be able to attain the passive house standard after renovation and using today's technology. This is explained by the fact that some house characteristics impose a limiting factor on the energy renovation. Such examples are the shape, foundation and composition of the building envelope. Nevertheless, it is still possible to drastically reduce the final energy use by approximately 65-75 %. (C) 2016 The Authors. Published by Elsevier Ltd
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FU Development Fund of the Swedish Construction Industry (SBUF); Swedish Energy Agency; NCC AB
FX The project is funded by the Development Fund of the Swedish Construction Industry (SBUF), the Swedish Energy Agency and NCC AB.
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PT J
AU Kneifel, J
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Boyd, Matthew
TI Energy performance sensitivity of a net-zero energy home to design and use specifications
SO JOURNAL OF BUILDING PERFORMANCE SIMULATION
LA English
DT Article
DE net-zero energy construction; energy efficiency; residential building; whole building energy simulation
ID OCCUPANTS BEHAVIOR; SIMULATION; DWELLINGS; MODELS
AB The purpose of this report is to test the sensitivity of the energy performance of the National Institute of Standards and Technology (NIST)'s Net Zero Energy Residential Test Facility (NZERTF) design to variation in the assumed specifications of occupant behaviour and building design characteristics using whole building energy simulations. The analysis includes a total of 128 EnergyPlus (E+) simulations (DOE 2013) considering two levels for each of the seven factors that could impact the energy performance of the NZERTF: building design, air leakage, occupant behaviour, weather, building orientation, and heating and cooling setpoint temperatures. The results for each combination of the seven factors are analysed to determine the magnitude and significance of changing these factors, and the interaction effects between the factors. There is particular focus on the building design results to determine if the energy performance of the NZERTF is more or less stable than that of typical residential construction in Maryland.
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NR 14
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PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND
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J9 J BUILD PERFORM SIMU
JI J. Build. Perf. Simul.
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PT J
AU Xing, R
Hanaoka, T
Kanamori, Y
Dai, HC
Masui, T
AF Xing, Rui
Hanaoka, Tatsuya
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Dai, Hancheng
Masui, Toshihiko
TI Energy Service Demand Projections and CO2 Reduction Potentials in Rural Households in 31 Chinese Provinces
SO SUSTAINABILITY
LA English
DT Article
DE China; rural household; Shared Socioeconomic Pathways; CO2 emission; efficient technology
ID CARBON EMISSIONS; CONSUMPTION; URBAN; EXPENDITURE; ENVIRONMENT; EFFICIENCY; CITY
AB Until 2012, most of China's population lived in rural areas with markedly different patterns of household energy consumption from those in Chinese cities. The studies so far done on residential energy use in rural Chinese households have been limited to questionnaire surveys and panel data analyses. Hardly any studies on energy demand in rural areas have considered both the climatic and economic disparities across Chinese regions. In this study we conduct a systematic analysis of the rural Chinese residential sector on a regional basis. We begin by developing a macro-model to estimate energy service demands up to 2050.

Next, we apply the AIM(Asia-Pasific Integrated Model)/Enduse model, a bottom-up cost-minimization model with a detailed mitigation technology database, to estimate the mitigation potential of low-carbon technologies in rural China. Our results show that energy service demand in the rural household sector will continue to increase in regions with growing population or income conditions. However, after 2030, the rural residential energy service demand will start to decline in most Chinese regions. The impacts of efficient technologies will vary from one region to the next due to regional climatic and economic disparities. Throughout all of China, the penetration of efficient technologies can reduce CO2 emissions by 20% to 50%. Of the technologies available, efficient lighting, biomass water heaters, and efficient electronics bring the most benefit when implemented in rural households.

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PU MDPI AG
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PT J
AU Ho, E
AF Ho, Ezra
TI Bound by ethical complexities and socio-material histories: an exploration of household energy consumption in Singapore
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Singapore households; Energy-use; Sustainable consumption policy; Practice theory; Material geographies; Ethnography
ID PRO-ENVIRONMENTAL BEHAVIOR; CLIMATE-CHANGE; SUSTAINABILITY TRANSITIONS; LIFE-STYLES; GREEN CONSUMPTION; POLICIES; CONSERVATION; MANAGEMENT; CARBON; ETHNOGRAPHY
AB Households are increasingly subject to environmental regulation and intervention in today's carbonconstrained world. Highlighting cross-disciplinary synergies between practice theory and material geographies, I illuminate the lived complexities of everyday energy-use in Singapore. Based on an ethnographic study of 8 households, it is apparent that energy practices are sustained and reproduced through the subjectivities of materialities, practical ethics, socialised rules and histories, embedded withinin the spatio-temporalities of the actually-existing household. For energy conservation policy and research, these findings suggest non-engagement with the complexities of household energy-use. By promoting a single normative vision of `Green' energy practices, energy conservation initiatives risk alienating people with practices that do not resonate with household dynamics as they are lived. Instead, an enagement of `practices' instead of `behavior' opens up a more expansive field for research and policy engagement in the dynamic and path dependent processes of social normality, and more effective means of encouraging more sustainable ways of living. (C) 2015 Elsevier Ltd. All rights reserved.
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AU Long, TB
Young, W
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AF Long, Thomas B.
Young, William
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TI The impact of domestic energy efficiency retrofit schemes on householder attitudes and behaviours
SO JOURNAL OF ENVIRONMENTAL PLANNING AND MANAGEMENT
LA English
DT Article
DE retrofit; domestic; energy; efficiency; household; attitudes; behaviours
ID SUSTAINABLE CONSUMPTION; UK HOUSEHOLDS; COLD HOMES; CONSERVATION; POLICY; STRATEGIES; SPILLOVER; BARRIERS; SAVINGS; AGENDA
AB Retrofitting existing housing stock to improve energy efficiency is often required to meet climate mitigation, public health and fuel poverty targets. Increasing uptake and effectiveness of retrofit schemes requires understanding of their impacts on householder attitudes and behaviours. This paper reports results of a survey of 500 Kirklees householders in the UK, where the Kirklees Warm Zone scheme took place. This was a local government led city scale domestic retrofit programme that installed energy efficiency measures at no charge in over 50,000 houses. The results highlight key design features of the scheme, socio-economic and attitudinal factors that affected take-up of energy efficiency measures and impacts on behaviour and energy use after adoption. The results emphasise the role that positive feedback plays in reinforcing pro-environmental attitudes and behaviours of participants and in addressing concerns of non-participants. Our findings have implications for the design and operation of future domestic energy efficiency retrofit schemes.
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NR 65
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Z9 2
U1 2
U2 32
PU ROUTLEDGE JOURNALS, TAYLOR & FRANCIS LTD
PI ABINGDON
PA 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXFORDSHIRE, ENGLAND
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J9 J ENVIRON PLANN MAN
JI J. Environ. Plan. Manag.
PD OCT 3
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WC Environmental Studies
SC Environmental Sciences & Ecology
GA CP3KB
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OA gold
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PT J
AU Havas, L
Ballweg, J
Penna, C
Race, D
AF Havas, Lisa
Ballweg, Julie
Penna, Chris
Race, Digby
TI Energising households: a financial analysis of incentivised energy efficiency measures in remote Australia
SO ENERGY EFFICIENCY
LA English
DT Article
DE Energy efficiency; Households; Australia; Incentive; Internal rate of return
ID RESIDENTIAL SECTOR; BEHAVIOR; INVESTMENTS; CONSUMPTION; PROGRAMS; POLICIES; UK
AB Governments in developed economies are making considerable investments in energy efficiency technologies and encouraging residential households to conserve energy. A major programme in Australia

has invested A$280 million to encourage residential households to become more energy aware and make additional investment in energy efficiency measures. This paper examines the adoption of energy efficiency measures by residential households participating in this programme in a geographically remote Australian town. It uses data collected by the programme developers. It examines the financial return of the investment in terms of payback period and internal rate of return. It then discusses the financial return with respect to adoption of a range of products offered by the programme. Results show that adoption of energy efficiency measures by households was not solely guided by rational economic-maximising principles. For example, some frequently adopted measures had negative financial effectiveness. A range of important determining factors are discussed, and the consequent impact this has for analysis of the effectiveness of incentive programmes. Finally, this paper proposes considerations for future programmes to more effectively measure and target efficient adoption of energy efficient measures, both in remote and non-remote residential settings.

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NR 35
TC 2
Z9 3
U1 1
U2 5
PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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AU Barnes, E
Parrish, K
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TI Small buildings, big impacts: developing a library of small commercial building energy efficiency case studies
SO DEFINING THE FUTURE OF SUSTAINABILITY AND RESILIENCE IN DESIGN, ENGINEERING AND CONSTRUCTION
SE Procedia Engineering
LA English
DT Proceedings Paper
CT Defining the Future of Sustainability and Resilience in Design, Engineering and Construction
CY MAY 10-13, 2015
CL Chicago, CA
SP ASCE, ICSDEC
DE Small commercial buildings; building energy efficiency; case study
AB Small commercial buildings, or those comprising less than 50,000 square feet of floor area, make up 90% of the total number of buildings in the United States. Though these buildings currently account for less than 50% of total energy consumption in the U.S., this statistic is expected to change as larger commercial buildings become more efficient and thus account for a smaller percentage of commercial building energy

consumption. This paper describes the efforts of a multi-organization collaboration and their demonstration partners in developing a library of case studies that promote and facilitate energy efficiency in the small commercial buildings market as well as a case study template that standardized the library. Case studies address five identified barriers to energy efficiency in the small commercial market, specifically lack of: 1) access to centralized, comprehensive, and consistent information about how to achieve energy targets, 2) reasonably achievable energy targets, 3) access to tools that measure buildings' progress toward targets, 4) financial incentives that make the reduction effort attractive, and 5) effective models of how disparate stakeholders can collaborate in commercial centers to reach targets. The case study library can be organized by location, ownership type, decision criteria, building type, project size, energy savings, end uses impacted, and retrofit measures. This paper discusses the process of developing the library and case study template. Finally, the paper presents next steps in demonstrating the efficacy of the library and explores energy savings potential from broad implementation. (C) 2015 Published by Elsevier Ltd.
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CR Architecture 2030, 2015, 2030 DISTR
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NR 10
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Z9 2
U1 0
U2 0
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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SC Science & Technology - Other Topics; Engineering
GA BF1RN
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PT J
AU Pelenur, MJ
Cruickshank, HJ
AF Pelenur, Marcos J.
Cruickshank, Heather J.
TI Motivations to adopting energy efficiency measures in the home

SO PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS-ENERGY
LA English
DT Article
DE buildings; structures & design; energy; energy conservation
ID MULTIWAY CONTINGENCY-TABLES; CHI-SQUARED TESTS; CONSERVATION; GAP; UK; INDEPENDENCE; CONSUMPTION; HOUSEHOLDS; PATTERNS; BARRIERS
AB This paper presents a study that linked demographic variables with motivations for the adoption of domestic energy efficiency measures in UK cities. This study complements a previous paper that identified barriers, and together, the two papers aim to improve understanding of the 'energy efficiency gap' and improve the effectiveness of future energy efficiency initiatives. The data for this study were collected from 149 general population interviews (1.5-10 min) carried out across multiple locations in Manchester and Cardiff. The demographic variables were statistically linked to the identified motivations using a modified chi-square test of association (first order Rao-Scott corrected to compensate for multiple response data), and the effect size was estimated with an odds ratio test. The results revealed that strong associations exist between demographics and motivations, specifically that saving money was associated with incomes greater than [SIC]40 000, married individuals and semi/detached homes; while the motivation of resource efficiency was associated with incomes less than [SIC]40 000, single individuals and flats/terraced homes. The results and recommendations are aimed at policy makers, local councils and members of the construction/retrofit industry who are all working to improve the energy efficiency of the domestic built environment.
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FU EPSRC
FX This research was conducted at the University of Cambridge, Department of Engineering, Centre for Sustainable Development, and is part of the EPSRC funded research project: Re-Engineering the City 2020-2050 (Retrofit 2050) Urban Foresight and Transition Management. Finally, the authors would like to thank all of the friendly interviewees in Manchester and Cardiff.
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PA INST CIVIL ENGINEERS, 1 GREAT GEORGE ST, WESTMINISTER SW 1P 3AA, ENGLAND
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PT J
AU Chen, JY
Taylor, JE
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Taylor, John E.
TI Layering residential peer networks and geospatial building networks to model change in energy saving behaviors
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficiency; Geospatial networks; Multi-layer network system; Networks; Peer networks; Simulation; Social network analysis
ID ELECTRICITY CONSUMPTION; TOPOLOGY; CONSERVATION; SIMULATION
AB Complex human or engineered network systems can be examined as a series of coexisting layers. A variety of dynamic perturbations, such as information flows across computer networks, traffic flows across transportation networks and the spread of energy saving practices across human networks, have been treated separately as single networks in previous research. However, because these phenomena often consist of human networks interacting with engineered networks, analyzing the properties of the multi-layer network systems may provide more accurate insights. In this paper, we examine a multi-layer network system to provide insight into the diffusion of energy consumption practices through peer networks within and across residential buildings. We introduce a new model-the Layered Network Model-that treats that treats a residential peer network and a geospatial building network as a single, layered network. We compare this model to a previously published Multi-Layer Interactive Network Model by simulating diffusion through a real multi-layer network system consisting of a residential peer network and a geospatial building network from three experimental data-sets. We found our model to be more accurate and efficient, hence contributing an efficient mathematical model and set of simulation algorithms that accurately capture the post-perturbation response of a layered, residential peer network and a geospatial building network. (C) 2012 Elsevier B.V. All rights reserved.
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PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
SN 0378-7788
J9 ENERG BUILDINGS
JI Energy Build.
PD MAR
PY 2013
VL 58
BP 151
EP 162
DI 10.1016/j.enbuild.2012.11.027
PG 12
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA 112GH
UT WOS:000316580200017
DA 2018-05-03
ER
FN Clarivate Analytics Web of Science
VR 1.0
PT B
AU Hu, HF
Jenks, G
Huang, YH

Milencovic, M
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AF Hu, Huafen
Jenks, Geoffrey
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Milencovic, Milan
Hanebutte, Ulf
GP IEEE
TI Information and Communications Technology based Solutions in Achieving Building Energy Efficiency
SO 2013 1ST IEEE CONFERENCE ON TECHNOLOGIES FOR SUSTAINABILITY (SUSTECH)
LA English
DT Proceedings Paper
CT 1st IEEE Conference on Technologies for Sustainability (SusTech)
CY AUG 01-02, 2013
CL Portland, OR
SP IEEE, IEEE Oregon Sect, IEEE USA
DE ICT; real-time response; occupant behavior; operational energy efficiency
ID SIMULATION
AB Sophisticated and detailed building simulation tools are more commonly used by both architects and engineers in design process in hope to improve building energy efficiency. While building physics models being well developed and evolved in the past four decades, a surprisingly large and unexpected performance gap between the design intent and the actual operation continues to be observed and unsolved. Unaccounted dynamic occupant behavior in design stage is believed to be one of the significant contributing factors. On the other hand, the emerging and economic Information and Communications Technology (ICT) based sensing network has been showing great potential in better capturing occupant behavior dynamics during building operation. This paper introduces one ICT based solution - Personal Office Energy Monitor (POEM) developed by Intel Labs. Our preliminary results have shown POEM could be a promising noninvasive way of sensing real-time occupancy and informing the heating, ventilation and air conditioning (HVAC) system control for better operational energy efficiency. And a large scale of POEM deployments will result in a representative sample of occupancy profile in today's office environment, which researchers could use to develop a new occupancy profile for building design that reflect the actual office space utilization rate in today's organizational structure and flexible work arrangement and eventually lead to a more efficient building design.
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FU Intel Cooperation
FX This work is done in collaboration with the Energy and Sustainability Research Lab in Intel Labs and funded by Intel Cooperation.
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PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4673-4630-6
PY 2013
BP 49
EP 54
PG 6
WC Computer Science, Hardware & Architecture; Engineering, Electrical & Electronic
SC Computer Science; Engineering
GA BA3WM
UT WOS:000335001300008
DA 2018-05-03
ER

PT J
AU Ferguson, TM
MacLean, HL
AF Ferguson, Thomas M.
MacLean, Heather L.
TI Trade-linked Canada-United States household environmental impact analysis of energy use and greenhouse gas emissions
SO ENERGY POLICY
LA English
DT Article
DE Input-output analysis; Life cycle assessment; Sustainable consumption
ID LIFE-CYCLE ASSESSMENT; INPUT-OUTPUT-ANALYSIS; SUSTAINABLE CONSUMPTION; COST; REQUIREMENTS; MODEL
AB We compare energy use and greenhouse gas (GHG) emissions associated with total household expenditures and activities in Canada and US in 1997, the first detailed estimate of environmental burdens for Canadian households. We estimate direct burdens from published government data and indirect burdens using an industry-by-commodity, bi-national economic input-output life cycle assessment model developed in this study. Comparing 30 expenditure and two activity categories, per capita US household expenditures were 70% higher, while per capita household energy use and GHG emissions were only 10% and 44% higher, respectively. Energy use/dollar of expenditure was higher in most Canadian categories, while the average ratio of GHG emissions/energy use was higher in the US (65 vs 50 kg Eq. CO(2)/GJ) due largely to a higher proportion of electricity from nonrenewable sources. Indirect environmental burdens represented 63-69% of total burdens and 62-70% of total burdens were associated with household operation and transportation. Key drivers of differences between energy profiles were: higher per capita electricity use by Canadian households, and higher US household private health care expenditures and motor fuel use. Energy-intensive production for export represented a higher proportion of Canadian production, resulting in less agreement between consumption and production-based analyses for Canada than US. (C) 2011 Elsevier Ltd. All rights reserved.
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FX We thank the Ontario Graduate Scholarship Program, Natural Sciences and Engineering Research Council (Canada), AUTO21 Network Centre of Excellence, and the Ontario Government Early Researcher Award as well as Carnegie Mellon University's Green Design Institute.
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Z9 2
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PU ELSEVIER SCI LTD
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SN 0301-4215
J9 ENERG POLICY
JI Energy Policy
PD DEC
PY 2011
VL 39
IS 12
BP 8011
EP 8021
DI 10.1016/j.enpol.2011.09.056
PG 11
WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
GA 866EN
UT WOS:000298363400052
DA 2018-05-03
ER

PT J
AU Roussac, AC
de Dear, R
Hyde, R
AF Roussac, A. Craig
de Dear, Richard
Hyde, Richard
TI Quantifying the 'human factor' in office building energy efficiency: a mixed-method approach
SO ARCHITECTURAL SCIENCE REVIEW
LA English
DT Article
DE Commercial buildings; conceptual frameworks; energy efficiency; office buildings; social theory
AB There is an urgent need to understand the role that human competency, values and interests play in determining the energy efficiency of Australian commercial office buildings. Research focused on the interaction between building technologies and the people who operate them is therefore required,

AB especially in the case of older buildings where accessible and cost-effective technologies and know-how that can abate greenhouse gas emissions have not, as yet, been widely adopted. We need to ground this analysis in 'real-world' operational data rather than speculative models. This article proposes a mixed-method approach for defining and quantifying the extent to which operations staff and other key decision makers influence the energy efficiency of occupied Australian commercial office buildings, and presents preliminary findings.
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SN 0003-8628
J9 ARCHIT SCI REV
JI Archit. Sci. Rev.
PD MAY
PY 2011
VL 54
IS 2
SI SI
BP 124
EP 131
DI 10.1080/00038628.2011.582371
PG 8
WC Architecture
SC Architecture
GA 797EA
UT WOS:000293106100006

DA 2018-05-03
ER

PT J
AU Trebilcock, M
AF Trebilcock, M.
TI Perception of barriers to the inclusion of energy efficiency criteria in buildings
SO REVISTA DE LA CONSTRUCCION
LA Spanish
DT Article
DE energy efficiency; barriers; motivations; incentives
AB This article analyses the main barriers to energy-efficiency perceived by groups of architects who work in the public and private sectors in the main cities of the centre and south of Chile. The methodology was based on Focus Groups of architects from Temuco, Valdivia, Concepcion and Santiago who are experienced in these issues, or at least show a growing interest. The information gathered was organised around groups of barriers of different nature that were compared with the main personal motivations and also with the main external incentives perceived by the architects. The methodology also made it possible to distinguish different barriers and motivations coming from the groups of different cities that respond to local characteristics such as climate and specific socio-political situations. The results suggest that the main motivations for Chilean architects respond to aims of professional development and social responsibility; while the main barriers respond to multiple causes, from higher investment costs and lack of financial incentives to the important barriers of lack of knowledge and professional competence in these issues. The conclusions identify the main implications of this study for education, where the results suggest the necessity of covering education in energy efficiency along the complete application chain, from postgraduate studies to technical courses for construction workers, as well as the dissemination of knowledge for the whole society. In addition, the development of new policies in the area should focus on financial and tributary incentives, as well as more regulations with severe technical standards. The conclusions also suggest the necessity of a better articulation of the different institutions, which permit to generate more effective actions.
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PU PONTIFICIA UNIV CATOLICA CHILE, ESCUELA CONSTRUCCION CIVIL
PI SANTIAGO
PA AV VICUNA MACKENNA 4860, SANTIAGO, 0000, CHILE
SN 0718-915X
J9 REV CONSTR
JI Rev. Constr.
PD APR
PY 2011

VL 10
IS 1
BP 4
EP 14
DI 10.4067/S0718-915X2011000100002
PG 11
WC Construction & Building Technology; Engineering, Civil
SC Construction & Building Technology; Engineering
GA 795AA
UT WOS:000292942700002
OA gold
DA 2018-05-03
ER

PT J
AU Abeliotis, K
Nikolaou, N
Sardianou, E
AF Abeliotis, Konstadinos
Nikolaou, Niki
Sardianou, Eleni
TI Attitudes of Cypriot consumers on the ownership of household appliances:
the case of the city of Limassol
SO INTERNATIONAL JOURNAL OF CONSUMER STUDIES
LA English
DT Article
DE Appliances; households; sustainability; technology
ID CONSUMPTION PATTERNS; BEHAVIOR
AB The aim of this paper is to analyse the factors affecting consumers' preferences towards the ownership of household appliances. The study is based on 186 survey responses from Cypriot households, and they are analysed econometrically using regression techniques. The analysis is based on a theoretical framework, which takes into account both demographic and economic factors behind households' preference to energy-efficient appliances. The results show that consumers that buy energy-efficient appliances are highly educated and women. Household income is not a statistically significant variable of the probability to choose an appliance based on its energy efficiency characteristics. On the contrary, income and number of persons per household affect the number of appliances that consumers own.
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U2 1

PU WILEY-BLACKWELL
PI MALDEN
PA COMMERCE PLACE, 350 MAIN ST, MALDEN 02148, MA USA
SN 1470-6423
J9 INT J CONSUM STUD
JI Int. J. Consum. Stud.
PD MAR
PY 2011
VL 35
IS 2
BP 132
EP 137
DI 10.1111/j.1470-6431.2010.00966.x
PG 6
WC Business
SC Business & Economics
GA 720VP
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ER

PT S
AU Yuan, Y
Yuan, JL
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Li, L
AF Yuan, Yan
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BE Li, K
Li, X
Ma, S
Irwin, GW
TI Pareto Ant Colony Algorithm for Building Life Cycle Energy Consumption Optimization
SO LIFE SYSTEM MODELING AND INTELLIGENT COMPUTING, PT II
SE Communications in Computer and Information Science
LA English
DT Proceedings Paper
CT International Conference on Life System Modeling and Simulation / International Conference on Intelligent Computing for Sustainable Energy and Environment (LSMS-ICSEE)
CY SEP 17-20, 2010
CL Wuxi, PEOPLES R CHINA
SP Shanghai Univ, Queens Univ, Jiangnan Univ, CASS, Syst Modeling & Simulat Techn Comm, China Instrument & Control Soc, Embedded Instrument & Syst Techn Comm
DE ant colony algorithm; building life cycle; building energy consumption; multi-objective optimization
AB This article aims at realizing optimal building energy consumption in its whole life cycle, and develops building life cycle energy consumption model (BLCECM), as well as optimizes the model by Ant Colony Algorithm (ACA). Aiming at the complexity and multi-objective principle of building life cycle energy consumption, this research tries to modify Pareto Ant Colony Algorithm (PACA), making it fit the needs of finding solution to least energy consumption in a building's whole life cycle. In the initial stage of ant colony constructing solution, each objective weighing is defined randomly, which improves the optimal determination mechanism of Pareto solution, perfects the renovation principle of pheromone, and finally realize the goal of optimization. This research is a innovative application of ACA in building energy-saving

area, and it provides definite as well as practical calculation method for building energy consumption optimization in terms of a whole life cycle.

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PI BERLIN
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SN 1865-0929
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J9 COMM COM INF SC
PY 2010
VL 98
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WC Computer Science, Artificial Intelligence; Computer Science, Information Systems; Computer Science, Theory & Methods; Mathematical & Computational Biology
SC Computer Science; Mathematical & Computational Biology
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UT WOS:000288890300009
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ER

PT J
AU Amos-Abanyie, S
Akuffo, FO
Quagrain, V
AF Amos-Abanyie, Samuel
Akuffo, Fred O.
Quagrain, Victor
TI Unveiling Energy Saving Techniques for Cooling in Residential Buildings in Ghana
SO INTERNATIONAL JOURNAL OF VENTILATION
LA English
DT Article
DE bioclimatic approach; comfort zone; passive cooling techniques; thermal comfort; Ghana
ID NIGHT VENTILATION; COMFORT; ZONES
AB The gradual shift from the traditional approach of outdoor processes of habitation in Ghana to the indoor, coupled with an ingress of solar radiation, liberates excess heat into buildings and makes occupants feel uncomfortable. A straightforward response has been the adoption of air conditioners. This has resulted in high peak electricity demand and excess emissions of greenhouse gases into the atmosphere. This paper

identifies passive and low energy techniques which can improve the thermal comfort in buildings for the different climate zones of Ghana, and consequently reduce electricity demand and environmental effects due to air conditioning. The potential for various passive and low energy cooling techniques was determined by plotting climatic data comprising average monthly temperature and relative humidity over a thirty year period (1976-2005) for a total of ten towns and cities from the various climatic zones of Ghana on the Building Bioclimatic chart. This work is aimed at encouraging innovative and individual design solutions amongst building design professionals applicable to Ghana and regions elsewhere that are experiencing a growth in air conditioning. Reducing peak cooling-energy demand is of great interest to the power generating industries and policy makers. It is of interest to building investors, since it implies a possible reduction in the required installed plant capacity. This is also an essential element in Ghana's Climate Change Mitigation Program.

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SN 1473-3315
J9 INT J VENT
JI Int. J. Vent.
PD JUN
PY 2009
VL 8
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WC Construction & Building Technology; Energy & Fuels
SC Construction & Building Technology; Energy & Fuels
GA 613QL
UT WOS:000278994100003
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PT B
AU Chen, YP
Mu, XM
Zhang, JL
Lu, Z
AF Chen Yongpan
Mu Xianmin
Zhang Jili
Lu Zhen
BE Zhou, QH
TI Development of Monitoring System of Building Energy Consumption
SO 2009 INTERNATIONAL FORUM ON COMPUTER SCIENCE-TECHNOLOGY AND APPLICATIONS, VOL 2, PROCEEDINGS
LA English
DT Proceedings Paper
CT International Forum on Computer Science-Technology and Applications
CY DEC 25-27, 2009
CL Chongqing, PEOPLES R CHINA
SP Int Informat Techn & Applicat Assoc
DE building energy consumption; monitoring system; multi-tier distributed application services; database
AB dIn order to solve the serious problem of high energy consumption in large public buildings and government office buildings, this paper develops the monitoring system of building energy consumption (MSBEC), which could monitor not only energy consumption data, but also energy quality. Firstly, this paper designs the hardware subsystem with three-layer structure. At the information center layer, four data acquiring servers are linked with a double control disk array subsystem, which ensures the stability of monitoring system. The network layer adopts the RS485-TCP/IP mode and the RS485-ZigBee-TCP/IP mode to collect information from RS485 protocol terminal modules. Then this paper introduces the software subsystem with multi-tier distributed application services, which contains the persistence layer, the application layer, and the representation layer. Every layer is independent relatively, and may be developed by different technology. Based on the sufficient energy monitoring data, MSBEC could provide technical support for later energy retrofit.
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FU National Natural Science Foundation of China [50578049]; Key Projects in the National Science & Technology Pillar Program in the Eleventh Five-year Plan Period [2006BAJ01A09, 2008BAJ12B05]
FX This project is supported by National Natural Science Foundation of China (50578049) and Key Projects in the National Science & Technology Pillar Program in the Eleventh Five-year Plan Period (2006BAJ01A09, 2008BAJ12B05).
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NR 10
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PI LOS ALAMITOS
PA 10662 LOS VAQUEROS CIRCLE, PO BOX 3014, LOS ALAMITOS, CA 90720-1264 USA
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PY 2009
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DI 10.1109/IFCSTA.2009.211
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WC Computer Science, Interdisciplinary Applications
SC Computer Science
GA BOK74
UT WOS:000276907000091
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PT J
AU Yik, FWH
Lee, WL
AF Yik, FWH
Lee, WL
TI Rebate as an economic instrument for promoting building energy efficiency in Hong Kong
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE demand side management; rebate; energy efficiency; economics
ID DEMAND-SIDE MANAGEMENT; UTILITY DSM; BARRIERS; STRATEGIES; CAPACITY
AB Economic principles have been applied to elicit the conditions under which there will be benefit to power companies in offering rebates to consumers to encourage them to adopt energy saving measures. The analysis also provides an answer to how rebate rate should be determined to maximise social benefit. However, the analysis of the rebate-based demand side management (DSM) programmes launched by the two power companies in Hong Kong in the year 2000 showed that the prerequisite conditions that would

permit the power companies to derive benefits from the programmes were unlikely to exist. This suggests that use of this economic instrument for promoting energy efficiency requires governmental influence; it will not emerge solely as a commercial decision of the power companies in Hong Kong. (c) 2004 Elsevier Ltd. All rights reserved.
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SN 0360-1323
J9 BUILD ENVIRON
JI Build. Environ.
PD SEP
PY 2005
VL 40
IS 9
BP 1207
EP 1216
DI 10.1016/j.buildenv.2004.10.007
PG 10
WC Construction & Building Technology; Engineering, Environmental; Engineering, Civil
SC Construction & Building Technology; Engineering
GA 945JX
UT WOS:000230499900006
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ER

PT J
AU Filippin, C
AF Filippin, C.
TI Energy use of buildings in central Argentina
SO JOURNAL OF BUILDING PHYSICS
LA English
DT Article
DE energy efficient envelope; energy behavior; energy saving
AB The present work analyzes the consumption of energy of three typologically and technologically different buildings, and its interaction with dimensional, morphological, and thermal indicators. The comparison of heat energy consumed by the conventional and the solar buildings (individual and apartments) allows the evaluation of the energy saved through the use of passive solar techniques and thermal envelopes. The study buildings are located in Santa Rosa (capital of the province of La Pampa) in Argentina. The latitudinal variation of degree days oscillates between 1300 and 1600 degrees C to the north and the south, respectively. The results show the high correlation between the energy consumption and the energy loss through the building's envelope. In buildings with conventional technology, the envelope (without insulation) reaches a G value of 4.13 W/m(3)degrees C, higher than the admissible maximum value stipulated by the N. IRAM 11604 for the study region. The technologically optimized construction through the use of an energy-efficient envelope, a carpentry with double glazing, and a collecting area of 12% with respect to the building's useful area allowed an energy saving of around 75% during winter. The results confirm the large potential of the solar building design to reach significant levels of energy saving, and the comparison of solar and conventional buildings in terms of natural gas consumption confirms the magnitude of such a potential.
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SN 1744-2591
J9 J BUILD PHYS
JI J. Build Phys.
PD JUL
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VL 29
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BP 69
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WC Construction & Building Technology
SC Construction & Building Technology
GA 178DW
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PT J
AU Dominguez-Amarillo, S
Fernandez-Aguera, J
Fernandez-Aguera, P
AF Dominguez-Amarillo, Samuel
Fernandez-Aguera, Jesica
Fernandez-Aguera, Patricia
TI TEACHING INNOVATION AND THE USE OF SOCIAL NETWORKS IN ARCHITECTURE:

LEARNING BUILDING SERVICES DESIGN FOR SMART AND ENERGY EFFICIENT BUILDINGS
SO ARCHNET-IJAR INTERNATIONAL JOURNAL OF ARCHITECTURAL RESEARCH
LA English
DT Article
DE undergraduates; education; teaching innovation; gamification; energy efficiency
ID PEDAGOGY
AB Today's buildings are evolving from structures comprising unchanging, static elements scantly able to interact with their surroundings, towards complex systemic compounds with an impact on the environs that entails more than mere anthropic alteration. In pursuit of energy efficiency and true sustainability, buildings must acquire the ability to interact as well as to generate synergies. The most prominent features of this approach are energy management and information flows which, intelligently designed, not only enhance buildings' capabilities, but also introduce a significant change in their relationship with the surrounds ('smart cities') and its inhabitants. This new paradigm calls for revisiting undergraduate architectural instruction, adopting a more complex overview of energy use and management in the design process, regarding buildings as dynamic rather than static entities. The methodology focuses on creating learning environments that favour students' participation in problem solving and assessment, encouraging teamwork based on case studies and stressing the connection between this new architecture, ICTs included, and social networks as participatory design tools. These ideas were implemented in a pilot learning experience conducted at the University of Seville for undergraduate students. The use of ICTs and the collaboration of non-academic experts were observed to further student promotion and projection beyond the academic environment and introduce them to the professional community.
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EI 1938-7806
J9 ARCHNET-IJAR
JI Archnet-IJAR
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PT J
AU Yu, BY
Wei, YM
Kei, G
Matsuoka, Y
AF Yu, Biying
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Kei, Gomi
Matsuoka, Yuzuru
TI Future scenarios for energy consumption and carbon emissions due to demographic transitions in Chinese households
SO NATURE ENERGY
LA English
DT Article
ID CO2 EMISSIONS; TIME USE; CLIMATE-CHANGE; UNITED-STATES; POPULATION; ENVIRONMENT; ALLOCATION; BEHAVIOR; DEMANDS; TRENDS
AB Population dynamics has been acknowledged as a key concern for projecting future emissions, partly because of the huge uncertainties related to human behaviour. However, the heterogeneous shifts of human behaviour in the process of demographic transition are not well explored when scrutinizing the impacts of population dynamics on carbon emissions. Here, we expand the existing population-economy-environment analytical structure to address the above limitations by representing the trend of demographic transitions to small-family and ageing society. We specifically accommodate for inter-and intra-life-stage variations in time allocation and consumption in the population rather than assuming a representative household, and take a less developed province, Sichuan, in China as the empirical context. Our results show that the demographic shift to small and ageing households will boost energy consumption and carbon emissions, driven by the joint variations in time-use and consumption patterns. Furthermore, biased pictures of changing emissions will emerge if the time effect is disregarded.
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FU programme 'Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellowship for Foreign Researchers'; China's National Key RD Program [2016YFA0602603]; National Natural Science Foundation of China [71603020, 71521002, 71642004]; National Bureau of Statistics China; Joint Development Program of Beijing Municipal Commission of Education
FX This work was supported by the programme 'Japan Society for the

Promotion of Science (JSPS) Postdoctoral Fellowship for Foreign Researchers'. The authors acknowledge financial support received through China's National Key R&D Program (2016YFA0602603), and the National Natural Science Foundation of China (no. 71603020, no. 71521002 and no. 71642004). We also acknowledge the support of the National Bureau of Statistics China in sharing the 2008 time-use data with us, and acknowledge the support of the Joint Development Program of Beijing Municipal Commission of Education. We thank B. van Ruijven for his kind help in providing information for the Population- Environment-Technology (PET) model.

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U1 14
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PI LONDON
PA MACMILLAN BUILDING, 4 CRINAN ST, LONDON N1 9XW, ENGLAND
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J9 NAT ENERGY
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WC Energy & Fuels; Materials Science, Multidisciplinary
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AU Nie, HG
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AF Nie, Hong-guang
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Vasseur, Veronique
Fan, Ying
TI Drivers of urban and rural residential energy consumption in China from the perspectives of climate and economic effects
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Residential energy consumption (REC); Index decomposition analysis; Urban versus rural areas; Climate effect; China
ID INDEX DECOMPOSITION ANALYSIS; NATURAL-GAS CONSUMPTION; CO2 EMISSIONS; ELECTRICITY CONSUMPTION; REGRESSION-MODELS; SECTOR; URBANIZATION; EFFICIENCY; BUILDINGS; REDUCTION

AB In this study, we investigate the driving forces behind the changes in residential energy consumption (REC) in China's urban and rural areas over the 2001-2012 period. Based on the logarithmic mean Divisia index method, the REC changes are decomposed into seven driving forces, which are climate change, energy price, energy expenditure mix, energy cost share (in total expenditure), expenditure share (in income), per capita income and population effects. According to the results, climate effect due to increasing days with abnormal temperature, energy cost share effect characterized by more expenditure to be paid for energy use, income effect describing constant income growth in the residential sector definitely increase REC in both urban and rural areas. In contrast, energy prices and energy expenditure mix effects negatively contribute to the REC increase, respectively because of the increase in energy prices and the transition from the low-priced energy to high-priced energy. Expenditure share and population effects play opposite roles in urban and rural areas, and the reasons and implications are analysed in depth. (C) 2017 Elsevier Ltd. All rights reserved.

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SC Science & Technology - Other Topics; Engineering; Environmental Sciences
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PT J
AU Bourdeau, M
Guo, XF
Nefzaoui, E
AF Bourdeau, Mathieu
Guo, Xiaofeng
Nefzaoui, Elyes
TI Buildings energy consumption generation gap: A post-occupancy assessment
in a case study of three higher education buildings
SO ENERGY AND BUILDINGS
LA English
DT Article

DE Higher educational building; Heat and electric consumption; Positive energy building; Statistical analysis; Load curve

ID SCHOOL BUILDINGS; PERFORMANCE; SIMULATION; CAMPUS

AB The existing stock of institutional buildings constructed before current thermal regulations is known to be high energy-consuming. In several cases, they contribute to a large share in local authorities' expenses, especially for those dedicated to education and research. These high consumption levels are due in general to low thermal regulations requirements and to the diversity of occupants, occupancy profiles and used equipment. We hereby report on a comparative study of the energy consumption of three campus buildings covering more than 50,000 m(2) useful ground area and located in Paris region. Used data were collected during more than three years between 2014 and 2017 and at different time steps, from yearly down to a 10 min time step. Statistical analysis tools are used, to identify the main energy drivers and their relative weight in the overall energy consumption for instance. The impact of different thermal regulations is clearly assessed through a post-occupancy study. Together with equipment, occupancy is shown to be the main electric energy consumption driver. Introduced tools lay the ground for a non-intrusive method for large tertiary buildings' power demand curves decomposition and reconstruction.

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PT J
AU Heidari, M
Majcen, D
van der Lans, N
Floret, I
Patel, MK
AF Heidari, Mahbod
Majcen, Dasa
van der Lans, Nicoline
Floret, Idelette
Patel, Martin K.
TI Analysis of the energy efficiency potential of household lighting in Switzerland using a stock model
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficiency; Lighting; Household; Stock model; LED; Bottom-up modelling; Techno-economic analysis
ID CHINA
AB Lighting, a main focus of Swiss energy efficiency policy, is a substantial consumer of energy in the residential sector in Switzerland, requiring 4.1 PJ electricity in 2015 or 6.4% of the sector's total electricity demand. Currently, incandescent bulbs (sales were prohibited in 2014) and halogen bulbs (to be banned in 2018) jointly represent nearly 60% of the installed lighting capacity in Swiss households. In the past few years, the price of light emitting diodes (LEDs) dropped dramatically, offering largely unexploited opportunities for energy efficiency improvement. To assess the energy efficiency potential in household lighting, a dynamic model is developed that accounts for the change of the lighting stock per technology over time.

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PT J
AU Andersen, FM
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Hansen, LG
Jensen, CL
AF Andersen, Frits Moller
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TI Households' hourly electricity consumption and peak demand in Denmark
SO APPLIED ENERGY
LA English
DT Article
DE Hourly electricity demand; Household demand flexibility; Household appliances; Load forecasting
ID LOAD PROFILES; RESIDENTIAL DEMAND; FIELD EXPERIMENT; SIDE MANAGEMENT;

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AB The electrification of residential energy demand for heating and transportation is expected to increase peak load and require additional generation and transmission capacities. Electrification also provides an opportunity to increase demand response. With a focus on household electricity consumption, we analyse the contribution of appliances and new services, such as individual heat pumps and electric vehicles, to peak consumption and the need for demand response incentives to reduce the peak.

Initially, the paper presents a new model that represents the hourly electricity consumption profile of households in Denmark. The model considers hourly consumption profiles for different household appliances and their contribution to annual household electricity consumption. When applying the model to an official scenario for annual electricity consumption, assuming non-flexible consumption due to a considerable introduction of electric vehicles and individual heat pumps, household consumption is expected to increase considerably, especially peak hour consumption is expected to increase.

Next the paper presents results from a new experiment where household customers are given economic and/or environmental incentives to shift consumption to or away from specified hours. The experiment focuses on the present classic consumption and shows that household customers do react to incentives, but today the flexibility of the classic consumption is limited. Considering electric vehicles and individual heat pumps, for an individual household, the consumption of each of these technologies roughly doubles the household's consumption and considerably increases their potential for flexibility. Thus, in order to introduce incentives for demand flexibility, while considering reducing peak consumption, policy makers should initially focus on households that have a heat pump and/or an electric vehicle.

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TI Recent advances in the analysis of residential electricity consumption

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ID DEMAND-SIDE MANAGEMENT; BUILDING ENERGY-CONSUMPTION; OF-THE-ART; NEURAL-NETWORKS; SELF-CONSUMPTION; REGRESSION-ANALYSIS; CONDITIONAL DEMAND; HOUSEHOLD-LEVEL; LOAD PROFILES; PREDICTION
AB The emergence of smart grid technologies and applications has meant there is increasing interest in utilising smart meters. Smart meter penetration has significantly increased over the last decade and they are becoming more widespread globally. Companies such as Google, Nest, Intel, General Electric and Amazon are amongst those companies which have been developing end use applications such as home and battery energy management systems which leverage smart meter data. In addition, utilities and networks are becoming more aware of the potential benefits of using-household smart meter data in demand side management strategies such as energy efficiency and demand response. Motivated by this fact, the amount of research in this area has grown considerably in recent years. This paper reviews the most recent methods and techniques for using smart meter data such as forecasting, clustering, classification and optimization. The study covers various applications such as Home and Battery Energy Management Systems and demand response strategies enabled by the analysis of smart meter data. From a comprehensive review of the literature, it was observed that there are remarkable discrepancies between the studies, which make in-depth comparison and analysis challenging. Data analysis and reporting guidelines are suggested for studies which use smart meter data. These guidelines could provide a consistent and common framework which could enhance future research.
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WC Energy & Fuels; Engineering, Chemical
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PT J
AU Basinska, M
AF Basinska, M.
TI The use of multi-criteria optimization to choose solutions for energy-efficient buildings
SO BULLETIN OF THE POLISH ACADEMY OF SCIENCES-TECHNICAL SCIENCES
LA English
DT Article
DE global cost methodology; low energy buildings; European Union Directive; multi-criteria optimization
ID COST-OPTIMAL ANALYSIS; RESIDENTIAL BUILDINGS; DECISION-MAKING; ENVIRONMENTAL-IMPACT; SENSITIVITY-ANALYSIS; PERFORMANCE; SYSTEMS; DESIGN
AB The goal of this paper was to optimize the building envelope and technical equipment in the building through the mitigation of the global cost value, and then to evaluate the influence of the chosen assumptions on the primary energy index. The analyses carried out using global cost method allow for finding the cost optimal solution but only for the some range of primary energy index variability. In order to find the optimal solutions it was proposed to use the multi-criteria optimisation, assuming the following as basic criteria: a global cost value and investment prices increase (economic criteria), a primary energy index (energy-related criterion), an emission of carbon dioxide (environmental criterion). The analysed case study refers to the technical solutions for the residential buildings with the usable energy demand at the level of 40 and 15 kWh/m(2)/a. The presented method might be applied to different types of buildings: those being designed and those being the subject of the thermo-modernisation. The results demonstrate that the proposed model allows for classification of the alternative technical solutions regarding the designing process and the building's technical equipment. The carried out analyses indicate the economic possibility to achieve the low energy building standard and show the need to concentrate the activities related to the installation technology and used energy source.
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NR 35
TC 1
Z9 1
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PU POLSKA AKAD NAUK, POLISH ACAD SCI, DIV IV TECHNICAL SCIENCES PAS
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PA PL DEFILAD 1, WARSZAWA, 00-901, POLAND
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WC Engineering, Multidisciplinary
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PT J
AU Supasa, T
Hsiau, SS
Lin, SM
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Wu, JC
AF Supasa, Tharinya
Hsiau, Shu-San
Lin, Shih-Mo
Wongsapai, Wongkot
Wu, Jiunn-Chi
TI Household Energy Consumption Behaviour for Different Demographic Regions in Thailand from 2000 to 2010
SO SUSTAINABILITY
LA English
DT Article
DE residential energy consumption; Thailand; structural decomposition analysis; hybrid input-output
ID STRUCTURAL DECOMPOSITION ANALYSIS; INPUT-OUTPUT-ANALYSIS; CARBON EMISSIONS; CO2 EMISSIONS; CHINA; REQUIREMENTS; EFFICIENCY; POLICY; MODEL; CONSERVATION

AB Since 1995, the residential sector has been a fast-growing energy consumption sector in Thailand. This sector contributes dramatically to the growth of Thailand's electricity and oil demand. Our study analysed Thailand's residential energy consumption characteristics and the seven underlying factors affecting the growth in energy use of five demographic regions using an energy input-output method. Embodied energy decomposition revealed that direct energy consumption accounted for approximately 30% of total residential energy use, whereas indirect energy consumption was at 70%. During the studied period, the growth in indirect energy use for all household groups was primarily the result of higher consumption of commerce', air transport', manufacturing', food and beverages' and agriculture' products. Moreover, each influencing driver contributes differently to each household's growth in energy demand. The number of households was the leading factor that dominated the increases in residential energy use in the Greater Bangkok and Central regions. Growth in residential energy consumption in the Northern, Northeastern and Southern regions was strongly dominated by changes in income per capita. Consumption structure and using energy-efficient products had a moderate impact on all regions' energy consumption. Thus, our findings provide additional energy-saving strategies to restrain further growth in residential energy demand.

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PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
SN 2071-1050
J9 SUSTAINABILITY-BASEL
JI Sustainability
PD DEC
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DI 10.3390/su9122328
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences; Environmental Studies
SC Science & Technology - Other Topics; Environmental Sciences & Ecology
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PT J

AU Kruusimagi, M
Sharples, S
Robinson, D
AF Kruusimagi, Martin
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TI Living with an autonomous spatiotemporal home heating system: Exploration of the user experiences (UX) through a longitudinal technology intervention-based mixed-methods approach
SO APPLIED ERGONOMICS
LA English
DT Article
DE User-experience; UX; Design; Human-computer interaction; Hci; Spatiotemporal heating; Application; Interface; Longitudinal; Home heating; Technology intervention
ID THERMOSTATS; CHALLENGES; AUTOMATION; BEHAVIOR
AB Rising energy demands place pressure on domestic energy consumption, but savings can be delivered through home automation and engaging users with their heating and energy behaviours. The aim of this paper is to explore user experiences (UX) of living with an automated heating system regarding experiences of control, understanding of the system, emerging thermal behaviours, and interactions with the system as this area is not sufficiently researched in the existing homes setting through extended deployment. We present a longitudinal deployment of a quasi-autonomous spatiotemporal home heating system in three homes. Users were provided with a smartphone control application linked to a self-learning heating algorithm. Rich qualitative and quantitative data presented here enabled a holistic exploration of UX. The paper's contribution focuses on highlighting key aspects of UX living with an automated heating systems including (i) adoption of the control interface into the social context, (ii) how users' vigilance in maintaining preferred conditions prevailed as a better indicator of system over-ride than gross deviation from thermal comfort, (iii) limited but motivated proactivity in system-initiated communications as best strategy for soliciting user feedback when inference fails, and (iv) two main motivations for interacting with the interface managing irregularities when absent from the house and maintaining immediate comfort, latter compromising of a checking behaviour that can transit to a system state alteration behaviour depending on mismatches. We conclude by highlighting the complex socio-technical context in which thermal decisions are made in a situated action manner, and by calling for a more holistic, UX-focused approach in the design of automated home systems involving user experiences.

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FX The authors acknowledge Jacob Chapman and Daniel Ratzinger for their invaluable input in the realisation of this project. The study was approved by University of Nottingham Engineering ethics committee. Martin Kruusimagi is supported by the Horizon Doctoral Training Centre at the University of Nottingham (RCUK Grant No. EP/G037574/1).
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NR 38
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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JI Appl. Ergon.
PD NOV
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WC Engineering, Industrial; Ergonomics; Psychology, Applied
SC Engineering; Psychology
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PT J
AU Kiluk, S
AF Kiluk, Sebastian

TI Diagnostic information system dynamics in the evaluation of machine learning algorithms for the supervision of energy efficiency of district heating-supplied buildings
SO ENERGY CONVERSION AND MANAGEMENT
LA English
DT Article
DE District heating; Energy efficiency; Machine learning; Information system dynamics; Entropy
ID BILLING SYSTEM; PERFORMANCE; DEMAND; SIMULATION; PATTERNS; MODEL
AB Modern ways of exploring the diagnostic knowledge provided by data mining and machine learning raise some concern about the ways of evaluating the quality of output knowledge, usually represented by information systeins. Especially in district heating, the stationarity of efficiency models, and thus the relevance of diagnostic classification system, cannot be ensured due to the impact of social, economic or technological changes, which are hard to identify or predict. Therefore, data mining and machine learning have become an attractive strategy for automatically and continuously absorbing such dynamics.
This paper presents a new method of evaluation and comparison of diagnostic information systems gathered algorithmically in district heating efficiency supervision based on exploring the evolution of information system and analyzing its dynamic features.
The process of data mining and knowledge discovery was applied to the data acquired from district heating substations' energy meters to provide the automated discovery of diagnostic knowledge base necessary for the efficiency supervision of district heating-supplied buildings. The implemented algorithm consists of several steps of processing the billing data, including preparation, segmentation, aggregation and knowledge discovery stage, where classes of abstract models representing energy efficiency constitute an information system representing diagnostic knowledge about the energy efficiency of buildings favorably operating under similar climate conditions and supplied from the same district heating network.
The authors analyzed the evolution of a series of information systems originating from the same knowledge discovery algorithm applied to a sequence of energy consumption-related data. Specifically, the rough sets theory was applied to describe the knowledge base and measure the uncertainty of machine learning predictions of current classification based on a past knowledge base. Fluctuations of diagnostic class membership were identified and provided for the differentiation between returning and novel fault detections, thus introducing the qualities of information system uncertainty and its sustainability. The usability of the new method was demonstrated in the comparison of results for exemplary data mining algorithms implemented on real data from over one thousand buildings. (C) 2017 Elsevier Ltd. All rights reserved.
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PU PERGAMON-ELSEVIER SCIENCE LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 0196-8904
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J9 ENERG CONVERS MANAGE
JI Energy Conv. Manag.
PD OCT 15
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BP 904
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DI 10.1016/j.enconman.2017.05.006
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WC Thermodynamics; Energy & Fuels; Mechanics
SC Thermodynamics; Energy & Fuels; Mechanics
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PT J
AU Yeatts, DE
Auden, D
Cooksey, C
Chen, CF
AF Yeatts, Dale E.
Auden, Dana
Cooksey, Christy
Chen, Chien-Fei
TI A systematic review of strategies for overcoming the barriers to
energy-efficient technologies in buildings
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Review
DE Barriers to energy-efficient technologies; Reduction of fossil fuels;
Environmental health; Building energy
ID SUSTAINABLE CONSTRUCTION; INNOVATION; TRANSITION; DIFFUSION; SECTOR;

PERSPECTIVE; FRAMEWORK; ADOPTION

AB The energy used to construct, operate and eventually demolish buildings has accounted for 40% of total energy used globally and 9% of the world's greenhouse emissions. When examining major energy consumers such as Europe or the United States, the amounts of energy used for buildings is even higher. The use of energy-efficient technologies (EETs), such as low-energy windows and programmable thermostats, have had many positive results, including long-term energy reductions, a healthier living environment, the creation of jobs, and better quality housing. Unfortunately, there continue to be barriers to the use of EETs. While there are dozens of strategies for overcoming these barriers, many have gotten overlooked or lost. This paper provides a review of the literature that has focused on barriers to the use of EETs and strategies for overcoming these barriers. The method used for identifying relevant literature was a systematic search of scholarly publications addressing barriers and/or strategies for EET use. A theoretical framework is presented as a means of organizing the literature. The framework includes three broad groups of barriers: knowledge of EETs, access to EETs, and desire to use EETs. Strategies for overcoming the barriers are likewise organized and described. (C) 2017 Elsevier Ltd. All rights reserved.

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PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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PT J
AU Lin, HY
Wang, QX
Wang, Y
Liu, YL
Sun, Q
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AF Lin, Haiyang
Wang, Qinxing
Wang, Yu
Liu, Yiling
Sun, Qie
Wennersten, Ronald
TI The energy-saving potential of an office under different pricing mechanisms - Application of an agent-based model
SO APPLIED ENERGY
LA English
DT Article
DE Agent-based model; Energy saving potential; Public building; Electricity price; Energy system
ID DISTRICT-HEATING SYSTEMS; ELECTRICITY CONSUMPTION; AIR-CONDITIONERS; HOUSEHOLD ELECTRICITY; RESIDENTIAL BUILDINGS; PERFORMANCE; CHINA; DEMAND; REFORM; OPTIMIZATION
AB This paper developed an agent-based model (ABM) to explore the energy saving potentials (ESPs) of various types of appliances in offices under different pricing mechanisms. The model included four types of commonly used appliances in office buildings: an air conditioner (AC), computers, lights and a basic load. The total ESPs of the entire office are 6.7% and 17.4% on the second and the third price tier of the tiered pricing mechanism (TEP), while the ESPs are 11.8% and 14.2% under the peak-valley pricing (PVP) and critical peak pricing (CPP), respectively. Within different types of appliances, AC consumes the largest amount of electricity, over 50%, while the ESPs of the AC under different pricing mechanisms are only 6.9-12.1%. In contrast, the lights have the biggest ESP, be. 14.1-53.4%, under various pricing levels. Both the pricing mechanisms of PVP and CPP only have the effect of peak clipping and do not have a significant effect of valley filling, since there is no people working in the office during the valley price period. The maximum ESP, which is based on people's maximum-saving behavior, is much larger than the ESPs on the basis of people's ordinary consumption patterns. This implies the importance of improving people's awareness of energy saving and refining their behaviors. Lastly, the model developed in this study provides a generic platform for simulating many types of energy systems and is very effective for handling the complicated relations between different types of technology and the way how they are used and interacted with each other. ABMs have very good adaptability and capacity in simulating energy systems.
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FX This work was supported in part by Project ZR2014EEM025 supported by Natural Science Foundation of Shandong Province, China; and the 973 Program 2013CB228305, China.
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NR 47
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JI Appl. Energy
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WC Energy & Fuels; Engineering, Chemical
SC Energy & Fuels; Engineering
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PT J
AU Huo, HE
Shao, JH
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AF Huo, Haie
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TI Contributions of energy-saving technologies to building energy saving in different climatic regions of China
SO APPLIED THERMAL ENGINEERING
LA English
DT Article
DE Contribution rate; Energy-saving technology; Discomfort degree hours; Annual load; Climatic regions
ID OPTIMUM INSULATION THICKNESS; RESIDENTIAL BUILDINGS; THERMOPHYSICAL PROPERTIES; THERMAL PERFORMANCE; WINTER ZONE; ENVELOPE; SIMULATION; DESIGN; WALLS; CONSUMPTION
AB In China, the commonly used energy-saving technologies (ESTs) include the external insulation for roof and external wall, shading technology and natural ventilation. It is well known that the same EST demonstrates different effects in different climatic regions. In this study, the contribution rates of building envelopes in annual load and that of ESTs in energy saving are quantitatively investigated with the Finite Volume Method under unsteady-state conditions. A representative individual building is selected as the case model. Four typical cities of Shenyang, Beijing, Chengdu and Guangzhou are selected to represent different climatic regions of China. Results show that the critical parts where the energy-saving measures should be taken are roof and exterior wall. The contribution of external insulation dominates in the energy saving of the building models in all of the four climatic regions. In addition, shading device should be applied based on the climatic conditions. Natural ventilation is worth using in building design as it requires no capital investment except in severe cold zones in China. (c) 2017 Elsevier Ltd. All rights reserved.
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FU Education Department of Sichuan Province [17ZA0326]
FX This word was supported by the Key Project of Education Department of Sichuan Province (No. 17ZA0326).
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PT J
AU Barbieri, N
Palma, A
AF Barbieri, Nicolo

Palma, Alessandro
TI Mapping energy-efficient technological advances in home appliances
SO ENERGY EFFICIENCY
LA English
DT Article
DE Energy efficiency; Self-organising maps; Patent analysis; Home appliances; ICTs
ID SELF-ORGANIZING MAP; NEURAL-NETWORKS; PATENT ANALYSIS; UNITED-STATES; MARKET VALUE; K-MEANS; INNOVATION; FIRMS; PATTERNS; INDUSTRY
AB The present study employs patent data on three groups of large energy-efficient appliances (i.e. freezers/refrigerators, washing machines and dishwashers) and provides a methodology for (i) mapping components related to energy efficiency improvements, (ii) mapping their evolution over time and (iii) testing the technological fungibility of these components. Our analysis model exploits an original patent selection process and the concept of technological relatedness using co-occurrence analysis of patent classes as input for self-organising maps (SOMs), an unsupervised artificial neural network able to represent high-dimensional data in a visually attractive and two-dimensional distance-based map. The results confirm the pervasive nature of energy efficiency to be nested in many technological components. In addition, we show that a dematerialisation process has affected the evolution of energy efficiency technologies over time, in a technology space characterised by a high level of complexity and variety. Energy efficiency has links with information technologies embodied in the appliances, which are far from their maturity path. Consequently, innovation and information policies are of utmost importance in order to achieve more ambitious energy efficiency targets in the groups of appliances analysed.
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TI An ethnography of energy demand and working from home: Exploring the affective dimensions of social practice in the United Kingdom
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DT Article
DE Working from home; Energy practices; Affect; Comfort
ID THERMAL COMFORT; ENVIRONMENTAL-POLICY; CONSUMPTION; DEMOGRAPHICS; EXPERIENCE; EMOTIONS; TELEWORK; IMPACTS; DENMARK; PEOPLE
AB The practice of working from home has become widespread in developed countries, and the numbers of regular home workers are steadily increasing. There are potentially positive implications for energy consumption associated with home working, but these depend on myriad variables. This qualitative study,

based on interviews with regular home workers, provides a more in-depth perspective on how and why energy is used compared with quantitative models of household consumption. Ethnographic research data is analysed using insights from practice theory. Placing the practice at the heart of analysis, it explores meanings, materials and competences involved in home working, and attends to the affective experiences of practitioners. Considering working from home as an integrative practice, it explores how dispersed practices are incorporated into individual performances, bringing about affective satisfaction. Findings show that the practice of working from home is characterised by themes of comfort, control and flexibility, with implications for energy demand. It is argued that the synthesis of practice theory and affect can provide valuable insights for energy research. The paper discusses the implications for demand reduction, demand shifting and 'smart' controls, with reference to the role of employers, researchers, policy makers and home workers themselves.

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TI A Behavioral Economics Approach to Residential Electricity Consumption
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DT Article
DE agent-based modeling; complex systems; consumer behavior; economics; demand-side management; smart grids
ID DECISION-MAKING; POWER-SYSTEM; TECHNOLOGIES; REDUCTION; DEMAND; MODELS; GRIDS
AB Consumer behavior is complex and is difficult to represent in traditional economic theories of decision-making. This paper focuses on the development of an agent-based approach to analyze people's behavior in consuming electricity using a behavioral economics framework, where the consumer is the main agent of power systems. This approach may bring useful insights for distribution companies and regulatory agencies, helping to shift thinking to a more user-centric approach. The emergent properties of electricity consumption are modeled by the means of consumer's heuristics, taking into account the electricity price, consumer's satisfaction level, willingness to invest in new technologies, social interactions, and marketing strategies by the power utility. Analysis on the emergent behavior of this approach through simulation studies showed that it is indeed valuable, as does not require in-depth data of all details on human behavior. However, it contributes to the understanding of relations among various objects involved in electricity consumption.
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SN 1996-1073
J9 ENERGIES
JI Energies
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WC Energy & Fuels
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PT J
AU Reyna, JL
Chester, MV
AF Reyna, Janet L.
Chester, Mikhail V.
TI Energy efficiency to reduce residential electricity and natural gas use under climate change
SO NATURE COMMUNICATIONS
LA English
DT Article
ID BOTTOM-UP APPROACH; BUILDING STOCK; UNITED-STATES; CONSUMPTION; DEMAND; MODELS; SECTOR; SCENARIOS; IMPACTS; POLICY
AB Climate change could significantly affect consumer demand for energy in buildings, as changing temperatures may alter heating and cooling loads. Warming climates could also lead to the increased adoption and use of cooling technologies in buildings. We assess residential electricity and natural gas demand in Los Angeles, California under multiple climate change projections and investigate the potential for energy efficiency to offset increased demand. We calibrate residential energy use against metered data, accounting for differences in building materials and appliances. Under temperature increases, we find that without policy intervention, residential electricity demand could increase by as much as 41-87% between 2020 and 2060. However, aggressive policies aimed at upgrading heating/cooling systems and appliances could result in electricity use increases as low as 28%, potentially avoiding the installation of new generation capacity. We therefore recommend aggressive energy efficiency, in combination with low-carbon generation sources, to offset projected increases in residential energy demand.
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FU National Science Foundation [GRFP-DGE 1311230, SRN 1444755, WSC 1360509, IMEE 1335556, 1335640]; Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy Science and Technology Policy Fellowships; DOE [DE-SC0014664]
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from the Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy Science and Technology Policy Fellowships administered by the Oak Ridge Institute for Science and Education (ORISE) for the DOE. ORISE is managed by ORAU under DOE contract number DE-SC0014664. Any opinion, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. All opinions expressed in this paper are the author's and do not necessarily reflect the policies and views of DOE, ORAU or ORISE.

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PT J
AU Chayaamor-Heil, N
Hannachi-Belkadi, N
AF Chayaamor-Heil, Natasha
Hannachi-Belkadi, Nazila
TI Towards a Platform of Investigative Tools for Biomimicry as a New Approach for Energy-Efficient Building Design
SO BUILDINGS
LA English
DT Article
DE biomimicry; architectural design; energy efficiency; sustainability; data analysis; Bayesian network
AB Major problems worldwide are environmental concern and energy shortage along with the high consumption of energy in buildings and the lack of sources. Buildings are the most intensive energy consumers, and account for 40% of worldwide energy use, which is much more than transportation. In

next 25 years, CO2 emissions from buildings are projected to grow faster than in other sectors. Thus, architects must attempt to find solutions for managing buildings energy consumption. One of new innovative approaches is Biomimicry, which is defined as the applied science that derives inspiration for solutions to human problems through the study of natural designs' principles. Although biomimicry is considered to be a new approach for achieving sustainable architecture, but there is still not enough access for architects to make use of it, especially to implement biomimetic design strategy in architectural project. The main objective of this paper is to raise awareness of architects making use of biomimetic strategies with better accessible facility. We propose to create the tool setting relationship to formalize and bridge between biological and architectural knowledge, along with investigative tools to investigate the ability of reducing energy consumption by applying the biomimetic strategies on efficient-energy building design. This article hypothetically proposes an investigative tool based on Bayesian networks for testing the rapid result of choices from natural devices according to specific multi-criteria requirements in each case study.

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PI BASEL
PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
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JI Buildings
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WC Construction & Building Technology
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PT J
AU Alemi, P
Loge, F
AF Alemi, Payman
Loge, Frank
TI Energy efficiency measures in affordable zero net energy housing: A case study of the UC Davis 2015 Solar Decathlon home
SO RENEWABLE ENERGY
LA English
DT Article
DE Residential housing; Energy modeling; Zero net energy; Energy efficiency
ID CLEAR SKIES
AB The 2015 UC Davis Solar Decathlon Team designed and constructed an affordable zero net energy prototype home for California (CA) farmworkers. The prototype was modeled with BEopt and Microsoft Excel (R) for year-round operation under the Davis, CA climate. Each major energy-efficient feature of the home was separately analyzed to gauge its energy savings impact. The construction strategyof in-line framing, low window to wall ratio, and thermal mass in the floor, annually saved 810 kWh in space conditioning. The appliance scoring methodology evaluated appliances based on water efficiency, energy efficiency, and affordability-this methodology led to the adoption of appliances that yielded an annual energy savings exceeding 400 kWh. A graywater heat recovery system selected for the project, the Nexus, saved roughly 3500 kWh annually of electricity compared to an electric resistance water heater. The combined radiant/night sky system reduced the space conditioning energy of the home by nearly 1400 kWh. Over a full year, the UC Davis Solar Decathlon home is anticipated to be 12.9% net energy positive and consume 43.8% less energy than a conventional home, with the same floor plan, exposed to the Davis climate. (C) 2016 Elsevier Ltd. All rights reserved.
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FU UC Davis; Amramp; Armstrong; AUS Decking, Inc.; AutoDesk; Bluebeam; Bosch; Brown Construction; Building Materials and Construction Services; Center for Information Technology Research in the Interest of Society; Daikin; Davis Energy Group; Fastenal; Gudgel Yancey Roofing Inc.; Heising-Simons Foundation; Honda; Integrated Comfort; JamesHardie; Nexus eWater; Pacific Gas and Electric; Simpson Strong-Tie; SnapNrack PV Mounting Systems; Sunbelt Rentals; SunPower; Tandem Properties; UC Davis Office of the Provost and Executive Vice Chancellor; UC Davis College of Agricultural and Environmental Sciences; UC Davis College of

Engineering; UC Davis Division of Humanities, Arts, and Cultural Studies; UC Davis Division of Social Sciences; UC Davis Energy Efficiency Center; UC Davis Energy Institute; UC Davis Office of Graduate Studies; UC Davis Student Affairs; UC Davis Undergraduate Education; UC Davis Utilities; U.S. Department of Energy; Viega; Visions Paint Recycling; Weyerhaeuser
FX We are extremely grateful to all of the students, faculty, staff, and mentors who spent time and energy designing and constructing the Aggie Sol Home. We would like to thank UC Davis for all of its financial and infrastructural support. We also would like to express gratitude to all of the organizations that donated their valuable time, money, and resources to supporting our project:; Organization Name; Amramp; Armstrong; AUS Decking, Inc.; AutoDesk; Bluebeam; Bosch; Brown Construction; Building Materials and Construction Services; Center for Information Technology Research in the Interest of Society; Daikin; Davis Energy Group; Fastenal; Gudgel Yancey Roofing Inc.; Heising-Simons Foundation; Honda; Integrated Comfort; JamesHardie; Nexus eWater; Pacific Gas and Electric; Simpson Strong-Tie; SnapNrack PV Mounting Systems; Sunbelt Rentals; SunPower; Tandem Properties; UC Davis Office of the Provost and Executive Vice Chancellor; UC Davis College of Agricultural and Environmental Sciences; UC Davis College of Engineering; UC Davis Division of Humanities, Arts, and Cultural Studies; UC Davis Division of Social Sciences; UC Davis Energy Efficiency Center; UC Davis Energy Institute; UC Davis Office of Graduate Studies; UC Davis Student Affairs; UC Davis Undergraduate Education; UC Davis Utilities; U.S. Department of Energy; Viega; Visions Paint Recycling; Weyerhaeuser

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PU PERGAMON-ELSEVIER SCIENCE LTD
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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AU Beazley, S
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TI Enhancing energy efficiency in residential buildings through the use of
BIM: The case for embedding parameters during design
SO IMPROVING RESIDENTIAL ENERGY EFFICIENCY INTERNATIONAL CONFERENCE, IREE
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SE Energy Procedia
LA English

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CT International Conference on Improving Residential Energy Efficiency (IREE)
CY FEB 16-17, 2017
CL Woollongong, AUSTRALIA
SP Univ Woollongong, Sustainable Buildings Res Ctr
DE Energy efficiency; BIM; Section J; Building regulations
AB A building design is typically created by a collaboration of professionals. Whilst the advent of BIM tools makes the assessment of the performance of an iterative design possible, these tools are not commonly used, due to traditional practice prevailing, technical limitations including differing data formats, and industry resistance to innovation. Timely consistent feedback throughout the design process, as major design decisions are made, could enable the enhancement of energy efficiency. However, current design guidelines are typically not in digital rule form, preventing the automated checking and validation of developing design models. Furthermore, architectural design tools have poor connections to thermal and environmental analysis software, which is exacerbated by a lack of knowledge of the data requirements of other disciplines both upstream and downstream. This paper explores the potential for embedding parameters within architectural model files to enable the enhancement of energy efficiency at the design stage and through the design process. It explores the architectural to energy analysis data exchanges, and demonstrates the way in which energy efficiency parameters can be embedded within model files to inform decision making at the conceptual design stage. The paper found that by using tools readily available, it is possible to add value during the design process through the use of BIM, with improved design outcomes as the result. The need to develop new workflows between the disciplines as a result of this different approach was highlighted. This enhanced practice is more responsive and can support better communication within project teams through providing timely information and feedback, providing analysis before optimisation for energy efficiency. (C) 2017 The Authors. Published by Elsevier Ltd. Peer-review under responsibility of the scientific committee of the International Conference on Improving Residential Energy Efficiency.
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FU Steel Research Hub - Australian Research Council and industry [IH130100017]
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AU Di Giulio, R
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TI Integrated BIM-GIS based design for high energy efficiency hospital buildings
SO TECHNE-JOURNAL OF TECHNOLOGY FOR ARCHITECTURE AND ENVIRONMENT
LA English
DT Article
DE energy efficiency; healthcare districts; building information modeling; semantic driven design
AB The interoperability of the tools for managing and controlling the design process is one of the themes on which research and innovations are focussed in the field of BIM (Building Information Modelling) systems. A strategic objective of the STREAMER research, co-funded by the European Union within the context of the Seventh Framework Programme, is that of defining the tools and methods of designing hospital buildings that allow for a 50% reduction in energy consumption and emissions in large healthcare districts. Contributing to the achievement of this result is the creation of integrated tools, based on BIM and GIS systems, capable of providing an effective backup to the decisions of the various subjects involved in the project and the management of hospital complexes.
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FU European Community's Seventh Framework Programme [608739]
FX The research leading to these results has received funding from the European Community's Seventh Framework Programme under Grant Agreement No. 608739 (Project STREAMER).

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WC Architecture
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OA gold
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PT J
AU Gana, JA
Hoppe, T
AF Gana, James A.
Hoppe, Thomas
TI Assessment of the Governance System Regarding Adoption of Energy Efficient Appliances by Households in Nigeria
SO ENERGIES
LA English
DT Article
DE energy efficiency; policy; household electrical appliances; governance; Nigeria
ID RESIDENTIAL SECTOR; CO2 EMISSIONS; CONSERVATION; CONSUMPTION; BEHAVIOR; ENVIRONMENT; ATTITUDES; STRATEGY; DESIGN; JAPAN
AB The adoption of energy efficient electrical appliances by households has a great potential to reduce electricity consumption in Nigeria. A well-formulated and implemented policy (mix) to spur adoption is said to be required to drive this process. This article presents an assessment of policies that aim to spur adoption among households, and the related governance system. The analytical framework used for this analysis is the Governance Assessment Tool (GAT). Data collection involved semi-structured interviews, a review of policy documents, and secondary quantitative data. The results show that policies in Nigeria had little effect in meeting pre-set goals. The governance system was found to be weakly developed due to a lack of policy, the overlapping work of different governmental organizations, a lack of appropriate resources, and a lack of householders' involvement in agenda-setting and decision-making processes. Current actions mostly depend on local programmes that run via donor aid. They include the free exchange of CFL bulbs and metering studies of end user energy consumption. The results add further insight in the fields of governance and policy on energy efficiency issues in developing countries. This

article also provides suggestions for the design of policies that target the adoption of energy efficient electrical appliances among households in Nigeria.

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PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
SN 1996-1073
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JI Energies
PD JAN
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WC Energy & Fuels
SC Energy & Fuels
GA EI3WG
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PT J
AU Guo, W
Zhao, TY
Dai, HJ
AF Guo, Wen
Zhao, Tianyan
Dai, Hongjun
TI Calculation and decomposition of regional household energy consumption in China: based on perspectives of urbanization and residents' consumption
SO CHINESE JOURNAL OF POPULATION RESOURCES AND ENVIRONMENT
LA English
DT Article
DE Urbanization; residential consumption; household energy consumption
ID CO2 EMISSIONS; INTENSITY; COUNTRIES; LMDI
AB Demographic urbanization caused great changes in scale of residents' consumption and residents' lifestyle and then impacted changes of regional household energy consumption. This paper expanded Logarithmic Mean Decomposition Index method through introducing variables of urbanization and residential consumption into the model. It also analyzed the influences of six factors as energy structure, energy intensity, population scale, urbanization, residential consumption, and consumption inhibit on regional household energy consumption. Results showed that in 2003-2012, impact of urbanization on regional household energy consumption of Chinese three areas was significantly higher than population size. The "population gathered in eastern region" phenomenon caused eastern region getting the largest population scale effect. Driving force of residential consumption on regional household energy consumption was much higher than the other five effects. Due to the comparative advantage of residential consumption compared with government consumption, investment, and net export, the decrease of consumption ratio promoted the growth of regional household energy consumption. Energy intensity in Chinese three regions kept reducing in 2003-2012. The progress of energy utilization technology slowed the growth of regional household energy consumption, and energy intensity effect was most significant in the central region.
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FU National Natural Science Foundation of China [71671080, 7157109]; National Natural Science Youth Foundation of China [71301070]; National Statistical Science Research Project "Energy statistics and its balance sheet in China based on perspective of energy quality" [2016LZ36]; Science Foundation of Huainan Normal University [2016xj07zd]
FX This work was financially supported by Funding of National Natural Science Foundation of China "Research on environmental risk assessment and management of the avoidance project based on perspective of public perception," "Research on the evolution mechanism of the avoidance cluster behavior by considering of endogenous information under the internet environment" [Grant Numbers 71671080, 7157109], Funding of National Natural Science Youth Foundation of China "The formation, evolution and conflict coordination of the avoidance behavior" [Grant Number 71301070], Funding of National Statistical Science Research Project "Energy statistics and its balance sheet in China based on perspective of energy quality" [Grant Number 2016LZ36], Funding of Science Foundation of Huainan Normal University "Benefit evaluation of coal mining subsidence area comprehensive management based on external perspective" [Grant Number 2016xj07zd].
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WC Environmental Studies
SC Environmental Sciences & Ecology
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BE Yan, J
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Campana, P
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TI Innovative design of an educational physical simulation tool for investigating energy consumption in buildings for enhancing public engagement
SO 8TH INTERNATIONAL CONFERENCE ON APPLIED ENERGY (ICAE2016)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 8th International Conference on Applied Energy (ICAE)
CY OCT 08-11, 2016
CL Beijing Inst Technol, Beijing, PEOPLES R CHINA
SP Appl Energy Innovat Inst, Malardalen UNiv, China Assoc Sci & Technologies, HOME Program, Sichuan Univ, Jiangsu Univ, China Univ Min & Technol, Tianjin Univ, Tongji Univ, SW Jiaotong Univ, Xian Jiaotong Univ, Collaborat Innovat Ctr Elect Vehicles Beijing, Technol Unnovat Local Scale Optimum Integrat Battery Energy Storage, BAIC, BJEV, YuTong, Shenwu Grp
HO Beijing Inst Technol
DE Building enegy efficiency; simulation; educational tool; Building energy consumption; Thermal performance; Innovation
AB Reducing carbon emission and energy consumption in buildings is becoming an important priority on global level. Buildings consume significant amount of energy for heating or air-conditioning in most countries. The drive to enhance the understanding of building insulation and its effect on energy use, is critical for improving public engagement to achieve reduce carbon emission towards more sustainable future. This paper presents the design and the development an educational and research simulation tool to study and understand the thermal performance and energy efficiency of buildings. The novel design includes small-scale multi-layered model of buildings where insulation layers can be added to or removed from the building model in a modular and interchangeable manner to allow changes to the thermal performance. The results show that this novel model will provide a new educational tool to enhance the understanding of energy consumption and insulation in buildings. The design can be used to engage the

young generation regarding building insulation and energy efficiency. It also could provide an advanced research and teaching tool for energy in buildings, instrumentation and infrared thermography. (C) 2017 The Authors. Published by Elsevier Ltd.
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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FN Clarivate Analytics Web of Science
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AU Hoosain, MS
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AF Hoosain, Mohamed Sameer
Paul, Babu Sena
GP IEEE
TI Smart homes: A domestic demand response and demand side energy management system for future smart grids
SO PROCEEDINGS OF THE 2017 TWENTY FIFTH INTERNATIONAL CONFERENCE ON THE DOMESTIC USE OF ENERGY (DUE)
LA English
DT Proceedings Paper
CT 25th Annual International Conference on the Domestic Use of Energy (DUE)

CY APR 04-05, 2017
CL Cape Town, SOUTH AFRICA
SP Cape Peninsula Univ Technol, IEEE lAS, IES, PELS and Power & Energy Soc Chapters, S African Assoc Energy Serv Co, S African Inst Elect Engineers, Assoc Municipal Elect Undertakings, So Assoc Energy Efficiency, Sustainable Energy Soc So Africa, Natl Energy Efficiency Agcy, Univ Stelienbosch, Univ Cape Town, N W University, Eskom
DE Demand side management (DSM); demand response (DR); energy efficiency; smart grid; smart homes
AB Smart homes or the homes of the future will be equipped with advanced technologies for user comfort and entertainment. Intelligent systems will be available to ensure this comfort and reliability. With these technological advancements comes further energy management. The concept of domestic energy efficiency is a concern at present and will be, in the future. So how do we optimize homes and users as to how they conserve energy? Domestic user's energy usage represents a large amount of total electricity demand. Typical home energy systems utilize a rudimentary form of energy efficiency and management. In this paper we look at a Demand Response and Demand side management system model to curb this situation. The demand response system is achieved by the utility turning on/off smart power plugs wirelessly throughout the home based on peak and off peak periods via communication through its smart grid. To help consumers shift their loads during these times, appliance power sources that can act autonomously based on wired or wireless signals received from the utility via its smart grid is required. Users in response to this, connect their appliances to these plugs by generating their own hierarchy system by prioritizing their appliance usage. Whereas the demand side management system allows users to manually conflgnre dates and times for the turning on/off of the smart power plugs wirelessly through the user's smart user interface. Therefore, an energy efficient future smart home that can save the user on monthly expenditure and save on energy simultaneously.
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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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WC Energy & Fuels; Engineering, Electrical & Electronic
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AU Park, C
Xing, R
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Hanaoka, Tatsuya
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Capozzoli, A
Serra, V
TI Impact of Energy Efficient Technologies on Residential CO2 Emissions: A Comparison of Korea and China
SO 8TH INTERNATIONAL CONFERENCE ON SUSTAINABILITY IN ENERGY AND BUILDINGS, SEB-16
SE Energy Procedia
LA English
DT Proceedings Paper
CT 8th International Conference on Sustainability in Energy and Buildings (SEB)
CY SEP 11-13, 2016
CL Politecnico Torino, Turin, ITALY
HO Politecnico Torino
DE Residential sector; climate change; carbon emissions; energy efficient technology; climate and economic disparity
ID CONSUMPTION; EXPENDITURE; POLICIES; DEMAND
AB The residential sector accounts for the second or third share of final energy consumption and CO2 (carbon dioxide) emissions in both The Republic of Korea and in China. Energy service demand in the residential sector in these countries is influenced by climate and economic circumstances. However, in previous studies, such regional disparities are often overlooked, hence this study analyzes 6 Korean sub-national and 31 Chinese provincial levels while taking into consideration of reginal disparities. In this study principal socio-economic drivers such like GDP (Gross domestic product) and population are taken from used Shared Socioeconomic Pathways (SSPs). The impact of efficient technologies on future CO2 emissions is evaluated using the AIM (Asia-Pacific Integrated Model)/Enduse, a technology bottom-up optimization model integrated with bottom-up service demand models. Three future scenarios are also designed to conduct future evaluation on CO2 emissions growth and potential mitigation measures to meet the emissions target. From the results, impact of each technology was shown to vary across regions. Heating devices, water-heaters and cooking ranges with higher efficiencies are the most effective efficient technologies for both countries. Achieving a 30% CO2 emissions reduction goal requires the combination of various technologies across various regions due to differences in climate and economic circumstances. (C) 2017 The Authors. Published by Elsevier
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FU Environment Research and Technology Development Fund of the Ministry of the Environment, Japan [S-12-2]
FX This research was supported by the Environment Research and Technology Development Fund (S-12-2) of the Ministry of the Environment, Japan.

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Z9 1
U1 0
U2 2
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PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2017
VL 111
BP 699
EP 708
DI 10.1016/j.egypro.2017.03.231
PG 10
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels
GA BH4TC
UT WOS:000400643800071
OA gold
DA 2018-05-03

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Kyriakodis, Georgios-Evrystheas
Londorfos, Vasilis
Mastrapostoli, Elena
Karlessi, Theoni
Santamouris, Mat
BE Ding, L
Fiorito, F
Osmond, P
TI Transformation through renovation: An energy efficient retrofit of an apartment building in Athens
SO INTERNATIONAL HIGH-PERFORMANCE BUILT ENVIRONMENT CONFERENCE - A SUSTAINABLE BUILT ENVIRONMENT CONFERENCE 2016 SERIES (SBE16), IHBE 2016
SE Procedia Engineering
LA English
DT Proceedings Paper
CT International High-Performance Built Environment Conference (iHBE)
CY NOV 17-18, 2016
CL Sydney, AUSTRALIA
SP UNSW Built Environm, CRC Low Carbon Living, UrbanGrowth NSW
DE energy efficient retrofit; post retrofit monitoring; occupants evaluation
AB A 7 story social housing apartment building in Athens, Greece has been renovated following a holistic energy efficient retrofit process. The retrofit plan, resulting from tenant surveys, environmental parameters monitoring and extensive energy simulations, included commercially available technologies like insulation and energy efficient windows, innovative technologies like energy efficient lighting and smart coatings, passive techniques like night ventilation as well as RES, aiming to transform this inefficient building into a near zero energy one, achieving a reduction of the energy consumption and CO2 emissions by 80% and significant improvement of thermal comfort conditions. An experimental campaign has been executed in order to measure and validate the energy savings and indoor comfort conditions before and after the retrofit. The results of this monitoring procedure are reported and analyzed. Measurements include air leakage and thermal imaging for determining leakage rate and heat loss through the building fabric, smart meters to record energy consumption and indoor and outdoor environmental measurements. The opinion of the occupants is taken into account through pre- and post-retrofit surveys. (C) 2017 The Authors. Published by Elsevier
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OI De Masi, Rosa Francesca/0000-0002-3661-3330; Synnefa, Afroditi/0000-0003-2093-0179; Kyriakodis, Georgios-Evrystheas/0000-0001-9909-1085
FU European Union Seventh Framework Programme (FP7) [314283]

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NR 7
TC 1
Z9 1
U1 0
U2 0
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1877-7058
J9 PROCEDIA ENGINEER
PY 2017
VL 180
BP 1003
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PG 12
WC Construction & Building Technology; GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Engineering, Civil
SC Construction & Building Technology; Science & Technology - Other Topics; Engineering
GA BI0JD
UT WOS:000404873600103
OA gold
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ER

PT J
AU Granderson, J
Lin, GJ
AF Granderson, Jessica
Lin, Guanjing
TI Building energy information systems: synthesis of costs, savings, and best-practice uses
SO ENERGY EFFICIENCY
LA English
DT Article
DE Energy efficiency; Energy information systems; Commercial buildings; Costs and savings; Best practices
AB Building energy information systems (EIS) are a powerful customer-facing monitoring and analytical technology that can enable up to 20 % site energy savings for buildings. Few technologies are as heavily marketed, but in spite of their potential, EIS remain an underadopted emerging technology. One reason is the lack of information on purchase costs and associated energy savings. While insightful, the growing body of individual case studies has not provided industry the information needed to establish the business case for investment. Vastly different energy and economic metrics prevent generalizable conclusions. This

paper addresses three common questions concerning EIS use: what are the costs, what have users saved, and which best practices drive deeper savings? We present a large-scale assessment of the value proposition for EIS use based on data from over two-dozen organizations. Participants achieved year-over-year median site and portfolio savings of 17 and 8 %, respectively; they reported that this performance would not have been possible without the EIS. The median 5-year cost of EIS software ownership (up-front and ongoing costs) was calculated to be $1800 per monitoring point (kilowatt meter points were most common), with a median portfolio-wide implementation size of approximately 200 points. In this paper, we present an analysis of the relationship between key implementation factors and achieved energy reductions. Extent of efficiency projects, building energy performance prior to EIS installation, depth of metering, and duration of EIS were strongly correlated with greater savings. We also identify the best practices use of EIS associated with greater energy savings.

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FU Building Technologies Program of the US Department of Energy [DE-AC02-05CH11231]
FX The work described in the paper was supported by the Assistant Secretary for Energy Efficiency and Renewable Energy, Building Technologies Program, of the US Department of Energy under Contract No. DE-AC02-05CH11231.

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Z9 1
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U2 19
PU SPRINGER
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PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X

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J9 ENERG EFFIC
JI Energy Effic.
PD DEC
PY 2016
VL 9
IS 6
BP 1369
EP 1384
DI 10.1007/s12053-016-9428-9
PG 16
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA DY5PX
UT WOS:000385154300009
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Antoniolli, CB
Wander, PR
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Gonzalez, MAS
AF Kern, Andrea Parisi
Antoniolli, Cibele Bossa
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Stumpf Gonzalez, Marco Aurelio
TI Energy and water consumption during the post-occupancy phase and the users' perception of a. commercial building certified by Leadership in Energy and Environmental Design (LEED)
SO JOURNAL OF CLEANER PRODUCTION
LA English
DT Article
DE Building certification system; Energy consumption; Water consumption; Post-occupancy; Role of user
ID CERTIFICATION; PERFORMANCE; EFFICIENCY
AB Building certification performance has been on the research agenda, and studies from all over the world present different results. Some authors state that the certified buildings are more efficient, while some argue they are not. In Brazil, little is known about the performance of certified buildings, since relatively few are the buildings actually certified, most of them from the private sector. This study analyzed the first years of post-occupancy phase of a Brazilian commercial building, certified by LEED/gold level, version 2.2. Besides energy consumption, the research covered water consumption and the commitment of users' in the adoption of sustainable practices and their perception of the certified building, as well. As main results, the study points that: measured consumption are quite higher than predicted at the design, however show a reduction trend over time; some of the credits scored due to design solution are not effective during the post-occupancy; the majority of the interviewed users are satisfied with thermal and lightning comfort and think that the certification promotes work quality. (C) 2016 Elsevier Ltd. All.rights reserved.
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FU CNPq (Conselho Nacional de Pesquisa)
FX The authors thanks CNPq (Conselho Nacional de Pesquisa) for the research funding, and the generous assistance of all the people from the company who granted us access to their database and perception information.
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U2 15
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PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
SN 0959-6526
EI 1879-1786
J9 J CLEAN PROD
JI J. Clean Prod.
PD OCT 1
PY 2016
VL 133
BP 826
EP 834
DI 10.1016/j.jclepro.2016.05.081
PG 9
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Environmental Sciences
SC Science & Technology - Other Topics; Engineering; Environmental Sciences & Ecology
GA DT5TJ
UT WOS:000381545200076
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ER

PT J
AU Klockner, CA
Nayum, A
AF Klockner, Christian A.

Nayum, Alim
TI Specific Barriers and Drivers in Different Stages of Decision-Making about Energy Efficiency Upgrades in Private Homes
SO FRONTIERS IN PSYCHOLOGY
LA English
DT Article
DE energy efficiency upgrades; private homes; transtheoretical model; decision stages; barriers; drivers
ID REGULATED BEHAVIORAL-CHANGE; PRO-ENVIRONMENTAL BEHAVIOR; CARBON FOOTPRINT; MODEL; DETERMINANTS; WILLINGNESS
AB Energy efficiency upgrades of privately owned homes like adding to the insulation layers in the walls, roof or floor, or replacing windows with more efficiently insulated versions can contribute significantly to reducing the energy impact of the building sector and thus also the CO2 footprint of a household. However, even in countries like Norway that have a rather high rate of renovation, energy upgrades are not always integrated into such a refurbishment project. This study tests which structural and internal psychological barriers hinder and which drivers foster decision-making to implement such measures, once a renovation project is planned. With a theoretical background in stage-based models of decision-making 24 barriers and drivers were tested for their specific effect in the stages of decision-making. The four stages of decision-making assumed in this study were (1) "not being in a decision mode," (2) "deciding what to do," (3) "deciding how to do it," and (4) "planning implementation." Based on an online survey of 3787 Norwegian households, it was found that the most important barriers toward deciding to implement energy efficiency upgrades were not owning the dwelling and feeling the right time had not come yet. The most important drivers of starting to decide were higher expected comfort levels, better expected living conditions, and an expected reduction of energy costs. For the transition from deciding what to do to how to do it, not managing to make a decision and feeling the right point in time has not come yet were the strongest barriers, easily accessible information and an expected reduction of energy costs were the most important drivers. The final transition from deciding how to do the upgrades to planning implementation was driven by expecting a payoff within a reasonable time frame and higher expected comfort levels; the most important barriers were time demands for supervising contractors and-again-a feeling that the right point in time has not come yet. Implications for policy-making and marketing are discussed.
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FU Norwegian Energy Agency Enova
FX This research was funded by the Norwegian Energy Agency Enova.
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NR 40
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Z9 1
U1 0
U2 7
PU FRONTIERS MEDIA SA
PI LAUSANNE
PA PO BOX 110, EPFL INNOVATION PARK, BUILDING I, LAUSANNE, 1015, SWITZERLAND
SN 1664-1078
J9 FRONT PSYCHOL
JI Front. Psychol.
PD SEP 8
PY 2016
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AR 7362
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PG 14
WC Psychology, Multidisciplinary
SC Psychology
GA DV2BG
UT WOS:000382725200001
OA gold
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ER

PT J
AU Molavi, H
Ardehali, MM
AF Molavi, H.
Ardehali, M. M.
TI Utility demand response operation considering day-of-use tariff and optimal operation of thermal energy storage system for an industrial building based on particle swarm optimization algorithm
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Demand response; Tariff; Time-of-use; Thermal energy storage;

Optimization

AB Utility demand response (DR) programs and time-of-use (TOU) tariffs are designed to reduce customers loads as well as energy costs during peak periods in commercial and residential buildings. While TOU tariff is structured based on dividing a day into several periods with different corresponding electricity prices, the concept can be expanded for developing day-of-use (D-TOU) tariff, where different days in a week are treated differently, as experienced for industrial loads. Further, the advantages of such tariffs can be realized when demand side management technologies such as thermal energy storage (TES) in conjunction with heat pump systems are utilized. The goal of this study is to evaluate the effects of D-TOU tariff with four day types in a week on DR programs operation for an industrial customer with TES charged by an electric heat pump. The four day types considered in a week include Monday as start-up working day, Tuesday to Friday as regular working days, Saturday as half-day working day, and Sunday as weekend day. To achieve the goal, TOU and D-TOU tariffs are modeled and the TES system equipment capacities and operation with cooling and heating tanks are optimized based on particle swarm optimization for an industrial building load. The results for various pricing scenarios show that D-TOU tariff can be beneficial to the utility company and customer, as peak loads for electricity in day types 1, 2, 3 and 4 are reduced by 54, 52, 47 and 44% and customer costs for electricity cooling are lowered by 14, 13, 11 and 8%.

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NR 41
TC 1
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U1 1
U2 12
PU ELSEVIER SCIENCE SA
PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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J9 ENERG BUILDINGS
JI Energy Build.
PD SEP 1
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BP 920
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
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GA DT5NH
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PT J
AU Jiang, YF
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AF Jiang, Yufei
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Anumba, Chimay J.
TI An Analysis of BIM Web Service Requirements and Design to Support Energy Efficient Building Lifecycle
SO BUILDINGS
LA English
DT Article
DE BIM; web service; energy efficient building lifecycle
ID INFORMATION TECHNOLOGY; PERCEIVED USEFULNESS; USER ACCEPTANCE; MODELS; SYSTEMS; EASE
AB Energy Efficient Building (EEB) design, construction, and operations require the development and sharing of building information among different individuals, organizations, and computer applications. The Representational State Transfer (RESTful) Building Information Modeling (BIM) web service is a solution to enable an effective exchange of data. This paper presents an investigation into the core RESTful web service requirements needed to effectively support the EEB project lifecycle. The requirements include information exchange requirements, distributed collaboration requirements, internal data storage requirements, and partial model query requirements. We also propose a RESTful web service design model on different abstraction layers to enhance the BIM lifecycle in energy efficient building design. We

have implemented a RESTful Application Program Interface (API) prototype on a mock BIMserver to demonstrate our idea. We evaluate our design by conducting a user study based on the Technology Acceptance Model (TAM). The results show that our design can enhance the efficiency of data exchange in EEB design scenarios.

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U1 2
U2 15
PU MDPI AG
PI BASEL
PA POSTFACH, CH-4005 BASEL, SWITZERLAND
SN 2075-5309
J9 BUILDINGS
JI Buildings
PD JUN
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VL 6
IS 2
AR 20
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WC Construction & Building Technology
SC Construction & Building Technology
GA DR6GO
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OA gold
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AU Simanaviciene, Z
Volochovic, A
Cibinskiene, A
AF Simanaviciene, Zaneta
Volochovic, Andzej
Cibinskiene, Akvile
TI Features of Energy Saving Potential in Lithuanian Households
SO EQUILIBRIUM-QUARTERLY JOURNAL OF ECONOMICS AND ECONOMIC POLICY
LA English
DT Article
DE energy saving potential; households; evaluation; behavior change
AB Scientists from all over the world recognize that saving energy in households is currently a very relevant topic. Energy resources are a very important factor for each country's economic vitality. Not only the country's replenishment in energy resources is important, but also the reduction of energy consumption volume. The objective of the study: to assess the energy savings in households potential, applying the measures aimed at the behavior change of the population through energy-saving direction. Methodology: the impact of behavior change of the population measures is assessed according to the criteria of efficiency and effectiveness. In order to assess the potential for energy savings in households, the following methods,

such as an experiment, the control group formation scenario, household questionnaire, were used. The questionnaire was designed to supplement the experiment, in order to gain deeper knowledge of the household, to obtain more detailed information about the nature of the behavior, to identify barriers to behavior change, and to select a control group of households to carry out the experiment. Data, results and main contribution of the paper: research shows that people's behavior related to energy saving is influenced by a number of macro-level and micro-level factors. In the article the assumptions of the changing behavior of population are analyzed and the assessment of the specific measures aimed at the behavior changes of the population and their implementation impact is conducted.
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PU INST ECONOMIC RESEARCH-POLAND
PI TORUN
PA UL GAGARINA 13A, TORUN, 87100, POLAND
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J9 EQUILIBRIUM
JI Equilibrium
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WC Economics
SC Business & Economics
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AU Gohl, N
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Druck, H
AF Gohl, Natalie
Bauer, Dan
Drueck, Harald
BE Yesilata, B
TI 1to10-a cost-effective heat supply concept with low primary energy consumption for multi-family houses and small residential areas
SO PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON SOLAR HEATING AND COOLING FOR BUILDINGS AND INDUSTRY (SHC 2015)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 4th International Conference on Solar Heating and Cooling for Buildings and Industry (SHC)
CY DEC 02-04, 2015
CL Istanbul, TURKEY
DE solar thermal energy; shallow geothermal energy; multi-family houses; heat supply concept
AB This contribution introduces an innovative, sustainable heat supply concept. This concept, which is based on solar thermal and geothermal heat generation and advanced heat storage technologies, will be realized for the first time as a heat supply system for new apartment buildings. The key feature of the system is the fact, that on an annual basis only 1 kWh of electricity will be required to generate 10 kWh of heat. This contribution is focused on the presentation of the above described, newly developed system concept as well as first results of the design and simulation studies for a pilot heat supply system that is planned to be realized in a complex of three multi-family houses within a total living area of over 3 500 m(2) in the German city Crailsheim, which is located 80 km north-east of Stuttgart.
The development of the concept is part of the research project '1to10 - Development, testing and demonstration of a sustainable, standardized solar-geothermal heat supply concept'. In the conceptual design phase of the project, theoretical work for the realization of such systems is performed. (C) 2016 The Authors. Published by Elsevier Ltd.
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CR [Anonymous], 2014, RAUGEO HEL PE XA PRO
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NR 2
TC 1
Z9 1
U1 0

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PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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SC Construction & Building Technology; Energy & Fuels
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Jahangirian, S
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AF Salman, Laila
Salman, Safa
Jahangirian, Saeed
Abraham, Mehdi
German, Fred
Blair, Charlotte
Krenz, Peter
GP IEEE
TI Energy Efficient IoT-Based Smart Home
SO 2016 IEEE 3RD WORLD FORUM ON INTERNET OF THINGS (WF-IOT)
LA English
DT Proceedings Paper
CT IEEE 3rd World Forum on Internet of Things (WF-IoT)
CY DEC 12-14, 2016
CL Reston, VA
SP IEEE, DarkMatter, LoRa Alliance, Comcast MachineQ, ARM
DE IoT; Smart Home; Energy Efficient; Multi-band Antenna; HVAC; LED;
Compact Printed Antennas; Thermal Management; Energy Efficiency
AB Smart Home technology is the future of residential related technology which is designed to deliver and distribute number of services inside and outside the house via networked devices in which all the different applications & the intelligence behind them are integrated and interconnected. These smart devices have the potential to share information with each other given the permanent availability to access the broadband internet connection. Hence, Smart Home Technology has become part of IoT (Internet of Things). In this work, a home model is analyzed to demonstrate an energy efficient IoT based smart home. Several Multiphysics simulations were carried out focusing on the kitchen of the home model. A motion sensor with a surveillance camera was used as part of the home security system. Coupled with the home light and HVAC control systems, the smart system can remotely control the lighting and heating or cooling when an occupant enters or leaves the kitchen.
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NR 11
TC 1
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U1 2
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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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AU Tsynaeva, AA
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AF Tsynaeva, Anna A.
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TI The technology of automatic control of heat consumption in buildings
SO XXV POLISH - RUSSIAN - SLOVAK SEMINAR -THEORETICAL FOUNDATION OF CIVIL
ENGINEERING
SE Procedia Engineering
LA English
DT Proceedings Paper
CT 25th Russian-Polish-Slovak Seminar on Theoretical Foundation of Civil
Engineering
CY JUL 11-16, 2016
CL Zilina, SLOVAKIA
SP Univ Zilina
DE Buildings; Heat consumption; Automatic control; Investigation;
Efficiency
ID ENERGY

AB The paper is devoted to development and research of buildings' heat consumption management technology. Schematics of heat consumption management for CHP and low-grade as heat sources discussed. Analysis of management system capability during spring and autumn seasons conducted. The research was made with numerical approach. Adequacy of implemented models and methods was proved. Engineering and operational recommendations were made for management of buildings' heat consumption systems. Higher efficiency of buildings was proved while implementing developed technology regardless of heat sources. Management technology efficiency showed dependency on its schematics, heat-carrier temperature and temperature of low-grade heat source (for schematics with heat pump). (C) 2016 The Authors. Published by Elsevier Ltd.
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PU ELSEVIER SCIENCE BV
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 PROCEDIA ENGINEER
PY 2016
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WC Engineering, Civil
SC Engineering
GA BF7BP
UT WOS:000383946300125
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AU Xu, P
Shen, Y
Chen, L
Mao, JC
Chang, E
Ji, Y
AF Xu, Peng
Shen, Yang
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Mao, Jiachen
Chang, Eric
Ji, Ying
TI Assessment of energy-saving technologies retrofitted to existing public buildings in China
SO ENERGY EFFICIENCY
LA English
DT Article
DE Commercial building; Energy simulation; Energy-saving retrofit; Economic assessment
AB This study compared and analyzed both the energy savings and cost-effectiveness of various energy-saving technologies retrofitted to common buildings in China. Base models for an office and store building, set in representative climate zones of China-Beijing, Shanghai, and Guangzhou-were established and calibrated in EnergyPlus, a building energy simulation software program. Various energy-saving technologies were then applied to these models in EnergyPlus to calculate the overall energy savings under different climate conditions. In addition, a payback analysis was performed to determine the cost-effectiveness of each technology. The final results of this study can serve as a preliminary reference for selecting effective and economical energy-saving technologies to retrofit existing public buildings.
C1 [Xu, Peng; Shen, Yang; Chen, Lu; Mao, Jiachen; Chang, Eric; Ji, Ying] Tongji Univ, Coll Mech Engn, Shanghai 201804, Peoples R China.
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OI Mao, Jiachen/0000-0003-0504-6529
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NR 14
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Z9 1
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PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
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J9 ENERG EFFIC
JI Energy Effic.
PD JAN
PY 2016
VL 9
IS 1
BP 67
EP 94
DI 10.1007/s12053-015-9350-6
PG 28
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA DC1RC
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AU Yang, Z
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TI How Does Building Occupancy Influence Energy Efficiency of HVAC Systems?
SO CUE 2015 - APPLIED ENERGY SYMPOSIUM AND SUMMIT 2015: LOW CARBON CITIES AND URBAN ENERGY SYSTEMS
SE Energy Procedia
LA English
DT Proceedings Paper
CT Applied Energy Symposium and Summit - Low Carbon Cities and Urban Energy Systems (CUE)
CY NOV 15-17, 2015
CL Fuzhou, PEOPLES R CHINA
SP Appl Energy, Appl Energy Innovat Inst, China Assoc Sci & Technol HOME Program, Fujian Assoc Sci & Technol, Chinese Soc Engn Thermophys, Beijing Inst Technol, Tianjin Univ, Malardalen Univ, Future Energy Profile
DE building occupancy; HVAC system; energy efficiency; occupancy characteristics; commercial building; loads
ID SIMULATION
AB Occupancy (presence and number of occupants) is one of the most important factors impacting energy efficiency of HVAC systems as occupancy determines heating/cooling loads on the demand side by varying conditioning periods and settings. Despite the high volume of research activities in demand-driven HVAC controls, how and when occupancy should be linked with heating/cooling loads for sustained and maximum efficiency are still not clear as occupancy is stochastic in nature, and there exists heat transfer and balance among zones, as well as heat gain and loss through a building's envelope. There is no solution to date that can be directly applied in different buildings with different HVAC systems and occupancies. This paper systematically investigates how the occupancy influences the energy efficiency of HVAC systems. Specifically, the influence is analyzed from three perspectives of occupancy transitions, variations, and heterogeneity. The results demonstrated the energy significance of the three perspectives and provided the general ways of quantifying the influences of occupancy. (C) 2016 The Authors. Published by Elsevier ltd.
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RI Becerik-Gerber, Burcin/D-6897-2013
OI Becerik-Gerber, Burcin/0000-0001-8648-0989
CR Duarte C, 2013, ENERG BUILDINGS, V67, P587, DOI 10.1016/j.enbuild.2013.08.062
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NR 9
TC 1
Z9 1
U1 2
U2 3
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ENRGY PROCED
PY 2016
VL 88
BP 775
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PG 6
WC Energy & Fuels
SC Energy & Fuels
GA BG3KS
UT WOS:000387975200121
OA gold
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ER

PT J
AU Shatat, M
Tetlow, D
Riffat, S
AF Shatat, Mahmoud
Tetlow, David
Riffat, Saffa
TI The retrofitting of an old style semi-detached house for energy reduction and carbon savings under the UK climate
SO INTERNATIONAL JOURNAL OF LOW-CARBON TECHNOLOGIES
LA English
DT Article
DE climate change; building retrofit; energy consumption; greenhouse gases
AB The impact of climatic change through greenhouse gas emission is a recognized major global crisis. Energy use in residential and commercial buildings is a major part of the total consumption in European countries and is estimated to be similar to 40% of the total load. Currently, the concept of building retrofit has become a top priority for the UK government in order to meet the national plans for reducing CO2 emissions by 80% compared with 1990 levels by 2050. This study presents the simulation results for a case study of energy and CO2 emission savings of a nineteenth century semi-detached building in the UK. The building was refurbished to high standards of energy efficiency, with four simulation scenarios developed for analysis: As-built, As-built 1965, As-reality and post-retrofit. DesignBuilder software was used to

simulate the annual energy consumption and carbon emissions in all cases. In addition to this, thermal imaging and airtightness tests were conducted and the results were used to validate the models. The post-retrofit results showed there is a significant reduction in energy consumption that exceeded 80% with carbon emissions being reduced above 70%. Economic analysis of each retrofit scenario was then undertaken, and results showed payback varied between 9 and 40 years due to the fluctuation in fuel prices and construction retrofit materials. The models indicate performance of the building post-retrofit can be significantly improved in terms of energy reduction and CO2 emission savings. Further research is being performed to improve performance through field monitoring and installation of innovative retrofit technologies.

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Mohammadpourkarbasi H, 2013, BUILDINGS, V3, P220, DOI 10.3390/buildings3010220

RIBA, PRINC LOW CARB DES R

NR 7

TC 1

Z9 1

U1 2

U2 6

PU OXFORD UNIV PRESS

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PA GREAT CLARENDON ST, OXFORD OX2 6DP, ENGLAND

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J9 INT J LOW-CARBON TEC

JI Int. J. Low-Carbon Technol.

PD JUN

PY 2015

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IS 2

SI SI

BP 119

EP 130

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PG 12

WC Thermodynamics; Energy & Fuels

SC Thermodynamics; Energy & Fuels

GA CP4NU

UT WOS:000359859800004

OA gold

DA 2018-05-03

ER

PT J

AU Villoria-Siegert, R

Brodrick, P

Hallinan, K

Brecha, RJ

AF Villoria-Siegert, R.

Brodrick, P.

Hallinan, K.

Brecha, R. J.
TI Cost-availability curves for hierarchical implementation of residential energy-efficiency measures
SO ENERGY EFFICIENCY
LA English
DT Article
DE Community; Levelized cost; Energy efficiency; Residential; HVAC; Utility programs
AB Historical residential electricity data and natural gas consumption data were collected for, respectively, 1,200 and 178 residences in a small town in the USA. These data were merged with local building and weather databases, and energy consumption models were developed for each residence, revealing substantial variation in heating and cooling intensity. After estimating approximate physical building characteristics, energy profiles for each residence were calculated, and savings from adoption of the most cost-effective energy-efficiency measures for each residence were estimated. Effectively, we wish to leverage commonly available data sets to infer characteristics of building envelopes and equipment, without the need for detailed on-site audits. This study evaluates the potential energy savings for the residences studied and, by extrapolation, for the entire town, as a function of cost if the savings measures were to be implemented in rank-order of cost effectiveness to show that savings penetration for the community comes with nonlinearly increasing cost. The results show that nearly a 32 % collective savings in HVAC energy use could be achieved with a collective levelized cost for energy-saving measures of $10/mmBTU saved if the most cost-effective measures among the entire community are implemented first.
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NREL, 2010, DATABASE
NREL, 2005, DAT NAT SOL RAD DAT
NR 16
TC 1
Z9 1
U1 0
U2 2
PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
EI 1570-6478
J9 ENERG EFFIC
JI Energy Effic.
PD APR

PY 2015
VL 8
IS 2
BP 267
EP 279
DI 10.1007/s12053-014-9291-5
PG 13
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA CD7XT
UT WOS:000351309600006
DA 2018-05-03
ER

PT J
AU Bouhou, NE
Blackhurst, MF
Torres, P
AF Bouhou, Nour-El Imane
Blackhurst, Michael F.
Torres, Pamela
TI An empirical analysis of joint residential electricity efficiency gains within and across end uses: implications for demand-side management
SO ECOLOGICAL ECONOMICS
LA English
DT Article
DE Energy efficiency; Rebound effect; Consumer behavior
ID ENERGY; PROGRAMS; SAVINGS
AB To better understand the observed performance of demand-side approaches on residential electricity use, we develop and apply a mixed regression model of electricity consumption that includes marginal, joint technical change for multiple residential electricity end-uses (air conditioning, appliances, devices, and electric vehicles). Results indicate that the relative technical state of a home can significantly influence the performance of demand-side interventions, particularly the presence of a programmable thermostat. Within air conditioning, we generally find that "enough" consistent technical improvement is needed to realize energy savings, which could be due to engineering building performance or a declining marginal rebound effect as householders become thermally comfortable. Results indicate that homeowners do not leverage efficiency gains for appliance services but demonstrate mixed results when considering the expansion of electricity services. Householders may rebound into device loads, albeit such results are not statistically significant. However, results indicate that householders do not leverage efficiency gains for electric vehicles. These results demonstrate that the net effect of technological change in households is relative to a home's baseline technical efficiency and the degree to which homeowners seek new and existing energy services, challenging empirical assessments that do not control for the technical state of multiple end uses. (C) 2015 Elsevier B.V. All rights reserved.
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NR 34
TC 1
Z9 1
U1 1
U2 16
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 0921-8009
EI 1873-6106
J9 ECOL ECON
JI Ecol. Econ.
PD FEB
PY 2015
VL 110
BP 61
EP 70
DI 10.1016/j.ecolecon.2014.12.011
PG 10
WC Ecology; Economics; Environmental Sciences; Environmental Studies
SC Environmental Sciences & Ecology; Business & Economics
GA CC7CB
UT WOS:000350524200006
DA 2018-05-03
ER

PT S
AU Bastos, BQ
Souza, RC
Oliveira, FLC
AF Bastos, Bruno Q.
Souza, Reinaldo C.

Cyrino Oliveira, Fernando L.
BE Gomes, LFAM
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Shi, Y
TI Bottom-up long-term forecasting of Brazilian commercial class electricity consumption: First results
SO 3RD INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY AND QUANTITATIVE MANAGEMENT, ITQM 2015
SE Procedia Computer Science
LA English
DT Proceedings Paper
CT 3rd International Conference on Information Technology and Quantitative Management (ITQM)
CY JUL 21-24, 2015
CL Rio De Janeiro, BRAZIL
SP Int Acad Informat Technol & Quantitat Management, Ibmec, FIRJAN, UFF, SOBRAPO, ASSESPRO, CAPES, FAPERJ, SUCESU RJ, SINDITEC, ANE Natl Acad Engn, Res Ctr Fictitious Econ, Data Sci, Key Lab Big Data Mining & Knowledge Management, Chinese Acad Sci, Sch Management, Univ Chinese Acad Sci, Sch Management, Chinese Acad Sci, Inst Policy & Management, Chinese Soc Management Modernizat, Univ Nebraska
DE Bottom-up model; electricity demand; commercial; Brazil
ID DEMAND
AB In Brazil, the electricity consumption of the commercial class has been growing more than the consumption of the other classes, e.g. residential, industrial, and others. Understanding why this is happening and how it would progress is essential for policy makers and for agents of the electrical sector. Bottom-up models consider a detailed and disaggregated representation of a region's economy, and allow the incorporation of technological changes and policy impacts in its forecasts. In this context, the paper presents the first results of the long-term bottom-up modelling of Brazilian commercial class electricity consumption. The bottom-up model used in this work is the FORECAST model adapted for Brazil. It differentiates the five regions of the country, 8 subsectors of the tertiary sector, and 14 building and end user related energy services, such as lighting in buildings, street lighting, ventilation and air conditioning, and others. Despite the lack of consolidated information at the required level of disaggregation in Brazil, the first results show proximity to the official long-term forecasts. The results are analyzed and discussed. (C) 2015 Published by Elsevier B.V.
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RI Cyrino Oliveira, Fernando Luiz/B-4187-2015
OI Cyrino Oliveira, Fernando Luiz/0000-0003-1870-9440
CR Atakhanova Z, 2007, ENERG POLICY, V35, P3729, DOI 10.1016/j.enpol.2007.01.005
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Kermanshahi B, 2002, INT J ELEC POWER, V24, P789, DOI 10.1016/S0142-0615(01)00086-2
NR 9
TC 1
Z9 1
U1 0

U2 5
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 PROCEDIA COMPUT SCI
PY 2015
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BP 388
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DI 10.1016/j.procs.2015.07.088
PG 7
WC Computer Science, Information Systems; Computer Science, Theory & Methods
SC Computer Science
GA BD3RJ
UT WOS:000360101400043
OA gold
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PT S
AU Elotefy, H
Abdelmagid, KSS
Morghany, E
Ahmed, TMF
AF Elotefy, Hazem
Abdelmagid, Khaled S. S.
Morghany, Ezzat
Ahmed, Tarek M. F.
BE Salame, C
Aillerie, M
Papageorgas, P
TI Energy-efficient Tall buildings design strategies: A holistic approach
SO INTERNATIONAL CONFERENCE ON TECHNOLOGIES AND MATERIALS FOR RENEWABLE ENERGY, ENVIRONMENT AND SUSTAINABILITY -TMREES15
SE Energy Procedia
LA English
DT Proceedings Paper
CT International Conference on Technologies and Materials for Renewable Energy, Environment and Sustainability (TMREES)
CY APR 17-20, 2015
CL Beirut, LEBANON
SP Euro Mediterranean Inst Sustainable Dev
DE Energy efficiency; design strategies; tall buildings; visualisation
AB The number of tall buildings is increasing as a result of the advances in construction technologies and the rising land prices. These buildings are characterised by their high energy consumption compared to other building types as they rely intensively on mechanical HVAC systems due to the extreme weather conditions associated with the increase in height. However, they present a great opportunity for energy savings. In recent years, it has been noticed the increasing interest in geometry and form of tall buildings, as a result of the evolution of parametric modelling and 3D visualisation tools, on the expense of the environmental aspect. This paper discusses factors affecting the energy consumption in the tall buildings. Through an extensive analysis of Literature, active and passive energy efficient strategies adopted in tall building at various building stages are identified. In addition, the role of architectural design parameters, such as building form, orientation and envelope on the tall building energy performance are highlighted. Finally, a set of guidelines and environmental design strategies to be considered in different phases in order to achieve energy-efficient tall buildings are proposed. These strategies have been categorised into four stages namely early design, conceptualisation, and documentation and operational. A 3D modelling

approach was used to visualise and illustrate the proposed strategies in different stages. (C) 2015 The Authors. Published by Elsevier Ltd.
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NR 11
TC 1
Z9 1
U1 1
U2 9
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ENRGY PROCED
PY 2015
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WC Energy & Fuels; Environmental Sciences; Materials Science, Multidisciplinary
SC Energy & Fuels; Environmental Sciences & Ecology; Materials Science
GA BD4EY
UT WOS:000360574400147
OA gold
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ER

PT S
AU Kmet'kova, J
Krajcik, M
AF Kmet'kova, Jana
Krajcik, Michal
BE Perino, M
TI Energy efficient retrofit and life cycle assessment of an apartment building
SO 6TH INTERNATIONAL BUILDING PHYSICS CONFERENCE (IBPC 2015)
SE Energy Procedia
LA English
DT Proceedings Paper

CT 6th International Building Physics Conference (IBPC)
CY JUN 14-17, 2015
CL Torino, ITALY
SP ATI Piemonte, PolitecnicoTorino, Dept Energy
DE Energy performance; Life cycle assessment; Life-cycle costs;
Sustainability; Residential building
AB While new buildings should be designed as intelligent low or zero-energy buildings, refurbishment of the existing building stock may present even a greater challenge, when in particular financing of the necessary investments to energy saving measures poses the biggest barrier. As the residential sector in the EU is responsible for about 40% of the total energy consumption and up to 40 % of the total carbon dioxide emissions, the residential building stock offers high potential for energy savings. By applying the life cycle assessment, it is possible to optimise the social, economic and environmental aspects, starting from the extraction of raw materials, up to the final disposal of waste materials. A case study of a selected representative residential building located in Slovakia is presented, for which the cost-optimal levels of energy performance are determined in terms of life-cycle costs of the building. Three variants of renovation were defined, each variant having different level of thermal insulation of building constructions. The method of Life-Cycle Costs was used to evaluate the economic feasibility of the suggested renovation scenarios for the apartment house. (C) 2015 Published by Elsevier Ltd.
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OI Krajcik, Michal/0000-0002-1074-0948
CR Becchio C., 2013, CLIMA 2013
Kmetkova J., 2013, THESIS SVF STU BRATI
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[Anonymous], 2012, 73054022012 STN
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NR 5
TC 1
Z9 1
U1 1
U2 9
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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PY 2015
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WC Construction & Building Technology; Energy & Fuels; Physics, Applied
SC Construction & Building Technology; Energy & Fuels; Physics
GA BE3LF
UT WOS:000370934403043
OA gold
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ER

PT S
AU Lassandro, P
Cosola, T
Tundo, A

AF Lassandro, Paola
Cosola, Teresa
Tundo, Antonella
BE Perino, M
TI School building heritage: energy efficiency, thermal and lighting comfort evaluation via virtual tour
SO 6TH INTERNATIONAL BUILDING PHYSICS CONFERENCE (IBPC 2015)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 6th International Building Physics Conference (IBPC)
CY JUN 14-17, 2015
CL Torino, ITALY
SP ATI Piemonte, PolitecnicoTorino, Dept Energy
DE Energy efficiency; sustainability; lighting comfort; thermal comfort; school building; vitual tour; education
AB Since the Italian school buildings cause huge energy waste, it is increasingly compelling to identify, quantify and eliminate energy deficits through integrated audits and coordinated actions of energy saving and retrofit. We developed a methodology that is based on a holistic approach that correlates students' post occupancy evaluation with instrumental survey and software simulations and, at the same time, we examined an innovative use of virtual tour to make the energy audit results friendly available to school managers and community. This methodology, validated on a school building of the 20s-30s, identified energy saving and retrofitting actions according to cost levels. (C) 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/hy-nc-nd/4.0/).
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NR 7
TC 1
Z9 1
U1 0
U2 4
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2015
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BP 3168
EP 3173
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PG 6

WC Construction & Building Technology; Energy & Fuels; Physics, Applied
SC Construction & Building Technology; Energy & Fuels; Physics
GA BE3LF
UT WOS:000370934403040
OA gold
DA 2018-05-03
ER

PT B
AU Lima, WS
Souto, E
Rocha, T
Pazzi, RW
Pramudianto, F
AF Lima, Weslen S.
Souto, Eduardo
Rocha, Thiago
Pazzi, Richard W.
Pramudianto, Ferry
GP IEEE
TI User Activity Recognition for Energy Saving in Smart Home Environment
SO 2015 IEEE SYMPOSIUM ON COMPUTERS AND COMMUNICATION (ISCC)
LA English
DT Proceedings Paper
CT IEEE Symposium on Computers and Communication (ISCC)
CY JUL 06-09, 2015
CL Larnaca, CYPRUS
DE Activity Recognition; Energy Consumption; Internet of Things; Smart Environment
AB In recent years, the consumption of electricity has increased considerably in the industrial, commercial and residential sectors. This has prompted a branch of research which attempts to overcome this problem by applying different information and communication technologies, turning houses and buildings into smart environments. In this paper, we propose and design an energy saving technique based on the relationship between the user's activities and electrical appliances in smart home environments. The proposed method utilizes machine learning techniques to automatically recognize the user's activities, and then a ranking algorithm is applied to relate activities and existing home appliances. Finally, the system gives recommendations to the user whenever it detects a waste of energy. Tests on a real database show that the proposed method can to save up to 35% of electricity in a smart home.
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NR 25
TC 1
Z9 1
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4673-7194-0
PY 2015
BP 751
EP 757
PG 7
WC Computer Science, Theory & Methods; Engineering, Electrical & Electronic; Telecommunications
SC Computer Science; Engineering; Telecommunications
GA BF2MW
UT WOS:000380481500120
DA 2018-05-03
ER

PT J
AU Lombardo, G
Cicero, C
AF Lombardo, Grazia
Cicero, Chiara
TI Rehabilitation strategies for energy-efficient buildings in GeoCluster
SO ADVANCES IN BUILDING ENERGY RESEARCH
LA English
DT Review
DE GeoCluster; refurbishment; modern buildings; Mediterranean climate; innovative envelope
AB The concept of GeoCluster is a virtual homogeneous trans-regional area where strong similarities are found in terms of climate, environmental context, culture, construction typologies. It allows to export relevant results and guidelines, studied in a specific area, in others trans-regional areas with strong similarities. Present research regards the modern building heritage constituting framed buildings that represent, at the international level, a large part of the existing heritage and is characterized by poor performance in environmental and energetic aspects. In particular, this paper identifies guidelines to approach the optimization of the intervention for the energetic restoration of a building's heritage belonging to the GeoCluster that we call "Mediterranean".
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CR Campioli A., 2007, COMPORTAMENTO ENERGE
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NR 15
TC 1
Z9 1
U1 0
U2 0
PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 2-4 PARK SQUARE, MILTON PARK, ABINGDON OR14 4RN, OXON, ENGLAND
SN 1751-2549
EI 1756-2201
J9 ADV BUILD ENERGY RES
JI Adv. Build. Energy Res.
PY 2015
VL 9
IS 1
BP 34
EP 54
DI 10.1080/17512549.2014.923326
PG 21
WC Construction & Building Technology
SC Construction & Building Technology
GA V8Z2K
UT WOS:000422101700003
DA 2018-05-03
ER

PT S
AU Lu, CH
AF Lu, Ching-Hu
BE Stadon, J
Gwilt, I
Smith, CH
TI IoT-enhanced and Bidirectionally Interactive Information Visualization for Context-aware Home Energy Savings
SO Proceedings of the 2015 IEEE International Symposium on Mixed and Augmented Reality Media, Art, Social Science, Humanities and Design
SE International Symposium on Mixed and Augmented Reality
LA English
DT Proceedings Paper
CT IEEE International Symposium on Mixed and Augmented Reality Media, Art, Social Science, Humanities and Design

CY SEP 29-OCT 03, 2015
CL Fukuoka, JAPAN
SP Conf Publishing Serv, IEEE Comp Soc, IEEE Comp Soc Tech & Conf Activities Board
DE GAME-BASED ECO-FEEDBACK; IOT; PHYSICAL-CYBER SYSTEM; CONTEXT-AWARENESS; MIXED REALITY; H.5.2 [USER INTERFACES]: USER-CENTERED DESIGN; I.2.11 [DISTRIBUTED ARTIFICIAL INTELLIGENCE]: MULTIAGENT SYSTEMS
AB In recent years, due to deteriorating global warming, there has been increasing attention to home energy savings, which is often a serious and not so interesting task. In this regard, we proposed a playful and bidirectionally interactive eco-feedback with three kinds of information visualization integrated with a 3D pet-raising game, which synchronously visualizes the information of the physical environment with the virtual environment by leveraging IoT (Internet of Things) enabled technologies in hopes of enhancing user experience and prolonging users' engagement in energy savings. In addition to mere mapping from physical to virtual environment for traditional game-based energy savings, this study also makes use of the other direction to form a bidirectional mapping to empower users to allow direct and flexible remote control anywhere and anytime in a more natural and playful way. Furthermore, integrating context-awareness with the bidirectional mapping in an energy-saving system also enhances the immersive experience of the users.
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NR 10
TC 1
Z9 1
U1 0
U2 2
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1554-7868
BN 978-1-4673-9628-8
J9 INT SYM MIX AUGMENT
PY 2015
BP 15
EP 20
DI 10.1109/ISMAR-MASHD.2015.20
PG 6
WC Computer Science, Artificial Intelligence; Computer Science, Interdisciplinary Applications; Computer Science, Theory & Methods; Imaging Science & Photographic Technology
SC Computer Science; Imaging Science & Photographic Technology
GA BF3EW
UT WOS:000380533700004
DA 2018-05-03
ER

PT B
AU Mendes, TDP
Godina, R

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AF Mendes, T. D. P.
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Matias, J. C. O.
Catalao, J. P. S.
GP IEEE
TI Smart and Energy-Efficient Home Implementation: Wireless Communication Technologies Role
SO 2015 IEEE 5TH INTERNATIONAL CONFERENCE ON POWER ENGINEERING, ENERGY AND ELECTRICAL DRIVES (POWERENG)
LA English
DT Proceedings Paper
CT IEEE 5th International Conference on Power Engineering, Energy and Electrical Drives
CY MAY 11-13, 2015
CL riga, LATVIA
DE Smart Home; Cloud-Based Solutions; Smart Domestic Appliances; Wireless protocols
ID SENSOR NETWORKS; SYSTEMS
AB Smart home vision aims for the integration of key electrical appliances and services, communications and information technologies into one intelligent network to be controlled, monitored and managed by the building user. A wireless infrastructure as a smart home communication backbone is the logical choice for a so high level of integration. This paper updates on wireless communication technologies state-of-the-art for short range applications, and discusses their suitability according to major functional areas or services that may benefit from smart home implementation.
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NR 15
TC 1
Z9 1
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U2 2
PU IEEE
PI NEW YORK

PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4799-9978-1
PY 2015
BP 377
EP 382
PG 6
WC Energy & Fuels; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BF1XU
UT WOS:000380443900057
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ER

PT S
AU Parfenenko, Y
Shendryk, V
Vashchenko, S
Fedotova, N
AF Parfenenko, Yuliia
Shendryk, Vira
Vashchenko, Svitlana
Fedotova, Natalya
BE Dregvaite, G
Damasevicius, R
TI The Forecasting of the Daily Heat Demand of the Public Sector Buildings with District Heating
SO INFORMATION AND SOFTWARE TECHNOLOGIES, ICIST 2015
SE Communications in Computer and Information Science
LA English
DT Proceedings Paper
CT 21st International Conference on Information and Software Technologies (ICIST)
CY OCT 15-16, 2015
CL Druskininkai, LITHUANIA
SP Kaunas Univ Technol
DE Forecasting; Heat energy demand; Neural network; Information system; Energy management
ID CONSUMPTION
AB This study is devoted to the increasing of the heat energy demand forecasting accuracy for district heating of the public sector buildings.
The authors have analyzed forecasting techniques used for the heat energy demand forecasting for buildings with district heating. The system model for description the forecasting process as a part of the information support of the heat energy management process in the public sector institution is proposed.
The mathematical model of the heat energy demand forecasting of a public sector building have been developed. It is based on the usage of the artificial neural networks technology. It takes into account both meteorological and social components of impact on the heat energy demand. The computational experiments that prove its accuracy have been carried out. The proposed models have been implemented in the forecasting subsystem of the information and analysis system "HeatCAM".
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OI Parfenenko, Yuliia/0000-0003-4377-5132; Shendryk, Vira/0000-0001-8325-3115
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NR 22
TC 1
Z9 1
U1 1
U2 3
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 1865-0929
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J9 COMM COM INF SC
PY 2015
VL 538
BP 187
EP 198
DI 10.1007/978-3-319-24770-0_17
PG 12
WC Computer Science, Information Systems; Computer Science,
Interdisciplinary Applications; Computer Science, Software Engineering;
Computer Science, Theory & Methods
SC Computer Science
GA BE2GI
UT WOS:000369179100017
DA 2018-05-03
ER

PT S
AU Semprini, G
Barbieri, D
Gober, A
Zandi, F
AF Semprini, Giovanni
Barbieri, Davide
Gober, Alessandro
Zandi, Francesca
BE Perino, M
TI Effect of occupant behavior and control systems on the reduction of
energy needs of residential buildings
SO 6TH INTERNATIONAL BUILDING PHYSICS CONFERENCE (IBPC 2015)

SE Energy Procedia
LA English
DT Proceedings Paper
CT 6th International Building Physics Conference (IBPC)
CY JUN 14-17, 2015
CL Torino, ITALY
SP ATI Piemonte, PolitecnicoTorino, Dept Energy
DE building energy needs; occupant behaviour; control systems; dynamic energy simulation; thermostatic radiator valves
AB Adoption of energy metering systems in apartments with centralized heating plant will lead to greater awareness of the users on energy consumptions. Moreover control systems allow to manage internal temperature according to kind of occupation of the apartment.
Starting from the energy consumption of a case study, an apartment block in Bologna, this paper shows the results, based on dynamic simulation, of reduction of energy needs resulting from retrofitting on the building envelope and the effects of thermoregulation systems. Different setting of the internal temperature in adjacent apartments can lead to a variation of energy consumption up to 30%. (C) 2015 Published by Elsevier Ltd.
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Ferrante A, 2014, SUSTAIN CITIES SOC, V13, P237, DOI 10.1016/j.scs.2014.02.001
Gagliano A, 2014, ENRGY PROCED, V62, P62, DOI 10.1016/j.egypro.2014.12.367
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Semprini G, 2015, BSA 2015 2 IBPSA IT
[Anonymous], 2011, DESIGNBUILDER ENERGY
NR 7
TC 1
Z9 1
U1 0
U2 1
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2015
VL 78
BP 633
EP 638
DI 10.1016/j.egypro.2015.11.044
PG 6
WC Construction & Building Technology; Energy & Fuels; Physics, Applied
SC Construction & Building Technology; Energy & Fuels; Physics
GA BE3LF
UT WOS:000370934400106
OA gold
DA 2018-05-03
ER

PT S
AU Sun, J
Zhang, YP
AF Sun, Jie
Zhang, Yongping
GP IEEE

TI Towards an Energy Efficient Architecture in Smart Building
SO 2015 INTERNATIONAL CONFERENCE ON COMPUTATIONAL INTELLIGENCE AND COMMUNICATION NETWORKS (CICN)
SE International Confernce on Computational Intelligence and Communication Networks
LA English
DT Proceedings Paper
CT 7th International Conference on Computational Intelligence and Communication Networks (CICN)
CY DEC 12-14, 2015
CL Jabalpur, INDIA
SP IEEE, IEEE Comp Soc, MIR Labs, Gyan Ganga Inst Technol & Sci, IEEE MP Sub Sect
DE energy conservation; smart building; sensor network
AB Reducing energy consumption within buildings has become a focus of researchers. This paper looks modern buildings as a cyber-physical energy system and provide a three-layer architecture with the focus on energy saving. We introduce the key technologies from sensing, computation and controlling aspects, besides with highlighting some issues for consideration.
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CR Agarwal Y., 2010, P 2 ACM WORKSH EMB S, P1, DOI DOI 10.1145/1878431.1878433
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NR 9
TC 1
Z9 1
U1 1
U2 2
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2375-8244
BN 978-1-5090-0076-0
J9 INT CONF COMPUT INTE
PY 2015
BP 1589
EP 1592
DI 10.1109/CICN.2015.302
PG 4
WC Computer Science, Artificial Intelligence; Engineering, Electrical & Electronic; Telecommunications
SC Computer Science; Engineering; Telecommunications
GA BG1XE
UT WOS:000387128200325
DA 2018-05-03
ER

PT J
AU Surmann, M
Brunauer, W

Bienert, S
AF Surmann, Markus
Brunauer, Wolfgang
Bienert, Sven
TI How does energy efficiency influence the Market Value of office buildings in Germany and does this effect increase over time?
SO JOURNAL OF EUROPEAN REAL ESTATE RESEARCH
LA English
DT Article
DE Office buildings; Energy efficiency; Energy consumption; Energy performance certificates; Hedonic pricing; Valuation; Sustainable real estate
AB Purpose - The paper aims to estimate the effect of energy efficiency on the Market Value of office buildings and consider whether this effect increases over time.
Design/methodology/approach - The authors analyze a dataset of office building valuations from 2009 to 2011, provided by the German Investment Property Database. The authors use hedonic regression models to determine the effect of energy efficiency and energy consumption on Market Values. Using generalized additive models (GAM) for modeling nonlinear covariate effects, the authors control for further building characteristics and location. Due to the small sample size, the authors introduce an innovative econometric approach that mitigates this problem.
Findings - Mainly due to the small sample size, and in spite of the newly developed econometric methodology, the authors do not find clear evidence of the relationship between energy efficiency and the Market Value. However, the study nonetheless provides interesting insights into the composition of office building Market Values in Germany.
Originality/value - In addition to the empirical results for the German office market, the main contribution of this paper lies in the econometric methodology. Beside the application of cutting-edge statistical techniques, the authors develop a method for handling datasets, for which the variable of interest is rarely observed, leveraging on the total available data. Thus, the methodology offers promising prospects for future research in similar settings.
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U1 1
U2 1
PU EMERALD GROUP PUBLISHING LTD
PI BINGLEY
PA HOWARD HOUSE, WAGON LANE, BINGLEY BD16 1WA, W YORKSHIRE, ENGLAND
SN 1753-9269
J9 J EUR REAL ESTATE RE
JI J. Eur. Real Estate Res.
PY 2015
VL 8
IS 3
BP 243
EP 266
DI 10.1108/JERER-04-2015-0018
PG 24
WC Business, Finance
SC Business & Economics
GA V08ZO
UT WOS:000214113500003
DA 2018-05-03
ER

PT J
AU Szumilo, N
AF Szumilo, Nikodem
TI How do office buildings take advantage of energy efficiency? A study of the relationship between operating expenses and energy certification
SO INTERNATIONAL JOURNAL OF ENVIRONMENTAL TECHNOLOGY AND MANAGEMENT
LA English
DT Article
DE energy efficiency; operating expenses; corporate sustainability; green real estate; low-energy office buildings; sustainable finance; sustainable strategies implementation; sustainable consumer behaviour; green buildings
AB This research examines the relationship of operating expenses and energy certification in US offices. Data for four markets over a period from Q1 2007 to Q1 2011 is used. EnergyStar certification scores are used to determine the level of energy efficiency and a hedonic pricing method to model operating expenses. The

results indicate a positive but non-linear relationship between costs and efficiency. Out of a number of considered explanations this seems to be best explained by initial technological difficulties in implementing energy efficiency, a self-selection bias influencing the data or a combination of different effects.
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NR 22
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Z9 1
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U2 1
PU INDERSCIENCE ENTERPRISES LTD
PI GENEVA
PA WORLD TRADE CENTER BLDG, 29 ROUTE DE PRE-BOIS, CASE POSTALE 856, CH-1215 GENEVA, SWITZERLAND
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J9 INT J ENVIRON TECHNO
JI Int. J. Environ. Technol. Manag.
PY 2015
VL 18
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BP 116
EP 135
DI 10.1504/IJETM.2015.068973
PG 20
WC Engineering, Environmental
SC Engineering
GA V97FS
UT WOS:000213318300002
DA 2018-05-03
ER

PT J

AU Zhou, W
Mountain, DC
AF Zhou, Wen
Mountain, Dean C.
TI The benefits of combining utility-controlled demand response with residential zoned cooling
SO ENERGY EFFICIENCY
LA English
DT Article
DE Residential zoned cooling; Direct load control; Demand response
ID PEAK ELECTRICITY USE; LOAD CONTROL; CLIMATE
AB This paper evaluates the effectiveness of combining direct load control with a residential zoned-cooling technology in meeting the objectives of reducing peak demand and maintaining home comfort level. In contrast, the traditional approach has been for utilities to smooth summer peak cooling loads, by controlling the cooling load of the whole house. While accounting for weather, dwelling characteristics and demographics, with detailed field data, we are able to develop empirical models to evaluate the benefits of utility control of cooling loads for a residential zoned cooling system during summer peak-demand periods and to compare with non-zoned systems. A zoned house allows for an upper floor cooling interruption without affecting the comfort on the main floor. An upper floor interruption for a full 4 h during the day leads to an average peak air conditioning change of -0.52 kW, approximately 1.6 times the reduction from the curtailment of cooling by cycling the air conditioning serving the whole house.
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FU Natural Resources Canada; Ontario Power Authority; Social Sciences and Humanities Research Council of Canada
FX Research funding was provided by Natural Resources Canada, Ontario Power Authority and Social Sciences and Humanities Research Council of Canada. The analysis in this paper owes much to Terry Strack who oversaw the fieldwork portion of the pilot and to Jeremy Sager and Dan Carr who provided advice throughout the duration of the research. Thanks are also extended to three anonymous reviewers for their very helpful suggestions and comments.
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NR 13
TC 1
Z9 1
U1 0
U2 3
PU SPRINGER
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J9 ENERG EFFIC
JI Energy Effic.
PD DEC
PY 2014
VL 7
IS 6
BP 1067
EP 1099
DI 10.1007/s12053-014-9265-7
PG 33
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
GA AS8ZN
UT WOS:000344533500008
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ER

PT S
AU De Rose, R
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AF De Rose, Raffaele
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Raso, Cinzia
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BE CamarinhaMatos, LM
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TI A Framework for Energy-Efficiency in Smart Home Environments
SO COLLABORATIVE SYSTEMS FOR SMART NETWORKED ENVIRONMENTS
SE IFIP Advances in Information and Communication Technology
LA English
DT Proceedings Paper
CT 15th IFIP WG 5.5 Working Conference on Virtual Enterprises (PRO-VE)
CY OCT 06-08, 2014
CL Amsterdam, NETHERLANDS
SP IFIP WG 5 5 Co Operat infrastructure for Virtual Enterprises & Elect Business, Soc Collaborat Networks, IEEE Syst Man & Cybernet Soc, Univ Amsterdam, New Univ Lisbon, UNINOVA
DE Energy Efficiency; Smart Home Environment (SHE); Interoperable Home Energy Management Systems (HEMS); Information Management Model; Energy Consumption Forecasting
ID LOAD; NETWORKS
AB A resource-efficient Europe is a pillar of the EU 2020 program which aims at smart, sustainable, inclusive growth. The diffusion of smart networked environments, wherein humans, intelligent agents and devices collaborate, is fundamental for achieving energy-efficiency in buildings. In this context, this paper deals with the topic of Smart Home Environments (SHEs), where users can exploit multimedia services to interact with heterogeneous and interconnected smart appliances in order to save energy, reduce costs and improve users' comfort and safety. In particular, we propose an interoperable architectural framework and a related knowledge-based management model, associated with a specific forecasting model, for monitoring and managing energy consumption in SHEs.
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OI De Rose, Raffaele/0000-0003-1184-1721; Ammirato, Salvatore/0000-0001-6617-3789
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NR 11
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PU SPRINGER-VERLAG BERLIN
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PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
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J9 IFIP ADV INF COMM TE
PY 2014
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WC Computer Science, Hardware & Architecture; Computer Science, Information Systems; Telecommunications
SC Computer Science; Telecommunications
GA BD3QR
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PT B
AU Peng, XH
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AF Peng, Xiaohui
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Koshizuka, Noboru
Sakamura, Ken
GP IEEE
TI A Framework for Peak Electricity Demand Control Utilizing Constraint

Programing Method in Smart Building
SO 2014 IEEE 3RD GLOBAL CONFERENCE ON CONSUMER ELECTRONICS (GCCE)
LA English
DT Proceedings Paper
CT 3rd IEEE Global Conference on Consumer Electronics (GCCE)
CY OCT 07-10, 2014
CL Tokyo, JAPAN
SP IEEE
DE peak electricity demand control; smart building; energy saving policy; constraint programing
AB Reducing large electricity consumption is a primary concern for researchers and practitioners in smart buildings. Peak electricity demand is the result of temporarily correlated energy demand surges caused by uncoordinated operation of subsystems such as air-conditioning, heating, ventilating and so on. It might cause severe issues such as service disruption and high cost of energy production and distribution. Many buildings applied various energy saving policies with building automation system to control the behaviors of smart devices to save energy. In this paper, we propose a framework for peak electricity demand control based on constraint programing technology in smart building.
C1 [Peng, Xiaohui; Bessho, Masahiro; Koshizuka, Noboru; Sakamura, Ken] Univ Tokyo, Grad Sch Interdisciplinary Informat Studies, Interfac Initiat Informat Studies, Tokyo, Japan.
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TC 1
Z9 1
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U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
PY 2014
BP 744
EP 748
PG 5
WC Engineering, Electrical & Electronic
SC Engineering
GA BF6CK
UT WOS:000382964400257
DA 2018-05-03
ER

PT S
AU Sanseverino, ER
Sanseverino, RR
Scaccianoce, G

Vaccaro, V
AF Sanseverino, Eleonora Riva
Sanseverino, Raffaella Riva
Scaccianoce, Gianluca
Vaccaro, Valentina
BE Murgante, B
Misra, S
Rocha, AMAC
Torre, C
Rocha, JG
Falcao, MI
Taniar, D
Apduhan, BO
Gervasi, O
TI Municipal Building Regulations for Energy Efficiency in Southern Italy
SO COMPUTATIONAL SCIENCE AND ITS APPLICATIONS - ICCSA 2014, PT II
SE Lecture Notes in Computer Science
LA English
DT Proceedings Paper
CT 14th International Conference on Computational Science and Its Applications (ICCSA)
CY JUN 30-JUL 03, 2014
CL Guimaraes, PORTUGAL
SP Univ Minho, Univ Perugia, Univ Basilicata, Monash Univ, Kyushu Sangyo Univ, Assoc Portuguesa Investigacao Operac
DE Sustainable urban planning; Energy efficiency in buildings; Municipal building regulation
AB The building sector is still one of the most energy consuming sectors in Italy, like developed countries in Europe. At European level, the main policy driver related to the energy use in buildings is the Energy Performance of Buildings Directive (EPBD, 2002/91/EC) and its recast. Through the EPBD introduction, requirements for certification, inspections, training or renovation are now imposed in Member States. In order to fulfill the expected changes, local regulations are a key factor aiming at sustainable territorial planning. It is thus required support the issue of local rules at municipal level in order to guide local administrators and technicians and to limit discretional power of bureaucracy. In this paper, a review of the most common practices for building regulations in Europe and in Italy is proposed, then the role and the framework of a municipal building regulation for the Southern European area accounting for sustainability features is discussed.
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OI vaccaro, valentina/0000-0001-9888-0314; Scaccianoce, Gianluca/0000-0003-2193-8949
CR Comune di Bologna, 2009, REG URB ED CITT BOL
Comune di Monterotondo, 2009, NORM SOST AMB ALL RE
[Anonymous], 2013, LEG INN EN ED REG ED
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Legambiente, 2012, REG ED IT
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PU SPRINGER-VERLAG BERLIN
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PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
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J9 LECT NOTES COMPUT SC
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WC Computer Science, Information Systems; Computer Science, Software Engineering; Computer Science, Theory & Methods
SC Computer Science
GA BC0TI
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PT B
AU Slini, T
Giama, E
Papadopoulos, AM
AF Slini, Theodora
Giama, Efrosini
Papadopoulos, Agis M.
GP IEEE
TI On the elasticity of residential energy consumption
SO 5TH INTERNATIONAL CONFERENCE ON INFORMATION, INTELLIGENCE, SYSTEMS AND APPLICATIONS, IISA 2014
LA English
DT Proceedings Paper
CT 5th International Conference on Information, Intelligence, Systems and Applications (IISA)
CY JUL 07-09, 2014
CL Chania, GREECE
SP Inst Elect & Elect Engineers, Biol & Artificial Intelligence Fdn, Univ Piraeus
DE Disposable income; residential energy consumption; elasticity
AB The current paper discusses the analysis of the results that emerged from a field study conducted in two consecutive years, aiming at the assessment of the economic recession's impact on the consumers' behaviour regarding energy consumption and space heating. The field survey was carried out, by means of interviews with questionnaires, in Northern Greece, an area where there is an increased energy demand for space heating compared to Athens and Southern Greece and hence an intensive need for efficient and effective solutions. The results of the field study, which has been carried out between 2011 and 2013, were analysed in order to identify major tendencies, if any, in the consumers' behaviour, with respect to the prevailing energy prices and the disposable household income. In that sense determining the degree of elasticity of residential energy consumption can be determined in a bottom-up approach and compared to the national average values for the same period. A further goal was to capture details that are helpful in

order to understand technological choices and behavioural patterns when it comes to coping with a lesser income and increased energy costs.
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OI Papadopoulos, Agis/0000-0002-4470-8903
CR [Anonymous], 2012, ODYSSEE MURE 2010 MO
EEA (European Environment Agency), 2011, 2011 SURV RES EFF PO
EL.STAT (Hellenic Statistical Authority), 2012, SURV INC HOUS COND G
Eurostat, 2013, F4 QUAL LIF IN KEEP
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OECD, GREEC GLANC POL SUST
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World Economic Forum, 2012, EN EC GROWTH EN VIS
NR 11
TC 1
Z9 1
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
PY 2014
BP 349
EP 354
PG 6
WC Computer Science, Artificial Intelligence; Computer Science, Information Systems
SC Computer Science
GA BB7PA
UT WOS:000345861900100
DA 2018-05-03
ER
FN Clarivate Analytics Web of Science
VR 1.0
PT J
AU Voss, K
Kunz, C
AF Voss, Karsten
Kuenz, Carolin
TI Climate data and climate change - Analysis of the influence on energy demand, performance requirement and thermal comfort of buildings.
SO BAUPHYSIK
LA German
DT Article
AB Climate data and climate change - Analysis of the influence on energy demand, performance requirement and thermal comfort of buildings. Continuous research on climate change has improved the knowledge on climate forecast modelling, so that local and regional climate data sets for the application in building energy modelling are available. The paper analyses the data sets of most known sources and compares the relevant characteristics at four German locations. Simulation results for three commercial building examples (office, school and hotel) illustrate how the climate change may influence heating and cooling demands and capacities as well as the summer thermal comfort if no adjustments with respect to construction, service technology and user behaviour are applied. A significant decrease in space heating demand is contrasted by increased cooling demand and increased indoor temperatures during summer

even until 2050. Especially for the office buildings, the summer conditions develop critical, so that active cooling will be mandatory in the summer hot regions. This trend was already detected during the past decade. The forecast is critical for all existing buildings. Significant improvements of the envelope properties such as glazing or shading and passive cooling options become mandatory. The changes predicted for schools and hotels remain moderate.
C1 [Voss, Karsten] Berg Univ Wuppertal, Fachbereich Architektur D, D-42285 Wuppertal, Germany.
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NR 15
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U1 0
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PI BERLIN
PA ROTHERSTRASSE 21, BERLIN, DEUTSCHLAND 10245, GERMANY
SN 0171-5445
J9 BAUPHYSIK
JI Bauphysik
PD OCT
PY 2012
VL 34
IS 5
BP 189
EP 196
DI 10.1002/bapi.201200027
PG 8
WC Construction & Building Technology
SC Construction & Building Technology
GA 015NP
UT WOS:000309453500004
DA 2018-05-03
ER

PT S
AU Borggaard, J
Cliff, E
Gugercin, S
AF Borggaard, Jeff
Cliff, Eugene
Gugercin, Serkan

GP IEEE
TI Model Reduction for Indoor-Air Behavior in Control Design for Energy-Efficient Buildings
SO 2012 AMERICAN CONTROL CONFERENCE (ACC)
SE Proceedings of the American Control Conference
LA English
DT Proceedings Paper
CT American Control Conference (ACC)
CY JUN 27-29, 2012
CL Montreal, CANADA
SP Boeing, Bosch, Corning, Eaton, GE Global Res, Honeywell, MathWorks, Mitsubishi Elect Res Lab, Natl Instruments, Xerox, Adept MobileRobots, Momentum Press, Quanser, SIAM, Springer, Taylor & Francis, United Technologies Res Ctr, Visual Solut, Wiley-Blackwell
ID SYSTEMS; APPROXIMATION; ALGORITHM
AB We present two methods for generating reduced-order models for the indoor-air environment in control design for energy efficient buildings. In one method, projection-based H-2-optimal interpolatory model reduction techniques are employed on a high-dimensional state-space model resulting from finite element discretization of convection-diffusion equations. In the second approach, we obtain reduced-models directly from input and output measurements using a data-driven model reduction approach. In both cases, we produce reduced-order models that accurately represent the input-output behavior of the full-order system.
C1 [Borggaard, Jeff; Cliff, Eugene; Gugercin, Serkan] Virginia Tech, Interdisciplinary Ctr Appl Math, Blacksburg, VA 24061 USA.
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RI Borggaard, Jeff/I-5585-2017
OI Borggaard, Jeff/0000-0002-4023-7841
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NR 18
TC 1
Z9 1
U1 0
U2 1
PU IEEE COMPUTER SOC
PI LOS ALAMITOS
PA 10662 LOS VAQUEROS CIRCLE, PO BOX 3014, LOS ALAMITOS, CA 90720-1264 USA
SN 0743-1619
BN 978-1-4577-1096-4
J9 P AMER CONTR CONF
PY 2012
BP 2283

EP 2288
PG 6
WC Automation & Control Systems; Engineering, Electrical & Electronic
SC Automation & Control Systems; Engineering
GA BCN53
UT WOS:000310776202094
DA 2018-05-03
ER

PT S
AU Domahidi, A
Ullmann, F
Morari, M
Jones, CN
AF Domahidi, Alexander
Ullmann, Fabian
Morari, Manfred
Jones, Colin N.
GP IEEE
TI Learning Near-optimal Decision Rules for Energy Efficient Building Control
SO 2012 IEEE 51ST ANNUAL CONFERENCE ON DECISION AND CONTROL (CDC)
SE IEEE Conference on Decision and Control
LA English
DT Proceedings Paper
CT 51st IEEE Annual Conference on Decision and Control (CDC)
CY DEC 10-13, 2012
CL HI
SP IEEE, Soc Ind & Appl Math, Inst Operat Res Management Sci, Japanese Soc Instrument & Control Engineers, European Union Control Assoc, Int Federat Automat Control, Elsevier, GE Global Res, MathWorks, Springer, Univ Hawaii Manoa, Coll Engn, Univ Texas Dallas, Journal Franklin Inst, Engn & Appl Math, Taylor & Francis Grp, Visual Solut, Wolfram Res
AB Recent studies suggest that advanced optimization based control methods such as model predictive control (MPC) can increase energy efficiency of buildings. However, adoption of these methods by industry is still slow, as building operators are used to working with simple controllers based on intuitive decision rules that can be tuned easily on- site. In this paper, we suggest a synthesis procedure for rule based controllers that extracts prevalent information from simulation data with MPC controllers to construct a set of human readable rules while preserving much of the control performance. The method is based on the ADABOOST algorithm from the field of machine learning. We focus on learning binary decisions, considering also the ranking and selection of measurements on which the decision rules are based. We show that this feature selection is useful for both complexity reduction and decreasing investment costs by pruning unnecessary sensors. The proposed method is evaluated in simulation for six different case studies and is shown to maintain the high performance of MPC despite the tremendous reduction in complexity.
C1 [Domahidi, Alexander; Ullmann, Fabian; Morari, Manfred] ETH, Dept Informat Technol & Elect Engn, Automat Control Lab, CH-8092 Zurich, Switzerland.
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RI Sun, JT/G-1703-2015; Jones, Colin/N-2878-2013
OI Jones, Colin/0000-0001-7239-4799
CR Coffey B., 2012, THESIS
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NR 21
TC 1
Z9 1
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 0743-1546
BN 978-1-4673-2066-5
J9 IEEE DECIS CONTR P
PY 2012
BP 7571
EP 7576
PG 6
WC Automation & Control Systems; Computer Science, Artificial Intelligence;
Engineering, Electrical & Electronic
SC Automation & Control Systems; Computer Science; Engineering
GA BIB20
UT WOS:000327200407128
DA 2018-05-03
ER

PT S
AU Ryu, MW
Kim, J
Lee, SS
Ahn, IY
Yun, J
AF Ryu, Min-Woo
Kim, Jaeho
Lee, Sang-Shin
Ahn, Il-Yeup
Yun, Jaeseok
BE Kim, TH
Ramos, C
Abawajy, J
Kang, BH
Slezak, D
Adeli, H
TI Design of Rule Model for Building Energy Efficiency Base on User
Occupancy and Spatial Features

SO COMPUTER APPLICATIONS FOR MODELING, SIMULATION, AND AUTOMOBILE
SE Communications in Computer and Information Science
LA English
DT Proceedings Paper
CT International Conference on Modeling and Simulation (MAS 2012)/International Conference on Automotive Science and Technology (asnt 2012)
CY NOV 28-DEC 02, 2012
CL Jeju, SOUTH KOREA
DE Energy Efficiency; Energy Saving; Rule Model; User Occupancy; Spatial Features
AB Due to energy shortage and energy price increase, many researchers have been working on improving energy use efficiency using information and communication technology. In most of these studies, however, energy management and saving is performed by detecting a user's particular situation with sensors and then applying the rules predefined. This style of energy saving and management using static rules would improve energy use efficiency, but also decrease user comfort level at the same time. Because energy use pattern depends strongly on changes in human behavior, the rules for managing energy use should be dynamically updated. In this paper, we first define spatial properties and propose a rule model where rules could be dynamically updated according to user feedback and applied to various situations.
C1 [Ryu, Min-Woo; Kim, Jaeho; Lee, Sang-Shin; Ahn, Il-Yeup; Yun, Jaeseok] Korea Elect Technol Inst, Embedded Software Convergence Res Ctr, Songnam, South Korea.
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CR Baer D. M., 1968, J APPL BEHAV ANAL
Crawley D. B., 2001, ORIGINAL RES ARTICLE, V33
Crawley D. B., 2008, BUILDING ENV, V43
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NR 5
TC 1
Z9 1
U1 0
U2 2
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 1865-0929
BN 978-3-642-35247-8
J9 COMM COM INF SC
PY 2012
VL 341
BP 58
EP 63
PG 6
WC Computer Science, Information Systems; Computer Science, Theory & Methods
SC Computer Science
GA BEB94
UT WOS:000316030600009
DA 2018-05-03
ER

PT J
AU Thomas, VM
Meier, AK
Gunda, SG

Wenzel, TP
AF Thomas, Valerie M.
Meier, Alan K.
Gunda, Siva G.
Wenzel, Thomas P.
TI Cars are buildings: Building-like energy use in automobiles
SO TRANSPORTATION RESEARCH PART D-TRANSPORT AND ENVIRONMENT
LA English
DT Article
DE Light-duty vehicles; Air-conditioning costs; Electricity use in vehicles
AB This paper examines vehicle energy use as if vehicles were buildings. Vehicle air conditioners are much less efficient than residential air conditioners, and in the US consume about 0.9 quadrillion BTUs (quads) per year, comparable to the 2.3 by air conditioners in residences. Vehicle heating, in contrast, is a model of efficiency, running as a combined-heat-and-power system using waste heat from the motor. Electricity use from appliances such as DVD players, laptops, and refrigerators remains modest, although stand-by power use is growing. Technology and policy approaches used for buildings can address similar types of energy use in cars. (C) 2011 Elsevier Ltd. All rights reserved.
C1 [Thomas, Valerie M.] Georgia Inst Technol, Sch Publ Policy, Atlanta, GA 30332 USA.
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OI Thomas, Valerie/0000-0002-0968-8863; Meier, Alan/0000-0002-1260-2151
CR Bosch R., 1996, AUTOMOTIVE HDB
*CA AIR RES BOARD, 2009, COOL CARS REFL GLAZ
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NR 12
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Z9 1
U1 0
U2 2
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 1361-9209
J9 TRANSPORT RES D-TR E
JI Transport. Res. Part D-Transport. Environ.
PD JUN
PY 2011
VL 16
IS 4
BP 341
EP 345
DI 10.1016/j.trd.2011.01.010
PG 5
WC Environmental Studies; Transportation; Transportation Science &

Technology
SC Environmental Sciences & Ecology; Transportation
GA 745QS
UT WOS:000289181300012
DA 2018-05-03
ER

PT S
AU Spataru, C
Gillott, M
AF Spataru, Catalina
Gillott, Mark
BE Howlett, RJ
Jain, LC
Lee, SH
TI The Use of Intelligent Systems for Monitoring Energy Use and Occupancy in Existing Homes
SO SUSTAINABILITY IN ENERGY AND BUILDINGS
SE Smart Innovation Systems and Technologies
LA English
DT Proceedings Paper
CT 2nd International Conference on Sustainability in Energy and Buildings (SEB 2010)
CY MAY 06-07, 2010
CL Brighton, ENGLAND
DE Energy Efficient Dwellings; Post-occupancy Evaluation (POE); Occupants Behaviour; Building Performance
AB In the UK the existing domestic building stock accounts for 30 % of the total carbon dioxide emissions [Domestic energy fact file, BRE, 2008]. The UK Government has set ambitious targets for reducing UK carbon dioxide emissions by 80% by 2050. These targets will require significant changes to the existing buildings. To understand and quantify the benefits of refurbishment solutions, it is vital to monitor exemplar buildings and to bring them to an energy efficiency standard with lower associated carbon emissions, by finding the most efficient way to refurbish them. A 1930's replica three bed semi-detached house analyzed in this study is located in the University of Nottingham campus and is fully monitored, including monitoring of the occupants patterns, environmental monitoring, electricity use and energy associated with space and hot water heating. This paper analyses techniques used for tracking computing technologies in everyday domestic settings. A Real Time Occupancy Monitoring System using ultra wideband (UW) radio frequency (RF) is used in this study to track person's location within the research house. The results presented in this paper shows that energy consumption profiles are related to the occupants and their profiles. The data also depends on the outside weather conditions and occupants' behaviour. The study shows that it is not enough just to improve building performance in order to improve energy efficiency; it is also important to understand and influence occupant behaviour, due to the fact that in domestic buildings the occupants exert complete control of the appliances, lights, heating, and ventilation. The results of this study suggest that general behavioural trends and patterns can be extracted from long-term collected data. This systematic study could benefit the existing housing stock in the UK by applying the same methods used in the research house.
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OI Gillott, Mark/0000-0002-4829-8243
CR Aggarwal JK, 1999, COMPUT VIS IMAGE UND, V73, P428, DOI 10.1006/cviu.1998.0744
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NR 11
TC 1
Z9 1
U1 0
U2 9
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 2190-3018
BN 978-3-642-17386-8
J9 SMART INNOV SYST TEC
PY 2011
VL 7
BP 247
EP 256
PG 10
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA BBM02
UT WOS:000307329200025
DA 2018-05-03
ER

PT S
AU Taneja, O
AF Taneja, Om
GP ASHRAE
TI Measures for Maintaining Low Energy use in Commercial Buildings over their LifeCycle
SO ASHRAE: TRANSACTIONS 2011, VOL 117, PT 1
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT Winter Conference of the American-Society-of-Heating-Refrigerating-and-Air-Conditioning-Engineers (ASHRAE)
CY 2011
CL Las Vegas, NV
SP Amer Soc Heating, Refrigerating & Air-Conditioning Engineers (ASHRAE)
AB The challenge that sustainable buildings movement faces is, "how to maintain the intended sustainable performance with regards to low energy use, indoor comfort and projected operating costs savings over the long term use of the building" Rapid decline in sustainable performance of a few high-profile buildings affects credibility of the High Performance buildings initiatives, reinforces doubts amongst climate-change non-believers and slows down the enthusiasm of the investors. Examining the lifecycle performance and costs, raising the awareness of building owners and tenants, adopting the best operational and maintenance practices by trained and skilled operating staff, and incorporating measurements, verification and automation technologies to automatically track and optimize the performance of all key buildings systems needs to become an essential part of property management culture to avoid pitfalls.
Emergence of Building Energy Labeling Program and Building Information modeling techniques coupled with energy use sub- metering can alert of issues during commissioning, building occupancy, tenant-fit ups, building-use changes or of decline in performance due to poor operations and maintenance management. Building Heating, Ventilation and Air Conditioning systems are significant users of energy as well as their operations and maintenance impacts the health and security of tenants. Therefore, proper

design, configuration, commissioning, operations and maintenance of such systems continues to offer opportunities for reducing the emission of greenhouse gases, and any lapses in monitoring and correcting deficiencies creates shortfall in sustainable performance over the life of a building. As the largest single landlord in the United States, the Federal Government oversees about 500,000 federal buildings. With additional resources being made available under the Recovery Act funding, new tools are emerging to allow monitoring and control of energy use.

This paper outlines various qualitative and quantitative measures that can be practiced to improve and sustain performance of all building systems and infrastructure elements. Amongst all the measures, having trained and motivated operations and maintenance staff involved from concepts stage through design, construction, commissioning, and operations not only facilitates meeting the original design intent, but also allows to make adaptive changes with changes in occupancy, functionality, codes, standards or security requirements. Such general practices can assure sustenance of energy and environmental performance over the life cycle of systems and buildings. This paper also emphasizes how industry professional and trade organizations can guide towards standards and guidelines that can be more easily assimilated by the operations and maintenance staff and can help modify human behavior towards not only designing, but maintaining a more socially and environmentally responsible built-environment.

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ASHRAE, 2010, PERF MEAS PROT COMM
*CA EN COMM, 2000, EN ACC KEY TOOL MAN
*EPA, EPA EN STAR PORTF MA
*INT AG MEM UND, 2006, FED LEAD HIGH PERF B
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JARNAGIN RE, 2009, ASHRAE J DEC, P18
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VICKROY R, 2010, BUILDING OPERATI MAY, P25
*WORLD RESOURCES I, CLIMATE ENERGY TRANS
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NR 20
TC 1
Z9 1
U1 0
U2 3
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
J9 ASHRAE TRAN
PY 2011
VL 117
BP 525
EP 532
PN 1
PG 8
WC Thermodynamics
SC Thermodynamics
GA BXF18
UT WOS:000295933900065

DA 2018-05-03
ER

PT S
AU Choi, KS
Ahn, YK
Park, YC
Park, WC
Seo, HM
Jung, KM
Seo, KH
AF Choi, Kwang-Soon
Ahn, Yang-Keun
Park, Young-Choong
Park, Woo-Chool
Seo, Hae-Moon
Jung, Kwang-Mo
Seo, Kyeung-Hak
GP IEEE
TI Architectural Design of Home Energy Saving System based on Realtime Energy-Awareness
SO PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON UBIQUITOUS INFORMATION TECHNOLOGIES & APPLICATIONS (ICUT 2009)
SE Proceedings of the International Conference on Ubiquitous Information Technologies & Applications
LA English
DT Proceedings Paper
CT 4th International Conference on Ubiquitous Information Technologies
CY DEC 20-22, 2009
CL Fukuoka, JAPAN
SP IEEE
ID MANAGEMENT
AB Recently, a global market related to energy efficiency and energy saving technologies is being extended rapidly with the growth of a matter of primary concern about extreme climate change. Especially, in the home network environments where only its functional aspects have been focused on without considering energy consumption, it is urgent to develop new energy-efficient technologies specialized in the home network environments.
In this paper, architecture of home energy saving system (HESS) based on energy-awareness and its basic functional requirements are designed and proposed for real-time home energy monitoring service, reducing or cutting off standby power caused by home appliances, and intelligent home energy management service.
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CR Inoue M, 2003, IEEE T CONSUM ELECTR, V49, P606, DOI 10.1109/TCE.2003.1233782
Jeong YK, 2008, IEEE T CONSUM ELECTR, V54, P487, DOI 10.1109/TCE.2008.4560119
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PARK WK, 2008, INT C ADV EL MICR OC, P121
Williams E, 2006, IEEE INT SYMP ELECTR, P167, DOI 10.1109/ISEE.2006.1650055
NR 5
TC 1
Z9 1
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1976-0035

BN 978-1-4244-5131-9
J9 P INT C UBIQ INFORM
PY 2009
BP 5
EP 9
PG 5
WC Computer Science, Theory & Methods; Engineering, Electrical & Electronic
SC Computer Science; Engineering
GA BRS47
UT WOS:000283532900002
DA 2018-05-03
ER

PT S
AU Sun, JY
Yin, B
Feng, JH
Zhan, SL
Jin, ZY
AF Sun Jin-ying
Yin Bo
Feng Jian-hua
Zhan Song-lin
Jin Zhan-yong
BE Lan, H
TI Policy Analysis and Mode Design on Incremental Investment and Financing of Building Energy Efficient Market in China
SO 2009 INTERNATIONAL CONFERENCE ON MANAGEMENT SCIENCE & ENGINEERING (16TH), VOLS I AND II, CONFERENCE PROCEEDINGS
SE International Conference on Management Science and Engineering-Annual Conference Proceedings
LA English
DT Proceedings Paper
CT 16th International Conference on Management Science and Engineering
CY SEP 14-16, 2009
CL Moscow, RUSSIA
SP Natl Nat Sci Fdn China, Harbin Inst Technol, State Univ Management, IEEE Technol Management Council
DE incremental investment and financing; building energy efficient market; policy; mode design
ID ENVIRONMENT
AB Development barriers of building energy efficient market (BEEM) in China mainly centralize on unitary construction capital source channel and deficient effective capital supply. To the key problems of capital financing in BEEM, this study takes the incremental investment and financing (IIF) as research object. Establish two-stage leader-followers game model based on Stackelberg with government and other investors during the course of IIF for BEEM, and prove that government's participant degree and mode have important influence on market investment efficiency and proposed policy path improving IIF influence factors. Propose three types of policy path including CAC, MBI and market standardization policy type (MSP). On the basis of research result, propose three IIF modes suit for this stage in China, which include IIF mode combining market admittance and energy efficient label, IIF mode based on existing residential building energy efficient retrofit mode and IIF mode under energy efficient supervision framework.
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NR 26
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U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2155-1847
BN 978-1-4244-3970-6
J9 INT C MANAGE SCI ENG
PY 2009
BP 1913
EP +
DI 10.1109/ICMSE.2009.5317744
PG 3
WC Computer Science, Information Systems; Computer Science,
Interdisciplinary Applications; Engineering, Industrial; Operations
Research & Management Science
SC Computer Science; Engineering; Operations Research & Management Science
GA BMY95
UT WOS:000273956800285
DA 2018-05-03
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AF Baverstock, Garry
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Jennings, Philip
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BE Jennings, P
Ho, G
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TI A case for establishing a nationally based program for sustainable energy and water use in the Built Environment: An investigation into: Establishing a vibrant R, D & D Collaborative Centre for Energy Efficient Lifestyles, Developmental Patterns, Building Technologies and Building Design Strategies
SO Renewable Energy for Sustainable Development in the Asia Pacific Region
SE AIP CONFERENCE PROCEEDINGS
LA English
DT Proceedings Paper
CT International Conference on Renewable Energy for Sustainable Development in the Asia Pacific Region
CY FEB 04-08, 2007
CL Fremantle, AUSTRALIA
SP World Renewable Energy Network, Res Inst Sustainable Energy, Int Org Biotechnol & Bioengn, Western Australian Sustainable Energy Assoc, AusAID, Sustainable Energy Dec Off, Dept Environm & Heritage Australian greenhouse Off, Dept Planning & Infrastruct, Synergy, Solar e com
AB For the past decade, politicians have applied different shades of "green-wash" to global environmental issues in order to help juggle their positions in the political spectrum. This has created the illusion that effective measures are being pursued in the public interest for both this and future generation(s). The reality is, however, that nearly of all these initiatives are "input focused" and the various States of the Environment reports confirm that, despite decades of endeavour and large financial investment, there is little return on investment and that the rate of environmental degradation, particularly of the global atmosphere, continues to increase. Despite fierce posturing from the global warming sceptics, it seems that finally, the long term data indices of global warming are being accepted seriously and politicians around the world are responding by investing public funds in the quest for the search for options. This paper contends that with global warming, humans will need to embrace uncertainty and manage change and that innovation and cooperation across all disciplines and the cooperation of the entire political and social spectrum will be required to solve the ecological disasters that have already begun to unfold and accelerate in frequency. It looks from a strategic viewpoint at how specialist education can catalyse change and play an important role in managing the change. The case study used in this analysis is the RISE Master of Science Course in Environmental Architecture. It explores the implications of linking to converging interests from other emerging course streams for Engineering and other Built Environment disciplines such as Planning, Project Management and Interior design as well as socio-economic disciplines and the integrative discipline of Systems Dynamics.
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NR 7
TC 1
Z9 1
U1 0
U2 3
PU AMER INST PHYSICS
PI MELVILLE
PA 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA
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J9 AIP CONF PROC
PY 2007
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BP 154
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WC Energy & Fuels; Environmental Sciences; Environmental Studies; Physics, Applied
SC Energy & Fuels; Environmental Sciences & Ecology; Physics
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Narumi, D
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AF Habara, H
Narumi, D
Shimoda, Y
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BE Yang, X
Zhao, B
Zhao, R
TI An occupant indoor thermal environment control behavior model to estimate residential cooling energy consumption
SO INDOOR AIR 2005: PROCEEDINGS OF THE 10TH INTERNATIONAL CONFERENCE ON INDOOR AIR QUALITY AND CLIMATE, VOLS 1-5
LA English
DT Proceedings Paper
CT 10th International Conference on Indoor Air Quality and Climate (Indoor Air 2005)
CY SEP 04-09, 2005
CL Beijing, PEOPLES R CHINA
SP Tsinghua Univ, Minist Educ China, Natl Nat Sci Fdn China, Beijing Municipal Commiss Sci & Technol, Shanghai Municipal Commiss Sci & Technol, US EPA, Amer Ind Hyg Assoc, Amer Soc Heating, Refrigerating & Air Conditioning Engineers, Int Commiss Occupat Hlth, SC Indoor Air Qual & Hlth, Int Council Res & Innovat Bldg & Construct, European Commiss Asia Pro Eco Programme Promot Sustainable Solut Environm Europe & Asia, Korean Soc Indoor Environm, Soc Indoor Environm
DE control behavior; cross ventilation; air conditioner; energy consumption; residential house
AB Recently, some studies attempt to modelize control behavior for architectural heat transfer simulation. However, few of these studies consider cross ventilation. In this paper, we devised a control behavior model including cross ventilation. First, we performed surveys to study the relationship between indoor temperature and air conditioner On control. Then, the control behavior model applying the transition probability of air conditioner Off-to-On state based on the survey results was devised. Moreover, it was incorporated into the model we proposed before to estimate air conditioning energy consumption considering cross ventilation. Finally, the simulation results with our method were compared to those with the typical method. Consequently, our method estimated air conditioner operation time by about 20% less and cooling energy consumption by about 5% less compared to the typical method. This suggested that the typical method could overestimate air conditioner operation time and cooling energy consumption.
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PU TSINGHUA UNIVERSITY PRESS
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PA TSINGHUA UNIVERSITY HAIDIANQU, BEIJING 100084, PEOPLES R CHINA
BN 978-7-89494-830-4
PY 2005
BP 1179
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WC Construction & Building Technology; Engineering, Environmental; Public, Environmental & Occupational Health
SC Construction & Building Technology; Engineering; Public, Environmental & Occupational Health
GA BDJ55
UT WOS:000233831201094
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PT J
AU Jaffar, B
Oreszczyn, T
Raslan, R
Summerfield, A
AF Jaffar, Badria
Oreszczyn, Tadj
Raslan, Rokia
Summerfield, Alex
TI Understanding energy demand in Kuwaiti villas: Findings from a quantitative household survey
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Household survey; Residential energy demand; Kuwait; Energy efficiency policy
ID BUILDING CHARACTERISTICS; OCCUPANTS BEHAVIOR; RESIDENTIAL SECTOR; CONSUMER-BEHAVIOR; CONSUMPTION; SPACE; ELECTRICITY; DETERMINANTS; EFFICIENT; PATTERNS
AB Residential buildings in Kuwait account for almost 60% of the country's national electrical power generated, considerably greater than all other sectors or building types. This paper identifies key drivers of energy use in Kuwaiti villas based on a survey of 250 households undertaken throughout the six districts of Kuwait. The survey consists of a cross-sectional interviewer-administered questionnaire designed to gather detailed information about building physical characteristics, occupants' socio-demographic background and energy-use behaviours. Survey data is analysed using both statistical descriptive methods and multiple linear regression analysis to identify key determinants of energy consumption in a sample of Kuwaiti villas. Analysis indicates that an occupant driven cooling behaviour (air-conditioning thermostat temperature set points) is the major driver of energy use, followed by the number of rooms and the number of occupants. Together, such drivers significantly explain 32% of the variability in energy

consumption Survey findings provide descriptive information about Kuwaiti households and insights into the key drivers of energy use to better inform further research and policy interventions in this field. (C) 2018 Elsevier B.V. All rights reserved.
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FU Research Councils UK [EP/K011839/1]
FX This study was undertaken as part of a PhD research at the UCL Energy Institute. Oreszczyn is Director of the RCUK Centre for Energy Epidemiology at UCL and funded by Research Councils UK (EP/K011839/1). The authors are grateful to all the participants in the household survey and to the interview personnel for their generous assistance in the data collection process. The authors are also grateful to the Kuwait Ministry of Electricity and Water for their data and information support.
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NR 43
TC 0
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PI LAUSANNE
PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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JI Energy Build.
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA GA7CC
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PT J
AU Koezjakov, A
Urge-Vorsatz, D
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AF Koezjakov, A.
Urge-Vorsatz, D.
Crijns-Graus, W.
van den Broek, M.
TI The relationship between operational energy demand and embodied energy in Dutch residential buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
ID LIFE-CYCLE ENERGY; PARAMETERS; MELBOURNE; STOCKS
AB Reducing heat demand of buildings, due to legal and technological advances in the EU, shifts the ratio of operational vs. embodied energy towards an increasing share of the latter. This leads to a shifting focus on building materials (embodied) energy use. In this study the relationship between heat demand and embodied energy use was investigated, using Dutch residential buildings as a case study. The analysis was performed using the 3SCEP HEB (Center for Climate Change and Sustainable Energy Policy High Efficiency Buildings) model and a constructed Embodied Energy Database Management System (EEDMS), containing embodied energy use of materials most common in Dutch residential construction. The resulting embodied energy use in Dutch dwelling archetypes varies from 52 to 106 MJ/(m(2).a), annualised over building lifetimes and 3.0 to 6.4 GJ/m(2) in total. These values are for the building construction and exclude recurrent embodied energy and technical installations. For operational energy use the range is 124 to 682 MJ/(m(2).a). A total energy use reduction of 36% can be reached in 2050 through 46% reduction in operational energy use and 35% increase in embodied energy use, compared to 2015. This research confirms that the relative importance of embodied energy use is increasing: the embodied energy use in standard homes is about 10-12% of the total energy use, while it is 36-46% in energy efficient homes. Particularly in light of the goal to reach a maximum global temperature increase of well below 2 degrees C

by 2100, it is important to include embodied energy use in future policy objectives. (C) 2018 The Authors. Published by Elsevier B.V.

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PA PO BOX 564, 1001 LAUSANNE, SWITZERLAND
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SC Construction & Building Technology; Energy & Fuels; Engineering
GA GA7CC
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ER

PT J
AU Liu, YQ
AF Liu, Yingqi
TI Role of a forward-capacity market to promote electricity use reduction in the residential sector-a case study of the potential of social housing participation in the Electricity Demand Reduction Pilot in the UK
SO ENERGY EFFICIENCY
LA English
DT Article
DE Electricity use reduction; Peak demand; Capacity market; Residential; Social housing
ID ENERGY-EFFICIENT APPLIANCES; ISO NEW-ENGLAND; DISCOUNT RATES; POLICY; CONSERVATION; PERFORMANCE; EXPERIENCE; RESOURCE; BARRIERS; PROGRAMS
AB The residential sector is key for electricity demand in many developed economies. Reducing electricity use in households is valuable for carbon mitigation and capacity adequacy and addressing fuel poverty. In many liberalised systems, a forward-capacity market is established to remunerate resources' capacity value, with some allowing electricity use reduction to participate. This paper focuses on the Electricity Demand Reduction Pilot in the UK that trials a novel approach of incentivising electric efficiency via the Great Britain capacity market. Using a case study of social housing, it identifies barriers faced by the

residential sector to utilise funding from the pilot. While opportunities exist for electricity use reduction in lighting, appliances and heating, financial incentives based on the impact on system peak demand are unlikely to be attractive and disadvantage insulation and efficient heating system. Limited budget for electric efficiency project and inflexible requirement of over 2-year payback of Electricity Demand Reduction (EDR) Pilot pose the challenge of funding projects, especially for small organisations, even if they can deliver capacity value to the electricity system. The obligation to deliver and verify committed peak savings and limited scope for payback present challenges and risks for projects to target potential opportunities within households. For communal electricity use, the minimum savings, cash flow and limited internal capabilities are constraints. Therefore, it is inadequate to rely on a forward-capacity market as a primary vehicle for incentivising electric efficiency investment in the residential sector, highlighting the importance of alternative provisions like supplier obligation and market transformation.

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FX The author is supported by the China Scholarship Council to undertake this research. The author would like to thank all participants in this research, Professor Nick Eyre and Dr. Sarah Darby for their valuable comments on this paper and Dr. Gavin Killip and Dr. Marina Topouzi for their help with the design of survey.

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AU Shen, HZ
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Fan, Ruifang
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TI Impacts of rural worker migration on ambient air quality and health in China: From the perspective of upgrading residential energy consumption
SO ENVIRONMENT INTERNATIONAL

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DT Article
DE Rural migrant works; Urbanization in China; Ambient air pollution; Particulate matter; Human health
ID GLOBAL BURDEN; ANTHROPOGENIC EMISSION; URBAN MIGRATION; POLLUTION; MIGRANTS; DISEASE; TRENDS; LABOR; URBANIZATION; SHANGHAI
AB In China, rural migrant workers (RMWs) are employed in urban workplaces but receive minimal resources and welfare. Their residential energy use mix (REM) and pollutant emission profiles are different from those of traditional urban (URs) and rural residents (RRs). Their migration towards urban areas plays an important role in shaping the magnitudes and spatial patterns of pollutant emissions, ambient PM2.5 (fine particulate matter with a diameter smaller than 2.5 mu m) concentrations, and associated health impacts in both urban and rural areas. Here we evaluate the impacts of RMW migration on REM pollutant emissions, ambient PM2.5, and subsequent premature deaths across China. At the national scale, RMW migration benefits ambient air quality because RMWs tend to transition to a cleaner REM upon arrival at urban areas-though not as clean as urban residents'. In 2010, RMW migration led to a decrease of 1.5 mu g/m(3) in ambient PM2.5 exposure concentrations (C-ex) averaged across China and a subsequent decrease of 12,200 (5700 to 16,300, as 90% confidence interval) in premature deaths from exposure to ambient PM2.5. Despite the overall health benefit, large-scale cross-province migration increased megacities' PM2.5 levels by as much as 10 mu g/m(3) due to massive RMW inflows. Model simulations show that upgrading within-city RMWs' REMs can effectively offset the RMW-induced PM2.5 increase in megacities, and that policies that properly navigate migration directions may have potential for balancing the economic growth against ambient air quality deterioration. Our study indicates the urgency of considering air pollution impacts into migration-related policy formation in the context of rapid urbanization in China.
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AU Kangas, HL
Lazarevic, D
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TI Technical skills, disinterest and non-functional regulation: Barriers to building energy efficiency in Finland viewed by energy service companies
SO ENERGY POLICY
LA English
DT Article
DE Energy services; Barriers; Energy efficiency; Ecosystem; Energy service company; Buildings
ID POLICY MIXES; CREATIVE DESTRUCTION; MARKET; MODEL; KEY; STRATEGY; BENEFITS; INDUSTRY; FOSTER
AB Energy inefficiency in the building stock is a substantial contributor to climate change. Integrated energy service companies (IESCs) have a potentially important role in improving energy efficiency. This paper presents a qualitative analysis of the energy efficiency barriers in the Finnish building sector based on data from interviews with twelve IESCs. Taking a novel supply side perspective, we place IESCs at the centre of the emerging energy services business ecosystem to identify the barriers and hindering factors (real world illustrations of barriers). From this perspective, we also examine cause-effect relationships between the hindering factors and the actors. Hindering factors, reported by IESCs, were categorised under a revised barrier taxonomy consisting of economic market failures and economic market, behavioural, organisational and institutional barriers. The most salient hindering factors lack of technical skills, disinterest in energy efficiency improvements and non-functional regulation were analysed with respect to ecosystem actors causing and affected by these factors. Public actors have a key role in overcoming these barriers, for instance, by creating new possibilities for entrants to take part in decision-making, increasing the functionality and practicality of policies and by providing up-to date energy efficiency information.
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PT J
AU Long, C
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AF Long, Christopher
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TI Characteristics or culture? Determinants of household energy use behavior in Germany and the USA
SO ENERGY EFFICIENCY
LA English
DT Article
DE Energy use; Household behavior; Oaxaca-Blinder decomposition; Germany; United States
ID CONSERVATION; EFFICIENCY; PERCEPTIONS; CONSUMPTION; INVESTMENTS; PREFERENCES; COMPETITION; ATTITUDES; CITIZENS; ADOPTION
AB Multilateral climate agreements are more likely to be successful when they acknowledge and address both differences in country energy use behavior and the factors that shape behavior. This paper employs an Oaxaca-Blinder decomposition to analyze factors underlying differences in residential energy use behavior in Germany and the USA. We focus on three household decisions: purchasing energy-efficient appliances, employing energy-saving measures like turning off lights when leaving a room, and purchasing fuel-efficient vehicles. For all of these decisions, US household adoption is significantly lower than German household adoption. These differences in observed energy use behavior are decomposed into components arising from differences in country mean characteristic and from differences in adoption propensities for given characteristics. Both country characteristics and propensities contribute to observed energy use behavior differences in German and US households. In particular, perceptions of the human role in climate change, financial advantages of energy savings, and effectiveness of energy savings in combating climate change play significant roles in generating observed country difference.
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AU Trotta, G
AF Trotta, Gianluca
TI Factors affecting energy-saving behaviours and energy efficiency investments in British households
SO ENERGY POLICY
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DT Article
DE Energy behaviours; Energy efficiency; Appliances; Retrofit; Energy saving; British households
ID PRO-ENVIRONMENTAL BEHAVIOR; EUROPEAN COUNTRIES; SOCIAL NORMS; CONSERVATION; ATTITUDES; GAP; CONSUMPTION; BARRIERS; HEALTH; US
AB The objective of this paper is to identify the socio-demographic, dwelling, and environmental factors that have the strongest influence on the daily energy-saving behaviours, the adoption of energy efficient appliances and the energy efficient retrofit investments made by British households. This study uses British household data from the "Survey of Public Attitudes and Behaviours towards the Environment"

collected in 2009, and employs nonlinear principal components analysis (NLPCA), ordinary least squares (OLS) regression, and probit models. The results show different household profiles with specific features driving daily energy-saving behaviours and energy efficiency investments. Environmental variables are a good predictor of both energy-saving behaviours and investment in energy efficient appliances but not of energy efficient retrofit measures. Results of income and dwelling type variables with regard to energy-saving behaviours and energy efficient retrofit investments significantly diverge; in addition, interesting patterns emerge with respect to the respondents' age, sex, and marital status. By evaluating and understanding the household and dwelling characteristics that affect energy-saving behaviours and energy efficiency investments, it is possible to obtain a clearer idea of where and how energy and emissions savings can be made, and to propose effective and targeted policies that promote energy-responsible lifestyles.

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AU Rahman, A
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TI Predicting electricity consumption for commercial and residential buildings using deep recurrent neural networks
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DT Article
DE Building energy modeling; Machine learning; Recurrent neural networks; Deep learning; Electric load prediction
ID OF-THE-ART; ENERGY-CONSUMPTION; MODELS
AB This paper presents a recurrent neural network model to make medium-to-long term predictions, i.e. time horizon of >= 1 week, of electricity consumption profiles in commercial and residential buildings at one-

hour resolution. Residential and commercial buildings are responsible for a significant fraction of the overall energy consumption in the U.S. With advances in sensors and smart technologies, there is a need for medium to longterm prediction of electricity consumption in residential and commercial buildings at hourly intervals to support decision making pertaining to operations, demand response strategies, and installation of distributed generation systems. The modeler may have limited access to information about building's schedules and equipment, making data-driven machine learning models attractive. The energy consumption data that is available may also contain blocks of missing data, making time-series predictions difficult. Thus, the main objectives of this paper are: (a) Develop and optimize novel deep recurrent neural network (RNN) models aimed at medium to long term electric load prediction at one-hour resolution; (b) Analyze the relative performance of the model for different types of electricity consumption patterns; and (c) Use the deep NN to perform imputation on an electricity consumption dataset containing segments of missing values. The proposed models were used to predict hourly electricity consumption for the Public Safety Building in Salt Lake City, Utah, and for aggregated hourly electricity consumption in residential buildings in Austin, Texas. For predicting the commercial building's load profiles, the proposed RNN sequence-to-sequence models generally correspond to lower relative error when compared with the conventional multi-layered perceptron neural network. For predicting aggregate electricity consumption in residential buildings, the proposed model generally does not provide gains in accuracy compared to the multi layered perceptron model.

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TI Interval Estimations of Building Heating Energy Consumption using the Degree-Day Method and Fuzzy Numbers
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DE degree-day method; fuzzy number and arithmetic; interval estimation
ID OPTIMUM INSULATION THICKNESS; TYPICAL METEOROLOGICAL YEAR; RELIABILITY-ANALYSIS; CLIMATE-CHANGE; SET APPROACH; UNCERTAINTY; DEMAND; WEATHER; PROPAGATION; TURKEY
AB The purpose of this paper is to propagate the input uncertainties of the degree-day method to estimate the building heating energy consumption as numerical intervals. While it is common to use average or expected values (e.g., Typical Meteorological Year) to address the input uncertainties, this practice can only yield the best estimates as single-point values without informing the possible range of variations. After classifying two types of uncertainty as weather variability and imprecision in the degree-day method, this paper proposes the adoption of fuzzy numbers and their arithmetic as the theoretical approach to handle uncertainty. As the degree-day method mainly involves elementary arithmetic (e.g., addition and multiplication), fuzzy number arithmetic can be directly applied to formally process numerical intervals. The proposed method is demonstrated and verified via a building example in Canada, and the interval results are comparable to the variation of heating energy consumption based on the data of outdoor ambient temperatures in 52 years.

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U2 0
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SN 2075-5309
J9 BUILDINGS
JI Buildings
PD FEB
PY 2018
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IS 2
AR 21
DI 10.3390/buildings8020021
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WC Construction & Building Technology
SC Construction & Building Technology
GA FZ3SL
UT WOS:000427510600009
OA gold
DA 2018-05-03
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PT J
AU Damette, O
Delacote, P
Del Lo, G
AF Damette, Olivier
Delacote, Philippe
Del Lo, Gaye
TI Households energy consumption and transition toward cleaner energy sources
SO ENERGY POLICY
LA English
DT Article
DE Energy consumption; Energy transition; Energy switching; Environmental concern; Dependent qualitative econometrics
ID SELECTION BIAS; DEMAND; MODEL
AB The paper investigates the factors influencing households' energy choices, and the drivers of switching toward cleaner energy. We first present a theoretical framework to determine the factors that explain households' energy consumption and highlight the motivations underlying their transition towards less polluting sources, including their environmental preference. Using French household data from ADEME, we provide an econometric test of qualitative variables following studies by Dubin and McFadden (1984). Our results show that income and prices are the main determinants of household energy consumption. Environmental considerations seem to influence the choice of energy sources more than consumption. We also find evidence that income and relative capital cost are the most important variables for household energy switching.
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U2 2
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JI Energy Policy
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WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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ER

PT J
AU Das, R
Richman, R
Brown, C
AF Das, Runa
Richman, Russell
Brown, Craig
TI Demographic determinants of Canada's households' adoption of energy efficiency measures: observations from the Households and Environment Survey, 2013
SO ENERGY EFFICIENCY
LA English
DT Article
DE Demographics; Energy efficiency; Technology adoption; Consumer behavior; Discrete choice; Energy consumption
ID RESIDENTIAL CONSERVATION PROGRAMS; HEATING-SYSTEMS; CONSUMPTION; BEHAVIOR; POLICY; PARTICIPATION; ATTITUDES; PATTERNS; MODEL; HOME
AB In addition to a growing and aging population, Canada has experienced large shifts in its residential sector. There are more households, homes are larger with less people in them, and there are more appliances per household, all of which contribute to increased energy consumption. The present work explores the demographic determinants of residential energy efficiency adoption using the 2013 Households and Environment Survey. With binary logistic regressions, we predicted the odds of households adopting three energy-efficient actions: energy-saving lights, programmable thermostats, and changes to a dwelling following an energy audit. Although it was found that Canadian households are participating in energy efficiency, not all groups are participating equally. Similar to previous research, seniors appear to be more inclined to adopt less challenging measures such as energy-saving lights, as opposed to more intensive dwelling upgrades. Additionally, levels of education and income were positively related to the adoption of energy efficiency measures. However, the results showed household income to be less of a contributing factor for decisions regarding dwelling changes compared to the financial incentives offered via government grants. The results suggest a need to increase energy efficiency education and to continue offering financial incentives as the country increases its residential energy efficiency.
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NR 53
TC 0
Z9 0
U1 5
U2 5
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PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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J9 ENERG EFFIC
JI Energy Effic.
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PY 2018
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BP 465
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental

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AF Diaz-Mendez, S. E.
Torres-Rodriguez, A. A.
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Escalante Soberanis, M. A.
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Pedraza-Basulto, G. K.
TI Economic, environmental and health co-benefits of the use of advanced control strategies for lighting in buildings of Mexico
SO ENERGY POLICY
LA English
DT Article
DE Environmental and health concerns; Emission Factors and Intake factors; Air pollution; Local and global climate change; Energy saving; Control devices for lighting systems
ID ENERGY SAVINGS; AIR-POLLUTION; CONTROL-SYSTEMS; INTAKE FRACTION; DAYLIGHT; POWER; CITY
AB Merida, Mexico, is a city that spends 17% of its electricity for lighting purposes. This electricity comes from thermal power plants that use fossil fuels. These emit a large amount of particulate matter, around 2.5 micrometers (PM2.5), which can penetrate deepest lung parts (alveoli), causing cardiovascular disease. Mexico has a policy (NOM-028-ENER-2010) that establishes the minimum efficiency for lighting in buildings. However, lighting is often used inappropriately (e.g. daytime or when there are no people using them). One solution for this problem is to use control device technology of multiple types (combination of daylight, motion and presence sensors). However, these strategies have not been fully implemented in Mexico, mainly due to the high cost of commercial control devices. This study aims to know the lost co-benefits when control devices are not implemented for lighting cost reduction, such as: energy saving (kw-h/yr), electricity bill reduction (USD/yr), PM2.5 emission reduction (mu g/m(3)), cardiovascular death reduction (death/yr) and cardiovascular death cost reduction (USD/yr). For those reasons, it is recommended that energy policy decisions regarding building lighting efficiency include the implementation of control devices. Moreover, such policies should be preceded by research studies focused on detailed device cost, co-benefits and socio-economic analysis.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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PT J
AU Djanibekov, U
Gaur, V
AF Djanibekov, Utkur
Gaur, Varun
TI Nexus of energy use, agricultural production, employment and incomes among rural households in Uttar Pradesh, India
SO ENERGY POLICY
LA English
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DE Bioenergy; Heterogeneity; Rural interdependencies; Rural inequality; Agricultural household model; Dynamic programming
ID LAND-USE; FOOD SECURITY; EMISSIONS; MODEL; TECHNOLOGIES; BIOENERGY; IMPACTS
AB This study analyzes the nexus issues of energy use, agricultural production, income and employment among heterogeneous and interdependent rural households in Uttar Pradesh, India. We use an agricultural household dynamic programming model that includes two types of households differentiated by their socio-economic characteristics and that are linked through agricultural contracts. Households are also differentiated by their membership in terms of men, women and children. The model simulates the effects of policies such as state subsidies for the purchase of solar panels, improvement in non-agricultural employment opportunities, and combinations of the two, as they are suggested to improve energy supply and reduce trade-offs in energy use. The model results indicate that households improve energy use patterns by using solar panels; yet, adoption of such technology is conditional on state subsidy levels of 50% and 80% for the purchase of solar panels for farming and domestic purposes respectively. Subsidies for solar panels together with improvement of off-farm work increases off-farm employment levels and income of the poorer household, however, this policy reduces agricultural production. In addition, the wealthier household incurs losses from improvement in non-agricultural employment opportunities due to reduced labor availability for farm operations.
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FX The authors gratefully acknowledge the support for this research from the German Federal Ministry for Economic Cooperation and Development (BMZ).
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AU Hoicka, CE
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Parker, Paul
TI Assessing the adoption of the house as a system approach to residential energy efficiency programs
SO ENERGY EFFICIENCY
LA English
DT Article
DE Voluntary programs; Residential energy efficiency evaluations; Energy efficiency retrofits; House as a system
ID SOCIOTECHNICAL SYSTEM; RETROFIT; CONSERVATION; CONSUMPTION; HOMEOWNERS; BUILDINGS; CANADA; IMPROVEMENTS; EMISSIONS; SAVINGS
AB The traditional model of taking single actions when components reach their end of life or provide inadequate service has enabled the residential sector to gradually improve its energy efficiency over time. However, to achieve the large potential reductions in energy consumption and greenhouse gas emissions in residential buildings, a deeper systematic approach is required. The house as a system approach to energy retrofits emphasizes that for the greatest improvements in energy performance, multiple retrofit actions must be taken, and the order is important. This was the core concept in the Canadian residential energy efficiency programs, EnerGuide for Houses (1998-2006) and ecoEnergy (2007-2012). In this study, a systematic analysis of a large dataset that documents 19,552 residential energy evaluations conducted by a single agency in Waterloo, Canada, allows for a more nuanced description of how well the energy retrofit actions taken by participants followed the house as a system approach. The findings are encouraging in that participants did respond to the multiple recommendations given to them by energy advisors. In particular, a higher number of recommendations were associated with households arranging follow-up evaluations and taking more action under the performance-based grant program. However, the results also illustrate that participants frequently did not attend to the retrofits in the combinations associated with the house as a system approach. Insulation to reduce heat losses should have been the first priority in the systemic approach, but was often not upgraded, and the extent or depth of the upgrade was often less than what had been recommended. Furnaces and windows, which should have been upgraded in combination with or after the building envelope, were often upgraded as singular actions, demonstrating the persistence of the traditional model in some households. Time-limited grants do not appear compatible with encouraging the house as a system approach; it appears that staged approaches and careful attention to the building envelope retrofits would allow these programs to promote the house as a system approach to encourage deep retrofits and achieve low-carbon housing.
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FX The authors thank the Residential Energy Efficiency Project staff and partners who supported, delivered, and managed the programs at the local level. Valuable work on related topics by graduate students and other members of the Sustainable Energy Policy group at the University of Waterloo also helped to inform thinking in this area. The Social Sciences and Humanities Research Council of Canada and Ontario Graduate Scholarship provided financial support. Any errors or omissions remain the responsibility of the authors.
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PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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PT J
AU Jia, JJ
Xu, JH
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TI Public acceptance of household energy-saving measures in Beijing: Heterogeneous preferences and policy implications
SO ENERGY POLICY
LA English
DT Article
DE Household energy consumption; Energy-saving measures; Heterogeneous preference; Residential sector; Acceptance level
ID ENVIRONMENTAL BEHAVIOR; DECOMPOSITION ANALYSIS; RESIDENTIAL BUILDINGS; CEMENT INDUSTRY; CO2 EMISSIONS; CHINA; CONSERVATION; CONSUMPTION; EFFICIENCY; INTERVENTIONS
AB Residents have different acceptance levels of household energy-saving measures and heterogeneous preferences for energy-saving attributes. Using questionnaire method, this paper studies the residents' acceptance of and preferences for 24 energy-saving measures in Beijing, China. Conjoint and variance analysis are used to examine preferences for attribute levels of energy-saving measures and the heterogeneity in preferences, respectively. The results show that energy-saving measures are relatively highly acceptable overall, while technical energy-saving measures are almost the least acceptable. The energy-saving domain (home versus transport) is the most important attribute that determines the acceptance level. Home and behavioral energy-saving measures are preferred to transport and technical energy-saving measures, respectively. For households living within the fourth Ring Road in Beijing and for

people with high environmental concern, their average acceptance levels of energy saving measures are 65% and 80% higher than those of their counterparts, respectively. Home energy-saving measures are more favored by households without elders over 60 years old, individuals with low educational level, and residents with low environmental concern, compared with their counterparts. Currently, effective policy tools targeting at behavioral energy conservation are scarce. Publicity about energy-saving measures contributes to improving residents' familiarity with these measures and environmental concern. Customized incentive policies are needed.

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TI Opportunities and challenges in energy demand reduction for Canadian residential sector: A review
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LA English
DT Review
DE Energy demand reduction; Residential sector; Energy conservation; Energy efficiency; Energy saving; Passive buildings
ID PHASE-CHANGE MATERIALS; GREENHOUSE-GAS EMISSIONS; LIFE-CYCLE ENERGY; BUILDING ENERGY; EFFICIENT APPLIANCES; SAVING TECHNOLOGIES; ELECTRICITY DEMAND; POLICY INSTRUMENTS; SIDE MANAGEMENT; THERMAL STORAGE

AB Developing energy independent and sustainable communities has gained a high level of global interest in recent times. The Federal Sustainable Development Strategy for Canada (FSDS) has defined the addressing of climate change and the shrinking of the environmental footprint as priority themes in its sustainable development approach. In the pursuit of planning net-zero to net-positive community energy systems, reducing the energy demand of the residential buildings is the first priority, particularly as the residential sector accounts for 17% of the secondary energy use in Canada. Various technical, behavioural, and policy level interventions are available for reducing residential energy consumption. In this review, demand reduction interventions have been categorised as efficiency, saving and conservation measures. The benefits, limitations and challenges present in adopting those strategies are discussed for various regions in Canada. Even though there is an advanced level of knowledge available on energy demand reduction, the scattered information needs to be brought together to develop a combined and inclusive approach for residential demand management. Collected knowledge will inform decision makers engaged in the design of residential buildings and planning of sustainable communities to identify the interventions which can be implemented in a given locality. This review aims to address the above gaps through a comprehensive review on potential energy demand reduction methods, especially for Canada. The implications of the findings to Canadian residential energy sector as a whole are discussed in the final part of the review.

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AU Ullahl, I
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TI A Prediction Mechanism of Energy Consumption in Residential Buildings
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SO ENERGIES
LA English
DT Article
DE Internet of Things; energy prediction; smart homes; Hidden Markov Model
ID ARTIFICIAL NEURAL-NETWORKS; ELECTRICAL CONSUMPTION; SYSTEM; MANAGEMENT
AB Internet of Things (IoT) is considered as one of the future disruptive technologies, which has the potential to bring positive change in human lifestyle and uplift living standards. Many IoT-based applications have been designed in various fields, e.g., security, health, education, manufacturing, transportation, etc. IoT has transformed conventional homes into Smart homes. By attaching small IoT devices to various appliances, we cannot only monitor but also control indoor environment as per user demand. Intelligent IoT devices can also be used for optimal energy utilization by operating the associated equipment only when it is needed. In this paper, we have proposed a Hidden Markov Model based algorithm to predict energy consumption in Korean residential buildings using data collected through smart meters. We have used energy consumption data collected from four multi-storied buildings located in Seoul, South Korea for model validation and results analysis. Proposed model prediction results are compared with three well-known prediction algorithms i.e., Support Vector Machine (SVM), Artificial Neural Network (ANN) and Classification and Regression Trees (CART). Comparative analysis shows that our proposed model achieves 2.96% better than ANN results in terms of root mean square error metric, 6.09% better than SVM and 9.03% better than CART results. To further establish and validate prediction results of our proposed model, we have performed temporal granularity analysis. For this purpose, we have evaluated our proposed model for hourly, daily and weekly data aggregation. Prediction accuracy in terms of root mean square error metric for hourly, daily and weekly data is 2.62, 1.54 and 0.46, respectively. This shows that our model prediction accuracy improves for coarse grain data. Higher prediction accuracy gives us confidence to further explore its application in building control systems for achieving better energy efficiency.
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AF Bertone, Edoardo
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TI Role of financial mechanisms for accelerating the rate of water and energy efficiency retrofits in Australian public buildings: Hybrid Bayesian Network and System Dynamics modelling approach
SO APPLIED ENERGY
LA English
DT Article
DE Bayesian Networks; Building retrofitting; Green buildings; System Dynamics; Water-energy nexus
ID CONDITIONED OFFICE BUILDINGS; UNCERTAINTY; CONSUMPTION; BENEFITS; STORAGE
AB In Australia, the government spending on public buildings' energy and water consumption is considerable; however the building energy and water retrofit market potential has been diminished by a number of barriers, especially financial. In contrast, in other advanced economies there are several reported financing strategies that have been shown to accelerate retrofit projects implementation. In this study, a coupled Bayesian Network System Dynamics model was developed with the core aim to assess the likely influence of those novel financing options and procurement procedures on public building retrofit outcomes scenarios in the Australian context. A particular case-study focusing on Australian public hospitals was showcased as an example in this paper. Stakeholder engagement was utilised to estimate likely preferences and to conceptualise causal relationships of model parameters. The scenario modelling showed that a revolving loan fund supporting an energy performance contracting procurement procedure was preferred. Subsequently, the specific features of this preferred framework were optimised to yield the greatest number of viable retrofit projects over the long term. The results indicated that such a financing scheme would lead to substantial abatement of energy and water consumption, as well as carbon emissions. The strategic scenario analysis approach developed herein provides evidence-based support to policy-makers advocating novel financing and procurement models for addressing a government's sustainability agenda in a financially responsible and net-positive manner.
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FU Sustainable Built Environment National Research Centre (SBEnrc) based in Australia; Queensland Government (Department of Housing and Public Works); Western Australian Government (Department of Commerce, Building Commission, Sustainable Building and Department of Finance); Aurecon; Swinburne University; Griffith University; Curtin University
FX This research project was supported by the Sustainable Built Environment National Research Centre (SBEnrc) based in Australia. The collaborative industry partners to the project include the Queensland Government (Department of Housing and Public Works), Western Australian Government (Department of Commerce, Building Commission, Sustainable Building and Department of Finance), and Aurecon. Research partners include Swinburne University, Griffith University and Curtin University. We are grateful for the support provided for this project.
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AB Building operations account for the largest proportion of energy use throughout the building life cycle. The energy saving potential is considerable taking into account the existence of a wide variety of building operation deficiencies. The advancement in information technologies has made modern buildings to be not only energy-intensive, but also information-intensive. Massive amounts of building operational data, which are in essence the reflection of actual building operating conditions, are available for knowledge discovery. It is very promising to extract potentially useful insights from big building operational data, based on which actionable measures for energy efficiency enhancement are devised.
Data mining is an advanced technology for analyzing big data. It consists of two main types of data analytics, i.e., supervised and unsupervised analytics. Despite of the power of supervised analytics in predictive modeling, unsupervised analytics are more practical and promising in discovering novel knowledge given limited prior knowledge. This paper provides a comprehensive review on the current utilization of unsupervised data analytics in mining massive building operational data. The commonly used unsupervised analytics are summarized according to their knowledge representations and applications. The challenges and opportunities are elaborated as guidance for future research in this multi-disciplinary field.
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AB The design of sustainable constructions also resilient to climate change has become a challenging issue given the increasing greenhouse emissions rate imputable to the built environment in urban areas. In this context, dynamic simulation models represent a suitable tool to support the design from very preliminary phases, since they allow an accurate prediction of the constructions requirements, their environmental performance, and indoor comfort conditions for their occupants. Therefore, starting from specific inputs, that is, weather conditions, construction technologies, materials, energy systems, operation settings, occupancy, and so forth, it is possible to estimate the realistic building energy performance. Moreover, the calibration procedures allow making the model even more representative of the field conditions of a construction. Given the massive progress carried out by the scientific community during the last decades, this paper presents a comprehensive review of the different building dynamic simulation approaches and available tools. While previous review studies focused on single separated aspects of dynamic simulations approaches, that is, calibration methods, software, simulation of single building energy systems, the aim of the present review is to propose a more holistic approach by investigating the recent scientific progress in simulating realistic dense urban environments. In this view, the review focus bridges the gap between the simulation at single-building level and simulation at the increasingly important neighborhood scale by showing the multiple benefits deriving from using dynamic simulation tools at district level, for a more reliable investigation of building performance in their urban context, where more than 50% of the global population worldwide currently lives. (C) 2017 Wiley Periodicals, Inc.
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TI Behavioural modification framework to address wastage in household electricity consumption
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DT Article
DE Responsible consumption; electricity wastage; change of mindset; behaviouralmodification framework
ID REPERTORY GRID TECHNIQUE; ENERGY-CONSERVATION; VALUE ORIENTATIONS; SYSTEMS-APPROACH; SAVING BEHAVIOR; ERGONOMICS; MANAGEMENT; PRODUCTS; STRATEGY; INTERVENTION
AB Household electricity wastage poses a sustainability issue. Ergonomic interventions that prevent wastage through technological innovations are expensive and complex, making consumers unwilling to adopt them. The study aimed to investigate the motivations and impediments in avoiding electricity wastage. Thirteen Repertory Grid interviews were conducted on household electricity users relating to the behaviour of those living with them. The key motivational themes found were altruistic and egoistic reasons while the impediments were perceived behavioural control, hedonism and self-efficacy. Based on the research findings, a behavioural modification framework was developed to encourage consumers to adopt a higher level of responsible electricity practice through the following suggested interventions - (1) reframing sustainability from future-for-others' to present-for-us', (2) clarifying responsible consumption and (3) performance feedback. The research identified the key motivations and impediments of being a responsible household electricity user and provided a framework to encourage a higher responsibility level.Practitioner Summary: Household electricity wastage poses sustainability issue: excess CO2 & high costs. We developed a mindset changing behavioural modification framework. We investigated HFE issues: motivations & impediments of avoiding the wastage, i.e. altruistic, egoistic, behavioural control, hedonism & self-efficacy. The framework provides governments insights into strategies to address the wastage.
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AF Eon, Christine
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TI Influencing energy and water use within a home system of practice
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Home system of practice; Monitoring; behaviour; Energy efficiency; Water efficiency; Routines
ID RESIDENTIAL BUILDINGS; MULTIPLE-REGRESSION; NEURAL-NETWORKS; CONSUMPTION; BEHAVIOR; FEEDBACK; DEMAND; DESIGN; TERM; CONSERVATION
AB Approaches that attempt to influence resource use in the home often consider the building system alone, without due consideration of occupants and their practices. However, occupants interact with technology and ultimately affect energy and water metabolism in the home. This research used an explanatory design mixed method approach to investigate the energy and water use in eight homes over a two-year period, before and after an intervention based on persuasive behaviour change. Each home was considered as a system of practice and results were analysed in terms of overall resource reduction, changes in practice and changes made to the building systems. It was revealed that five of the homes succeeded in reducing their resource use through the two years. Most changes were achieved through affecting technology as an element of practice. Automation was shown to enable the dis-interlocking of practices from aligned and

interlocked routines and can be considered an effective solution to influence resource use in the home. (C) 2017 Elsevier B.V. All rights reserved.
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PT J
AU Fuentes, E
Arce, L
Salom, J
AF Fuentes, E.
Arce, L.
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TI A review of domestic hot water consumption profiles for application in systems and buildings energy performance analysis

SO RENEWABLE & SUSTAINABLE ENERGY REVIEWS
LA English
DT Review
DE Domestic hot water; User behaviour; Energy efficiency
ID SOLAR THERMAL-SYSTEMS; HEATING-SYSTEM; MANAGEMENT; RESOLUTION; MODEL; CONSERVATION; ELECTRICITY; COLLECTORS; PATTERNS; SCHOOLS
AB Domestic hot water usage (DHW) accounts for a significant share of energy consumption in different types of buildings. Achieving a detailed characterization of domestic hot water usage profiles is of great relevance, as this information will allow for a more reliable assessment of the energy efficiency of systems and buildings. A deeper knowledge of the features of demand profiles will allow for the design of innovative control strategies based on consumption patterns. In this study, the authors review recent works on hot water consumption profiles in different types of buildings and then synthesize available information for the accurate estimation of the energy consumption resulting from DHW use. Water draw-off consumption patterns specified in national and international technical standards are reviewed and influential parameters on water consumption are identified, including climatic conditions, seasonality, building type and socio-economic factors. State-of-the-art modelling tools for generating DHW usage profiles are summarised and new research lines are then proposed, taking into account the caveats in the current characterization and modelling of DHW consumption in buildings.
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FX The authors acknowledge the BEE Group of CIMNE for their collaboration through the project BECA (Balanced European Conservation Approach), Grant Agreement number: 270981, partially funded under the ICT Policy Support Programme (ICT PSP) as part of the Competitiveness and Innovation Framework Programme by the European Community.
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NR 134
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TI A global analysis of residential heating and cooling service demand and cost-effective energy consumption under different climate change scenarios up to 2050
SO MITIGATION AND ADAPTATION STRATEGIES FOR GLOBAL CHANGE
LA English
DT Article
DE Residential energy service demand; Space heating; Space cooling; Water heating; Heating and cooling degree days; Climate change feedback; Global energy assessment model
ID SECTOR; MODEL
AB Climate change and energy service demand exert influence on each other through temperature change and greenhouse gas emissions. We have consistently evaluated global residential thermal demand and energy consumption up to the year 2050 under different climate change scenarios. We first constructed energy service demand intensity (energy service demand per household) functions for each of three services (space heating, space cooling, and water heating). The space heating and cooling demand in 2050 in the world as a whole become 2.1-2.3 and 3.8-4.5 times higher than the figures for 2010, whose ranges are originated from different global warming scenarios. Cost-effective residential energy consumption to satisfy service demand until 2050 was analyzed keeping consistency among different socio-economic conditions, ambient temperature, and carbon dioxide (CO2) emission pathways using a global energy assessment model. Building shell improvement and fuel fuel-type transition reduce global final energy consumption for residential thermal heating by 30% in 2050 for a 2 degrees C target scenario. This study demonstrates that climate change affects residential space heating and cooling demand by regions, and their desirable strategies for cost-effective energy consumption depend on the global perspectives on CO2 emission reduction. Building shell improvement and energy efficiency improvement and fuel fuel-type transition of end-use technologies are considered to be robust measures for residential thermal demand under uncertain future CO2 emission pathways.
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NR 33
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Z9 0
U1 7
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PI DORDRECHT
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AU Guo, F
Akenji, L
Schroeder, P
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AF Guo, Fei
Akenji, Lewis
Schroeder, Patrick
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TI Static analysis of technical and economic energy-saving potential in the residential sector of Xiamen city
SO ENERGY
LA English
DT Article
DE Technical potential; Economic potential; Energy savings; Household energy consumption; Levelised cost of conserved energy; Residential buildings
ID BUILDINGS; CHINA; MODEL; EFFICIENCY; HEAT
AB Based on a household energy use survey, this paper explores the technical and economic potential of residential energy savings in a Chinese city, Xiamen. The survey adopted a similar questionnaire used by the U.S. EIA's Residential Energy Consumption Survey (RECS), covering the end-uses of cooking, water heating, plug-in appliances, lighting and space cooling. The analysis shows that the technical potential of energy savings in Xiamen's residential buildings is significant, around 20%. Of the technical potential, about two-thirds to four-fifths are cost-effective from a whole society perspective. The cost-effectiveness was evaluated by comparing the Levelised Cost of Conserved Energy (LCOCE) of advanced technical measures with the actual cost of conserved energy. The actual cost of energy is defined by adding the carbon emission cost and hidden government subsidies over the retail prices of energy. About three-quarters of the technical energy-saving potential in Xiamen come from adopting efficient household appliances, therefore, further tightening the energy efficiency standards for key household appliances and promoting wide diffusion of efficient models of appliances by various effective financial incentives are essential for achieving residential energy savings in China's "Hot Summer and Warm Winter" region where Xiamen locates. (C) 2017 Elsevier Ltd. All rights reserved.
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PT J
AU Knowles, HS
Hostetler, ME
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AF Knowles, Hal S., III
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TI Describing the dynamics, distributions, and multiscale relationships in the time evolution of residential building energy consumption
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Fractal dimension; Electricity smart meter; Complex systems; Building performance; Nonlinear dynamics; Probability density function
ID PHYSIOLOGY; BEHAVIOR; SYSTEMS; MARKET; COMPLEXITY; DISEASE
AB Residential buildings may be described as complex social-technological systems. expressing component interdependence and chaotic temporal variability. As such, we characterized the dynamics and multiscale relationships of hourly electricity consumption data for 13 occupied Florida houses from calendar year 2013. Statistical approaches included: (1) exploratory data analyses with distribution-based descriptive statistics; (2) normality testing; (3) spectral and monofractal analyses; (4) multifractal detrended fluctuation analyses (MFDFA) with surrogate testing; and (5) Ward's minimum variance method for hierarchical agglomerative clustering. Results suggested the energy-use patterns were non-normal, nonlinear, and exhibited predominantly anti -persistent fractal complexities. Thus, classical descriptive statistics presuming Gaussian probability density function (PDF) distributions neither well fit, nor well described, the data and their interdependent characteristics. Notably, clusters of comparable houses were categorically and statistically different when using descriptors based on normality (e.g., mean, variance, skewness, kurtosis) versus those based on fractality (e.g., Hurst exponent, multifractal spectrum width). We believe MFDFA statistical outputs may serve as novel indicators of residential building dynamics as they better characterize the complex, nonlinear asset and occupancy interactions and they require no assumptions regarding the PDF distribution shape. We offer guidance on the data management, transformation, parameterization, and interpretation processes necessary to apply MFDFA to whole-house, short-interval, electricity consumption time series data. Multifractal quantification of building performance time series data may be useful on multiple fronts: (1) detecting under-performing households; (2) improving segmentation, targeting, and pre/post analyses of energy efficiency interventions; (3) diagnosing building system failure risks; and (4) improving smart grid supply and load balancing. (C) 2017 Elsevier B.V. All rights reserved.
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AU Zhang, LM
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AF Zhang, Limao
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TI Valuation of energy efficient certificates in buildings
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy efficient labels; Valuation; Housing market; Atlanta; Hedonic pricing method; EarthCraft
ID HOUSING-MARKET; CONSUMPTION; AUSTRALIA; STANDARDS; QUALITY; PRICES; REGION; LABELS; CITY
AB Building energy efficiency labeling programs are promising strategies to encourage investments in green buildings. It is necessary to explicitly measure the value of energy efficient labels from an economic perspective that is more understandable to both developers and buyers. This research not only documents evidence on whether a sales premium exists for energy-certified homes but also investigates the effects Of market characteristics on the magnitude of the added value of building energy efficiency labeling programs. A hedonic pricing model of 1679 single-family home sales in the metropolitan Atlanta area in the U.S. is developed, with numerous explanatory variables (such as location, time of sale, green features, and other housing characteristics) taken into account. Results indicate that: (i) Homes that earn energy certificates demonstrate a sales price premium of 11.7%, which equates to a dollar value of over $47,000 in Atlanta's housing market; (ii) The regional energy labels certificated by the EarthCraft House receives higher recognition in the marketplace than that by national Energy Star programs. (iii) The certified homes that are located in the top school districts (i.e., with the top 50 schools) enjoy a substantially higher increase in the home sales premium, compared to green homes in districts with the low-quality schools. A random sampling method is further used to ensure the quality of the regression results with the limited size of the dataset by eliminating stochastic effects of the selected dataset. This research contributes to (i) the body of knowledge by analyzing the market value of building energy efficiency labels in the residential housing market and (ii) the state of practice by shedding light on the information asymmetry problem between home developers and buyers in the housing market to facilitate the adoption of energy labels in building products.

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PT J
AU Park, ES
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TI Consumer Acceptance Analysis of the Home Energy Management System
SO SUSTAINABILITY
LA English
DT Article
DE Home Energy Management System; Technology Acceptance Model; Partial Least Squares-Structural Equation Modeling
ID INFORMATION-TECHNOLOGY USAGE; USER ACCEPTANCE; ELECTRICITY CONSERVATION; PERCEIVED USEFULNESS; MODEL; BEHAVIOR; ADOPTION; BELIEFS; EASE
AB The purpose of this paper is to study consumer acceptance of the Home Energy Management System, which is the next generation electronic management system that the Korean government plans to implement in households. The Home Energy Management System is a critical device in maximizing the efficiency of electric energy consumption for each household by using a smart grid. Because it can visualize

real-time price information on the electricity, households can easily monitor and control the amount of electricity consumption. With this feature, the Home Energy Management System can contribute to consumers' total energy savings. This is a major reason why the Korean government wishes to implement it nationwide. Since the Home Energy Management System is a product that applies new technology that has not yet been directly encountered by consumers, there may be a difference in the level of public perception of the Home Energy Management System. Therefore, the impact of consumers' awareness of the Home Energy Management System on their intention to use is important. To do this, the Technology Acceptance Model is utilized in this study. Traditional research on the Technology Acceptance Model includes awareness of usefulness and ease of use as well as intention to use. In contrast, in this research, an extended Technology Acceptance Model with four additional factorseconomic benefit, social contribution, environmental responsibility, and innovativenessthat may affect the consumer's awareness of usefulness and ease of use, is proposed. To collect the data, the survey was conducted with 287 respondents. As a result, the proposed model proved to be suitable in explaining the intention to use with a 70.3% explanation power. It is found that economic benefit (0.231) and innovativeness (0.259) impact on usefulness of the Home Energy Management System. Moreover, usefulness (0.551) has a bigger effect on intention to use than ease of use (0.338) does. Based on this, it is desirable for the Korean government to pursue a public relations strategy that emphasizes the economic benefits, social contributions, and environmental responsibility that will be gained when introducing the Home Energy Management System. It is effective to focus on consumers who are inclined to accept innovation. In addition, more effective results can be obtained by referring to the usefulness of the Home Energy Management System rather than referring to ease of use.

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PU MDPI AG
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PA ST ALBAN-ANLAGE 66, CH-4052 BASEL, SWITZERLAND
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J9 SUSTAINABILITY-BASEL
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Environmental Sciences; Environmental Studies
SC Science & Technology - Other Topics; Environmental Sciences & Ecology
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PT J
AU Semprini, G
Gulli, R
Ferrante, A
AF Semprini, Giovanni
Gulli, Riccardo
Ferrante, Annarita
TI Deep regeneration vs shallow renovation to achieve nearly Zero Energy in existing buildings Energy saving and economic impact of design solutions in the housing stock of Bologna
SO ENERGY AND BUILDINGS
LA English

DT Article
DE nZEBs -; Nearly zero energy buildings; Deep renovation; Energy retrofitting; Urban environment; Social housing
ID MEDITERRANEAN CLIMATE; METHODOLOGY; RETROFITS
AB Whilst new nearly Zero Energy (nZE) concepts have been the first priority in the previous decade, in more recent years it has become widely acknowledged that renovating dwellings will have a large impact on the energy use in buildings. Using a simplified calculation method, this paper illustrates the high-energy consumption in several building types within the housing stock in Bologna. Among these, a specific building has been selected as the worst-case for an in-depth investigation. For this building the paper analyses a large set of possible scenarios for renovation-from the more standard operations up to higher levels of facade components' transformation- as technically feasible solutions to achieve a nearly Zero Energy Building (nZEB).

By discussing the economic/energy impact of each scenario, this paper aims at contributing to the debate on deep-versus-shallow renovation in existing buildings. In particular, it attempts at answering the following important research issues: whether the technical feasibility is associated to the economic feasibility in the retrofitting towards nZEBs; to what extent deep renovation and high transformation of buildings is competitive with respect to shallow retrofit; whether non-energy related factors can be considered to properly assess the economic competitiveness.

Energy and economic benefits are the main renovation's objectives in building renovation; nonetheless, non-energy related aspects are also helpful to expand the feasibility of nZEBs retrofit in the current building practises.
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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Simanaviciene, Z
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Simanavicius, A
AF Simanaviciene, Zaneta
Dirma, Virgilijus
Simanavicius, Arturas
TI Psychological factors influence on energy efficiency in households
SO OECONOMIA COPERNICANA
LA English
DT Article
DE psychological factors; efficient use of electricity; households
ID LITHUANIA
AB Research background: Most of the studies and their authors focus on the social and economic impacts of energy-saving behavior. However, they do not focus on the psychological factors affecting the efficiency of energy consumption in households. Lithuania has a lack of a unified and justified opinion on psychological factors that affect the energy efficiency of households.

Purpose of the article: The main objective of the article is to identify the psychological factors that influence energy efficiency in households and to identify the appropriate measures to change the individual's energy consumption behavior.

Methods: The article was based on analysis of scientific literature and expert evaluation, when experts selected the most influencing psychological factors. Expert valuation allowed to set the right conditions in which individuals are more easily assimilated by means of energy saving.

Findings: In most cases, economic and technological factors significantly influence household energy consumption. Increased energy-efficient equipment production and supply is causing an energy consumption growth in households, because they are more inclined to buy and use more efficient electrical equipment. An investigation has showed that the energy consumption is strongly influenced by some cultural and psychological factors: with greater public openness to innovation, the households tend to use energy more efficiently. Also, some psychological indicators have significant impact on energy consumption has - frequently the more pronounced neuroticism or extraversion rate. Since the research was performed only in Lithuania, in the future it will seek to carry out an investigation in several countries

and to compare a various factors on the proposed measures and the efficiency of household energy consumption.

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PI TORUN
PA JURIJA GAGARINA 11, TORUN, 87-100, POLAND
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J9 OECON COPERNIC
JI Oecon. Copernic.
PD DEC
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WC Economics
SC Business & Economics
GA FT7IW
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OA gold
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FN Clarivate Analytics Web of Science
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PT J
AU Faia, R
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Manuel Corchado, Juan
TI Case based reasoning with expert system and swarm intelligence to determine energy reduction in buildings energy management
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Artificial intelligence; Case based reasoning; Demand response; Energy efficiency; Intelligent house energy management
ID ENVIRONMENT; PREDICTION; RETRIEVAL; FRAMEWORK; REUSE
AB This paper proposes a novel Case Based Reasoning (CBR) application for intelligent management of energy resources in residential buildings. The proposed CBR approach enables analyzing the history of previous cases of energy reduction in buildings, and using them to provide a suggestion on the ideal level of energy reduction that should be applied in the consumption of houses. The innovations of the proposed CBR model are the application of the k-Nearest Neighbors algorithm (k-NN) clustering algorithm to identify similar past cases, the adaptation of Particle Swarm Optimization (PSO) meta-heuristic optimization method to optimize the choice of the variables that characterize each case, and the development of expert systems to adapt and refine the final solution. A case study is presented, which considers a knowledge base containing a set of scenarios obtained from the consumption of a residential building. In order to provide a response for a new case, the proposed CBR application selects the most

similar cases and elaborates a response, which is provided to the SCADA House Intelligent Management (SHIM) system as input data. SHIM uses this specification to determine the loads that should be reduced in order to fulfill the reduction suggested by the CBR approach. Results show that the proposed approach is capable of suggesting the most adequate levels of reduction for the considered house, without compromising the comfort of the users. (C) 2017 Elsevier B.V. All rights reserved.

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SC Construction & Building Technology; Energy & Fuels; Engineering
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PT J
AU Ahn, J
Cho, S
AF Ahn, Jonghoon
Cho, Soolyeon
TI Development of an intelligent building controller to mitigate indoor thermal dissatisfaction and peak energy demands in a district heating system
SO BUILDING AND ENVIRONMENT
LA English
DT Article
DE Intelligent building control; Energy savings; Indoor thermal environment; Peak demands; Temperature prediction; District heating system
ID CONTROL STRATEGIES; FUZZY CONTROL; HVAC SYSTEMS; ENVIRONMENT; PERFORMANCE
AB District heating systems were gradually improved with the development of generation, storage, distribution technologies, and the demands continued to expand significantly. The percentage of houses supplied by district heating systems were fast grown up, and it was reported that the global market for the systems would expand by about 6% in the period between 2016 and 2024.

However, most studies for district heating models focused on fuel use in plants, energy distribution, and carbon reduction. Many simulations adopting computing technologies dealt with mechanical performances in the systems. Also, recent statistical analyses overlooked zone-scaled thermal comfort directly affecting users' workability in buildings.

This research proposes an intelligent controller to improve thermal comfort and reduce peak energy demands in a district heating system. An artificial intelligence based model with temperature and thermal comfort detectors optimizes supply air conditions to maintain desired room temperature responding to users' characteristics in four different building types. The model reduces peak demands for cooling and

heating to optimize plant and distribution capacity. Comparative analyses describe the model's effectiveness that it improves thermal comfort level by 27%, and that it reduces peak energy demands by 30% in comparison with a conventional on/off controller. The model has an advantage that it properly responds to temperature changes with high performance to mitigate thermal dissatisfaction and energy loss. In spite of the sensitive controls to ensure human comfort, it is confirmed that the model can contribute to design optimization for energy supply systems in urban scaled models. (C) 2017 Elsevier Ltd. All rights reserved.

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NR 50
TC 0
Z9 0
U1 9
U2 9
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
SN 0360-1323
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J9 BUILD ENVIRON
JI Build. Environ.
PD NOV 1
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VL 124
BP 57
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DI 10.1016/j.buildenv.2017.07.040
PG 12
WC Construction & Building Technology; Engineering, Environmental; Engineering, Civil
SC Construction & Building Technology; Engineering
GA FI8KV
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PT J
AU Bariss, U
Bazbauers, G
Blumberga, A
Blumberga, D
AF Bariss, Uldis
Bazbauers, Gatis
Blumberga, Andra
Blumberga, Dagnija
TI System Dynamics Modeling of Households' Electricity Consumption and Cost-Income Ratio: a Case Study of Latvia
SO ENVIRONMENTAL AND CLIMATE TECHNOLOGIES
LA English
DT Article
DE Consumer behavior; electricity; energy efficiency; households; system dynamics
ID BEHAVIOR; TRANSITIONS
AB Increased energy efficiency of the building sector is high on the list of priorities for energy policy since better energy efficiency would help to reduce impact on climate change and increase security of energy supply. One aim of the present study was to find a relative effect of growth of demand for energy services due to changes in income, energy consumption per unit of demand due to technological development, changes in electricity price and household income on household electricity consumption in Latvia. The method applied included system dynamics modeling and data from a household survey regarding the relationship between electricity saving activities and the electricity cost-income ratio. The results revealed that, in direct contrast to the expected, a potential reduction of the electricity consumption is rather insensitive to electricity price and electricity cost-income ratio, and that the efficiency of technologies could be the main drivers for future electricity savings. The results suggest that support to advancement of technologies and faster replacement of inefficient ones rather than influencing the energy price could be

effective energy policy measures. The model, developed in the study could be used in similar assessments in other countries.

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FX This study was supported by Latvia's National Research Program's project "Latenergi." The authors would also like to thank Mr. Toms Prodanuks for handling the household survey data and Ms. Lelde Timma for help in the review of information sources.

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PU DE GRUYTER OPEN LTD
PI WARSAW
PA BOGUMILA ZUGA 32A ST, 01-811 WARSAW, POLAND
SN 1691-5208
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J9 ENVIRON CLIM TECHNOL
JI Environ. Clim. Technol.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY

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UT WOS:000417192900003
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PT J
AU Cohen, R
Austin, B
Bannister, P
Bordass, B
Bunn, R
AF Cohen, Robert
Austin, Barry
Bannister, Paul
Bordass, Bill
Bunn, Roderic
TI How the commitment to disclose in-use performance can transform energy outcomes for new buildings
SO BUILDING SERVICES ENGINEERING RESEARCH & TECHNOLOGY
LA English
DT Article
DE Design for performance; base building; Commitment Agreement; energy performance; energy rating; energy performance disclosure
AB The paper describes the transformation that has taken place over the last 15 years in the energy efficiency of new office buildings constructed in Australia and considers if and how the UK could follow suit. The success in Australia has been greatest for the base building': the energy performance of the HVAC services in tenanted spaces and of all end uses in the common parts. It embraces a design for performance' culture, supported by the NABERS Commitment Agreement', where developers and their teams sign up to an in-use performance target. The process is underpinned by advanced simulation, strategic sub-metering and fine-tuning post occupation to help eliminate wasteful deviations. The paper considers the opportunity for the UK to introduce a Commitment Agreement process for new office buildings, integrated with the Soft Landings Framework. It is argued that from a technical perspective base building energy performance in new UK offices could be as good as it is in Australia. However, there are non-technical drivers missing in the UK. To compete with their Australian peers, the UK property and construction industries need a base building energy measurement and rating system, creating the ability to set a performance target and disclose the outcome.Practical application: Design for performance uses a much more realistic building simulation model at the design stage. Although this requires a lot more inputs (details of the building's proposed chillers, AHUs, ducts and valves, etc. and their controls), it enables the designers to capitalise from computer-aided-design to improve energy efficiency. This process deploys the technology improvement template by which much of the modern world has progressed so fast, and enables innovation to flourish. The more advanced HVAC model can predict target energy budgets for each sub-system (boilers, chillers, fans, pumps, etc.) against which the actual energy used, as measured with sub-meters, can be compared to inform fine tuning during early operation. Although a model's predictions can be considered the ideal energy performance of the as-built system, there's an expectation that the base building's real performance should turn out to be within around 10% of that anticipated from the modelling.
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U1 1
U2 1
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J9 BUILD SERV ENG RES T
JI Build Serv. Eng. Res. Technol.
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PT J
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Hu, B
Sun, YJ
Li, AB
Li, J
Zhang, GQ
AF Yu, Zhun (Jerry)
Hu, Bin
Sun, Yongjun
Li, Anbang
Li, Jun
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TI Standby energy use and saving potentials associated with occupant behavior of chinese rural homes
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Standby energy use; Occupant behavior; Data mining; Energy-saving potential; Household appliance
ID POWER

AB A deep understanding of household appliance standby energy use (SEU) and associated saving potentials in Chinese rural areas is vitally important due to the huge amounts of households and appliances. However, to date, few study has been conducted and very little is known about the SEU. Meanwhile, existing methods of estimating such saving potentials have two limitations. Firstly, they primarily evaluated it through upgrading appliances while a more practical way of improving behavior should also be considered. Secondly, they do not take the impact of its influential factors into account simultaneously, and tend to significantly decrease the estimation accuracy. To address the above issues, an investigation on the appliance SEU and its influential factors in Chinese rural homes was first conducted. Then, a data mining-based method for estimating the saving potentials was proposed, and improving occupant behavior pertaining to SEU was also considered in the estimation. The method was further applied under three typical scenarios: appliance upgrades, behavior change and the combination of both. In addition, barriers to promote standby energy reductions have been analyzed and corresponding recommendations have been made. Main contributions of this study include: (1) providing SEU of Chinese rural homes and estimating saving potentials caused by various ways including behavior change and, (2) a new method of estimating energy-saving potentials with improved accuracy.

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FU Early Career Scheme [CityU 21207915]; Natural Science Foundation of China [51408205]; Fundamental Research Funds for the Central Universities
FX The research work presented in this paper is jointly supported by the Early Career Scheme (CityU 21207915), the Natural Science Foundation of China (Project No. 51408205) and the Fundamental Research Funds for the Central Universities.

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NR 19
TC 0
Z9 0
U1 6
U2 6
PU ELSEVIER SCIENCE SA
PI LAUSANNE
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JI Energy Build.
PD NOV 1
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WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA FK6IN
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PT J
AU Patrao, C
de Almeida, AT
Harrison, B
Schlomann, B
Damnics, M
Fonseca, P
AF Patrao, Carlos
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Harrison, Bob
Schlomann, Barbara
Damnics, Melissa
Fonseca, Paula
TI Low power mode energy demand of household appliances-SELINA and APP projects
SO ENERGY EFFICIENCY
LA English
DT Review
DE Standby power; Network standby; Low power mode; Electronic appliances; Entertainment appliances; Information and communication technology; Energy efficiency; Internet of Things
ID ELECTRICITY CONSUMPTION; POTENTIALS
AB In the last decades, it has been recognized that energy consumption in low power modes for electrical and electronic products is an important issue. There is a need to expand energy efficiency efforts beyond simple standby modes into the new more complex area of networks, thus tackling the new paradigm of living based on the Internet of Things. The European project SELINA carried out a large scale in store monitoring campaign, measuring about 6300 different equipment. Since then, there is no reference to other similar market surveillance studies being carried out in Europe. In Asia, a market surveillance campaign performed by the Asia Pacific Partnership with measurements on a regular basis has been very successful. SELINA results show that 18.5% of the measured products present power values higher than the 2010 EC 1275/2008 regulation threshold in off-mode, and for standby this value reached 31%. When a comparison is made with the 2013 EC 1275/2008 regulation threshold, these values increase twice. The Asia Pacific Partnership results alert policy makers that low passive standby does not guarantee low active standby. Several studies indicate that consumer electronic products are becoming more efficient and their energy consumption is decreasing. However, because the ownership of appliances is also increasing, these improvements in energy efficiency do not seem to have significant impact in the overall consumption of the households. In addition, there is evidence that not all appliances in the market reach the performance announced by the manufacturers. Recent measurements carried out by the Natural Resources Defense Council on flat screen TVs revealed that their real energy consumption seems to be higher than announced in the label. This shows the urgent need for measurement campaigns, since no market surveillance is being carried out on regular basis, and trusting the manufacturer's data seems to be unreliable.
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FU European Union
FX The SELINA Project was co-financed by the Intelligent Energy Europe Programme of the European Union.
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Z9 0
U1 3
U2 4
PU SPRINGER
PI DORDRECHT
PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
SN 1570-646X
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J9 ENERG EFFIC
JI Energy Effic.
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Environmental Studies
SC Science & Technology - Other Topics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Timma, L
Bazbauers, G
Bariss, U
Blumberga, A
Blumberga, D
AF Timma, Lelde
Bazbauers, Gatis
Bariss, Uldis
Blumberga, Andra
Blumberga, Dagnija
TI Energy efficiency policy analysis using socio-technical approach and system dynamics. Case study of lighting in Latvia's households
SO ENERGY POLICY
LA English
DT Article
DE System dynamics; Modelling; Lighting sector; Energy efficiency; Consumer behaviour
ID MODEL; TRANSITIONS; SECTOR
AB Worldwide the lighting sector demands around 1/5 of total electricity used. While the diffusion of new lighting technologies occurs quickly and prices for these technologies drop, at the same time around 1/3 of households in developed European countries continue to choose incandescent light bulbs. This phenomena shows a large potential for saving electricity. Therefore, the aim of our research is to model the diffusion of innovation for energy efficiency solutions in households in Latvia. The methodology combines an empirical study with system dynamics modelling. The model showed that electricity consumption in households decreased by 14% from the year 2015 until the year 2040. The sensitivity analysis shows that changes in the parameters used in this analysis caused expected behaviour, where the uncertainly in electricity consumption in households accounted for +/- 16% in the year 2040. Although this developed system dynamics model was based on a specific process of diffusion of innovation, its general application to other products and services is possible, since the developed model serves as a white-box. The structure of the model can be used for other studies; the model can be enhanced with the newest results or adapted for other case studies.
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FU National Research Program
FX The work has been supported by National Research Program "Energy efficient and low-carbon solutions for a secure, sustainable and climate variability reducing energy supply (LATENERGI)".
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Z9 0
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND
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J9 ENERG POLICY
JI Energy Policy
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PG 10
WC Economics; Energy & Fuels; Environmental Sciences; Environmental Studies
SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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DA 2018-05-03
ER

PT J
AU Al-Hinti, I
Al-Sallami, H
AF Al-Hinti, I.
Al-Sallami, H.
TI Potentials and Barriers of Energy Saving in Jordan's Residential Sector through Thermal Insulation
SO JORDAN JOURNAL OF MECHANICAL AND INDUSTRIAL ENGINEERING
LA English
DT Article
DE Thermal insulation; building codes; residential buildings; energy saving
ID CONSUMPTION; IMPACT

AB The residential sector in Jordan accounts for 21% of final energy consumption and 43% of total electricity consumption. More than 60 % of energy consumed in households is used for space heating and cooling. Thermal insulation of building is a decisive factor in reducing residential heating and cooling energy needs. Although thermal insulation codes have been adopted since the early eighties, enforcement of these codes has been limited. This resulted in sporadic implementation of thermal insulation in residential buildings that varies according to the ownership type, income and education levels. This paper presents an analysis of potential energy savings that can be achieved through retrofitting Jordanian households to comply with the existing thermal insulation codes. In addition, the legal, social, economic, and technical barriers of the use of thermal insulation are discussed in an attempt to bring a better understanding of how the projected savings can be assured. (C) 2017 Jordan Journal of Mechanical and Industrial Engineering. All rights reserved

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NR 17
TC 0
Z9 0
U1 0
U2 0
PU HASHEMITE UNIV
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PA DEANSHIP ACAD RES & GRADUATE STUD, PO BOX 330127, ZARKA, PC 13133, JORDAN
SN 1995-6665
J9 JORDAN J MECH IND EN
JI Jordan J. Mech. Ind. Eng.
PD SEP
PY 2017
VL 11
IS 3
BP 141
EP 145
PG 5
WC Engineering, Mechanical
SC Engineering
GA GB0KC
UT WOS:000428733700001
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ER

PT J
AU Radpour, S
Mondal, MAH
Kumar, A
AF Radpour, Saeidreza
Mondal, Md Alam Hossain
Kumar, Amit
TI Market penetration modeling of high energy efficiency appliances in the residential sector
SO ENERGY
LA English
DT Article
DE Market penetration; Market share; Residential appliances; Energy efficiency; Incentives
ID TRANSPORTATION SECTOR; END-USE; STANDARDS; FUEL; TECHNOLOGIES; PERFORMANCE; PROGRAM
AB The aim of this research is to model the market penetration of energy efficient appliances in the residential sector. The analysis focuses on six major appliances refrigerators, freezers, clothes washers, clothes dryers, and ranges to forecast their market penetration and market share during the years 2012 - 2050. Models were developed for each category using 22 years of historical data related to population, household income, immigration, and appliance price. These variables were selected based on the statistical tests of twelve macroeconomic variables. The market shares of high efficiency appliances were analyzed based on the related capital costs, operating costs, lifetime, and incentive. The results show that in Alberta the market penetration growth rate of dishwashers is higher than that of all other appliances, with a projected 30.52% increase between 2012 and 2050. The modeling results also indicate that the average annual energy consumption by refrigerators will decrease from 560.9 kWh in 2012 to 460.8 kWh in 2050, and this decrease indicates an annual energy efficiency improvement of 0.47%. In addition, the effect of an incentive on adopting high energy efficiency appliances and ultimately on energy efficiency improvement in Alberta is more effective for dishwashers and clothes washers. (C) 2017 Elsevier Ltd. All rights reserved.
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FU NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair Program in Energy and Environmental Systems Engineering [IRCPJ 436795 436794 - 2011]; University of Alberta
FX The authors of this paper are thankful to the NSERC/Cenovus/Alberta Innovates Associate Industrial Research Chair Program in Energy and Environmental Systems Engineering (Grant No. IRCPJ 436795 & 436794 - 2011) and the Cenovus Energy Endowed Chair Program in Environmental Engineering at the University of Alberta for financial support of this research. The authors thank Astrid Blodgett for editorial assistance.
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NR 40
TC 0
Z9 0
U1 5
U2 5
PU PERGAMON-ELSEVIER SCIENCE LTD
PI OXFORD
PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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JI Energy
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels
GA FE5YV
UT WOS:000408288100080
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ER

PT J
AU Schoch, T
AF Schoch, Torsten
TI Energy-efficient Masonry Buildings with AAC
SO CEMENT WAPNO BETON

LA English
DT Article; Proceedings Paper
CT 5th Conference of the Concrete-Producers-Association (SPB)
CY OCT 10-11, 2017
CL Serock, POLAND
SP Concrete Producers Assoc
ID HOUSE; PLUS
AB The building of houses with low energy consumption or even a negative energy balance with the massive building construction methods commonly used in Europe has been a usual and acknowledged practice for some decades. Massive building construction was a driving factor that could not be ignored in the first attempts toward low-energy houses. Monolithic external walls, which undertake the tasks both of bearing the loads and of resisting fire, and keeping noise and vapour out of the interior rooms, were particularly challenged, since they were to do without outside "assistance" in the form of insulation layers. This challenge seems greater than ever with the path to zero-energy buildings in Europe. It has been demonstrated on many "beacon" projects that even extreme requirements do not have to mean the end of monolithic construction and certainly not of massive construction, given the right building services technology. The presented building projects are only a few, more are being added daily. Nonetheless, a critical note about the developing principle seems justified. Independent of the demand to always keep an eye on the economic benefit of a measure, some developments seem suitable to change the monolithic approach in European building to a background to be fulfilled alone with insulation to facades or in constructions. The projects presented in this article should also deliver sufficient arguments to permit the existing range of technology to still act in an unrestrained manner instead of restricting it.
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NR 5
TC 0
Z9 0
U1 1
U2 1
PU STOWARZYSZENIE PRODUCENTOW CEMENTU
PI KRAKOW
PA UL LUBELSKA 29 LOK 4-5, KRAKOW, 30-003, POLAND
SN 1425-8129
J9 CEM WAPNO BETON
JI Cem. Wapno Beton
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WC Construction & Building Technology; Materials Science, Composites
SC Construction & Building Technology; Materials Science
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PT J
AU Silenzi, F
Priarone, A
Fossa, M
AF Silenzi, Federico
Priarone, Antonia
Fossa, Marco
TI Energy demand modeling and forecast of Monoblocco Building at the city hospital of Genova according to different retrofit scenarios
SO INTERNATIONAL JOURNAL OF HEAT AND TECHNOLOGY
LA English
DT Article
DE Energy Saving; Buildings; Retrofitting; Energy Plus; Dynamic Simulations
AB Buildings are one of the major energy consumers. Thus, it is crucial to develop new solutions in order to retrofit existent buildings especially for public buildings), achieving both energy saving and environmental protection. The proposed solutions are in many cases expensive and it is necessary to evaluate them case by case. The present analysis focuses on the development of a methodology useful to select and evaluate different energy retrofitting solutions and it is applied to energy simulations of the Monoblocco Pavilion at the San Martino Hospital in Genova, Italy. The model allows to evaluate the building heating and cooling loads and to predict the energy requests associated to different retrofit scenarios. The selected retrofit technologies include some innovative solutions such as facade super insulated void panel, smart rotating windows with different emissivity glass and sunlight carrying optic-fiber coupled with dimmed LED lighting system. Results have been analyzed in terms of hourly values of selected variables and the different effects related to the retrofit strategies have been compared in terms of energy saving. The comparison included also the Simple Pay Back Period SPB) of the investment in order to identify the best technologies combination also from an economic point of view.
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NR 9
TC 0
Z9 0
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PU EDIZIONI ETS
PI PISA
PA PIAZZA CARRARA 16-19, 56126 PISA, ITALY
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JI Int. J. Heat Technol.
PD SEP
PY 2017
VL 35
SI 1
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DI 10.18280/ijht.35Sp0105
PG 8
WC Thermodynamics
SC Thermodynamics
GA FP0OB
UT WOS:000417300500005
OA gold
DA 2018-05-03
ER

PT J
AU Lu, ML
Wang, ZH
AF Lu, Milin
Wang, Zhaohua
TI Rebound effects for residential electricity use in urban China: an aggregation analysis based E-I-O and scenario simulation
SO ANNALS OF OPERATIONS RESEARCH
LA English
DT Article
DE Direct rebound; Indirect rebound; Energy efficiency; Input-output model; China
ID ENERGY EFFICIENCY; EMPIRICAL-EVIDENCE; CONSUMPTION; HOUSEHOLDS; EMISSIONS; TRANSPORT; FALLACIES; BACKFIRE; POLICY; UK
AB Technological progress is considered an important means of decreasing energy consumption. However, rebound effects caused by energy efficiency improvements directly affect the realization of energy savings and emission reduction. This paper focuses on the main theory and methodology of direct and indirect rebound effects. Using 30 sets of provincial panel data and national input-output data for China from 2007, this paper builds a co-integrating equation, a panel error correction model, and an 8-sector energy-input-output model. We subsequently estimate the direct and indirect rebound effects of urban residential electricity use. The results indicate that in the long term the direct plus indirect partial rebound effect is 0.79; in the short term it is 0.78. Thus, the majority of the expected electricity reduction in Chinese urban residential energy consumption arising from efficiency improvement may be offset. These rebound effects impair the functioning of energy efficiency policies. Therefore, the Chinese government should not improve energy efficiency alone-they must also take into consideration the relevant energy-pricing reforms when formulating energy policies.
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FU National Nature Science Foundation of China [71173017, 71573016, 71521002]; State Key Development Program of Basic Research of China [2012CB95570003]
FX This study is supported by the National Nature Science Foundation of China (Reference Nos. 71173017, 71573016, 71521002) and State Key Development Program of Basic Research of China (Reference No. 2012CB95570003). The authors also want to thank Prof. Yiming Wei for his comment and suggestion.
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NR 46
TC 0
Z9 0
U1 7
U2 15
PU SPRINGER
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PA VAN GODEWIJCKSTRAAT 30, 3311 GZ DORDRECHT, NETHERLANDS
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PG 22
WC Operations Research & Management Science
SC Operations Research & Management Science
GA FB8PO
UT WOS:000406401200025
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ER

PT J
AU Marin, G
Palma, A
AF Marin, Giovanni
Palma, Alessandro
TI Technology invention and adoption in residential energy consumption A
stochastic frontier approach
SO ENERGY ECONOMICS
LA English
DT Article
DE Energy efficiency; Energy policies; Technological adoption; Electrical
appliances; Stochastic frontier analysis; Residential sector
ID ELECTRICITY CONSUMPTION; TECHNICAL INEFFICIENCY; HOME APPLIANCES;
PANEL-DATA; POLICY INSTRUMENTS; HEALTH EXPENDITURE; INDUCED INNOVATION;
CARE EXPENDITURE; ECO-INNOVATION; EFFICIENCY GAP
AB In this paper we analyse the electricity consumption of a set of four traditional 'white goods' in a panel of ten EU countries observed over the period 1995-2013 with the aim of disentangling the amount of technical efficiency from overall energy saving using a stochastic frontier approach. The efficiency trend is modelled as a function of energy efficiency policies and innovation dynamics that combines invention and adoption processes using specific patents weighted by granular production data and worldwide bilateral import flows. Our model also accounts for potential endogeneity arising when innovation processes and economic growth are considered. With this replicable approach, the stochastic frontier framework allows for explicit modelling of innovation processes. Our results show that the efficiency component is related to changes in the energy efficient technological content of appliances. The 'international' component represents a predominant share of technological advancement and exerts a significant influence on the transient efficiency. Our evidence calls for an active role to be played by policy makers in focusing on innovation and trade policies in order to achieve more ambitious energy efficiency targets.
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AU Schleich, J
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AF Schleich, Joachim
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TI Persistence of the effects of providing feedback alongside smart metering devices on household electricity demand
SO ENERGY POLICY
LA English
DT Article
DE Smart metering; Feedback; Persistence; Household electricity consumption
ID ENERGY-CONSERVATION; CONSUMPTION; INFORMATION; SAVINGS
AB Using large-sample high temporal resolution data from a smart metering field trial, we econometrically estimate the effects of providing feedback in addition to smart metering devices. We compare consumption levels and patterns between a pilot group that received feedback in addition to smart metering devices and a control group with only smart metering devices. We investigate, in particular, the persistence of the effects and whether the effects differ between periods of high and low household occupancy, i.e. between morning and evening periods, and between weekdays and weekend days. The findings show that feedback is effective, leading to about 5% electricity consumption reduction that is persistent over an eleven month period. Furthermore, our results show that this reduction affects both low and high occupancy periods, suggesting that feedback is associated with rather permanent changes in habitual behavior and/or investments in energy-efficient technologies.
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AU Medjdoub, B
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TI Impact of household transitions on domestic energy consumption and its applicability to urban energy planning
SO FRONTIERS OF ENGINEERING MANAGEMENT
LA English
DT Article
DE urban energy planning; household transitions; smart cities; energy forecasting; household projection; serious gaming
ID ELECTRICITY; PERFORMANCE; APPLIANCES; SPACE; MODEL; UK
AB The household sector consumes roughly 30% of Earth's energy resources and emits approximately 17% of its carbon dioxide. As such, developing appropriate policies to reduce the CO2 emissions, which are associated with the world's rapidly growing urban population, is a high priority. This, in turn, will enable the creation of cities that respect the natural environment and the well-being of future generations. However, most of the existing expertise focuses on enhancing the thermal quality of buildings through building physics while few studies address the social and behavioral aspects. In fact, focusing on these aspects should be more prominent, as they cause between 4% and 30% of variation in domestic energy consumption. Premised on that, the aim of this study was to investigate the effect in the context of the UK of household transitions on household energy consumption patterns. To achieve this, we applied statistical procedures (e.g., logistic regression) to official panel survey data comprising more than 5500 households in the UK tracked annually over the course of 18 years. This helped in predicting future transition patterns for different household types for the next 10 to 15 years. Furthermore, it enabled us to study the relationship between the predicted patterns and the household energy usage for both gas and electricity. The findings indicate that the life cycle transitions of a household significantly influence its domestic energy usage. However, this effect is mostly positive in direction and weak in magnitude. Finally, we present our developed urban energy model "EvoEnergy" to demonstrate the importance of incorporating such a concept in energy forecasting for effective sustainable energy decision-making.
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PA NO 4 DEWAI DAJIE, BEIJING 100120, PEOPLES R CHINA
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AU Copiello, S
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Gabrielli, Laura
TI Analysis of building energy consumption through panel data: The role played by the economic drivers
SO ENERGY AND BUILDINGS
LA English
DT Article
DE Energy consumption; Buildings; Panel data; Demand elasticity
ID RESIDENTIAL ELECTRICITY CONSUMPTION; NATURAL-GAS CONSUMPTION; CO2 EMISSIONS; DWELLING CHARACTERISTICS; EUROPEAN COUNTRIES; UNITED-STATES; DEMAND; DETERMINANTS; EFFICIENCY; OCCUPANTS
AB Policy makers have realized that without significant increases in the energy efficiency and notable reductions in the energy use of the household sector, it will be impossible to lower carbon dioxide emissions and mitigate the risks of climate change at the global level. The energy demand in residential buildings is influenced by several parameters, such as national economic growth, climate and weather, demographic structure, and technological development. In this paper, we analyze the determinants of electricity and natural gas consumptions in Italy during the period from 2004 to 2013. We provide

estimates of price and income elasticities of the demand for both the energy sources in the residential sector. The role played by both energy price and household income is worth attention because it provides evidence for the occurrence of the direct rebound effect. Therefore, the economic drivers of the energy demand are important to improve the policies meant to reduce greenhouse gas emissions and contrast the global warming. (C) 2017 Elsevier B.V. All rights reserved.

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AB Drawing on agency theory and absorptive capacity literature, this paper empirically analyzes factors of adoption and barriers to adoption of four crosscutting, ancillary energy efficiency measures (EEMs) for non-residential buildings (efficient lighting, building insulation, heating system replacement, and optimization of heating system operations). The empirical analysis employs a large representative sample of organizations in the German trade, commerce and services sector. Results from econometric analyses provide evidence for a negative effect of principal agent relationships (landlord-tenant; owner-user of energy supply equipment; parent-subsidiary) and for a positive effect of organizational attributes that contribute to absorptive capacity (energy manager in place; energy audit conducted; experience with decentralized low carbon energy). However, the significance of these effects varies by measure. For non-adopters, heterogeneity of crosscutting ancillary EEMs has little impact on the ranking of barriers to adoption. The most relevant barriers for all EEMs are rented spaces, high investment costs, and other priorities; least relevant are technical risk to production and risk to product quality. Finally, we find little evidence for differences in the factors of adoption and barriers to adoption between manufacturing and non-manufacturing organizations. These findings are robust to alternative model specifications.(C) 2017 Elsevier B.V. All rights reserved.
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AB This study provides understanding of the influence of outside temperature on intuitional buildings in an urban landscape. We derive heating and cooling degree days for each of the buildings by identifying an appropriate choice of balance point temperatures and perform multiple linear regression seasonally to characterize the temperature-electricity use relations.

Our study reveals considerable differences in temperature-electricity relationships based on building use and characteristics. In addition to outside temperature, the weekday effect has large influences on electricity consumption of buildings. Summer months have greater influence of outside temperature on electricity consumption followed by transition months and winter as an increase in one cooling degree day (CDD) increases daily electricity consumption by 0.124 kW/m2 whereas during winter, one heating degree day (HDD) increases daily electricity consumption by 0.025 kW/m2 and by 0.099 kW/m2 during transition months. We apply two kinds of models to project electricity demand for projected temperature profiles in 2030. Both cases strongly suggest higher electricity demand not just in summer months but also during transition periods in spring and fall. Overall, electricity demand increases by 0.95% under a low emission scenario (RCP 4.5) and 2.03% under a high emission scenario (RCP 8.5), which is likely to put immense pressure on the United States electric grid system and an overall increase in the energy cost by 2030.
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TI Overcoming internal barriers to industrial energy efficiency through energy audit: a case study of a large manufacturing company in the home appliances industry
SO CLEAN TECHNOLOGIES AND ENVIRONMENTAL POLICY
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DT Article
DE Energy efficiency; Energy audit; Energy efficiency barriers; Manufacturing sector
ID DATA ENVELOPMENT ANALYSIS; MEDIUM-SIZED ENTERPRISES; KEY PERFORMANCE INDICATORS; CEMENT INDUSTRY; PRODUCTIVITY; MANAGEMENT; PERSPECTIVES; DRIVERS; POLICY; POWER
AB Energy efficiency plays a key role in reducing global energy consumption, especially in the industrial sector, with an indirect positive impact on the competitiveness of industrial firms. Although a cultural shift toward recognizing the strategic importance of energy efficient and environmental friendly solutions is diffusing among industrial companies, also pushed by the evolution of local and international regulatory frameworks, strong barriers hampering the adoption of energy efficiency measures (EEMs) still exist. These barriers, and in particular those linked to behavioral issues, may be overcome by the use of a well-designed energy audit methodology. However, how energy audit can help overcome behavioral barriers to industrial energy efficiency remains an under-researched topic in literature. This paper presents and discusses a novel methodology for energy audit developed and implemented by a large manufacturing company. The methodology is built around four phases, and it pays special emphasis to the initial step of the audit, where the strongest resistance to the implementation of EEMs is typically found due to a lack of awareness and commitment which hampers the identification of needs and opportunities associated with the adoption of EEMs. The proposed methodology has been able to overcome in practice the typical behavioral barriers that affect the implementation of EEMs in the manufacturing sector and has strong applicability in other firms and industries.
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TI A review of Agent-Based Modelling of technology diffusion with special reference to residential energy efficiency
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ID MARKET DYNAMICS; CONSUMER; BEHAVIOR; SIMULATION; CONSUMPTION; EMISSIONS; SYSTEMS; PERFORMANCE; ECONOMICS; ATTITUDES
AB Residential energy efficiency is an important strategy for reducing greenhouse gas emissions. There are many technologies that help improve residential energy efficiency, and in fact, increased energy efficiency has already helped reduce global greenhouse gas emissions significantly in the past. However, with greater innovation, further improvements can be made and improving energy efficiency is an ongoing activity. Policymakers around the world are putting strategies in place to speed up the adoption of energy efficient technologies and practices, but ultimately this process is based on choice by residents themselves. Human decision making and choice however is a very complex issue, and complex computational tools are required in order to analyse and/or predict the impact of various policies. Traditionally, equation-based models such as Bass and Choice models have been used to describe the diffusion of technologies in a population, but certain limitations have been identified. This article explores what these limitations are in the context of energy efficient residential technologies and how an alternative computational and empirical paradigm, Agent-Based Modelling (ABM), can help resolve some of these limitations. As such, this is a review article into how ABM can support analysis of strategies to catalyse greater uptake of energy efficiency in the residential sector. Crown Copyright (C) 2017 Published by Elsevier Ltd. All rights reserved.
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U1 11
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J9 SUSTAIN CITIES SOC
JI Sust. Cities Soc.
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WC Construction & Building Technology; GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
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PT J
AU Verkade, N
Hoffken, J
AF Verkade, Nick
Hoffken, Johanna
TI Is the Resource Man coming home? Engaging with an energy monitoring platform to foster flexible energy consumption in the Netherlands
SO ENERGY RESEARCH & SOCIAL SCIENCE
LA English
DT Article
DE Smart grids; Flexibility; Resource Man; Energy practices
ID SMART GRIDS; SOCIAL NORMS; HOUSEHOLDS; USERS; POWER
AB In this article we empirically study the notion of 'The Resource Man' put forward by Strengers (2014): a motivated and knowledgeable micro-resource manager, who uses domestic smart grid innovations to manage energy demand in a sustainable, affordable and grid-friendly way. To explore this notion, we analyse a case study where energy cooperative members engaged with an ICT-based monitoring platform focussing on three domestic energy-managing activities - energy monitoring, planning and sharing. We find that although this case provided the best prerequisites for the Resource Man to emerge, none of these activities was sustained during the project. This outcome underlines that the Resource Man perspective held by many actors in the energy industry has a narrow understanding of energy consumption and how it can be changed or made more flexible. We suggest that it is easier to understand householders' engagement with energy through the concept of energy practice or "e-practices". E-practices go beyond managing energy with smart devices, and can include being actively involved in an energy collective, generating, trading, storing or discussing energy. We argue that in general, domestic smart grid technology can play a potential but limited role in effecting changes to complex and interlinked daily practices. (C) 2017 The Authors. Published by Elsevier Ltd.
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PT J
AU Klemick, H
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Wolverton, A
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Wolverton, Ann
TI Potential Barriers to Improving Energy Efficiency in Commercial Buildings: The Case of Supermarket Refrigeration(1)
SO JOURNAL OF BENEFIT-COST ANALYSIS
LA English
DT Article
DE energy efficiency paradox; market failures; supermarkets; technology investment barriers
ID OFFICE BUILDINGS; PROSPECT-THEORY; ECONOMICS; POLICY; UNCERTAINTY; PARADOX
AB According to engineering analyses, energy-intensive commercial buildings have ample opportunities to reduce energy use while saving money, but many seemingly profitable strategies go unadopted. This study explores potential barriers to energy- and refrigerant-reducing investments in supermarket refrigeration. While supermarkets are large energy users, energy and refrigerant account for a relatively small proportion of expenditures. However, due to the intensely competitive nature of the industry, reducing refrigeration costs could have a sizable impact on supermarkets' bottom lines. Given the scarcity of empirical data in this context, we conducted focus groups and interviews with U.S. supermarket representatives to elicit information about potential barriers to investment and used content analysis to qualitatively evaluate results. Participant statements suggest that the rate at which they adopt specific energy- reducing refrigeration technologies and practices correlates fairly well with estimates of expected payback. Uncertainty and imperfect information about the performance of new technologies, high opportunity costs of capital, and tradeoffs with other valued system attributes such as reliability and customer appeal were the most pervasive potential barriers discussed by participants, although split incentives between firms and contractors or employees also played a role for some firms. Our assessment is that these factors have moderately limited or slowed investments in energy- saving refrigeration technologies for many firms; only in the cases of uncertainty/imperfect information and split incentives between firms and contractors or employees are these barriers potentially indicative of market failures. In addition, in several instances we identify ways in which analysts could improve engineering-based net present value calculations to make them more consistent with actual firm decisions.
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PT J
AU Usmani, F
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AF Usmani, Faraz
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Jeuland, Marc
TI Can economic incentives enhance adoption and use of a household energy technology ? Evidence from a pilot study in Cambodia
SO ENVIRONMENTAL RESEARCH LETTERS
LA English
DT Article
DE rebates; improved cookstoves; technology adoption; biomass fuels; randomized controlled trial
ID IMPROVED COOKING STOVES; DEVELOPING-COUNTRIES; IMPROVED COOKSTOVES; AIR-POLLUTION; INDIA; BEHAVIOR; CLIMATE; HEALTH; DEMAND; PERFORMANCE
AB While much work has examined approaches to increase uptake of a variety of household environmental, health, and energy technologies, researchers and policymakers alike have struggled to ensure long-term use. Drawing on a pilot-scale experiment conducted in rural Cambodia, this study evaluates whether economic incentives enhance continued use of-and fuel savings from- improved cookstoves (ICS). Capital-cost subsidies that have been traditionally employed to enhance ICS adoption were augmented with rebates linked to stated and objectively measured use in order to investigate impacts on both initial and sustained adoption in the treatment group. Results show that households do respond to these rebates by adopting the intervention ICS at significantly higher rates, and by using it more frequently and for longer periods. Consistent with these stove-use patterns, solid-fuel use and time spent collecting or preparing fuels also decline. However, this effect appears to diminish over time. Thus, while economic inducements may significantly increase adoption and use of new environmental health technologies, corresponding reductions in environmental or livelihood burdens are not guaranteed. Additional research on the design and implementation of incentive-based interventions targeting households directly-such as carbon financing or other forms of results-based financing (RBF) for improved cookstoves- therefore seems warranted prior to wider implementation of such solutions.
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PT J
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Choi, CH
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Choi, Chul Hun
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TI Agent-based modeling of the adoption of high-efficiency lighting in the residential sector
SO SUSTAINABLE ENERGY TECHNOLOGIES AND ASSESSMENTS
LA English
DT Article
DE Agent based modeling; High efficiency lighting; Simple decision heuristics
AB Due to the wide use of incandescent lighting, residential sector has much lower energy efficiency comparing to commercial sector. However, adoption of compact fluorescent (CFL) and light-emitting diode (LED) technology in residential sector has been slow because of several obstacles such as high price tag, poor public information, and additional cost to achieve favorable lighting features. A deep understanding on consumer's behavior is needed to support policy development in order to speed up the penetration of CFL and LED in the residential sector. Agent-based modeling (ABM) has been used to capture the dynamics of complex socio-technical systems, and represent a suitable tool. Previous work on ABM of consumer adoption of CFL and LED rely heavily on multi-criteria decision making of the agents. Since light bulbs are not a significant purchase for most households, it is highly possible that customers will not go through complex decision making mechanics. This research establishes an ABM of residential lighting purchase and usage within a hypothetical community and tries to illustrate possible adoption paths under different scenarios. Agents are divided into three groups with different simple decision heuristics when making purchase. Energy consumption and greenhouse gas (GHG) emission from each scenario are calculated and compared. Results of the simulation show that incandescent lamps will eventually fade out of the market even with no policy implemented. After 25 years, annual energy consumption can be reduced by roughly 30% compared to Year 2010. Under best case where incandescent bulbs are banned, the energy consumption reduction can be up to 70%. Among scenarios, incandescent ban and energy saving campaign yield best energy consumption and GHG emission reduction results.

LED technology advancement can improve market penetration of LED lighting but has little effect on incandescent fade out. It is also shown that lighting technology retrofitting can achieve higher reduction on electricity consumption and GHG emission than electricity grid improvement. (C) 2016 Elsevier Ltd. All rights reserved.
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NR 25
TC 0
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U1 3
U2 6
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 2213-1388
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J9 SUSTAIN ENERGY TECHN
JI Sustain. Energy Technol. Assess.
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WC Energy & Fuels
SC Energy & Fuels
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PT J
AU Vogele, S
Hansen, P
Poganietz, WR
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AF Voegele, Stefan
Hansen, Patrick
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Prehofer, Sigrid
Weimer-Jehle, Wolfgang
TI Building scenarios for energy consumption of private households in Germany using a multi-level cross-impact balance approach
SO ENERGY
LA English
DT Article
DE Cross-impact balance; Energy demand of private households; Socio-technical scenario construction; Energy bottom-up model
ID RESIDENTIAL SECTOR; CLIMATE-CHANGE; DEMAND; CONSTRUCTION; EMISSIONS; CONTEXT; MODELS
AB A major goal concerning the energy transition in Germany is the reduction of energy usage. In Germany in 2011, private households consumed 2194 PJ and have been identified as a sector with high energy reduction potential. The energy demand of this sector is dependent on many linked quantitative and qualitative factors (e.g., number of persons and demographic structure, expenditures, cost of energy saving measures, willingness to invest, and level of coordination in international climate policy). In our study, we introduce a multilevel cross-impact approach which allows for the definition and quantification of data for scenario analysis while taking the interdependences between different factors on the global, national and sectoral levels into account. This approach makes it possible to overcome limitations that conventional energy models are usually confronted with. By applying a trend analysis in combination with information on the interdependence of relevant factors on the global and national levels, consistent sectoral views of the private household's future are created. (C) 2016 Elsevier Ltd. All rights reserved.
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PA THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND
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J9 ENERGY
JI Energy
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WC Thermodynamics; Energy & Fuels
SC Thermodynamics; Energy & Fuels

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PT J
AU Volland, B
AF Volland, Benjamin
TI The role of risk and trust attitudes in explaining residential energy demand: Evidence from the United Kingdom
SO ECOLOGICAL ECONOMICS
LA English
DT Article
DE Risk attitudes; Trust; Energy expenditures; BHPS; UK households
ID SPACE HEATING EXPENDITURES; SOCIAL DILEMMA ANALYSIS; ENVIRONMENTAL ATTITUDES; EFFICIENT TECHNOLOGIES; ECONOMETRIC-ANALYSIS; CONSUMPTION; DETERMINANTS; PREFERENCES; AVERSION; BEHAVIOR
AB Recent research into the determinants of household energy consumption has aimed to incorporate findings from economics, sociology and psychology in order to obtain a more comprehensive understanding of the factors determining energy demand. The current paper contributes to this nascent stream of literature by studying the relationship between risk attitudes, trust propensity and energy consumption at the household level. Drawing on the British Household Panel Survey, a well-known data set in the context of energy studies, I show that trust is negatively correlated with household energy demand, while higher risk tolerance leads to increases in residential energy use. Potential explanations for these findings are investigated, suggesting that risk preferences may be related with overall appliance stock and the size of the rebound effect. (C) 2016 Elsevier B.V. All rights reserved.
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JI Ecol. Econ.
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WC Ecology; Economics; Environmental Sciences; Environmental Studies
SC Environmental Sciences & Ecology; Business & Economics
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PT S
AU Abidin, NI
Zakaria, R
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Sahamir, Shaza Rina
Shamsuddin, Siti Mazzuana
BE Park, JW
Lie, HA
Hardjasaputra, H
Thayaalan, P
TI Factor Analysis on Criteria Affecting Lean Retrofit for Energy Efficient Initiatives in Higher Learning Institution Buildings
SO 6TH INTERNATIONAL CONFERENCE OF EURO ASIA CIVIL ENGINEERING FORUM (EACEF 2017)
SE MATEC Web of Conferences
LA English
DT Proceedings Paper
CT 6th International Conference of Euro-Asia-Civil-Engineering-Forum (EACEF)
CY AUG 22-25, 2017
CL Hanyang Univ, Seoul, SOUTH KOREA
SP Euro Asia Civil Engn Forum, Korean Soc Soil & Groundwater Engn, Indonesian Univ Consortium
HO Hanyang Univ
ID RESIDENTIAL BUILDINGS; EXISTING BUILDINGS; UNIVERSITY CAMPUS; CONSUMPTION; DESIGN; SUSTAINABILITY; CONSERVATION; COST
AB The expansion of Higher Learning Institution (HLI) is a global concerns on energy demand due to campus act like a small city. Intensive mode of operation of a building is correlated to the energy utilization. Improvement in the current energy efficiency is crucial effort to minimize the environmental effect through minimisation of energy in operation by retrofitting and upgrade the existing building system or components to be more efficient. Basically, there are three recommended steps for the improvement known as lean initiatives, green technology and clean energy in response to becoming zero

energy solutions for building. The deliberation of this paper is aimed to highlight the criteria affecting in retrofitting of existing building in HLI with lean initiatives in order to achieve energy efficiency and reduction of energy comsumption. Attention is devoted to reviewing the lean energy retrofitting initiatives criteria for daylighting (side lighting), daylighting (skylight) and glazing. The questionnaire survey was employed and distributed to the architects who has an expertise in green building design. Factor analysis was adopted as a method of analysis by using Principal Component with Varimax Rotation. The result is presented through summarizing the sub-criteria according to its importance with a factor loading 0.50 and above. The result found that majority of the criteria developed achieved the significant factor loading value and in accordance with the protocal of analysis. In conclusion the results from analysis of this paper assists the stakeholders in assessing the significant criteria based on the desired lean energy retrofitting initiatives and also provides a huge contribution for future planning improvement in existing buildings to become an energy efficient building.

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PY 2017
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AR UNSP 02025
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WC Engineering, Civil; Materials Science, Multidisciplinary
SC Engineering; Materials Science
GA BJ6LH
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PT J
AU Asadi, I
Mahyuddin, N
Shafigh, P
AF Asadi, Iman
Mahyuddin, Norhayati
Shafigh, Payam
TI A review on indoor environmental quality (IEQ) and energy consumption in building based on occupant behavior
SO FACILITIES
LA English
DT Review
DE Thermal comfort; Energy consumption; Indoor air quality; Aural comfort; Human behavior; Indoor environmental quality; Visual comfort
ID RESIDENTIAL BUILDINGS; AIR-QUALITY; PERFORMANCE; SIMULATION; OFFICE; ACCEPTANCE; MANAGEMENT; COMFORT; MODELS; NOISE
AB Purpose - The purpose of this paper is to review the concept of occupant behavior and its relation with indoor environmental quality (IEQ) and building energy consumption. The behavior is referred to any direct or indirect action, which is selected by an occupant to manage the unpleasant indoor environmental conditions. Thermal comfort, indoor air quality, aural comfort and visual comfort are the key factors of IEQ evaluation. Human behavior significantly interacts with energy consumption in buildings.
Design/methodology/approach - Each IEQ parameter was reviewed separately and the overall IEQ acceptance was considered. In addition, this paper reviews the methods that were used to measure and simulate the IEQ factors, energy consumption and human behavior. Finally, the lack of knowledge in this field is based on the review demonstrated.
Findings - Most studies considered one or two IEQ factors to evaluate IEQ acceptance in buildings. Further, weakness of simulating all IEQ factors at the same time is the deficiency of IEQ simulation, based on reviews. In the case of occupant behavior simulation, the uncertainly of human psychological parameter is a drawback to predict behavior.
Originality/value - Energy consumption, occupant health and productivity are related to IEQ. Human behavior affects building energy consumption directly. Simulation software and methods can predict IEQ factors and human behavior. Therefore, reviewing the existing studies is critical to find new methods for measuring and simulating IEQ, energy consumption and human behavior in buildings.

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WC Management
SC Business & Economics
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TI Towards a Context-Driven Platform using IoT and Big Data Technologies for Energy Efficient Buildings
SO PROCEEDINGS OF 2017 3RD INTERNATIONAL CONFERENCE OF CLOUD COMPUTING TECHNOLOGIES AND APPLICATIONS (CLOUDTECH)
LA English
DT Proceedings Paper
CT 3rd International Conference of Cloud Computing Technologies and Applications (CloudTech)
CY OCT 24-26, 2017
CL Rabat, MOROCCO
SP IEEE, Higher Natl Sch Comp Sci & Syst Anal, Mohamed V Univ Rabat, Fac Sci Rabat, Moroccan Assoc Cloud Comp
DE Energy Efficient Buildings; Big data; IoT; Complex-event processing; Context-awarness
ID SYSTEMS
AB Context-awareness is crucial for leveraging energy-efficient buildings by developing intelligent control approaches in which sensing and actuation tasks are performed according to the contextual changes. This could be done by including the users' actions and behaviours in up-to-date context taking into account the complex interlinked elements, situations, processes, and their dynamics. In this paper, we introduce a holistic platform that integrates recent sensing/actuating and Big data technologies for monitoring and data processing. The main aim is to develop context-driven control approaches whereby energy consumption, production, and storage could be controlled according to actual situations (e.g., occupancy, occupant behaviour patterns, energy production patterns, and weather data). A platform prototype was deployed in our university test site. Experiments have been conducted and preliminary results show the usefulness of this holistic platform for monitoring and data processing in energy efficient buildings.
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NR 23
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PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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AU Bianchini, G
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AF Bianchini, Gianni
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GP IEEE
TI Optimal Demand-Response Operation of Heating and Energy Storage in Smart Buildings
SO 2017 AEIT INTERNATIONAL ANNUAL CONFERENCE
LA English
DT Proceedings Paper
CT AEIT International Annual Conference (AEIT)
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CL Cagliari, ITALY
SP AEIT, Regione Autonoma Sardegna, Comun Cagliari, Univ Cagliari, Confindustria, IEEE IES, Consiglio Nazl Ingn, Ordine Ingn Cagliari Scoula Formazione, CNPI, Collegio Periti Industriali Periti Industriali Laureati Provincia Cagliari
ID SYSTEMS
AB This paper deals with the problem of minimizing the electricity bill of smart buildings equipped with centralized heating systems and thermal and electrical storage devices. Building participation in a Demand-Response program in the form of price-volume signals is also considered. The proposed solution is based on a Model Predictive Control approach to operate the heating system and the storage devices in an optimal fashion, under thermal comfort and technological constraints.
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SC Engineering
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TI An Integrated MPC Approach for Demand-Response Heating and Energy
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CT IEEE 56th Annual Conference on Decision and Control (CDC)
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SP IEEE
DE Energy Systems; Building heating management; Energy storage;

Demand-Response; Model predictive control
ID SYSTEMS
AB This paper deals with the problem of minimizing the electricity bill of smart buildings equipped with centralized heating systems and thermal and electrical storage devices. Building participation in a Demand-Response program in the form of price-volume signals is also considered. The proposed solution is based on a Model Predictive Control approach to operate the heating system and the storage devices in an optimal fashion, under thermal comfort and technological constraints.
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BE Littlewood, J
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TI Ethical issues of monitoring sensor networks for energy efficiency in smart buildings: a case study
SO SUSTAINABILITY IN ENERGY AND BUILDINGS 2017
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CT 9th International Conference on Sustainability and Energy in Buildings (SEB)
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CL Chania, GREECE
SP KES Int, Cardiff Metropolitan Univ, Cardiff Sch Art & Design, Sustainable & Resilient Built Environm Res Grp
DE sensors; Internet of Things; ethics; privacy; security; monitoring; energy; idoor environmental quality; control
ID SPERM DNA FRAGMENTATION; WI-FI; PUBLIC BUILDINGS; PRIVACY; MANAGEMENT; MOTILITY; INTERNET; SYSTEMS; MODEL
AB The development of Internet of Things (IoT) based sensors has become crucial for analyzing and optimizing the energy-performance of buildings. However, researchers and professionals should be prepared to deal with the social and thus ethical issues arising from the use of such technologies. Based on a real case-study, we present a detailed analysis of the networks of stakeholders and the consequent ethical issues related to the implementation of energy and IEQ sensors network in an Italian university campus. Alternative scenarios for eliminating or reducing the criticalities related to security and privacy issues are proposed. (C) 2017 The Authors. Published by Elsevier Ltd.
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PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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Kondoh, S
TI Comparative analysis of average time of use of home appliances
SO 24TH CIRP CONFERENCE ON LIFE CYCLE ENGINEERING
SE Procedia CIRP
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CT 24th CIRP Conference on Life Cycle Engineering (CIRP LCE)
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CL Kamakura, JAPAN
SP CIRP, Denso, DMG MORI, Mazak Fdn, JSPS Grant Aid, Japan World Exposit 1970 Commemorat Fund
DE Average time of use; Home appliances; middle-income economies
ID REPLACEMENT; EQUIPMENT; HOUSEHOLD; ENERGY
AB Greater appliance penetration has been associated with economic advancement, sophisticated lifestyles, improved safety, health and several environmental benefits. However, recent studies suggest that easier appliances acquisition also push reductions in the total time of appliance use, regardless of the gains achieved by technological advancement. With this respect, estimation of the total time of use of appliances is the first important step towards understanding such a trade-off. This study reports a summary of the

average age of appliances in developing countries from Southeast Asia, Mexico and some developed countries, as well as a discussion of the relationship between income level and age of appliances using scatter plots of the summarised data. Six categories of appliances (personal computers, mobile phones, washing machines, refrigerators, air conditioners and TVs) were summarised from the literature, and the observed differences in the average age were hypothesised to have connection with income level and the appliance penetration rates. Average appliance age in a greater scale of income (using GNI per capita, PPP) also showed two main trends. Namely, a U-shaped and linear pattern in which the six appliances could be categorised. (C) 2017 The Authors. Published by Elsevier B.V.

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Z9 0
U1 0
U2 0
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J9 PROC CIRP
PY 2017
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WC Engineering, Industrial
SC Engineering
GA BI0AK

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OA gold
DA 2018-05-03
ER

PT S
AU Damrongsak, D
Wongsapai, W
AF Damrongsak, Det
Wongsapai, Wongkot
BE Alam, F
Jazar, R
Chowdhury, H
TI Personnel responsible for energy capacity building programs for sustainable energy efficiency in Thailand
SO 1ST INTERNATIONAL CONFERENCE ON ENERGY AND POWER, ICEP2016
SE Energy Procedia
LA English
DT Proceedings Paper
CT 1st International Conference on Energy and Power (ICEP)
CY DEC 14-16, 2016
CL RMIT Univ, Melbourne, AUSTRALIA
HO RMIT Univ
DE Energy efficiency curriculum; Energy capacity building; Energy conservation
AB Since 1992, the designated factory and commercial building in Thailand have to officially appoint their own personnel responsible for energy (PRE) under the Energy Conservation and Promotion Act B.E. 2535 (A.D. 1992). PRE is an important element for each designated facility to drive the energy management system and ensure its success of the program. In Thailand, one may become PRE from various methods, but most common way of becoming PRE is from PRE training programs under required educational background. This paper concludes the PRE training programs in Thailand which consists of five main curriculums as the following: 1) PRE for designated factory 2) PRE for designated building 3) Senior PRE theoretical training 4) Senior PRE practical training and 5) PRE for manager level. The first four curriculums are compulsory programs required by law while the last one is a voluntary program. The technical comparison between those five curriculums is presented. The driving mechanism to implement those five curriculums including barriers are also raised. (C) 2017 The Authors. Published by Elsevier Ltd.
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CR DEDE, 1992, EN CONS PROM ACT
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EPPO, 2015, GAS PLAN 2015 2036
EPPO, 2015, ALT EN DEV PLAN 2015
NR 6
TC 0
Z9 0
U1 0
U2 1
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ENRGY PROCED

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WC Energy & Fuels; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BH7IP
UT WOS:000402566300010
OA gold
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ER

PT B
AU Das, SK
Mukherjee, A
AF Das, Sajal Kanta
Mukherjee, A.
GP IEEE
TI IoT based Smart Home Management to enhance the services to the Occupancies and minimized energy demand by controlling appliances using Wireless Motes
SO 2017 INTERNATIONAL CONFERENCE ON MICROELECTRONIC DEVICES, CIRCUITS AND SYSTEMS (ICMDCS)
LA English
DT Proceedings Paper
CT International conference on Microelectronic Devices, Circuits and Systems (ICMDCS)
CY AUG 10-12, 2017
CL Vellore Inst Technol, Vellore, INDIA
SP Vellore Inst Technol, Sch Elect Engn, Dept Micro & Nanoelectron, IEEE Elect Devices Soc, GlobalFoundries, Mentor
HO Vellore Inst Technol
DE Smart Houses; Intelligent Houses; Ambient Intelligence; IoT; Ubiquitous computing; WSN
AB We have to set up a prototype model for smart Building environment with more advanced activity and event classification techniques, as well as new adaptive service provision schemes to adjust the services according to the user's behaviour model and the feedback provided by the user. Integration of the building systems with embedded sensors, actuators and microcomputers or microcontrollers allows them to communicate with one another through the building controller. We also expect to continue our work on network optimization for sensing and control, and also expand our work into cross-products of higher technological development. Examples of "things" include: People; Location (of objects); Time Information (of objects); Condition (of objects). The quality of a daily life, reduction of costs and increasing security are the main important issues when we design a smart environment for inside and outside of our building areas.
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Yang R, 2012, SUSTAIN CITIES SOC, V2, P1, DOI 10.1016/j.scs.2011.09.001
NR 19
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-5386-1716-8
PY 2017
PG 6
WC Engineering, Electrical & Electronic
SC Engineering
GA BJ4LW
UT WOS:000425169900014
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PT S
AU Delmastro, C
Martinsson, F
Mutani, G
Corgnati, SP
AF Delmastro, Chiara
Martinsson, Fredrik
Mutani, Guglielmina
Corgnati, Stefano P.
BE Seto, K
Robinson, D
Virji, H
Kovacs, Z
Zhai, J
Sami, N
Pettit, C
Sridhar, KS
TI Modeling building energy demand profiles and district heating networks for low carbon urban areas
SO URBAN TRANSITIONS CONFERENCE
SE Procedia Engineering
LA English
DT Proceedings Paper
CT Urban Transitions Conference
CY SEP, 2016
CL Shanghai, PEOPLES R CHINA
DE urban planning; heat strategies; buildings; district heating network; scenarios analysis

AB Urban energy consumptions growth has become an urgent topic that requires solutions for significantly reduce carbon emission in the next decades. This paper aims in exploring the integration of building performance improvement and low carbon district heat technological choices by considering the upgrade of conversion technologies, efficiency and the exploitation of local resources.

The paper is based on a GIS-based model that spatially characterize the space heating demand of urban buildings. Starting from clustering buildings with similar thermo-physical characteristics, the total energy use of buildings can be depicted and compared with the energy balance data of the city in order to scale the bottom-up results for matching the total load. Reasonable energy efficiency measures are further proposed by considering three different scenarios up to 2050. Long-term building scenarios are applied to a district heating simulation model for investigating how the reduction of building heat demand will impact the district heating production and operations. In particular, the combination of the building model and the district heating model aims at exploring the effects of district network expansion or new low carbon investments from an economic and environmental perspective. The model has been successfully applied to the city of Turin, Italy and the city of Stockholm, Sweden. The flexibility of the approach may allow it to be easily adjusted to different urban areas for providing indications on cost-effective strategies for efficient, low-carbon heat solutions in integrated energy systems. Results highlight that finding synergies between the demand and supply sector will lead to environmental and economic benefits, in particular for district-heated cities. (c) 2017 The Authors. Published by Elsevier Ltd.

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Swedish Energy Agency, 2014, COMP DAT 44 REN PROJ

TABULA (Typology Approach for Building Stock Energy Assessment), 2009, TABULA TYP APPR BUIL

NR 15
TC 0
Z9 0
U1 0
U2 0
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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WC Multidisciplinary Sciences; Urban Studies
SC Science & Technology - Other Topics; Urban Studies

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UT WOS:000425682900034
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ER

PT B
AU Deng, JX
Shen, ZZ
AF Deng, Jian-Xun
Shen, Zhi-Zhou
BE Zhang, SH
Wei, PS
TI Energy saving reconstruction of existing residential buildings in hot summer and warm winter zones-experience learnt from home and abroad
SO MECHANICS AND ARCHITECTURAL DESIGN
LA English
DT Proceedings Paper
CT International Conference on Mechanics and Architectural Design (MAD)
CY MAY 14-15, 2016
CL Suzhou, PEOPLES R CHINA
DE Existing Buildings; Hot Summer and Warm Winter Zones; Energy Saving; Measures
AB Combined with cases of energy-saving existing building from home and abroad, this passage discusses about the reconstruction condition of existing buildings and makes a comparison by analyzing the existing buildings in terms of energy-saving technologies and relevant policies, which points out the existing energy-saving problems of existing buildings in Hot Summer and Warm Winter Zones in our country. Also, it sums up the experience of energy-saving reconstruction and finally proposes energy-saving measures.
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FU Xiamen Construction and Technology Projects [XJK2013-1-3]
FX Xiamen Construction and Technology Projects (Item Code: XJK2013-1-3).
CR Chen Elan, 2012, APPLIANCE LOW E GLAS
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NR 4
TC 0
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PU WORLD SCIENTIFIC PUBL CO PTE LTD
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WC Construction & Building Technology; Engineering, Civil; Engineering, Geological
SC Construction & Building Technology; Engineering
GA BI6UI
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PT S
AU Di Ruocco, G
Sicignano, C
Sessa, A
AF Di Ruocco, Giacomo
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Sessa, Anna
BE Ding, L
Fiorito, F
Osmond, P
TI Integrated methodologies energy efficiency of historic buildings
SO INTERNATIONAL HIGH-PERFORMANCE BUILT ENVIRONMENT CONFERENCE - A SUSTAINABLE BUILT ENVIRONMENT CONFERENCE 2016 SERIES (SBE16), IHBE 2016
SE Procedia Engineering
LA English
DT Proceedings Paper
CT International High-Performance Built Environment Conference (iHBE)
CY NOV 17-18, 2016
CL Sydney, AUSTRALIA
SP UNSW Built Environm, CRC Low Carbon Living, UrbanGrowth NSW
DE Historic buildings; integrated approach; sustainability; reversibility; BIM
AB For several years, Italian associations and research organizations have been developing strategies aimed at evaluating and increasing energy efficiency in historic buildings, offering a sort of guidelines about this issue. These strategies are intended to provide useful information for a correct approach to the energy retrofit of historic buildings, offering a framework as well as innovative technical solutions for integrated design intervention restoration of historic buildings. The purpose of the guidelines is investigating the relationship between architectural restoration and plant installations, which are - now - rarely explored problems theoretically and experimentally, by introducing the concept of improvement instead of adapting to the standards of safety and comfort, in accordance with the integrated conservation strategies (Amsterdam Declaration, 1975). Effective proposals of a historic building energy retrofit (or a cultural landscape) can be implemented in a conscious way, tending to an architectural and landscape integration, without changing the monumental building, as it often happens in the case of adaptation of a new building to the new rules. The proposed methodology is based on an interdisciplinary approach, articulated in successive phases: analysis of plant systems, measurements of environmental quality, identification of vulnerabilities, defining appropriate intervention techniques, verification of the improvement achieved. The case study concerns a historic building in Salerno (Italy) dating back to the eighteenth century, used as a school complex. It will be investigated by the morphological, technological, static, energy point of view, by the use of a BIM platform, in order to identify energy efficiency measures consistent with the technological and structural aspects. The objective is, therefore, to identify an integrated methodology of energy retrofit of historic buildings. (C) 2017 The Authors. Published by Elsevier Ltd.
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U2 0
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PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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WC Construction & Building Technology; GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Environmental; Engineering, Civil
SC Construction & Building Technology; Science & Technology - Other Topics; Engineering
GA BI0JD
UT WOS:000404873600171
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PT S
AU Ding, Q
Cai, WJ
Wang, C
AF Ding, Qun
Cai, Wenjia
Wang, Can
BE Yan, J
Sun, F
Chou, SK
Desideri, U
Li, H
Campana, P
Xiong, R
TI Impact of household consumption activities on energy consumption in China-evidence from the lifestyle perspective and input-output analysis
SO 8TH INTERNATIONAL CONFERENCE ON APPLIED ENERGY (ICAE2016)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 8th International Conference on Applied Energy (ICAE)
CY OCT 08-11, 2016
CL Beijing Inst Technol, Beijing, PEOPLES R CHINA
SP Appl Energy Innovat Inst, Malardalen UNiv, China Assoc Sci & Technologies, HOME Program, Sichuan Univ, Jiangsu Univ, China Univ Min & Technol, Tianjin Univ, Tongji Univ, SW Jiaotong Univ, Xian Jiaotong Univ, Collaborat Innovat Ctr Elect Vehicles Beijing, Technol Unnovat Local Scale Optimum Integrat Battery Energy Storage, BAIC, BJEV, YuTong, Shenwu Grp
HO Beijing Inst Technol
DE household consumption; energy consumption; input-output analysis; energy conservation
ID EMISSION
AB The household sector has become the second largest consumer of final energy, ranking only next to the industrial sector in China. Except for the direct energy consumption of household sector, people's

consumption activities also indirectly affect the energy consumption of multiple production sectors. This paper investigates the direct and indirect impact of household consumption activities on energy consumption in China from the consumers' lifestyle perspective based on the input-output analysis. The results show that China's energy consumption caused by household consumption activities in 2012 accounts for 24.7% of the total finial energy consumption. The indirect energy consumption of household consumption activities is 1.35 times more than the direct energy consumption. Residential activities cause the most indirect energy consumption, while the smelting and pressing industry of ferrous metal is the most energy-consuming industrial sector influenced by household consumption. We also find that the low-carbon pattern and accelerated technological advance can reduce the indirect energy consumption effectively by scenario analysis. (C) 2017 The Authors. Published by Elsevier Ltd.

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TC 0
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PU ELSEVIER SCIENCE BV
PI AMSTERDAM
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WC Energy & Fuels
SC Energy & Fuels
GA BI0MH
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PT J
AU Enshassi, A
Elzebdeh, S
Mohamed, S
AF Enshassi, Adnan
Elzebdeh, Salam

Mohamed, Sherif
TI Drivers affecting household residents' water and related energy consumption in residential buildings
SO INTERNATIONAL JOURNAL OF BUILDING PATHOLOGY AND ADAPTATION
LA English
DT Article
DE Consumption; Residential buildings; Energy; Households; Water
ID GAZA-STRIP; URBAN WATER; END-USE; CONSERVATION; DEMAND; ATTITUDES; BEHAVIOR; RECLAMATION; MANAGEMENT
AB Purpose - The Gaza Strip in Palestine is suffering from a shortage of water and energy. To manage the current situation and address future issues, practical approaches need to be adopted to enhance water and energy efficiency. The purpose of this paper is to elicit professionals' perceptions of the drivers affecting water and related energy consumption in residential buildings in the Gaza Strip.
Design/methodology/approach - In total, 19 drivers were identified from previous research and modified according to the results of a pilot study. These drivers were ranked under a Relative Importance Index (RII). A questionnaire survey was then administered and non-random purposive sampling used. The population of this study comprised stakeholders, including the United Nation Refugee Work Agency, Gaza Strip Governorates Municipalities, and the Coastal Municipalities Water Utility.
Findings - The results of all drivers (i.e. RII = 71.43 per cent, mean = 3.57) indicated that the respondents agreed about which drivers were affecting water and energy consumption. The sign Test-value was a positive 4.55 and the p-value was 0.000 (i.e. smaller than the level of significance a = 0.050). The means of these drivers differed significantly and were greater than the hypothesised value of 3. Accordingly, it was concluded that the drivers investigated significantly affected household residents' consumption of water and energy in residential buildings. The study revealed that climate changes, knowledge of how to conserve water and energy and household size were the most important drivers affecting household residents' consumption of water and related energy in residential buildings.
Practical implications - The study will assist the parties concerned about water and energy use to be aware and understand the drivers affecting water and related energy the consumption in order to provide household residents with the necessary knowledge to ensure conservation and sustainability. Although this study related to a narrow geographical area in Palestine, the findings could be useful to similar locations in the Middle East and Africa.
Originality/value - This research demonstrates the drivers affecting water and related energy the consumption in residential buildings in the Gaza Strip which is considered the first study in Palestine and in the region. The study provides a useful platform for the development of appropriate water and energy strategies in Palestine and other similar geographical locations in the Middle East.
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NR 67
TC 0
Z9 0
U1 4
U2 4
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PA HOWARD HOUSE, WAGON LANE, BINGLEY BD16 1WA, W YORKSHIRE, ENGLAND
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JI Int. J. Build. Pathol. Adapt.
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WC Construction & Building Technology
SC Construction & Building Technology
GA FC6SF
UT WOS:000406971100004
DA 2018-05-03
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PT S
AU Ertugrul, N
McDonald, CE
Makestas, J
AF Ertugrul, Nesimi
McDonald, Cathryn E.
Makestas, John
GP IEEE
TI Home Energy Management System for Demand-Based Tariff Towards Smart Applicances in Smart Grids
SO 2017 IEEE 12TH INTERNATIONAL CONFERENCE ON POWER ELECTRONICS AND DRIVE SYSTEMS (PEDS)
SE International Conference on Power Electronics and Drive Systems
LA English
DT Proceedings Paper
CT IEEE 12th International Conference on Power Electronics and Drive Systems (PEDS)
CY DEC 12-15, 2017
CL Honolulu, HI
SP IEEE, PEDS, IEEE POWER ELECT SOC, IND APPLICAT SOC, Univ Hawaii, HawatiTourism Author
DE Expert systems; heuristic algorithms; load management; smart grids; smart homes; energy management; demand based tariff
AB The peak demand placed on an electricity network can be reduced using a demand-based tariff, in which part of a customer's electricity bill is dependent on their maximum demand reached over a period of time. This paper reviews the state of the associated technologies, and it offers a smart grid hardware and software solution to achieve a home energy management system to assist electricity users to reduce their maximum demand. The method uses the application of the standards for demand response capabilities of electrical products, in combination with plug-in switching modules placed between any mains-powered appliance and the power point. The software system uses a heuristic algorithm that takes actions to achieve the target limit while causing the least inconvenience possible to the user. A prototype system has been developed and demonstrated using a simulated data that the maximum demand in a simulated household can be reduced significantly.
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FU SA Power Networks, Digital Home Systems, ARENA
FX The authors would like to acknowledge the supports provided from SA Power Networks, Digital Home Systems, ARENA sponsored Australian Energy Storage Knowledge Bank project and the technical staff at the School of Electrical and Electronic Engineering.
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NR 20
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2164-5256
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J9 INT C POWER ELECT DR
PY 2017
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WC Engineering, Electrical & Electronic
SC Engineering
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UT WOS:000426968800086
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FN Clarivate Analytics Web of Science
VR 1.0
PT B
AU Fratu, M
Cirstolovean, L
AF Fratu, Mariana
Cirstolovean, Lucian
GP IEEE
TI Information Modelling for Energy Efficiency in Intelligent Buildings
SO 2017 INTERNATIONAL CONFERENCE ON OPTIMIZATION OF ELECTRICAL AND ELECTRONIC EQUIPMENT (OPTIM) & 2017 INTL AEGEAN CONFERENCE ON ELECTRICAL MACHINES AND POWER ELECTRONICS (ACEMP)
LA English
DT Proceedings Paper
CT International Conference on Optimization of Electrical and Electronic Equipment (OPTIM) / Intl Aegean Conference on Electrical Machines and Power Electronics (ACEMP)
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SP Univ Politehnica Timisoara, Tech Univ Cluj Napoca, Middle E Tech Univ Ankara, Inst Elec & Elect Engineers, IEEE Ind Elect Soc, IEEE Ind Applicat Soc, IEEE Power Elect Soc, Inst Elect Engineers Japan, Korean Inst Power Elect
HO Transilvania Univ Brasov
ID BIM
AB In this article one examine the topic of Building Information Modeling (BIM) from the perspective of the residential building' owners. We present a novel approach to estimate of energy consumption through the identification of the relevant parameters and the application of Soft Computing techniques.
The residential buildings must be capable of not only providing mechanisms to minimize their energy consumption, but also integrating their own energy sources to ensure their energy sustainability.
We characterize the building in terms of its contextual features and energy consumption, and then select the most appropriate techniques to generate the most accurate model charged with energy rationalization.
The innovative technologies would need to ensure that the owners achieve management tool to provide advanced energy management of intelligent built environment, where smart objects, as well as distributed energy resources are installed.
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TC 0
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PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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WC Engineering, Electrical & Electronic
SC Engineering
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PT J
AU Lancheros-Cuesta, DJ

Lara, DP
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AF Janeth Lancheros-Cuesta, Diana
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Marulanda Garcia, Geovanny
TI Monitoring platform for the consumption of electricity in a home
SO INTERNATIONAL JOURNAL OF WEB INFORMATION SYSTEMS
LA English
DT Article
DE Advanced Web applications; Energy consumption; Monitoring system; Smart sensor
AB Purpose - Nowadays, an extra consumption of electric energy in the Colombian houses is generated due to electric or electronic elements plugged into the electric network. This fact produces a cost overrun in the user's electricity bills. To reduce this extra cost, and also with a plus of reducing greenhouse gas emission, a monitoring system for the consumption of electric energy in a household will be designed and implemented to make electricity users realize how much money and energy is being wasted due to the unnecessary electric elements plugged into the network. This paper aims to show a monitoring system that allows the client to supervise the consumption of some appliances inside his/her home, remotely. It is also considered the HMI to be able to log in, choose the intervals of data and generate reports and graphics. The monitoring system is based on the integration of several technologies that are already used and implemented in houses and buildings, such as: measuring and treatment of data electronically using microcontrollers, Wi-Fi technology and dynamic graphic interface (website).
Design/methodology/approach - The methodology consists of several tasks, starting from documentation of the variables, instrumentation and methods for getting to the solution; the first part of the methodology focuses on selecting the electric and/or electronic elements to be monitored, so the instrumentation is able to monitor. Then, the power stage was implemented in this stage to measure signals from the sensors while sensing the electric nodes are adjusted, so does the transmission and reception. In the third stage, the design information system was implemented; this is where the received data from the sensors are stored and managed for further organization and visualization. Activities included the following: Analysis of the model of use cases: Identification of actors and actions that are involved in the system. Server selection: Study of the different server to manage the database. Design of the database: The variables, tables, fields, profiles are determined for managing the information. Connection between sensors and database: Correct data transmission and managing to the database from the sensors. Finally, the system is validated in a rural house for a month.
Findings - The monitoring system satisfies the main objective of making a tracing of the behavior of some appliances inside a house, showing graphically the instant current generated while connected, the cumulated energy consumed and the cost in Colombian pesos of the energy consumed so far, in real time.
Research limitations/implications - The monitoring system requires the correct functioning of the sensors connected to each household appliance in the home.
Practical implications - The main approach in the monitoring platform is the real-time measurement of energy consumption by nodes (in each appliance) that allows the user to control the money. The innovative impact of the project will be based on the use of hardware and information systems in the measurement of electrical consumption.
Social implications - This research has a direct impact on the economic aspects of the low-income population by allowing them to manage their energy consumption through the proposed system.
Originality/value - The main approach in the monitoring platform is the real-time measurement of energy consumption by nodes (in each appliance) that allows the user to control the money.
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PT S
AU Jo, HP
Kim, HG
Kim, SS
AF Jo, Haeng Pil
Kim, Hye Gi
Kim, Sun Sook
GP ASHRAE
TI Analysis of Energy Consumption in Office Buildings Based on the National Building Energy Database in Korea
SO 2017 ASHRAE ANNUAL CONFERENCE PAPERS

SE ASHRAE Conference Papers
LA English
DT Proceedings Paper
CT ASHRAE Annual Conference
CY JUN 24-28, 2017
CL Long Beach, CA
SP ASHRAE
AB Beintranfsing enemy use can help building, owners and managers to assess building energy performance and to identify energy egfficiency opportunities. With the advanced information technologies, many countries have provided databases. tools, and evaluation frameworks to compare building to standards or peer-group and to assess energy performance based on real energy data collection. Energy consumption data make It easy to understand the energy use characteristics of each building, and can promote occupants awareness of building energy efficiency when providing an energy performance developed from these data. As a way of improving energy efficiency in the building sector, the Korean government has developed a nation-wide integrated energy consumption database with more than 6 million building records. The purpose of this paper is to introduce the framework of the national building energy consumption database and to analyze energy use characteristics of office buildings across the couantry. We conducted a multiple regression anarysis to analyse relationships between the office building energy consumption and the independent variable Including building size, building age, etc. in order to identify variable that have a significant influence to energy consumption. Several multiple regession models were developed and then we selected the best model for predicting energy consumption in an building. The regression model shows that a building's gross area, building height and building age have a significant impact on builsing energy consumption. The developed prediction model was used as an equation to calculated predicted energy consumption of existing office buildings in Korea. the prediction model shows a high explanatory power of 93.7%. We compared the actual energy consumption with the predicted energy consumption using the prediction model, and as a result, the error rate shows 18.4%. The prediction model derived from this study could be used to review the effects of energy policies and set a benchmarking for energy performance.
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FU Architecture & Urban Development Research Program - Ministry of Land, Infrastructure and Transport (MOLIT) of Korea government [17AUDP-b079104-04]; Korea Agency for Infrastructure Technology Advancement (KAIA)
FX This research was supported by a grant (17AUDP-b079104-04) from Architecture & Urban Development Research Program funded by Ministry of Land, Infrastructure and Transport (MOLIT) of Korea government and Korea Agency for Infrastructure Technology Advancement (KAIA)
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NR 12
TC 0
Z9 0
U1 0
U2 0
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA

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SC Thermodynamics; Construction & Building Technology
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PT S
AU Kashani, A
Ozturk, Y
AF Kashani, Atieh
Ozturk, Yusuf
GP IEEE
TI Residential Energy Consumer Behavior Modification via Gamification
SO 2017 IEEE 6TH INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY RESEARCH AND APPLICATIONS (ICRERA)
SE International Conference on Renewable Energy Research and Applications
LA English
DT Proceedings Paper
CT 6th IEEE INTERNATIONAL CONFERENCE on RENEWABLE ENERGY RESEARCH and APPLICATIONS (ICRERA 2017)
CY NOV 05-08, 2017
CL San Diego, CA
SP IAS IEEE Ind Applicat Soc, IES, IEEJ, IEICE Commun Soc, KBSoftware, IEEE, IJRER, PELS
DE Demand response; customer behavior modification; energy monitoring; energy economics
AB This paper aims to present an integrated platform to explore the role of society, culture, and behavior in energy efficiency uptake, and identify specific marketing techniques that may result in user behavior modification. We developed a consumer behavior modification framework which monitors consumer energy usage through the SDG&E Green Button API and make recommendations to the consumer. Behavior change is entbrced through energy pricing and showing the impact of the individual consumer's CO2 emissions when using energy at peak hours versus at non-peak hours. The foucs is to improve the homeowner's "know" and "care", aiming to influence actions through transformation of moral in addition to monetary savings. Following an engineering and economics model the system provides the tools for research in social variability, as well as the social and cultural context that shapes our habits and practices in energy consumption.
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FX This study is supported in part by SDSU Presidential Leadership fund , Department of Energy DE-EE 0007327, STEP/FEEDER Network.
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NR 23
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Engineering, Electrical & Electronic
SC Science & Technology - Other Topics; Energy & Fuels; Engineering
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PT S
AU Kim, YY
Sun, C
AF Kim, Yuliya
Sun, Cheng
BE Cui, W
Rusu, E
TI The Energy-Efficient Adaptation Scheme for Residential Buildings in Kazakhstan
SO 2017 2ND INTERNATIONAL CONFERENCE ON ADVANCES ON CLEAN ENERGY RESEARCH (ICACER 2017)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 2nd International Conference on Advances on Clean Energy Research (ICACER)
CY APR 07-09, 2017
CL Berlin, GERMANY
DE adaptation; green building; reduce energy consumption; strategy
ID OPTIMIZATION
AB Green building is a system of interaction between climate, and the natural source has energy property, harmony with nature. Due to the cold climate of Kazakhstan, the issue of energy consumption of

residential buildings is more important. Energy consumption of buildings in this region is more than half of the total. The system optimizes, must apply the theoretical analysis of research related to current problems.

More efficient use of the construction of residential buildings and reduce energy consumption. To expand and develop creative, original architectural design ideas, principles, and methods. Application of green technology in the territory of Kazakhstan in the first step can be carried out by passive energy conservation.

The results, theoretical model, adapt to green standards in Kazakhstan and planned development model. The adaptation of green technology is possible to represent framework. For a more detailed analysis and further research. (C) 2017 The Authors. Published by Elsevier Ltd

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PU ELSEVIER SCIENCE BV

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J9 ENRGY PROCED

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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels

SC Science & Technology - Other Topics; Energy & Fuels

GA BJ2DW

UT WOS:000419168400004

OA gold

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ER

PT J

AU Kneifel, J
O'Rear, E
AF Kneifel, Joshua
O'Rear, Eric
TI Reducing the impacts of weather variability on long-term building energy performance by adopting energy-efficient measures and systems: a case study
SO JOURNAL OF BUILDING PERFORMANCE SIMULATION
LA English
DT Article
DE low-energy; net-zero energy; weather variability; sensitivity analysis; whole-building simulation; EnergyPlus
ID CLIMATE-CHANGE; NET-ZERO; CONSUMPTION; DESIGN; HOUSE
AB This case study uses whole-building simulation software to investigate the ability of alternative sets of energy conservation measures to limit the sensitivity in energy use and heating, ventilation, and air-conditioning (HVAC) peak electricity demands by residential buildings due to weather variability. Four alternative building designs are considered: a net-zero energy design based on the National Institute of Standards and Technology (NIST) net-zero energy residential test facility (NZERTF), a comparable, yet less efficient design built according to the 2015 International Energy Conservation Code (IECC), and two low-energy designs at varying levels of energy-efficiency. The findings from this study reveal which measures best ensure robust annual energy performance and occupant comfort by low- and net-zero energy homes given weather variability, as well as how much resulting energy performances vary across the sets of conservation measures considered in this work.
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NR 36
TC 0
Z9 0
U1 3
U2 6
PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 2-4 PARK SQUARE, MILTON PARK, ABINGDON OR14 4RN, OXON, ENGLAND
SN 1940-1493
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J9 J BUILD PERFORM SIMU
JI J. Build. Perf. Simul.
PD JAN
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SI SI
BP 58
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WC Construction & Building Technology
SC Construction & Building Technology
GA EF6GS
UT WOS:000390429700005
DA 2018-05-03
ER

PT S
AU Leong, XW
Essah, EA
AF Leong, Xi Wen
Essah, Emmanuel A.
BE Geving, S
Time, B
TI Bridging the gap between energy consumption and the indoor environmental quality of a 1960s educational building
SO 11TH NORDIC SYMPOSIUM ON BUILDING PHYSICS (NSB2017)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 11th Nordic Symposium on Building Physics (NSB)
CY JUN 11-14, 2017
CL Trondheim, NORWAY
SP Norwegian Univ Sci & Technol, SINTEF
DE University Library; Energy; Indoor Environmental Quality; Modelling
AB The fundamental purpose of a building has evolved from merely providing protection from external environmental climate to more emphasis on integrating building services through building regulations to provide the synergy of comfort, efficiency and safety to the indoor environment. This research recognizes the rising demand and increasing quality of indoor environmental quality (IEQ) in the modern society compared to the acceptable level of previous traditional buildings. Generally due to its varied operations, educational buildings, in this case University libraries have its own set of challenges and barriers such as minimizing damages and decay of books and maintaining indoor conditions with an oversight of providing good IEQ to occupants. This paper presents a detailed evaluation of a 1960s-educational library

with 24-hour access at the University of Reading. Through in-situ measurements, modelling and simulations of the buildings energy consumption, IEQ parameters and occupancy patterns, investigations have been performed. Varied scenarios using the Integrated Environmental Solution (IES) software were also investigated. The findings illustrate that due to mixed faCade configuration (i.e. sandstone and bricks) there is the unflinching need to balance aesthetics of the facade and functionality of a building to reduce excessive energy use via heating, without compromising on occupant comfort and well-being Although it is envisaged that refurbishing the library building will provide energy savings of up to 40%, this is farfetched and can only be achieved at the detriment of occupant comfort levels as evident in the simulation results, where these savings could not be realised. This paper further discusses the methods, scenarios, and results of ensuring good IEQ, comfort and energy efficiency are not been seen as mutually exclusive. This study forms part of ongoing research into the impact of educational buildings. (C) 2017 The Authors. Published by Elsevier Ltd. Peer-review under responsibility of the organizing committee of the 11th Nordic Symposium on Building Physics.

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TC 0
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PU ELSEVIER SCIENCE BV
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 ENRGY PROCED
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WC Architecture; Construction & Building Technology; Energy & Fuels; Physics, Applied
SC Architecture; Construction & Building Technology; Energy & Fuels; Physics
GA BJ6AD
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ER

PT B

AU Mo, Y
Zhao, D
Mccoy, A
Du, J
Agee, P
AF Mo, Yunjeong
Zhao, Dong
Mccoy, Andrew
Du, Jing
Agee, Philip
BE Lin, KY
ElGohary, N
Tang, P
TI Latent Relationship between Construction Cost and Energy Efficiency in Multifamily Green Buildings
SO COMPUTING IN CIVIL ENGINEERING 2017: SMART SAFETY, SUSTAINABILITY, AND RESILIENCE
LA English
DT Proceedings Paper
CT ASCE International Workshop on Computing in Civil Engineering (IWCCE)
CY JUN 25-27, 2017
CL Univ Washington, Seattle, WA
SP Amer Soc Civil Engineers, Amer Soc Civil Engineers, Comp Div
HO Univ Washington
DE Residential building; Energy efficiency; Machine learning; Sustainability
ID CONSUMPTION
AB Residential buildings account for more than 20 percent of total energy usage in the U.S. in the past decade. Reduction of household energy consumption has environmental and economic impacts. As the first step, building scientists and construction engineers have endeavored efforts to obtain an accurate energy use prediction; however, few have focused on the relationship between construction cost and energy use. This paper investigates the associations between detailed construction cost takeoffs and actual energy uses in multifamily green buildings. The researchers employ advanced machine learning analytics to model the correlations between construction cost and energy use data which were collected from multifamily residential units. Findings identify the cost divisions in the construction stage that significantly correlates the energy use in the operational stage. The model allows developers to predict the energy consumption based on the construction costs, and enables them to adjust the investment strategies to amplify the energy efficiency of green building technologies.
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PU AMER SOC CIVIL ENGINEERS
PI NEW YORK
PA UNITED ENGINEERING CENTER, 345 E 47TH ST, NEW YORK, NY 10017-2398 USA
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PY 2017
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WC Computer Science, Interdisciplinary Applications; Engineering, Civil
SC Computer Science; Engineering
GA BJ5RN
UT WOS:000426216800034
DA 2018-05-03
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PT J
AU Nizetic, S
AF Nizetic, Sandro
TI Realisation barriers in energy efficiency projects in Croatian public buildings: a critic overview and proposals
SO INTERNATIONAL JOURNAL OF SUSTAINABLE ENERGY
LA English
DT Article
DE Energy efficiency; barriers; public buildings; energy efficiency policy
ID BEHAVIOR; PROGRAM; CLIMATE; SAVINGS; SYSTEM; SECTOR; POLICY; GAP
AB This paper discusses in detail specific barriers to establishing energy efficiency policies in Croatian public buildings that affect the realisation of energy efficiency projects. Barriers were discovered after years of collaboration with public institutions in Croatia, especially at a local level. Although the information presented in this paper relates specifically to the geographical areas of Splitsko-Dalmatinska and Dubrovacko-Neretvanska counties in Croatia, the research can be generalised to the country as a whole. The paper also analyses the important role of the United Nations Development Programme in encouraging proactive energy efficiency policies in public buildings in Croatia. Finally, a new organisational framework is proposed to eliminate existing barriers and to establish a system which will lead to the effective realisation of energy efficiency projects in buildings. The research presented in this paper should also be useful to countries facing similar barriers to energy investments.
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NR 37
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U2 0
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PA 2-4 PARK SQUARE, MILTON PARK, ABINGDON OR14 4RN, OXON, ENGLAND
SN 1478-6451
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J9 INT J SUSTAIN ENERGY
JI Int. J. Sustain. Energy
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WC Energy & Fuels
SC Energy & Fuels
GA FC7VA
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PT S
AU Nizetic, S
Papadopoulos, AM
AF Nizetic, Sandro
Papadopoulos, Agis M.
BE Bikas, D
Theodosiou, T
Katerina, T

TI Concept of Building Evaluation Methodology for Gap Estimation between Designed and Achieved energy savings
SO SUSTAINABLE SYNERGIES FROM BUILDINGS TO THE URBAN SCALE
SE Procedia Environmental Sciences
LA English
DT Proceedings Paper
CT International Conference on Sustainable Synergies from Buildings to the Urban Scale (SBE)
CY OCT 16-19, 2016
CL Thessaloniki, GREECE
SP Aristotle Univ Thessaloniki, Fac Engn, Dept Civil Engn, Lab Building Construct & Building Phys, Tech Chamber Greece
DE buildings; energy efficiency; energy savings
ID WINDOW OPENING BEHAVIOR; MEDITERRANEAN CLIMATE; OFFICE EQUIPMENT; CONTROL-SYSTEMS; EFFICIENCY; CONSUMPTION; PERFORMANCE; MANAGEMENT; IMPACT
AB Nowadays, despite the plethora of existing standards and calculation methodologies, i.e. procedures assessing a building's energy efficiency, it is unfortunately common to monitor significant differences between designed and achieved energy savings in practice. This is a problem that in extremis may lead to contractual and even legal claims, but in any case sheds doubt on the whole energy efficiency approach and finally presents one of the barriers for investments in energy efficiency projects. It should therefore be addressed and in order to achieve this, one has to understand the problem: Numerous and often intertwined factors lead to the aforementioned discrepancy, based on the differences in methodological approaches and standards adopted as well as the boundary conditions they use, they will all be discussed in the paper.

Furthermore, a novel building evaluation methodology will be presented; its conceptual approach addresses the different influences addressed and taken into account, as they can significantly affect the level of achieved energy savings in buildings. In that sense, the main purpose of the proposed methodology is to evaluate in advance, the difference rate between designed and achieved energy savings. This approach can be a useful decision tool in the phase where energy efficiency projects are rated and evaluated for possible investments. (C) 2017 The Authors. Published by Elsevier B.V.
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Yik F. W. H., 2014, FACILITIES, V20, P406
NR 27
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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J9 PROCEDIA ENVIRON SCI
PY 2017
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WC Construction & Building Technology; Engineering, Civil; Environmental Sciences
SC Construction & Building Technology; Engineering; Environmental Sciences & Ecology
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PT S
AU Nugroho, SB
Zusman, E
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Arifin, N
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Gomi, K.
Fujita, T.
BE Seto, K
Robinson, D
Virji, H

Kovacs, Z
Zhai, J
Sami, N
Pettit, C
Sridhar, KS
TI The Effect of Prepaid Electricity System on Household Energy Consumption - the Case of Bogor, Indonesia
SO URBAN TRANSITIONS CONFERENCE
SE Procedia Engineering
LA English
DT Proceedings Paper
CT Urban Transitions Conference
CY SEP, 2016
CL Shanghai, PEOPLES R CHINA
DE Prepaid Electric Metering System; Household Energy Consumption; Seemingly Unrelated Regression; Bogor City Indonesia
ID METER
AB Governments are increasingly seeking low-cost ways to curb residential energy use. This article examines the effect of one such innovative approach to energy savings in Bogor, Indonesia: a prepaid electricity meter system. The Bogor prepaid system requires households pay up front for their electricity as the meter tracks consumption and credit. By enabling users to see the relationship between energy use and costs, the metering system is intended to promote energy savings behaviour. However, the system in Bogor is introduced on a voluntarily opt-in basis. Further, it is still uncertain whether those joining the program will actually save energy. Identifying which kinds of households are most likely to join the program and then save energy are important considerations as policymakers contemplate further reforms to Bogor's prepaid system. A survey was conducted of 600 Bogor households to determine whether certain kinds of households were more inclined to join the voluntary program and self-report energy-relevant behaviour. A seemingly unrelated regression equation (SURE) model was then used to estimate the possible correlation between a series of covariates familiar to the energy savings literature and the decision to initially join and then saving energy through the program. The result shows the family size and recent income changes (during the last five years) were more likely to join voluntary program, while senior citizens were less likely to join. The results also reveal that education level play significant role in changing behaviour of households in the program. The results suggest that the program needs to be made convenient for low-income and elderly households. Accompanying the program with additional information on energy savings might also help make the program more effective. (c) 2017 The Authors. Published by Elsevier Ltd.
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TC 0
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PU ELSEVIER SCIENCE BV
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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PT J
AU Papadopoulos, TA
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AF Papadopoulos, Theofilos A.
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Papagiannis, Grigoris K.
TI USE Efficiency: an innovative educational programme for energy efficiency in buildings
SO INTERNATIONAL JOURNAL OF SUSTAINABLE ENERGY
LA English
DT Article
DE Energy audits; energy education; building energy efficiency; inter-institutional programme; interdisciplinary course
ID SUSTAINABLE DEVELOPMENT; IMPLEMENTATION; DESIGN
AB Power engineers are expected to play a pivotal role in transforming buildings into smart and energy-efficient structures, which is necessary since buildings are responsible for a considerable amount of the total energy consumption. To fulfil this role, a holistic approach in education is required, tackling subjects traditionally related to other engineering disciplines. In this context, USE Efficiency is an inter-institutional and interdisciplinary educational programme implemented in nine European Universities targeting energy efficiency in buildings. The educational programme effectively links professors, students, engineers and industry experts, creating a unique learning environment. The scope of the paper is to present the methodology and the general framework followed in the USE Efficiency programme. The proposed methodology can be adopted for the design and implementation of educational programmes on energy efficiency and sustainable development in higher education. End-of-course survey results showed positive feedback from the participating students, indicating the success of the programme.
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FU USE Efficiency project of the IEE programme; USE Efficiency project in the frame of the IEE programme
FX The funding of this work under the USE Efficiency project in the frame of the IEE programme is greatly acknowledged. The authors are solely responsible for the results presented in this paper, which do not represent the Community.
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AF Rafsanjani, Hamed Nabizadeh
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Tang, P
TI Analysis of Delay Interval and Energy-Load Variation for Non-Intrusively Extracting Occupant Energy-Use Information in Commercial Buildings
SO COMPUTING IN CIVIL ENGINEERING 2017: SMART SAFETY, SUSTAINABILITY, AND RESILIENCE
LA English
DT Proceedings Paper
CT ASCE International Workshop on Computing in Civil Engineering (IWCCE)

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CL Univ Washington, Seattle, WA
SP Amer Soc Civil Engineers, Amer Soc Civil Engineers, Comp Div
HO Univ Washington
AB Many studies indicate that energy consumption in commercial buildings is highly related to occupants' energy-use behaviors, and improving these behaviors is regarded as the most cost-effective approach toward enhancing commercial building energy efficiency. Effective behavior-interventions rely on the availability of occupant-specific energy-use information, which is extremely expensive to capture with existing intrusive load monitoring (ILM) technologies. On the other hand, non-intrusive load monitoring (NILM) approaches have proven cost effective for monitoring appliance-specific energy consumption. In order to extend the concept of NILM to occupant energy-use monitoring in commercial buildings, this paper examines the importance of two occupancy-related energy-use variables-delay interval and energy-load variation-in identifying occupant-specific energy-use information. The results from implementing a k-Nearest Neighbors classifier into aggregate energy consumption data collected over the course of one month from a small office space reveal that these variables are effective in developing sophisticated NILM-based approaches for obtaining occupant energy consumption information. By providing this information at minimal cost, such approaches could make a great contribution to behavior-related energy research.
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FX This work was financially supported by the Research Council Interdisciplinary Grant Award from UNL. Any opinions, findings, conclusions, or recommendations expressed in this paper are those of the authors and do not necessarily reflect the views of the UNL Research Council.
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GP IEEE
TI Exploring the Application and Usability of NFC for Promoting Self-Learning on Energy Consumption of Household Electronic Appliances
SO 2017 IEEE 4TH INTERNATIONAL CONFERENCE ON SOFT COMPUTING & MACHINE INTELLIGENCE (ISCMI)
LA English
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CT 4th IEEE International Conference on Soft Computing & Machine Intelligence (ISCMI)
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CL MAURITIUS
SP IEEE, IEEE Computat Intelligence Soc, India Int Congress Computat Intelligence, Scientia Salus Patriae
DE near-field communication; self-learning; energy consumption; household appliances; usability
AB During the past decade, the significant increase in the adoption of consumer electronics has caused a rise in energy demand within the residential and household sectors globally. Since these electronics are dependent on electricity, the impact of these sectors on the environment is also deteriorating and it becomes important to take remedial action. For this, various websites and mobile applications have emerged that provide information to household users on energy consumption of devices and as well as reduction mechanisms. However, since these platforms are limited in various ways in their endeavor to promote self-learning on energy consumption reduction, awareness still remains an important barrier thus giving rise to the need for further investigation on innovative technologies and platforms. Even though Near Field Communication (NFC) could potentially be used, limited work has been conducted in relation to energy consumption of consumer electronics. As such, this paper delves into the application and usability of NFC for promoting self-learning on energy consumption of household electronic appliances through an Android based application called NFC Energy Tracker (NET).
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NR 22
TC 0
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PT J
AU Risch, A
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Salmon, Claire
TI What matters in residential energy consumption: evidence from France
SO INTERNATIONAL JOURNAL OF GLOBAL ENERGY ISSUES
LA English
DT Article
DE household energy consumption; discrete-continuous choice model; residential sector
ID SPACE HEATING EXPENDITURES; ELECTRICITY DEMAND; MICROECONOMETRIC APPROACH; HOMEOWNERS DECISIONS; SOCIAL PRACTICE; CHOICE ANALYSIS; POLICY MEASURES; HOUSEHOLD; SECTOR; GERMANY
AB Given the objectives countries set to realise energy savings and decrease greenhouse gas emissions, an understanding of the main factors driving household energy consumption is crucial in formulating effective policy measures. The objective of this study is to identify the main determinants of household energy consumption in French residences. The model uses a discrete-continuous decision framework that allows for interactions between decisions about the heating system (discrete choice) and about energy consumption (continuous choice). The results show that the intensity of energy used per square metre is almost completely determined by the technical properties of the dwelling and the climate. The role of socio-demographic variables is shown to be particularly small. The paper shows that to be effective,

environmental policy must strongly encourage households to renovate and adopt energy-saving appliances.

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NR 63
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Z9 0
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PU INDERSCIENCE ENTERPRISES LTD
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PA WORLD TRADE CENTER BLDG, 29 ROUTE DE PRE-BOIS, CASE POSTALE 856, CH-1215 GENEVA, SWITZERLAND
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WC Environmental Studies
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GA EO2TP
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ER

PT J
AU Shin, W
Park, M
AF Shin, Wonkyoung
Park, Minyong
TI Quantitative Analysis Of User Interfaces For Large Electronic Home Appliances And Mobile Devices Based On Lifestyle Categorization Of Older Users
SO EXPERIMENTAL AGING RESEARCH
LA English
DT Article
ID ADULTS; AGE; USABILITY; DESIGN; ENVIRONMENTS; PERFORMANCE; CONSUMERS; PRODUCTS; PEOPLE; GENDER
AB Background/Study Context: The increasing longevity and health of older users as well as aging populations has created the need to develop senior-oriented product interfaces. This study aims to find

user interface (UI) priorities according to older user groups based on their lifestyle and develop quality of UI (QUI) models for large electronic home appliances and mobile products.Methods: A segmentation table designed to show how older users can be categorized was created through a review of the literature to survey 252 subjects with a questionnaire. Factor analysis was performed to extract six preliminary lifestyle factors, which were then used for subsequent cluster analysis. The analysis resulted in four groups. Cross-analysis was carried out to investigate which characteristics were included in the groups. Analysis of variance was then applied to investigate the differences in the UI priorities among the user groups for various electronic devices. Finally, QUI models were developed and applied to those electronic devices.Results: Differences in UI priorities were found according to the four lifestyles (money-oriented, innovation-oriented, stability- and simplicity-oriented, and innovation- and intellectual-oriented). Twelve QUI models were developed for four different lifestyle groups associated with different products. Three washers and three smartphones were used as an example for testing the QUI models.Conclusion: The UI differences of the older user groups by the segmentation in this study using several key (i.e., demographic, socioeconomic, and physical-cognitive) variables are distinct from earlier studies made by a single variable. The differences in responses clearly indicate the benefits of integrating various factors of older users, rather than single variable, in order to design and develop more innovative and better consumer products in the future. The results of this study showed that older users with a potentially high buying power in the future are likely to have higher satisfaction when selecting products customized for their lifestyle. Designers could also use the results of UI evaluation for older users based on their lifestyle before developing products through QUI modeling. This approach would save time and costs.

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TC 0
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SC Geriatrics & Gerontology; Psychology
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PT S
AU Trombley, J
Halawa, E
AF Trombley, Jeremy
Halawa, Edward
BE Ma, Z
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Cooper, P
TI Can further energy reductions be achieved through behaviour changes in low income households?
SO IMPROVING RESIDENTIAL ENERGY EFFICIENCY INTERNATIONAL CONFERENCE, IREE 2017
SE Energy Procedia
LA English
DT Proceedings Paper
CT International Conference on Improving Residential Energy Efficiency (IREE)
CY FEB 16-17, 2017
CL Woollongong, AUSTRALIA
SP Univ Woollongong, Sustainable Buildings Res Ctr
DE energy; low income; tropical; behaviour change; barriers; non-energy benefits
ID CONSERVATION; CONSUMPTION
AB Smart Cooling in the Tropics (SCIT) was a project whose main goals were to create energy savings and improve human thermal comfort in low income households located in Darwin, Australia. The project was funded through the Australian Government's Low Income Energy Efficiency Program (LIEEP). The attitudes and behaviours of the 476 participants were investigated through a series of surveys. Each participant was allocated a single, focused treatment based on the results from a home energy assessment. The impediments to energy savings were found to be diverse among participants, so having an individualized treatment plan was necessary to ensure it was appropriate for each participant. One particular aspect of the project that is examined here was the energy savings brought about using education to initiate behaviour changes in participants to reduce their electricity usage. The data collected showed that participants were already actively trying to reduce their consumption through common energy-saving practices before joining SCIT, which were the main energy-saving practices proposed through SCIT, and so further significant reductions through behaviour changes were not likely. At the conclusion of the project, over half of the participants identified a range of barriers still preventing them from additional savings and are described herein. The project was successful in improving thermal comfort levels in participating homes, as demonstrated by over 76% of participants saying they felt cooler/more comfortable because of their involvement. Furthermore, it was found that non-energy benefits were valued higher than energy savings, and improvements in comfort were the most identified and highest rated of all benefits. (C) 2017 The Authors. Published by Elsevier Ltd.
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NR 17
TC 0
Z9 0
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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AU Xiang, KL
Lin, HY
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AF Xiang, KangLi
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GP IEEE
TI A Residential End-use Electric Energy Consumption Model Based on the Development of Household Appliances
SO 2017 IEEE CONFERENCE ON ENERGY INTERNET AND ENERGY SYSTEM INTEGRATION (EI2)
LA English
DT Proceedings Paper
CT IEEE Conference on Energy Internet and Energy System Integration (EI2)
CY NOV 26-28, 2017
CL Beijing, PEOPLES R CHINA
SP IEEE, IEEE Power & Energy Soc, Tsinghua Univ, SEE, Energy Internet Res Inst, Beijing Assoc Sci & Technol, Tsinghua Berkeley Shenzhen Inst
DE household appliances; lighting; end-use electric energy consumption
AB Household appliances and lighting devices are the main terminals of electric energy in residential area. The demand of end-use electric energy is increasing with the development and innovation of household appliances. This paper analyzes the main factors influencing the terminal power consumption, provides a new method to estimate residential end-use electric energy consumption based on the purchase probability model of household appliances and lighting demand model, and optimizes the model according to the survey results in Fujian province, finally through the historical data of Fujian province to verify the model.
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PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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WC Energy & Fuels; Engineering, Electrical & Electronic
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TI Investigation on Passive Energy-saving Technologies of Demonstration Houses in Taohai Pasture
SO 10TH INTERNATIONAL SYMPOSIUM ON HEATING, VENTILATION AND AIR CONDITIONING, ISHVAC2017
SE Procedia Engineering
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CT 10th International Symposium on Heating, Ventilation and Air Conditioning (ISHVAC)
CY OCT 19-22, 2017
CL Jinan, PEOPLES R CHINA
SP Shandong Univ, Tsinghua Univ, Hong Kong Polytechn Univ, Univ Maryland, Univ Sydney, UiT
DE Rural demonstration house; passive energy-saving technology; energy simulation
AB With the construction of new villages in China, energy-saving technologies for rural buildings have been attracted extensive attention. According to the characteristic of severe cold climate in Hailar, Inner Mongolia, and the structure of rural residential buildings in Taohai Pasture and the energy use customs in these houses, the energy efficiencies of passive energy-saving technologies which are applied to demonstration houses in Taohai Pasture are analyzed. Based on BIM, the calculation models of three types of houses, including the demonstration house applied passive energy-saving technologies, the traditional house and the energy-saving standard model based on local rural residential energy-saving design standard, are established. Then energy simulation software is used to calculate dynamic heating loads of these houses. Furthermore some indexes such as heating load and annual energy consumption per unit building area are compared. The calculated results show that the heating load of the demonstration house in Taohai Pasture is decreased obviously through the passive energy-saving strategies of the thermal insulation of building envelopes, the effective setting of a solar room and the reasonable distribution of indoor functional zones. Compared to the annual heating loads of the traditional house and the energy-saving standard model, that of the demonstration house is reduced about 74.8 % and 28.9%, respectively. The investment increase of the envelope of the demonstration house can be recovered within 11.4 years through the reduction of annual energy use for heating. (c) 2017 The Authors. Published by Elsevier Ltd.
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FU 12th "Five-Year" National Science and Technology Infra-structure Program [2013BAL01B03]; Natural Science Basis Research Plan in Shaanxi Province of China [2016JM5077]
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PT J
AU Zhang, SC
Jiang, YQ
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Liu, ZJ
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AF Zhang, Shicong
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Liu, Zongjiang
Sun, Deyu
TI Key prescriptive parameters analysis of the new china building energy code based on saving to investment ratio methodology
SO INDOOR AND BUILT ENVIRONMENT
LA English
DT Article
DE Building energy code; Key prescriptive parameter; Incremental cost; SIR methodology; Payback period
ID LIFE-CYCLE
AB In this paper, a saving to investment ratio (SIR) method was used to determine the key prescriptive parameters for upgrading the building energy code with different energy reduction ratio requirements, including the U value of walls, roofs and windows; as well as a consideration of the efficiency of boilers and coefficient of performance of water chillers. An economic model for single typical energy saving technologies was established and the relationship between the incremental cost and the payback period of

the different technologies was analysed; then the baseline building model was optimized by these measures in descending order according to the SIR methodology. The model method (SIR) was then applied to case studies in four climate regions of China. A large office reference building situated in Harbin, Beijing, Shanghai and Guangzhou in climate zones from north to south of China was analysed as examples to showcase the relationship between the building energy saving ratio and the incremental cost. The key prescriptive parameter requirements of walls, roofs, windows, chillers and boilers with 5% and 10% energy saving ratios were defined separately for these buildings.

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PU SAGE PUBLICATIONS LTD
PI LONDON
PA 1 OLIVERS YARD, 55 CITY ROAD, LONDON EC1Y 1SP, ENGLAND
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J9 INDOOR BUILT ENVIRON
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WC Construction & Building Technology; Engineering, Environmental; Public, Environmental & Occupational Health
SC Construction & Building Technology; Engineering; Public, Environmental & Occupational Health
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ER

PT J
AU Dahlmann, F
Veal, G
AF Dahlmann, Frederik
Veal, Gareth
TI THE ROLE OF UMBRELLA AGREEMENTS IN ACHIEVING SUSTAINABILITY GOALS: ENERGY EFFICIENCY AT THE EMPIRE STATE BUILDING
SO JOURNAL OF GREEN BUILDING
LA English
DT Article
DE umbrella agreements; contractual arrangements and sustainability goals; energy service companies; Empire State Building; managing contractual performance risks; energy efficiency and management
ID PERFORMANCE CONTRACTING EPC; TRANSACTION COSTS TCS; BUSINESS MODEL; CORPORATE SUSTAINABILITY; SERVICE CONTRACTS; MANAGEMENT; UNCERTAINTY; PERSPECTIVE; INDUSTRY; RESPONSIBILITY
AB In this paper we investigate whether innovative and flexible contractual arrangements can support the process of achieving ambitious sustainability goals. We explore this question through an analysis of the role of umbrella agreements in driving energy savings in the building sector. Drawing on a case study of the iconic Empire State building, we examine the typical challenges faced by clients and contractors in devising suitable agreements that facilitate managing contractual and performance risks, as well as the sharing of responsibilities and cooperation between multiple project stakeholders. We find that the project arrangements appear to exhibit the adoption of the key characteristics commonly found in umbrella agreements which incorporate sustainability measures that maximize income through efficient delivery of outcomes. Specifically, this means that they need to enable stakeholders to manage repeated review cycles, complex perceptions and expectations, and different tacit assumptions and codes of behaviour, as well as managing and communicating in networks and obtaining agreement also from non-contractual parties. Moreover, we demonstrate that umbrella agreements can facilitate a network perspective of business relationships by emphasizing value co-creation and the embeddedness of firms within a network of interactions.
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JI J. Green Build.
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WC Architecture
SC Architecture
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PT J
AU Aune, M
Godbolt, AL
Sorensen, KH
Ryghaug, M
Karlstrom, H
Naess, R
AF Aune, Margrethe
Godbolt, Asne Lund
Sorensen, Knut H.
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Karlstrom, Henrik
Naess, Robert
TI Concerned consumption. Global warming changing household domestication of energy
SO ENERGY POLICY
LA English
DT Article
DE Household energy consumption; Climate change; Domestication; Energy efficiency; Energy culture
ID CLIMATE-CHANGE; LIFE-STYLES; HOME; ATTITUDES; TECHNOLOGIES; INNOVATIONS;

POLICY

AB This paper addresses possible effects of the growing focus on global warming on households' domestication of energy and the dynamics of energy consumption by comparing data pertaining to the domestication of energy within Norwegian households from two time periods: first, 1991-1995, when climate change was given little public attention, and, second, 2006-2009, after climate change became a major public concern. In the first period, we observed that the domestication of energy resulted in an energy culture emphasizing comfort and convenience with respect to everyday life and the abundant supply of clean hydropower. In the second period, this culture seemed to have changed, making households more concerned about their energy consumption. Consumption of energy was linked to climate change, and many interviewees claimed to save energy. However, the dominant expectation was still to be able to manage everyday life in a convenient and comfortable way. Thus, climate change concerns produced some but not very radical changes in the practical domestication of energy, including energy saving. A main effect was feelings of guilt, tempered by arguments regarding why change is difficult and complaints about political inaction. Thus, public engagement with climate change issues may facilitate energy efficiency policy but to succeed, wider climate policy measures seem to be needed. (C) 2016 Elsevier Ltd. All rights reserved.

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NR 39
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JI Energy Policy
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SC Business & Economics; Energy & Fuels; Environmental Sciences & Ecology
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PT J
AU Benitez, I
Diez, JL
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Delgado, I
AF Benitez, Ignacio
Diez, Jose-Luis
Quijano, Alfredo
Delgado, Ignacio
TI Dynamic clustering of residential electricity consumption time series
data based on Hausdorff distance
SO ELECTRIC POWER SYSTEMS RESEARCH
LA English
DT Article
DE Dynamic clustering; Data mining; Load profiles
ID FUZZY C-MEANS
AB As the analysis of electrical loads is reaching data measured from low voltage power distribution networks, there is a need for the main agents involved in the operation and management of the power grids to segment the end users as a function of their shapes of daily energy consumption or load profiles, and to obtain patterns that allow to classify the users in groups based on how they consume the energy. However, this analysis is usually limited to the analysis of single days. Since the smart metering data are time series formed by sequential measurements of energy through each hour or quarter of hour of the day, and also through each day, thanks to the implementation of Advanced Metering Infrastructure (AMI) and

the Smart Grid technologies, it becomes clear that the analysis of the data needs to be extended to consider the dynamic evolution of the consumption patterns through days, weeks, months, seasons, and even years. This is the objective of the present work. A new framework is presented that addresses the dynamic clustering, visualization and identification of temporal patterns in load profiles time series, fulfilling the detected gap in this area. The present development is a generic framework that allows the clustering and visualization of load profiles time series applying different classical clustering algorithms. A novel dynamic clustering algorithm is also presented, based on an initial segmentation of the energy consumption time series data in smaller surfaces, and the computation of a similarity measure among them applying the Hausdorff distance. Following, these developments are presented and tested on two dataset of energy consumption load profiles from a sample of residential users in Spain and London. (C) 2016 Elsevier B.V. All rights reserved.

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FU INGENIO program; CDTI (Technological Development Centre of the Ministry of Science and Innovation of Spain)
FX The data set for the Spanish case used in this work has been provided by the Spanish DSO Iberdrola Distribucion Electrica S.A. as part of the works developed in the Spanish R&D project GAD. The GAD or "Active Demand Management" (in Spanish) project was a project financed by the INGENIO 2010 program and supported by the CDTI (Technological Development Centre of the Ministry of Science and Innovation of Spain).

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WC Engineering, Electrical & Electronic
SC Engineering
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PT J
AU Luo, T
Pan, JY
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AF Luo, Tao
Pan, Ji-Yong
Gao, Hong-Jiang
Jia, Hui-Yan
TI Application Study of Green Building Energy Consumption Analysis Based on BIM Technology
SO JOURNAL OF RESIDUALS SCIENCE & TECHNOLOGY
LA English
DT Article
AB Aimed at the situation of green building design and CAD technology development, this article put forward a new green building design approach-integration of BIM technology and building energy efficiency analysis. The virtual building model created with BIM technology is a electronic database including all of the building's information. Importing this virtual building model to the building energy efficiency analysis application, we can get the energy analysis results quickly and easily.
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FU Doctoral foundation of Longyan University [LB2015003]; Fujian Provincial Department of education Youth Fund [JZ160327]
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WC Engineering, Environmental
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PT J
AU Mack, B
Tampe-Mai, K
AF Mack, Birgit
Tampe-Mai, Karolin
TI An action theory-based electricity saving web portal for households with an interface to smart meters
SO UTILITIES POLICY
LA English
DT Article
DE Intervention; Smart meter web portal; Action stage model
ID REGULATED BEHAVIORAL-CHANGE; ENERGY-CONSERVATION; SOCIAL NORMS; STAGE MODEL; FEEDBACK; METAANALYSIS; INTERVENTION; DETERMINANTS; CONSUMPTION; INFORMATION
AB The reduction in electricity consumption by private households is an important factor in the process of enhancing the sustainability of energy infrastructures. The information architecture of an action theory based smart meter web portal designed to facilitate electricity saving in private households is described with a focus on intervention techniques that support the transition from each stage of action planning to the next. Users are guided in their migration through the stages by the way information is structured. In order to address the gap between intention and action, the focus is on the support of the implementation of planned behavior. (C) 2016 Elsevier Ltd. All rights reserved.
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FU Helmholtz Alliance Energy-Trans
FX The smart meter project is funded by the Helmholtz Alliance Energy-Trans. We would like to express our gratitude towards our partners, the Stadtwerke Heidelberg Energie GmbH and Trianel GmbH, which have provided the households studied with the technical equipment needed and have supported the project in numerous ways.
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PT J
AU Park, S
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Park, S
AF Park, Sanguk
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TI Design and implementation of an office standby-power management system through physical and virtual management by user-device habitual pattern analysis in energy-Internet of Things environments
SO INTERNATIONAL JOURNAL OF DISTRIBUTED SENSOR NETWORKS
LA English
DT Article
DE Standby-power management system; energy-IoT (Internet of Things); physical and virtual management
AB In the changing environment of the Internet of Things, optimal energy management in smart spaces requires intelligent and reliable energy-aware-based context sensing and technologies that are capable of recognizing and analyzing the big-data user pattern. In this article, we propose an intelligent and reliable standby power management system. The system uses physical and virtual user behavioral pattern analysis based on energy-aware management to cut-off the standby power of office appliances in the office environment. We propose a two-step priority power-aware method. The first step entails physical perception and management that controls devices through user recognition and device relationship scenarios. The second step is virtual perception and management that controls the standby power by collecting user behavioral patterns and performs an analysis based on a rule mechanism. The proposed system was applied to three locations (offices A, B, and C) in the university test-bed. Power consumption

was reduced to 23% of the original consumption through the elimination of unnecessary standby power consumption.
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AU Egwunatum, S
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AF Egwunatum, Samuel
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TI OPTIMIZING ENERGY CONSUMPTION IN BUILDING DESIGNS USING BUILDING INFORMATION MODEL (BIM)
SO SLOVAK JOURNAL OF CIVIL ENGINEERING
LA English
DT Article
DE Building Information Modelling; Building energy performance analysis; Sustainability; Energy efficiency
ID CLIMATE-CHANGE; PERFORMANCE; IMPACTS
AB Given the ability of a Building Information Model (BIM) to serve as a multi-disciplinary data repository, this paper seeks to explore and exploit the sustainability value of Building Information Modelling/models in delivering buildings that require less energy for their operation, emit less CO2 and at the same time provide a comfortable living environment for their occupants. This objective was achieved by a critical and extensive review of the literature covering: (1) building energy consumption, (2) building energy performance and analysis, and (3) building information modeling and energy assessment. The literature cited in this paper showed that linking an energy analysis tool with a BIM model helped project design teams to predict and create optimized energy consumption. To validate this finding, an in-depth analysis was carried out on a completed BIM integrated construction project using the Arboleda Project in the Dominican Republic. The findings showed that the BIM-based energy analysis helped the design team achieve the world's first 103% positive energy building. From the research findings, the paper concludes that linking an energy analysis tool with a BIM model helps to expedite the energy analysis process, provide more detailed and accurate results as well as deliver energy-efficient buildings. The study further recommends that the adoption of a level 2 BIM and the integration of BIM in energy optimization analyse should be made compulsory for all projects irrespective of the method of procurement (government-funded or otherwise) or its size.
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AU Hormazabal, N
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TI The performance and in-use experience of low to zero carbon technologies in an experimental energy home
SO INTERNATIONAL JOURNAL OF LOW-CARBON TECHNOLOGIES
LA English
DT Article

DE zero carbon; experimental energy home; LZC; biomass boiler; sustainable home

AB In the UK, finances and resources are invested into the application of new technologies, construction materials and control systems for homes, with the aim of improving energy efficiency. One such example is the experimental BASF house, built to study the thermal performance to achieve a comfortable home that uses energy efficiently. The house includes low to zero carbon (LZC) technologies that are promoted to reach a higher level within the UK Code for Sustainable Homes (CSH). For this study a mixed-methods sequential explanatory design (Creswell JW. Research Design. Qualitative, Quantitative, and Mixed Methods Approaches, 3rd edn. Sage Publication, 2009; Nataliya VI, Creswell JW, Stick SL. Using mixed-methods sequential explanatory design: from theory to practice. Field Methods 2006; 18: 3) that has been developed in the field of social and behavioural sciences has been applied, consisting of two distinctive phases: quantitative and qualitative. The rationale behind is for the quantitative data and its analysis is used to understand system performances while the qualitative data explain the numerical results in-depth, through the subjects in study, the occupants' perceptions. This article presents conclusions from an investigation into the use and performance of a biomass boiler and passive design features, derived from a live-in experience in a well-insulated and airtight CSH Level 4 home over two consecutive winter periods (2008-9 and 2009-10), which is part of on-going research project. The study also discusses a number of issues regarding the effective efficiency and appropriateness of the systems, which were selected based on a desire to comply with regulations for a better rated home rather than on their user friendliness and comfort for the occupants of a sustainable home; jeopardizing people's safety in times.

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AU Kelly, AR
AF Kelly, Ashley Rose
TI Innovations in Home Energy Use: A Sourcebook for Behavior Change
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CR SOUTHWELL BG, 2016, INNOVATIONS HOME ENE
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PT J
AU McGill, G
Oyedele, LO
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AF McGill, Grainne
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McAllister, Keith
Qin, Menghao
TI Effective indoor air quality for energy-efficient homes: a comparison of UK rating systems
SO ARCHITECTURAL SCIENCE REVIEW
LA English
DT Article
DE sustainable assessment tools; indoor air quality; sustainability

criteria; energy-efficient Homes; UK eco-homes; zero carbon

ID ENVIRONMENTAL ASSESSMENT SCHEMES; ASSESSMENT TOOLS; HEALTH; VENTILATION; BUILDINGS; SUSTAINABILITY; SYMPTOMS; FEASIBILITY; ASSOCIATION; REFLECTIONS

AB The use of sustainable assessment methods in the UK is on the rise, anticipating the future regulatory trajectory towards zero carbon by 2016. The indisputable influence of sustainable rating tools on UK building regulations conveys the importance of evaluating their effectiveness in achieving true sustainable design, without adversely effecting human health and well-being. This paper reviews indoor air-quality (IAQ) issues addressed by UK sustainable assessment tools, and the potential trade-offs between building energy conservation and IAQ. The barriers to effective adoption of IAQ strategies are investigated, including recommendations, suggestions, and future research needs. The review identified a fundamental lack of IAQ criteria in sustainable assessment tools aimed at the residential sector. The consideration of occupants' health and well-being should be paramount in any assessment scheme, and should not be overshadowed or obscured by the drive towards energy efficiency. A balance is essential.

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NR 63
TC 0
Z9 0
U1 3
U2 18
PU TAYLOR & FRANCIS LTD
PI ABINGDON
PA 2-4 PARK SQUARE, MILTON PARK, ABINGDON OR14 4RN, OXON, ENGLAND
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J9 ARCHIT SCI REV
JI Archit. Sci. Rev.
PD MAR 3
PY 2016
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IS 2
BP 159
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WC Architecture
SC Architecture
GA DG2PZ
UT WOS:000371911000010
DA 2018-05-03
ER
FN Clarivate Analytics Web of Science
VR 1.0
PT B
AU Anand, R

Raj, H
AF Anand, Rishi
Raj, Himanshu
GP IEEE
TI Reliable Communication for Sustainable Energy Efficient Low Power Smart Home Application (SELSA)
SO 2016 International Conference on Internet of Things and Applications (IOTA)
LA English
DT Proceedings Paper
CT International Conference on Internet of Things and Applications (IOTA)
CY JAN 22-24, 2016
CL Maharashtra Acad Engn & Educ Res, Maharashtra Inst Technol, Pune, INDIA
SP IEEE Pune Sect
HO Maharashtra Acad Engn & Educ Res, Maharashtra Inst Technol
DE Internet of Things; Remote Management; Smart Home; ESP8266; MQTT Protocol
ID AGENTS
AB Technology has played a vital role in our living lifestyle. Today Technology is monotonically increasing our comfort level. Using very much efficient Technology that could save energy is what we are looking for. SELSA (Sustainable Energy Efficient Low Power Smart Home Application) is a solution to cut off Energy Wastage and provide users with multiple benefits like Remote Management, Intrusion Detection, Safety Solution and much more. At the same time SELSA uses ESP8266 which is extremely low power consuming hardware and MQTT which is very much lightweight publish-subscribe based messaging protocol to connect to Internet, this makes it very much reliable solution to cut off Energy Wastage and provide other benefits like Remote Management etc. Thus SELSA saves more energy and delivers secure, smart and connected solutions for a home.
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NR 14
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-5090-0044-9
PY 2016
BP 281
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WC Computer Science, Interdisciplinary Applications; Computer Science,
Theory & Methods
SC Computer Science
GA BG5IQ
UT WOS:000389507100040
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ER

PT S
AU Asadi, I
Mahyuddin, N
Shafigh, P
AF Asadi, Iman
Mahyuddin, Norhayati
Shafigh, Payam
BE Kamaruzzaman, SNB
Ali, ASB
Azmi, NFB
Chua, SJL
TI The relation between indoor environnemental quality (IEQ) and energy
consumption in building based on occupant behavior - A review
SO 4TH INTERNATIONAL BUILDING CONTROL CONFERENCE 2016 (IBCC 2016)
SE MATEC Web of Conferences
LA English
DT Proceedings Paper
CT 4th International Building Control Conference (IBCC)
CY MAR 07-08, 2016
CL Kuala Lumpur, MALAYSIA
SP Fac Built Environm, Dept Bldg Surveying, Royal Inst Surveyors Malaysia, Univ Kebangsaan, Univ
Technol MARA
DE indoor environmental quality (IEQ); energy consumption; human behavior
ID ENVIRONMENTAL-QUALITY; RESIDENTIAL BUILDINGS; SIMULATION; PERFORMANCE;
ACCEPTANCE; COMFORT; MODEL; HEAT
AB Indoor Environmental Quality (IEQ) is an important topic which impacts on occupant health,
productivity and also energy consumption in buildings. The four main parameters for IEQ evaluation are:
Thermal comfort, indoor air quality, visual comfort and aural comfort. The occupant behavior in buildings
defines as any direct or indirect act which an occupant selects to change the displeasure environmental
condition into the comfort conditions. The selected behavior by human has a significant impact on the
energy consumption in buildings. This paper reviews the methods which used to simulate IEQ parameters,
energy consumption and human behavior in buildings. It aims to promote the idea of more consideration
about the relation between occupant behavior and energy usage in buildings. This summary of existing
studies about the importance of human behavior factor in energy simulation software helps to identify
new methods and strategies for simulating IEQ, Energy and behavior.
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OI Shafigh, Payam/0000-0002-8576-3984; MAHYUDDIN,
NORHAYATI/0000-0002-0827-0975; Asadi, Iman/0000-0001-8724-6916
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NR 36
TC 0
Z9 0
U1 0
U2 3
PU E D P SCIENCES
PI CEDEX A
PA 17 AVE DU HOGGAR PARC D ACTIVITES COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE
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J9 MATEC WEB CONF
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SC Construction & Building Technology; Engineering; Materials Science
GA BG1FS
UT WOS:000386718500084
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PT S
AU Bahn, H

AF Bahn, H.
BE Kyriakopoulos, GL
TI Energy-efficient vertical transportation with sensor information in smart green buildings
SO 2016 INTERNATIONAL CONFERENCE ON NEW ENERGY AND FUTURE ENERGY SYSTEM (NEFES 2016)
SE IOP Conference Series-Earth and Environmental Science
LA English
DT Proceedings Paper
CT International Conference on New Energy and Future Energy System (NEFES)
CY AUG 19-22, 2016
CL Beijing, PEOPLES R CHINA
ID SYSTEMS
AB In modern smart green buildings, sensors can detect various physical status of a building such as temperature, humidity, motion, and light, which can be used for smart living services. This paper presents an energy-efficient vertical transportation by making use of indoor sensor technologies. Specifically, sensors detect elevator users before they push the call button, and then inform to the elevator control system through building networks. By using this information, our system generates a reservation call and controls the moving time and direction of each elevator efficiently. Simulation experiments with a variety of traffic situations show that our elevator control system exhibits significantly better performance than the conventional system that does not use sensor information with respect to passengers' waiting time and energy consumption.
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NR 21
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U1 2
U2 3
PU IOP PUBLISHING LTD
PI BRISTOL
PA DIRAC HOUSE, TEMPLE BACK, BRISTOL BS1 6BE, ENGLAND
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WC Energy & Fuels
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GA BG6QE
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PT S
AU Botticella, F
De Rossi, F
Mauro, AW
Nota, C
Vanoli, GP
AF Botticella, F.
De Rossi, F.
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Nota, C.
Vanoli, G. P.
GP INT INST REFRIGERAT
TI POTENTIAL ENERGY SAVING AND EMISSIONS REDUCTION USING PROPANE IN AN AIR-TO-WATER HEAT PUMP SYSTEM FOR HEATING AND COOLING IN RESIDENTIAL AND SERVICE BUILDINGS
SO 12TH IIR GUSTAV LORENTZEN NATURAL WORKING FLUIDS CONFERENCE
SE Refrigeration Science and Technology
LA English
DT Proceedings Paper
CT 12th IIR Gustav Lorentzen Natural Working Fluids Conference
CY AUG 21-24, 2016
CL Heriot Watt Univ, Edinburgh, SCOTLAND
SP Int Inst Refrigerat, J & E Hall Int, Epta, LU VE Grp, Bitzer, Danfuss, Emerson Climate Technol, Yellow Jacket
HO Heriot Watt Univ
DE propane; heat pump; CO2 emissions; TEWI
ID REFRIGERANT CHARGE; HYDROCARBONS; DESIGN
AB As reported in the IEA's report "Energy Technology Perspectives: Scenarios & Strategies to 2050 - IEA 2010", considering the building sector it is expected that the global final energy demand will increase up to 60% and the CO2 emissions will be nearly doubled in 2050. Following the current trends, the global average temperature is expected to rise of 3.6 degrees C in the long-term, as the World Energy Outlook 2014 shows. To reduce the environmental concerns related to the heating and cooling needs in the building sector, the heat pumps represent a valid option.

Being the indirect emissions for these appliances over the 90% of the total one, the improvement of the performance is of primary importance combined to the use of low GWP refrigerants, as the natural ones. Here the potential energy savings and emissions reduction is presented for propane air-to-water heat pumps in comparison to HFC ones, for several final users (apartment block and school building) and climates (warm, cold and average). For a fixed climate condition, changing the fluid and the final user type, through the modeling of the heat pump balanced with the same bivalent temperature, the performance maps are carried out; hence, a model in TRNSYS allows the integration of the energy consumption over the whole year accounting for real climatic data. Finally, the energy consumptions are adjusted with a factor accounting for the partial load operation and the TEWI parameter is used to measure the reduction of the total environmental impact.
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FU project: "SMART CASE - Soluzioni innovative multifunzionali per l'ottimizzazione dei consumi di energia primaria e della vivibilita indoor" [CUP: B58F12000450005]
FX This research was developed as a part of the project: "SMART CASE - Soluzioni innovative multifunzionali per l'ottimizzazione dei consumi di energia primaria e della vivibilita indoor (CUP: B58F12000450005)", which is gratefully acknowledged.
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NR 21
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PI PARIS
PA 177 BLVD MALESHERBES, F-75017 PARIS, FRANCE
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PY 2016
BP 827
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WC Engineering, Mechanical
SC Engineering
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PT S
AU Carbonara, E
Tiberi, M
AF Carbonara, Elisa

Tiberi, Mariagrazia
BE Masoero, MC
Arsie, I
TI Local energy efficiency interventions by the prioritization of thermal zones in an historical university building
SO 71ST CONFERENCE OF THE ITALIAN THERMAL MACHINES ENGINEERING ASSOCIATION (ATI 2016)
SE Energy Procedia
LA English
DT Proceedings Paper
CT 71st Conference of the Italian-Thermal-Machines-Engineering-Association (ATI)
CY SEP 14-16, 2016
CL Politecnico Torino, Turin, ITALY
SP Italian Thermal Machines Engn Assoc
HO Politecnico Torino
DE Building energy performances; costs benefits analysis; energy efficiency
ID CHP COMBINED HEAT; NATIONAL-PARKS; MICRO-CHP; PERFORMANCES; HYDROGEN; SYSTEMS; FRAGMENTATION; MANAGEMENT; TURBINES; COMFORT
AB Architectural constraints are a crucial aspect in energy retrofitting of historic buildings. Usual global interventions are often not allowed since preserving historical values of the building stock is mandatory. In this paper, the authors provide an alternative procedure by identifying the most profitable local interventions in order to maintain the architectural values during the restoration and energy retrofitting operations. So, thermal zones prioritization is the key element considered in this study. Its aim is to analyse which energy efficiency measures could be applied to a listed building, but at certain technological elements rather than a unique choice for the entire building envelope. Thus it will prove that you can work with individual elements of the building without compromising the protection of architectural good. The attention was placed in promoting single measures and improving the quality of the built environment. The case study is an historical building in Rome, currently used for university purposes. The analysis was carried out through a building simulation model so that to assess the building energy performance before and after the selected interventions. The chosen software is TRNSYS. This approach shows how interventions, usually not applicable at the building scale, would be beneficial if applied at local scale such as a single thermal zone or a single technological unit. The authors built a reference scenario and, for each identified thermal zone, tested the energy efficiency improvement in terms of heating demand reduction coming from the hypothesized local intervention. (C) 2016 The Authors. Published by Elsevier Ltd.
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[Anonymous], 1964, INT CHART CONS REST
NR 30
TC 0
Z9 0
U1 0
U2 0
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2016
VL 101
BP 988
EP 994
DI 10.1016/j.egypro.2016.11.125
PG 7
WC Thermodynamics; Engineering, Mechanical
SC Thermodynamics; Engineering
GA BH1HC
UT WOS:000398030000125
OA gold
DA 2018-05-03
ER

PT S
AU Case, M
Zhivov, A
Liesen, R
Zhivov, M
AF Case, Michael
Zhivov, Alexander
Liesen, Richard
Zhivov, Michael
GP ASHRAE
TI A Parametric Study of Energy Efficiency Measures Used in Deep Energy
Retrofits for Two Building Types and US Climate Zones
SO ASHRAE TRANSACTIONS, VOL 122, PT 1
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT ASHRAE Winter Conference
CY JAN 23-27, 2016
CL Orlando, FL
SP ASHRAE

AB One of the critical tasks of the International Energy Agency's Energy Conservation in Buildings and Communities Program's (IEC ECBC's) Annex 61 Business and Technical Concepts for Deep Energy Retrofit (DER) of Public Buildings is to develop bundles of core technologies (measures), which, when applied in major renovation projects to older, pre-1980 buildings, allow site energy reduction by 50% or better compared to the pre-renovation baseline. A short list of these technologies has been generated through analysis of DER projects (Zhivov et al. 2015). Characteristics of some of these "core technologies" depend on technologies available on an individual nation's market, minimum requirements of national standards, and life-cycle cost (LCC) analysis. In addition to these factors, requirements for building envelope-related technologies (e.g., insulation levels, windows), depend on specific climate conditions. This paper presents the results of computational modeling analysis conducted by the U.S. Army Engineer Research and Development Center team to determine the performance potential of the core technologies for two categories of buildings with relatively low internal loads in 15 U.S. climates using the net zero planner tool. This tool enabled simultaneous simulation of multiple building types and multiple technology bundles of energy efficiency measures in different climate zones. This research supported development of requirements for building envelope characteristics and typical equipment best practices for DER projects. Information presented in the paper along with results of similar studies conducted in Denmark, Estonia, Austria, Germany, China, and the UK (Riel et al. 2016; Yao et al. 2016; Zhivov 2016) for their nation-specific climate conditions have been used to develop general guidelines for technology bundles to be used in DER projects (Zhivov et al. 2016). Results of these studies show that 50% of site energy use reduction can be achieved in most climate conditions using a limited number of technologies readily available on the market. It is easier to reduce energy consumption in heating-dominated climates than in climates requiring cooling and humidity control. Additional energy efficiency technologies and measures specific to the building type and use, as well as to specific climate conditions, can further reduce energy use intensity of the building and allow achievement of even higher performance buildings (e.g., passive house standard or even net zero energy).

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CR ASHRAE, 2010, 9012010 ASHRAE
ASHRAE, 2007, 9012010 ASHRAE
ASHRAE, 2009, 18912009 ASHRAE
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ASHRAE, 1980, 9011980 ASHRAE
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USACE, 2013, LIGHTN DES GUID LOW
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Zhivov A, 2015, ASHRAE T, V121

NR 16

TC 0

Z9 0

U1 0

U2 0

PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS

PI ATLANTA

PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA

SN 0001-2505

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J9 ASHRAE TRAN

PY 2016

VL 122

BP 44

EP 57
PN 1
PG 14
WC Thermodynamics; Construction & Building Technology
SC Thermodynamics; Construction & Building Technology
GA BJ2CO
UT WOS:000418957700004
DA 2018-05-03
ER

PT S
AU Cesena, EAM
Good, N
Mancarella, P
AF Cesena, E. A. Martinez
Good, Nicholas
Mancarella, P.
GP IEEE
TI Energy Efficiency at the Building and District Levels in a Multi-Energy Context
SO 2016 IEEE INTERNATIONAL ENERGY CONFERENCE (ENERGYCON)
SE IEEE International Energy Conference
LA English
DT Proceedings Paper
CT IEEE International Energy Conference (ENERGYCON)
CY APR 04-08, 2016
CL Leuven, BELGIUM
SP IEEE
DE District energy systems; energy efficiency; low carbon technologies; multi-energy systems
ID ENVIRONMENTAL BENEFITS; RETROFIT
AB Increasing environmental concerns are encouraging new building energy efficiency (EE) concepts defined as reductions in net consumption of electricity, heat, gas and/or other energy vectors. Thanks to the smart grid paradigm, this is increasingly being achieved via the installation of low carbon technologies. However, this approach can be severely limited due to the physical and technical constraints of particular buildings (e.g., limited space to install technologies and limited energy network connection capacity). This paper proposes a more effective approach by explicitly including all relevant multi-energy flows in the EE concept and extending its scope to the district level. This paradigm shift allows energy flows to be produced and consumed in the most effective locations. The benefits from extending the scope of different EE concepts (e.g., based on electricity, electricity and heat, and all vectors) from the building to the district level are illustrated with a real UK multi-energy system.
C1 [Cesena, E. A. Martinez; Good, Nicholas; Mancarella, P.] Univ Manchester, Sch Elect & Elect Engn, Elect Energy & Power Syst Grp, Manchester M13 9PL, Lancs, England.
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Stoll P, 2014, ENERG POLICY, V65, P490, DOI 10.1016/j.enpol.2013.10.044
NR 13
TC 0
Z9 0
U1 1
U2 2
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2164-4322
BN 978-1-4673-8463-6
J9 IEEE INT ENER CONF
PY 2016
PG 6
WC Energy & Fuels; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BG6QX
UT WOS:000390822900058
DA 2018-05-03
ER

PT B
AU Chow, DHC
Sharples, S
AF Chow, D. H. C.
Sharples, S.
BE Wilkinson, SP
Xia, J
Chen, B
TI The feasibility of retrofitting existing office buildings to combat energy consumption due to future climate change in three key regions of China
SO SUSTAINABLE BUILDINGS AND STRUCTURES
LA English
DT Proceedings Paper
CT 1st International Conference on Sustainable Buildings and Structures (ICSBS)
CY OCT 29-31, 2015
CL Xian Jiaotong Liverpool Univ, Suzhou, PEOPLES R CHINA
SP Suzhou Municipal Govt, Suzhou Univ Sci & Technol
HO Xian Jiaotong Liverpool Univ
AB As China goes through the present phase of rapid urbanisation, there is an urgent need to reduce the energy consumption per unit area in buildings in order to mitigate a sudden surge in total energy usage in buildings. At the same time, buildings are expected to last longer, so they will also need to account for effects of future climate change. Much of China's existing buildings are not considered energy-efficient, and retrofitting these buildings to perform in the future would be a much less energy-intensive strategy than demolishing them and building new replacements. This paper aims to investigate the feasibility of retrofitting existing office buildings in three different climate regions of China. These include the "Cold" region in the north, which includes Beijing; the "Hot Summer Mild Winter" region in the south, which includes Guangzhou, and two regions from the "Hot Summer Cold Winter", which includes cities such as Shanghai and Nanjing. Using data from the climate model, HadCM3, Test Reference Years are generated for the 2020s, 2050s and 2080s, for various IPCC future scenarios for these cities, and using computer simulation, the feasibility of retrofitting office buildings to perform in the face of climate change in these regions is investigated. For the "Cold" region, simulation results suggest that energy reductions of up to 30% with improvements to the building enclosure is possible by retrofitting current existing office buildings to the current Chinese National Standard for the region. Retrofitting in the ""Hot Summer Mild Winter" region could reduce energy consumption by 45%, but the effects of retrofitting in the "Hot Summer

Cold Winter" region are less profound. Requirements for combating possible increases in energy consumption from heating and cooling demands due to future climate change was also investigated, and it was found that with the exception of Shanghai, by simply improving U-Values of the building envelope to the new national standards, the effects of future climate change can be nullified up to the 2080s. Further improvements to having similar standards as developed countries such as England and Wales will have less significance and may not be able to nullify the effects of climate change from the newly retrofitted office buildings. However, this could be achieved by involving other energy-saving strategies and installing suitable energy-saving technologies for the regions.

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NR 13

TC 0

Z9 0

U1 1

U2 2

PU CRC PRESS-TAYLOR & FRANCIS GROUP

PI BOCA RATON

PA 6000 BROKEN SOUND PARKWAY NW, STE 300, BOCA RATON, FL 33487-2742 USA

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PY 2016

BP 139

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PG 9

WC Architecture; Construction & Building Technology; Engineering, Civil

SC Architecture; Construction & Building Technology; Engineering

GA BF9OP

UT WOS:000385791200019

DA 2018-05-03

ER

PT S

AU Croitoru, C

Nastase, I

Sandu, M

Lungu, C

AF Croitoru, Cristiana

Nastase, Ilinca

Sandu, Mihnea

Lungu, Catalin

BE Damian, RM

TI Multi-criteria design and impact on energy consumption of a residential house- a parametric study

SO EENVIRO-YRC 2015 - BUCHAREST

SE Energy Procedia

LA English
DT Proceedings Paper
CT Conference on Sustainable Solutions for Energy and Environment (EENVIRO - YRC)
CY NOV 18-20, 2015
CL Bucharest, ROMANIA
SP Tech Univ Civil Engn, Fac Bldg Serv Engn
DE Energy consumption; energy efficiency; bioclimatic design; numerical simulation
ID CLIMATE ZONES; PERFORMANCE; BUILDINGS
AB High energy consumption problem has become increasingly acute human needs. Domestic heating in winter involves considerable expenses, so the idea of energy conservation and the need to implement reliable and innovative solutions in the field of energy in constructions emerged. Given these constrains, a judicious approach of the built environment is the study of energy consumption starting from the concept phase. This paper presents a parametric study regarding impact on energy consumption for different factors and the weighing associated. The analysis has been performed using an energy simulation program, which is able to provide a complex analysis of the thermal behavior of the building for different cases. The thermal behavior of a building should be the result of a multi-criteria optimization, considering both thermal comfort and energy savings. The purpose was to determine for each climatic zone when it is ineffective to increase the thermal resistance of the envelope element and the gain in energy economy begins to be insignificant. From these results we have chosen the optimal case for certain characteristics of glazed and opaque elements analyzing which is the best orientation for this case, considering both, heating and cooling load. The study indicated an optimal configuration of the envelope elements and optimal orientation of the building in order to reach the passive house level, demonstrating the necessity of such a step from the design phase. (C) 2015 The Authors. Published by Elsevier Ltd.
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EM cristiana.croitoru@cambi.ro
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NR 17
TC 0
Z9 0
U1 0
U2 6
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2016

VL 85
BP 141
EP 148
DI 10.1016/j.egypro.2015.12.284
PG 8
WC Energy & Fuels
SC Energy & Fuels
GA BE9NY
UT WOS:000377911100017
OA gold
DA 2018-05-03
ER

PT J
AU Furtuna, TF
Reveiu, A
Dardala, M
Smeureanu, I
AF Furtuna, Titus Felix
Reveiu, Adriana
Dardala, Marian
Smeureanu, Ion
TI IDENTIFYING CONSUMERS' PROFILES CONCERNING RESIDENTIAL LIGHTING
SO ECONOMIC COMPUTATION AND ECONOMIC CYBERNETICS STUDIES AND RESEARCH
LA English
DT Article
DE correspondence analysis; classification; clusters; types of consumers;
bulbs
ID ENERGY; ROMANIA
AB Reducing electricity consumption, by decreasing residential lighting, falls in the range of measures aimed to save 20% of primary energy consumption in European Union, up to 2020, and further to improve energy efficiency after 2020. Public lighting and appliances is about 14 % of total electricity consumption, in Romania. New energy efficient lighting technologies might contribute to a substantial decreasing of household electricity consumption. Data set used to apply the scientific methodology presented in the paper was gathered in a survey research, aiming to investigate Romanians attitude and behavior about lighting consumption in households. The goals of this research paper are both to identify the factors associated with the replacement of old incandescent lamps, with the new energy efficient compact fluorescent lamps and light emitting diodes, and to identify Romanian typologies of consumers and the patterns of their behavior. In order to accomplish the research goals, a model of analysis, based on Cluster Analysis and Multiple Correspondence Analysis methods has been proposed in the paper.
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FU Swiss Enlargement Contribution in the framework of the Romanian-Swiss Research Programme [IZERZ0_142217]
FX This work was supported by the Swiss Enlargement Contribution in the framework of the Romanian-Swiss Research Programme (Grant IZERZ0_142217).
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VITO, 2009, PREP STUD EC REQ EUP
NR 17
TC 0
Z9 0
U1 0
U2 5
PU ACAD ECONOMIC STUDIES
PI BUCHAREST
PA 15-17 CALEA DOROBANTI, SECTOR 1, BUCHAREST, 00000, ROMANIA
SN 0424-267X
EI 1842-3264
J9 ECON COMPUT ECON CYB
JI Econ. Comput. Econ. Cybern. Stud.
PY 2016
VL 50
IS 1
BP 23
EP 38
PG 16
WC Economics; Mathematics, Interdisciplinary Applications
SC Business & Economics; Mathematics
GA DH0MR
UT WOS:000372478800002
DA 2018-05-03
ER

PT S
AU Irmak, E
Kose, A
Gocmen, G
AF Irmak, Erdal
Kose, Ali
Gocmen, Gokhan
GP IEEE
TI Simulation and ZigBee Based Wireless Monitoring of the Amount of Consumed Energy at Smart Homes
SO 2016 IEEE INTERNATIONAL CONFERENCE ON RENEWABLE ENERGY RESEARCH AND APPLICATIONS (ICRERA)
SE International Conference on Renewable Energy Research and Applications
LA English
DT Proceedings Paper
CT 5th IEEE International Conference on Renewable Energy Research and Applications (ICRERA)
CY NOV 20-23, 2016
CL Birmingham, ENGLAND
SP IEEE, IEEE PELS, Int Journal Renewable Energy Res, IEEE Ind Applicat Soc, IEEE IES, IEEJ, IEICE Commun Soc, KBSoftware
DE Electrical household appliances; energy monitoring; Simulink; MATLAB/GUI; ZigBee

AB Smart homes can be defined as homes which can satisfy the needs of comfort with the help of wireless modules. The smart home technologies make the daily life easier and offers safer, more comfortable and economic life spaces. The smart home systems allow the user to monitor and also control all electronic and electrical devices in the house. In this study, a MATLAB/GUI based graphical interface has been prepared in order to monitor the energy consumption of electrical devices used in the home. Additionally a Simulink model of the system has been created on the basis of standard energy consumption data of real devices. This is a sample simulation and not using real data. Energy consumption data of household electrical appliances with different consumption values can be monitored numerically and graphically via this interface. This study focuses on the alternative usages of ZigBee wireless sensor networks in smart home automation system.
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Zou ZY, 2011, PROCEDIA ENGINEER, V15, DOI 10.1016/j.proeng.2011.08.284
NR 16
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2377-6897
BN 978-1-5090-3388-1
J9 INT CONF RENEW ENERG
PY 2016
BP 1019
EP 1023
PG 5
WC Energy & Fuels
SC Energy & Fuels
GA BI1HP
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DA 2018-05-03
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PT B

AU Khosrowpour, A
Duzener, T
Taylor, JE
AF Khosrowpour, Ardalan
Duzener, Tugce
Taylor, John E.
BE Perdomo-Rivera, JL
Gonzalez-Quevedo, A
Lopez DelPuerto, C
Maldonado-Fortunet, F
Molina-Bas, OI
TI Meta-Analysis of Eco-Feedback-Induced Occupant Energy Efficiency Benchmarked with Standard Building Energy Rating Systems
SO CONSTRUCTION RESEARCH CONGRESS 2016: OLD AND NEW CONSTRUCTION TECHNOLOGIES CONVERGE IN HISTORIC SAN JUAN
LA English
DT Proceedings Paper
CT Construction Research Congress
CY MAY 31-JUN 02, 2016
CL Univ Puerto Rico Mayaguez, Dept Civil Engn & Surveying, Construct Engn & M, San Juan, PR
SP Amer Soc Civil Engineers, Construct Inst, Construct Res Council
HO Univ Puerto Rico Mayaguez, Dept Civil Engn & Surveying, Construct Engn & M
ID ELECTRICITY CONSUMPTION; SOCIAL-INFLUENCE; BEHAVIOR; CONSERVATION; IMPACT; INFORMATION; SAVINGS; NORMS; POWER
AB Recent technological advancements have enabled energy efficiency building through automation, equipment upgrade, and material improvement. These enhancements are mostly focused on centrally controllable units such as HVAC, lighting systems, and equipment, while miscellaneous energy loads (e.g., plug loads) that are mostly controlled by occupants, are not as efficiently managed. Various energy rating systems, such as LEED (R) grade the mechanical and electrical equipment in buildings. However, the fact that people spend more than 90% of their time indoors, suggests a great opportunity to help buildings reach a higher level of efficiency by monitoring and quantifying occupants' energy-use. In this paper, we review the existing literature on occupant energy efficiency programs in residential and commercial buildings, and benchmark the potential of such programs to impact LEED rating systems. The main contribution of this paper is comparing the current occupant energy efficiency programs' potential against standard industry measures (i.e., LEED (R)). The results report a possible potential impact for residential building occupant energy efficiency, while indicating the lack of adequate reference and reliable measurement for the commercial sector. The details of the methodology, data analysis, and results are discussed in the paper along with future avenues of occupant-oriented energy efficiency research.
C1 [Khosrowpour, Ardalan; Duzener, Tugce; Taylor, John E.] Virginia Tech, Via Dept Civil & Environm Engn,750 Drillfield Ave, Blacksburg, VA 24061 USA.
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NR 35
TC 0
Z9 0
U1 0
U2 1
PU AMER SOC CIVIL ENGINEERS
PI NEW YORK
PA UNITED ENGINEERING CENTER, 345 E 47TH ST, NEW YORK, NY 10017-2398 USA
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WC Construction & Building Technology; Education, Scientific Disciplines; Engineering, Industrial; Engineering, Civil
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PT B
AU Kosonen, H
Kim, A
AF Kosonen, Heta
Kim, Amy
BE Perdomo-Rivera, JL
Gonzalez-Quevedo, A
Lopez DelPuerto, C
Maldonado-Fortunet, F
Molina-Bas, OI
TI Quantifying Plug Load Energy Use in a LEED Gold Building-Lessons Learned in the Installation Phase
SO CONSTRUCTION RESEARCH CONGRESS 2016: OLD AND NEW CONSTRUCTION TECHNOLOGIES CONVERGE IN HISTORIC SAN JUAN

LA English
DT Proceedings Paper
CT Construction Research Congress
CY MAY 31-JUN 02, 2016
CL Univ Puerto Rico Mayaguez, Dept Civil Engn & Surveying, Construct Engn & M, San Juan, PR
SP Amer Soc Civil Engineers, Construct Inst, Construct Res Council
HO Univ Puerto Rico Mayaguez, Dept Civil Engn & Surveying, Construct Engn & M
ID ECO-FEEDBACK; REAL-TIME; SYSTEM; BEHAVIOR; CONSUMPTION
AB Commercial buildings account for 18% of the total annual energy use in the United States, which makes energy conservation efforts in office environments crucial to meeting future energy-reduction goals. As existing building stock renews and future buildings become "smarter," occupant-driven loads such as plug loads become more important in regulating energy use. Previous studies have focused on adopting sensors and informatics to benchmark and reduce plug load usage and modeled the impacts of various energy interventions on occupant loads by using standard occupant schedules over relatively short periods of time. However, wireless network disruptions and manual plug load data management for technology driven interventions, variability of individual occupant schedules, and lack of occupant engagement have all been identified as challenges to both accurately quantifying and further reducing the energy use on campus. In this paper, we discuss the aforementioned challenges in the light of our experiences in installing plug load management systems to 86 work desks in a high-performance office building on the University of Washington campus. The installation process is discussed both from occupants' and research team's point of view. As a conclusion, we propose a set of recommendations for the technical realization of future energy intervention studies.
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NR 24
TC 0
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PU AMER SOC CIVIL ENGINEERS

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PA UNITED ENGINEERING CENTER, 345 E 47TH ST, NEW YORK, NY 10017-2398 USA
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WC Construction & Building Technology; Education, Scientific Disciplines; Engineering, Industrial; Engineering, Civil
SC Construction & Building Technology; Education & Educational Research; Engineering
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PT B
AU Nazer, M
AF Nazer, M.
BE Uslu, F
TI HOUSEHOLD ENERGY CONSUMPTION ANALYSIS IN INDONESIA 2008-2011
SO SOCIOINT16: 3RD INTERNATIONAL CONFERENCE ON SOCIAL SCIENCES AND HUMANITIES
LA English
DT Proceedings Paper
CT 3rd International Conference on Social Sciences and Humanities (SOCIOINT)
CY MAY 23-25, 2016
CL Istanbul, TURKEY
DE energy consumption; energy ladder; household energy
ID REQUIREMENTS; LADDER; TECHNOLOGY; TRANSITION; ZIMBABWE; CHOICES; INDIA
AB The goal of the study is to analyze the pattern and the change of household energy consumption and determinant factors in Indonesia in 2008-2011 by using National Economic Survey (SUSENAS) data of household budget survey. The concept of energy ladder and fuel stacking (multi fuel) are used to make a model of household energy consumption. The result of study shows that there was an increase in energy consumption, both for modern and traditional energy in the period of 2008-2011. Income elasticity of energy consumption is positive, meaning that there was an increase in consumption of modern energy together with traditional energy in line with the income growth. Household income is the main determinant factor of energy consumption along with others non-economic factors.
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NR 54
TC 0
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U1 0
U2 2
PU INT ORGANIZATION CENTER ACAD RESEARCH
PI ISTANBUL
PA YUNUS EMRE CAD AKASYA SK NO 22, UGUR MUMCU, ISTANBUL, KARTAL 00000, TURKEY
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PY 2016
BP 50
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WC Humanities, Multidisciplinary; Social Sciences, Interdisciplinary
SC Arts & Humanities - Other Topics; Social Sciences - Other Topics
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PT S
AU Rahman, KA
Leman, AM
Yusof, MZM
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AF Rahman, K. A.
Leman, A. M.
Yusof, M. Z. M.
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BE Sharif, S
Abdullah, MMAB
Rahim, SZA
Ghazali, MF
Saad, NM
Ramli, MM
Murad, SAZ
Isa, SSA
TI Consumer Awareness in Energy Efficiency for Residential Houses in Peninsular Malaysia
SO 2ND INTERNATIONAL CONFERENCE ON GREEN DESIGN AND MANUFACTURE 2016 (ICONGDM 2016)
SE MATEC Web of Conferences
LA English
DT Proceedings Paper
CT 2nd International Conference on Green Design and Manufacture (IConGDM)
CY MAY 01-02, 2016
CL Phuket, THAILAND
ID BEHAVIOR
AB Most energy efficiency (EE) measures implemented (or yet to be implemented) in Malaysia involve technological interventions, but it will rely on consumer behaviour including their awareness in energy consumption. This paper highlight the energy-saving awareness among consumers for residential houses which involves two main components: i) knowledge and ii) practice. The method for this study is using the questionnaires of 408 respondents from four zones in Peninsular Malaysia. Pearson Correlation analysis technique was used to examine the relationship of several variables with electricity saving awareness. The results of the analysis found that the both components, knowledge and practice have a significant relationship with consumer awareness. It shows that both components are very important to ensure the awareness of EE will be implemented by the consumer.
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NR 17
TC 0
Z9 0
U1 1
U2 1
PU E D P SCIENCES
PI CEDEX A
PA 17 AVE DU HOGGAR PARC D ACTIVITES COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE
SN 2261-236X
J9 MATEC WEB CONF
PY 2016
VL 78
AR UNSP 01010
DI 10.1051/matecconf/20167801010
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WC Engineering, Manufacturing; Engineering, Mechanical; Materials Science, Multidisciplinary
SC Engineering; Materials Science
GA BG1GD
UT WOS:000386729000010
OA gold
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PT S
AU Soimosan, TM
Felseghi, RA
AF Soimosan, Teodora-Melania
Felseghi, Raluca-Andreea
GP SGEM
TI EFFICIENT SOLAR TECHNIQUE FOR BUILDINGS CONNECTED TO THE DISTRICT HEATING SYSTEM. INDICATORS OF PERFORMANCE
SO ENERGY AND CLEAN TECHNOLOGIES CONFERENCE PROCEEDINGS, SGEM 2016, VOL III
SE International Multidisciplinary Scientific GeoConference-SGEM
LA English
DT Proceedings Paper
CT 16th International Multidisciplinary Scientific Geoconference (SGEM 2016)
CY JUN 30-JUL 06, 2016
CL Albena, BULGARIA
SP Bulgarian Acad Sci, Acad Sci Czech Republ, Latvian Acad Sci, Polish Acad Sci, Russian Acad Sci, Serbian Acad Sci & Arts, Slovak Acad Sci, Natl Acad Sci Ukraine, Inst Water Problem & Hydropower NAS KR, Natl Acad Sci Armenia, Sci Council Japan, World Acad Sci, European Acad Sci Arts & Lett, Acad Sci Moldova, Montenegrin Acad Sci & Arts, Croatian Acad Sci & Arts, Georgian Natl Acad Sci, Acad Fine Arts & Design Bratislava, Turkish Acad Sci, Bulgarian Ind Assoc, Bulgarian Minist Environm & Water
DE solar-thermal; collector field; energy efficiency; district heating system; performance indicator
AB The following desiderata in the urban energy domain are accomplished as a result of integrating the technologies of conversion and harness of the solar energy into the classic heating systems: saving important quantities of fossil fuels, reducing associated CO2 emissions, reducing the concentration of pollutants in urban areas, increasing the energy efficiency of the buildings, increasing the energy autonomy at the level of the district heating system. Harnessing the solar-thermal energy in crowded

urban areas for heating spaces and preparing domestic hot water in decentralized technical systems of producing heat is, most of the times, hard to implement given the restrictive conditions resulted from the local urban regulations, the limited available space for mounting the collectors fields and the operating regimes of the existing district heating systems. In this regard, the purposes of this paper are: identifying and analyzing the specific performance indicators applicable to urban consumers (buildings) equipped with decentralized solar-thermal systems which quantifies the impact of integrating solar thermal energy in the classic heating systems and the hybrid systems' efficiency thus obtained. The following concepts were approached simultaneously and synergistic: the energy efficiency of the buildings and the harnessing efficiency of the solar-thermal energy in the buildings connected to the district heating system. The criteria for a global evaluation of the performances achieved by the thermal energy Systems in accordance with the particularities of the working hypotheses and objectives pursued were established. The case-study Was carried out for an urban thermal area characterized by high thermal energy density in two hipotheses of energy efficiency of the buildings, the existing ones and the thermo-energetically optimized respectively. The computational modeling and setting of the operational frames of heating systems' simulations for the suggested working scenarios was achieved. The simulations were carried out during a calendar year.
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CR Guadalfajara M., 2013, SHC 2013 INT C SOL H
Duffle John A, 2013, SOLAR ENG THERMAL PR
[Anonymous], 2015, SURFACE METEOROLOGY
Soimosan T. M., 2015, THESIS
Srrensen P.A., 2012, HUTHER HEIKO SOLAR D
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[Anonymous], 2015, 190711997 SR ROM I S
[Anonymous], 48391997 SR ROM I ST
NR 9
TC 0
Z9 0
U1 0
U2 0
PU STEF92 TECHNOLOGY LTD
PI SOFIA
PA 1 ANDREY LYAPCHEV BLVD, SOFIA, 1797, BULGARIA
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J9 INT MULTI SCI GEOCO
PY 2016
BP 251
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels; Engineering, Environmental; Meteorology & Atmospheric Sciences
SC Science & Technology - Other Topics; Energy & Fuels; Engineering; Meteorology & Atmospheric Sciences
GA BG7IP
UT WOS:000391348900033
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PT B
AU Sonmez, D
Dincer, K
AF Sonmez, Deniz
Dincer, Kivanc
GP IEEE
BE Camurcu, AY
Cetin, A

TI A Review of Modern Residential Thermostats for Home Automation to
Provide Energy Efficiency
SO 2016 4TH INTERNATIONAL ISTANBUL SMART GRID CONGRESS AND FAIR (ICSG)
LA English
DT Proceedings Paper
CT 4th International Istanbul Smart Grid Congress and Fair (ICSG)
CY APR 20-21, 2016
CL Istanbul, TURKEY
SP Republ Turkey, Minist EU Affairs, Turkiye Cumhuriyeti Kultur Turizm Bakanligi, KOSGEB, TEDAS, TEIAS, Istanbul Buyuksehir Belediyesi, Turkish Electro Technol, Energy Business Council, Foreign Econ Relat Board, Istanbul Kanalizasyon Idaresi, BOTAS, IGDAS Gokyuzuyle Arkadas, Istanbul Ticaret Odasi, Istabul Sanayi Odasi, UHE, UFI, Elder, GAZBIR, TENVA, Turk Sanayici Isadamlari VAKFI, Organize Sanayi Bolgeleri Dernegi, Teknoloji Ar Ge Bilim Inouasyon Dernegi, TURKCELL, Vodafone, LUNA, STATUEAZ, SABAH, HITACHI, KOHLER, ORACLE, aselsan, ERICSSON, NETAS, SIEMENS, Microsoft, best, HHB EXPO, Republ Turkey, Minist Sci Ind & Technol, Republ Turkey, Minist Environm & Urbanisat, Republ Turkey, Minist Energy & Nat Resources, EPDK, Republ Turkey, Istanbul Metropolitan Municipal, Ugetam, IEEE SMARTGRID, IEEE Power & Energy Soc
DE Ambient Intelligence; Energy Management; Home Automation; Smart Homes;
Thermostats
AB This paper focuses on how recently announced modern programmable and smart residential thermostats for smart homes can contribute to better energy usage in households. It explores people's motivation for using these technologies, how they actually use them and how much energy they can save based on the producer's experimental measurements.
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CR Archacki R., 2003, COMMUNICATION
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Meier Alan, PEOPLE ACTUALLY USE
Nest, 2015, EN SAV NEST LEARN TH
Peffer Therese, PEOPLE USE THERMOSTA
NR 7
TC 0
Z9 0
U1 0
U2 2
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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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WC Computer Science, Artificial Intelligence; Engineering, Electrical &
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SC Computer Science; Engineering
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PT S
AU Szekeres, A
Jeswiet, J
AF Szekeres, Alex

Jeswiet, Jack
BE Seliger, G
Kruger, J
TI Impact of Technological Advancement on Adoption and Use of Residential Heat Pumps
SO 23RD CIRP CONFERENCE ON LIFE CYCLE ENGINEERING
SE Procedia CIRP
LA English
DT Proceedings Paper
CT 23rd CIRP Conference on Life Cycle Engineering
CY MAY 22-24, 2016
CL Berlin, GERMANY
SP CIRP
DE Energy; Heating; System Dynamics
AB Heat pump performance is always improving. Lower minimum operating temperatures and better performance curves are increasing both the number of hours of useful service and effectiveness while in use. We estimate the rate of technological development for residential air source heat pumps and their consequent rate of adoption using a system dynamics model. From the perspective of the use stage in life cycle assessment, energy savings and greenhouse gas emissions reductions are estimated. A substantial reduction in overall energy consumption is predicted, while greenhouse gas emissions are only reduced where electricity is generated with little or no fossil fuels. (C) 2016 The Authors. Published by Elsevier B.V.
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CR ASHRAE, 2013, 2013 ASHRAE HDB FUND
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Statistics Canada, TABL 127 008 SUPPL D
Statistics Canada, 2015, TABL 129 0003 SAL NA
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Wright T, 1936, J AERONAUT SCI, V3, P122, DOI DOI 10.2514/8.155
NR 16
TC 0
Z9 0
U1 0
U2 0
PU ELSEVIER SCIENCE BV
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PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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PY 2016
VL 48
BP 394
EP 400
DI 10.1016/j.procir.2016.03.160
PG 7
WC Engineering, Industrial; Operations Research & Management Science
SC Engineering; Operations Research & Management Science

GA BF9AT
UT WOS:000385400300067
OA gold
DA 2018-05-03
ER

PT S
AU Wang, D
Yu, W
Zhao, X
Dai, W
Ruan, Y
AF Wang, D.
Yu, W.
Zhao, X.
Dai, W.
Ruan, Y.
BE Kyriakopoulos, GL
TI The influence of thermal insulation position in building exterior walls on indoor thermal comfort and energy consumption of residential buildings in Chongqing
SO 2016 INTERNATIONAL CONFERENCE ON NEW ENERGY AND FUTURE ENERGY SYSTEM (NEFES 2016)
SE IOP Conference Series-Earth and Environmental Science
LA English
DT Proceedings Paper
CT International Conference on New Energy and Future Energy System (NEFES)
CY AUG 19-22, 2016
CL Beijing, PEOPLES R CHINA
ID LOADS
AB This paper focused on the influence of using position of thermal insulation materials in exterior walls on the indoor thermal comfort and building energy consumption of residential building in Chongqing. In this study, four (4) typical residential building models in Chongqing were established, which have different usage of thermal insulation layer position in exterior walls. Indoor thermal comfort hours, cooling and heating energy consumption of each model were obtained by using a simulation tool, Energyplus. Based on the simulation data, the influence of thermal insulation position on indoor thermal comfort and building energy consumption in each season was analyzed. The results showed that building with internal insulation had the highest indoor thermal comfort hours and least cooling and heating energy consumption in summer and winter. In transitional season, the highest indoor thermal comfort hours are obtained when thermal insulation is located on the exterior side.
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NR 21
TC 0
Z9 0
U1 0
U2 4
PU IOP PUBLISHING LTD
PI BRISTOL
PA DIRAC HOUSE, TEMPLE BACK, BRISTOL BS1 6BE, ENGLAND
SN 1755-1307
J9 IOP C SER EARTH ENV
JI IOP Conf. Ser. Earth Envir. Sci.
PY 2016
VL 40
AR UNSP 012081
DI 10.1088/1755-1315/40/1/012081
PG 13
WC Energy & Fuels
SC Energy & Fuels
GA BG6QE
UT WOS:000390786400081
OA gold
DA 2018-05-03
ER

PT B
AU Yang, Y
Jia, QS
Guan, XH
AF Yang, Yu
Jia, Qing-Shan
Guan, Xiaohong
GP IEEE
TI Improving the Prediction Accuracy of Building Energy Consumption using Location of Occupant
SO PROCEEDINGS 2016 IEEE INTERNATIONAL CONFERENCE ON INDUSTRIAL TECHNOLOGY (ICIT)
LA English
DT Proceedings Paper
CT IEEE International Conference on Industrial Technology (ICET)
CY MAR 14-17, 2016
CL Taipei, TAIWAN
SP Inst Elect & Elect Engineers, IEEE Ind Elect Soc, Natl Taiwan Univ, Int Ctr Excellence Intelligent Robot & Automat Res
DE Smart building; energy consumption forecasting; localization of occupant; platform
ID ARTIFICIAL NEURAL-NETWORKS; LOAD PROFILE
AB On the one hand, energy consumption forecasting in buildings is of great practical interest due to the large amount of energy that is consumed in buildings and therefore the big energy saving potential.

Improving the prediction accuracy has attracted more and more attentions in recent years but still remains an open question. On the other hand, recent advances in technology has provided various economically affordable ways to obtain the location of the occupant. In this work, we focus on how to improve the prediction accuracy of building energy consumption using location of occupant. Three major contributions have been made. First, we formulate the energy consumption prediction problems as Markov decision processes. Second, we develop a platform including a lab, an apartment, and one occupant. The location of the occupant as well as the energy consumption in the lab and the apartment are monitored in the platform. Third, we show that the prediction accuracies of the energy consumption of both the buildings and the occupant can be improved using the location of the occupant. We hope that this work sheds some light on improving the energy efficiency of buildings in the near future.

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NR 16

TC 0

Z9 0

U1 0

U2 1

PU IEEE

PI NEW YORK

PA 345 E 47TH ST, NEW YORK, NY 10017 USA

BN 978-1-4673-8075-1

PY 2016

BP 1550

EP 1555

PG 6

WC Computer Science, Theory & Methods; Engineering, Electrical & Electronic

SC Computer Science; Engineering

GA BG0ML

UT WOS:000386327700241

DA 2018-05-03

ER

PT S

AU Zdanys, P

Susinskas, S

Stasiskis, A

AF Zdanys, P.

Susinskas, S.

Stasiskis, A.
BE Koczy, L
Susniene, D
Zostautiene, D
TI Impact of the entrance vestibule on energy demand of a building
SO 11TH INTERNATIONAL CONFERENCE ON INTELLIGENT TECHNOLOGIES IN LOGISTICS AND MECHATRONICS SYSTEMS (ITELMS'2016)
SE Intelligent Technologies in Logistics and Mechatronics Systems
LA English
DT Proceedings Paper
CT 11th International Conference on Intelligent Technologies in Logistics and Mechatronics Systems (ITELMS)
CY APR 28-29, 2016
CL Panevezys, LITHUANIA
DE entrance vestibule; atrium; simulation of energy demand; DesignBuider; EnergyPlius; calculated total energy consumption; dynamic methods of detailed simulation
AB The article addresses the issues of energy efficiency of public buildings through application of dynamic simulation of the building energy demand. The main object of the Research is the influence of the entrance vestibule of the public building on the building's energy demand. By means of the computer programs Design Builder and EnergyPlius, the energetic simulation has been done in order to determine the energy demand. For the public building, two different simulations of the building premises' layout and changes of their use purposes have been done. We have presented the Research results and conclusions. (C) 2016 P. Zdanys, S. Susinskas, A. Stasiskis. Peer-review under responsibility of the Kaunas University of Technology, Panevezys Faculty of Technologies and Business
C1 [Zdanys, P.; Susinskas, S.; Stasiskis, A.] Kaunas Univ Technol, Panevezys Fac Technol & Business, S Daukanto Str 12, LT-35212 Panevezys, Lithuania.
RP Zdanys, P (reprint author), Kaunas Univ Technol, Panevezys Fac Technol & Business, S Daukanto Str 12, LT-35212 Panevezys, Lithuania.
EM ptvf@ktu.lt
CR Motuziene V., 2010, THESIS, P29
U. S. Departament of Energy, 2015, ENG REF REF ENERGYPL
NR 2
TC 0
Z9 0
U1 0
U2 0
PU MEDIMOND S R L
PI 40128 BOLOGNA
PA VIA MASERATI 5, 40128 BOLOGNA, 00000, ITALY
SN 2345-0088
BN 978-88-7587-737-8
J9 INTELL TECHNOL LOG
PY 2016
BP 195
EP 204
PG 10
WC Engineering, Multidisciplinary; Engineering, Electrical & Electronic; Engineering, Mechanical
SC Engineering
GA BG7SI
UT WOS:000391654200027
DA 2018-05-03
ER

PT S
AU Zhang, H
AF Zhang, Hong

BE Zhu, J
Yao, G
TI Research on Micro Energy Collection for Building Energy Saving Prediction
SO PROCEEDINGS OF THE 2016 4TH INTERNATIONAL CONFERENCE ON MACHINERY, MATERIALS AND COMPUTING TECHNOLOGY
SE AER-Advances in Engineering Research
LA English
DT Proceedings Paper
CT 4th International Conference on Machinery, Materials and Computing Technology (ICMMCT)
CY JAN 23-24, 2016
CL Hangzhou, PEOPLES R CHINA
DE Energy Conservation; Building; Air Conditioning; Collection Of Micro Energy
AB The diversity and complexity of large public buildings, our country's local climate, economy, life habits variation result in a lack of basic data to support energy-saving operation standard, energy saving technology for the reconstruction of the applicability and the lack of practical test, which leads to a phenomenon. Operating standards is still derived from the design standards and a small number of measured data, energy-saving technological transformation in a project or place successfully is popularized in the whole country, the engineering application and theory of scientific research confusion is not clear, management of government departments, public building owners is at a loss.
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Song Xinchao, 2014, Journal of Networks, V9, P2758, DOI 10.4304/jnw.9.10.2758-2765
NR 4
TC 0
Z9 0
U1 0
U2 1
PU ATLANTIS PRESS
PI PARIS
PA 29 AVENUE LAVMIERE, PARIS, 75019, FRANCE
SN 2352-5401
BN 978-94-6252-165-0
J9 AER ADV ENG RES
PY 2016
VL 60
BP 1771
EP 1774
PG 4
WC Automation & Control Systems; Computer Science, Theory & Methods; Engineering, Mechanical; Materials Science, Multidisciplinary
SC Automation & Control Systems; Computer Science; Engineering; Materials Science
GA BG2MS
UT WOS:000387481800352
DA 2018-05-03
ER

PT J
AU Koumoutsos, K
Kretsis, A

Kokkinos, P
Varvarigos, EA
Nikolopoulos, V
Gkioxi, E
Zafeiropoulos, A
AF Koumoutsos, Kostas
Kretsis, Aristotelis
Kokkinos, Panagiotis
Varvarigos, Emmanouel A.
Nikolopoulos, Vassilis
Gkioxi, Eirini
Zafeiropoulos, Anastatios
TI Gathering and processing energy consumption data from public educational buildings over IPv6
SO ENERGY SUSTAINABILITY AND SOCIETY
LA English
DT Article
DE Smart energy meters; Energy information system; Advance energy analytics; IPv6; School network
ID MONITORS; TERM
AB Background: Reducing energy consumption and CO2 emissions in order to address climate change requires behavioral changes by the citizens, who will have to adopt more environmentally friendly and energy-saving practices.
Methods: We present a system and corresponding practices for gathering energy consumption data from public school buildings over the Internet, processing them to identify hidden correlations and produce actionable advice and presenting the results in real-time to its occupants over the Web. We describe the metering infrastructure installed at schools for energy consumption monitoring and the related actions carried out in order to motivate local school communities towards an environmentally friendly behavior. The introduction of IPv6 was found to be a key enabling technology for setting up such a system in a simple, secure, and efficient way.
Results: The proposed system and processes are put under test in a pilot installation composed of about 50 IPv6-enabled schools of the Greek School Network (GSN). These are also combined with appropriate educational and social engagement tools. In this way, energy consumption, operating costs, and greenhouse effects can be reduced in the area of educational and public administration buildings in general. Thus, people become almost instantly aware of the energy and environmental implications of their actions, which motivates them towards behavioral changes and the adoption of environmentally friendly practices.
Conclusions: The pilot provides a good example of collaboration between the ICT sector, the smart building and automation vendors, and the public authorities.
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NR 14
TC 0
Z9 0
U1 4
U2 11
PU SPRINGER HEIDELBERG
PI HEIDELBERG
PA TIERGARTENSTRASSE 17, D-69121 HEIDELBERG, GERMANY
SN 2192-0567
J9 ENERGY SUSTAIN SOC
JI Energy Sustain. Soc.
PD DEC
PY 2015
VL 5
IS 1
AR 24
DI 10.1186/s13705-015-0051-y
PG 12
WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Energy & Fuels
SC Science & Technology - Other Topics; Energy & Fuels
GA CY6FK
UT WOS:000366503600024
OA gold
DA 2018-05-03
ER

PT J
AU Naranjo, YA
Kuchen, E
Rostol, CG
Frank, AA
AF Alamino Naranjo, Yesica
Kuchen, Ernesto
Gil Rostol, Celeste
Alonso Frank, Alcion
TI Operations monitoring and energy efficiency strategies in the Obras Sanitarias Sociedad del Estado (State Sanitary Works Company) public building, San Juan, Argentina
SO REVISTA HABITAT SUSTENTABLE
LA Spanish
DT Article
DE Rational use of energy; electric devices; energy; monitoring
AB In the last ten years, the increase in installed electricity capacity in consumption sectors has surpassed electricity generation capacity, thereby causing Argentina to become an energy-dependent country. One of the relief measures for the associated environmental, social and economic consequences involves reducing energy consumption in the buildings sector. People spend more than 30% of their time in work spaces, in climate-controlled indoor environments. The aim of this study is to find strategies to improve the energy efficiency of buildings without decreasing quality of life for users. To this end, a field study was carried out in the Obras Sanitarias Sociedad del Estado (OSSE) (State Sanitary Works Company) building, in the city of San Juan, Argentina, using an experimental approach that took into consideration functional and technological aspects of the building as well as its equipment. The results show high energy demand values for the heating and cooling system and the electric devices in offices. The implementation of minimum investment intervention strategies would enable a 42% reduction in energy consumption and the recovery of more than 70% of the total investment during the first year of operation.

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CR 2000Watt-Society, 1998, PROGR AH EN
ALEMANIA, 2000, ERNEUERBARE ENERGIEN
ALONSO-FRANK Alcion, 2012, REV AVERMA AVANCES E, V16, P65
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DUTT Gautam S., 2006, ESC EN ARG 2006 2020
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PLESSER Stefan, 2008, P 5 INT C IMPR EN EF
TORANZO Eugenia, 2012, REV AVERMA AVANCES E, V16, P157
NR 19
TC 0
Z9 0
U1 0
U2 0
PU UNIV BIO-BIO
PI CONCEPCION
PA WOOD ENGINEERING DEPT, AVENIDA COLLAO 1202, CASILLA 5-C, CONCEPCION, 00000, CHILE
SN 0719-0700
J9 REV HABITAT SUSTENTA
JI Rev. Habitat Sustentable
PD JUN
PY 2015
VL 5
IS 1
BP 14
EP 23
PG 10
WC Engineering, Environmental
SC Engineering
GA V36NW
UT WOS:000215975900003
OA gold
DA 2018-05-03
ER

PT S
AU Aileni, RM
AF Aileni, Raluca Maria
BE Vlada, M
Albeanu, G
Adascalitei, A

Popovici, M
TI Cloud hybrid service for monitoring building energy efficiency obtained by using insulation structures
SO Proceedings of the 10th International Conference on Virtual Learning
SE Proceedings of the International Conference on Virtual learning
LA English
DT Proceedings Paper
CT 10th International Conference on Virtual Learning
CY OCT 31, 2015
CL Timisoara, ROMANIA
DE Cloud computing; M2M; monitoring; sensors; building
AB The paper present the model based on smart sensors network system for building efficiency monitoring based on machine to machine (M2M) technologies. The system is based on temperature sensors, a mainboard, a transceiver and a power source. The sensors are integrated in experimental model for receiving and send wireless data. The data storage is made on cloud (PaaS) and the users may access data by using a web based interface (SaaS). Cloud computing and grid computing are oriented in sharing distributed resources in a network environment and this allow a large number of users to send and receive information. The resources shared are systems like CPUs, storage, data, and memory. By using cloud computing is possible to storage data received from sensors, analyze data and provide charts. Data from cloud computing services (PaaS) can be used in IoT projects.
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CR Aileni R. M., 2014, OPTIMIZATION THERMAL
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Doukas C., 2011, P HHIRD IEEE INT C C
Garber D., 2013, WINDOWS AZURE HYBRID
Jeffrey M. N., 2010, HDB CLOUD COMPUTING
NR 5
TC 0
Z9 0
U1 0
U2 0
PU BUCHAREST UNIVERSITY PRESS
PI BUCHAREST
PA SOS PANDURI NR 90-92, BUCHAREST, 050663, ROMANIA
SN 1844-8933
J9 PROC INT C VIRTUAL L
PY 2015
BP 342
EP 346
PG 5
WC Computer Science, Interdisciplinary Applications; Education & Educational Research
SC Computer Science; Education & Educational Research
GA BF3TL
UT WOS:000380576300050
DA 2018-05-03
ER

PT B
AU Benner, J
Hafele, KH
Bonsma, P
Bourdeau, M
Soubra, S

Sleiman, H
Robert, S
AF Benner, Joachim
Haefele, Karl-Heinz
Bonsma, Peter
Bourdeau, Marc
Soubra, Souheil
Sleiman, Hassan
Robert, Sylvain
BE Mahdavi, A
Martens, B
Scherer, R
TI Interoperable tools for designing energy-efficient buildings in healthcare districts
SO EWORK AND EBUSINESS IN ARCHITECTURE, ENGINEERING AND CONSTRUCTION 2014
LA English
DT Proceedings Paper
CT PROCEEDINGS OF THE 10TH EUROPEAN CONFERENCE ON PRODUCT AND PROCESS MODELLING (ECPPM 2014)
CY SEP 17-19, 2014
CL Department of Building Physics and Building Ecology of the Vienna Universi, Vienna, AUSTRIA
HO Department of Building Physics and Building Ecology of the Vienna Universi
AB The EU funded collaborative research project STREAMER aims on Energy-efficient Buildings (EeB), focusing on mixed-use healthcare districts. Besides innovations in EeB technology, special emphasis is laid on improving methodologies and tools used in the design process of new or retrofitted hospital buildings. STREAMER follows a model-based, holistic approach by integrating design data on both building and district level. Advanced ICT methods like Semantic Web, Ontologies, Parametric Modelling or Knowledge Based Systems, will be reviewed, adapted, and improved to use them during the energy-efficient-buildings design process. The project not only aims on developing theoretical concepts, but also on practical case studies: based on already existing software, a number of interoperable software tools shall be developed and evaluated in four demonstration projects. The paper describes the system architecture and provides a functional spectrum of the design tools, focusing on interoperability issues.
C1 [Benner, Joachim; Haefele, Karl-Heinz] Karlsruhe Inst Technol, Karlsruhe, Germany.
[Bonsma, Peter] TNO Tech Sci, Delft, Netherlands.
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RP Benner, J (reprint author), Karlsruhe Inst Technol, Karlsruhe, Germany.
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W3C, 2009, OWL 2 WEB ONT LANG
W3C, 2014, W3C SEM WEB
W3C, 2012, OWL 2 WEB ONT LANG D
NR 19

TC 0
Z9 0
U1 0
U2 0
PU CRC PRESS-TAYLOR & FRANCIS GROUP
PI BOCA RATON
PA 6000 BROKEN SOUND PARKWAY NW, STE 300, BOCA RATON, FL 33487-2742 USA
BN 978-1-315-73695-2; 978-1-138-02710-7
PY 2015
BP 915
EP 922
PG 8
WC Computer Science, Information Systems; Computer Science,
Interdisciplinary Applications
SC Computer Science
GA BF2QG
UT WOS:000380490000123
DA 2018-05-03
ER

PT B
AU Bunster, V
Noguchi, M
Garcia-Alvarado, R
Bustamante, W
AF Bunster, Victor
Noguchi, Masa
Garcia-Alvarado, Rodrigo
Bustamante, Waldo
BE Crawford, RH
Stephan, A
TI Operational energy consumption in Chilean social housing: exploring the
impacts of household changes
SO LIVING AND LEARNING: RESEARCH FOR A BETTER BUILT ENVIRONMENT
LA English
DT Proceedings Paper
CT 49th International Conference of the Architectural-Science-Association
CY DEC 02-04, 2015
CL Univ Melbourne, Melbourne Sch Design, Fac Architecture Bldg & Planning,
Melbourne, AUSTRALIA
SP Architectural Sci Assoc
HO Univ Melbourne, Melbourne Sch Design, Fac Architecture Bldg & Planning
DE Operational energy; forecasting; social housing; Chile
AB Recent initiatives towards the reduction of domestic energy consumption largely depend upon the availability of thorough information to enable focalised interventions and a posteriori impact assessment. This is a significant issue in developing countries, as informality of fuel markets and lack of intelligent technologies can undermine the capacity of policy makers to effectively target consumer behaviour. This study explores an alternative approach to inform such measures using energy forecasting before occupancy. Accordingly, a secondary analysis of publicly available datasets was conducted to assess general patterns of operational energy consumption in Chilean social housing and to develop a set of forecasting models which accuracy was later evaluated with the results of an on-site survey. Although the forecasting capabilities of the proposed models is not yet conclusive, the results of this study suggest that discrete socio-demographic factors can predict general patterns of operational energy consumption and therefore increase the accuracy of future energy efficiency measures.
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[Ministerio de Energia CDT-CCHC], 2010, DAT EST US FIN DET C
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McLoughlin F, 2015, APPL ENERG, V141, P190, DOI 10.1016/j.apenergy.2014.12.039
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[MINVU MINVU], 2014, DS 47 DE 1992
MINVU, 2010, DAT ENC PAN VIV
MINVU-IC, 2006, MAN APL REGL TERM
Swan LG, 2009, RENEW SUST ENERG REV, V13, P1819, DOI 10.1016/j.rser.2008.09.033
TWAS, 2008, SUST EN DEV COUNTR
UNTEC, 2010, EV PROGR EF EN INF F
NR 17
TC 0
Z9 0
U1 0
U2 2
PU UNIV MELBOURNE
PI PARKVILLE
PA FAC ARCHITECTURE BUILDING & PLANNING, PARKVILLE, 3052, AUSTRALIA
BN 978-0-9923835-2-7
PY 2015
BP 393
EP 402
PG 10
WC Architecture; Construction & Building Technology; Urban Studies
SC Architecture; Construction & Building Technology; Urban Studies
GA BF4MW
UT WOS:000381380100038
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ER

PT S
AU Cebrat, K
Lechowska, W
AF Cebrat, Krzysztof
Lechowska, Weronika
GP SGEM
TI IS LOW-TECH ARCHITECTURE STILL POSSIBLE? A STUDY OF BUFFER ZONES AND ENERGY EMBODIED IN BUILDINGS IN THE CONTEXT OF ENERGY CONSUMPTION STANDARDS
SO SGEM 2015, BOOK 4: ARTS, PERFORMING ARTS, ARCHITECTURE AND DESIGN
SE International Multidisciplinary Scientific Conferences on Social Sciences and Arts
LA English
DT Proceedings Paper
CT 2nd International Multidisciplinary Scientific Conference on Social Sciences and Arts (SGEM 2015)
CY AUG 26-SEP 01, 2015
CL Albena, BULGARIA

SP Bulgarian Acad Sci, Acad Sci Czech Republ, Latvian Acad Sci, Polish Acad Sci, Russian Acad Sci, Serbian Acad Sci & Arts, Slovak Acad Sci, Natl Acad Sci Ukraine, Natl Acad Sci Armenia, Sci Council Japan, World Acad Sci, European Acad Sci, Arts & Lett, Acad Fine Arts Zagreb, Croatia, Croatian Acad Sci & Arts, Acad Sci Moldova, Montenegrin Acad Sci & Arts, Georgian Acad Sci, Acad Fine Arts & Design Bratislava, Russian Acad Arts, Turkish Acad Sci

DE low-tech architecture; energy intensity; embodied energy; sustainable architecture

AB Is it possible to design near zero energy buildings without the use of technologically advanced but costly solutions? Or the other way around - is the use of expensive technical solutions effective from the point of view of the energy balance of the building? Can the overall environmental costs of a home, meeting the tightening up standards of energy consumption in buildings, be higher than anticipated savings? The paper answers these questions, basing on an analysis of the results of measurements of thermal properties of real objects and computer simulation models of buildings. The paper also shows the results of analyzing the energy embodied in economic value indicator (a development of the concept of energy intensity) as an estimate of the impact of the investment on the environment, basing on statistical data.

Examples of existing passive residential buildings, indicate that it is possible to design an object in which the combined energy of solar radiation and energy coming from internal gains are sufficient to heat the entire building. However, this also requires the use of modern building materials and infrastructure for instance heat recovery and IT control of home functions.

Studies have shown that there is an optimal form, structure and equipment of buildings, above which, the desire to further improve energy efficiency, in fact increases the demand for energy. This may result from not taking into account the global environmental costs of investment, and perhaps - as encouraged by advanced technology - with the departure from the best practices of low-tech architecture, such as temperature zoning inside the building.

The paper points out the benefits of taking into account these problems as well as areas of research that still need to be developed.

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Hegger M., 2008, ENERGY MANUAL SUSTAI
Jiao Y, 2012, ENERG BUILDINGS, V52, P20, DOI 10.1016/j.enbuild.2012.05.028
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NR 7
TC 0
Z9 0
U1 0
U2 1
PU STEF92 TECHNOLOGY LTD
PI SOFIA
PA 1 ANDREY LYAPCHEV BLVD, SOFIA, 1797, BULGARIA
SN 2367-5659
BN 978-619-7105-50-6
J9 INT MULTIDDISCIP SCI
PY 2015
BP 485
EP 492
PG 8
WC Humanities, Multidisciplinary; Social Sciences, Interdisciplinary
SC Arts & Humanities - Other Topics; Social Sciences - Other Topics
GA BE9RO
UT WOS:000378098500060
DA 2018-05-03
ER

PT S
AU Dong, W
AF Dong Wei
BE Du, W
Zhou, X
TI Application Research of Internet of Things Technology in Building Energy Saving
SO PROCEEDINGS OF THE 2015 3RD INTERNATIONAL CONFERENCE ON MACHINERY, MATERIALS AND INFORMATION TECHNOLOGY APPLICATIONS
SE ACSR-Advances in Comptuer Science Research
LA English
DT Proceedings Paper
CT 3rd International Conference on Machinery, Materials and Information Technology Applications (ICMMITA)
CY NOV 28-29, 2015
CL Qingdao, PEOPLES R CHINA
DE Internet of Things; Building Energy Saving; Energy Data Management
AB Concepts, architecture, data analysis and processing methods and other technical requirements in the standard Internet of things systematically optimize and improve existing building energy consumption monitoring theory, network architecture and implementation of technology, the concept of building energy system of things, network architecture, hardware and software key technology and engineering application technology implementation, to facilitate things in the construction sector energy saving application development, improve building energy efficiency and building levels, and promote the development of industries of things, to promote China's construction development of energy-saving and emission reduction has important practical and long-term significance.
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CR Atzori L, 2010, COMPUT NETW, V54, P2787, DOI 10.1016/j.comnet.2010.05.010
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WEI CY, 2011, EL COMM CONTR ICECC, P3650
NR 6
TC 0
Z9 0
U1 0
U2 1
PU ATLANTIS PRESS
PI PARIS
PA 29 AVENUE LAVMIERE, PARIS, 75019, FRANCE
SN 2352-538X
BN 978-94-6252-120-9
J9 ACSR ADV COMPUT
PY 2015
VL 35
BP 1884
EP 1888
PG 5
WC Automation & Control Systems; Computer Science, Theory & Methods; Engineering, Electrical & Electronic
SC Automation & Control Systems; Computer Science; Engineering
GA BE4CW
UT WOS:000371522300353
DA 2018-05-03
ER

PT S
AU Dong, W
AF Dong Wei
BE Liang, Z
Li, X
TI Web-based Building Energy Consumption Monitoring and Conservation Service
SO PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON MECHATRONICS, MATERIALS, CHEMISTRY AND COMPUTER ENGINEERING 2015 (ICMMCCE 2015)
SE ACSR-Advances in Comptuer Science Research
LA English
DT Proceedings Paper
CT 4th International Conference on Mechatronics, Materials, Chemistry and Computer Engineering (ICMMCCE)
CY DEC 12-13, 2015
CL Xian, PEOPLES R CHINA
DE Web; Building Energy Saving; Energy Monitoring; Conservation Service
ID INTERNET; THINGS
AB Building in operational use energy consumption including energy consumption of buildings in the course of the lighting, refrigeration equipment, power equipment and services, gas, water, elevators and the like. In energy-efficient buildings, not only to emphasize energy conservation technology, but also need to dig the whole building energy monitoring and management, so as to form the overall building energy consumption of energy-saving programs. ODBC and web-based technologies to enable the effective monitoring and building energy management. Web-based building energy monitoring and energy services platform can make full use of networking technology, will affect building energy consumption data management system as well as larger storage devices and management, analysis and processing, and use, from the point of view of energy efficiency optimization, to achieve the overall operation of building intelligent online monitoring, processing, and energy-saving models predict that provide openness energy services, greatly enhance the operation and management level of the entire building and energy efficiency utilization levels.
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CR Bandyopadhyay D, 2011, WIRELESS PERS COMMUN, V58, P49, DOI 10.1007/s11277-011-0288-5
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NR 7
TC 0
Z9 0
U1 0
U2 1
PU ATLANTIS PRESS
PI PARIS
PA 29 AVENUE LAVMIERE, PARIS, 75019, FRANCE
SN 2352-538X
BN 978-94-6252-133-9
J9 ACSR ADV COMPUT
PY 2015
VL 39
BP 3036
EP 3040
PG 5
WC Engineering, Electrical & Electronic; Engineering, Mechanical; Materials

Science, Multidisciplinary
SC Engineering; Materials Science
GA BE5OR
UT WOS:000373157303016
DA 2018-05-03
ER

PT S
AU Guan, Q
Liu, Y
AF Guan, Qiang
Liu, Yu
GP IEEE
TI Study on Comfort Environment Oriented Building Energy Consumption Intelligent Management System
SO 2015 27TH CHINESE CONTROL AND DECISION CONFERENCE (CCDC)
SE Chinese Control and Decision Conference
LA Chinese
DT Proceedings Paper
CT 27th Chinese Control and Decision Conference (CCDC)
CY MAY 23-25, 2015
CL Qingdao, PEOPLES R CHINA
SP IEEE Ind Elect Chapter, Qingdao Univ, IEEE Control Syst Soc, Syst Engn Soc China, Chinese Assoc Artificial Intelligence, Chinese Assoc Automat, Tech Comm Control Theory, Northeastern Univ
DE building energy consumption management; comfort environment; multi-sensor integration; complex event processing
AB The IOT-based building energy consumption management system, as an important technology management means for energy efficiency, is prevalent and applied widely. Nevertheless, the requirement of occupant comfort environment is rarely considered in most previous studies. In this paper, based on intelligent sensing technology, we put forward a novel system framework for building energy consumption management systems, which focuses on providing the comfort environment for occupants in energy saving. Firstly, the energy efficiency sensing and control unit is developed, which consists of several sensors for environment comfort evaluation and data fusion. In addition, the feedback control is realized in this unit through multi-sensor integration and GPIO ports. The concept of collaborating with people, machine and substance is reflected in the working process of this unit. Secondly, the relation between environment factors and energy consumption control is clearly described with the event-based ECA-rules. The real-time response to environment sensing and energy consumption data streams is achieved by utilizing complex event processing. Finally, the application scenarios show the benefits of the proposed system architecture.
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CR Dounis AI, 2009, RENEW SUST ENERG REV, V13, P1246, DOI 10.1016/j.rser.2008.09.015
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Frontczak M., 2013, BUILD ENVIRON, V46, P922
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NR 9
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK

PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1948-9439
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J9 CHIN CONT DECIS CONF
PY 2015
BP 5880
EP 5884
PG 5
WC Automation & Control Systems; Engineering, Electrical & Electronic
SC Automation & Control Systems; Engineering
GA BE7GY
UT WOS:000375232901053
DA 2018-05-03
ER

PT B
AU Kadolsky, M
Windisch, R
Scherer, RJ
AF Kadolsky, Mathias
Windisch, Ronny
Scherer, Raimar J.
GP IEEE
TI Knowledge Management Framework for Monitoring Systems improving Building Energy Efficiency
SO 2015 IEEE WORKSHOP ON ENVIRONMENTAL, ENERGY AND STRUCTURAL MONITORING SYSTEMS (EESMS)
LA English
DT Proceedings Paper
CT IEEE Workshop on Environment Energy Structural Monitoring Systems
CY JUL 09-10, 2015
CL Trento, ITALY
SP IEEE, IEEE SYST COUNCIL, IEEE ITALY SECT, IEEE INSTRUMENTATION MEASUREMENT SOC, UNIV TRENTO
DE BIM; eeBIM; Energy; Knowledge Management; Ontology; Intelligent Filtering; Building Performance Criteria
AB In the last decades scarcity of resources and global warming have led to a more and more efficient building design and usage aimed to reduce energy consumption and CO2 emission. For increasing energy efficiency of buildings over the whole life cycle monitoring systems became an important technology. Thereby, monitoring systems are usually applied in combination with controlling systems for providing building automation of HVAC (heating, ventilation and air conditioning) components in the usage phase. In this paper an approach will be presented describing a generic framework for efficiently using of monitoring in the design phase as well as in the usage phase. Based on certain building criteria a) the selection for an efficient, best cost- benefit, HVAC system and b) the efficient filtering, evaluating and prioritizing of energy performance values like cooling/heating consumption values will be supported. This will be done by considering only a small set of energy indicators representing and covering complex building designs and usage scenarios. As description method for the building criteria an ontology approach is considered comprising and consolidating the different input sources and creating the base for deriving and identifying these criteria. Furthermore, intelligent filtering methods are proposed operating on the origin source models and filtering and aggregating the elements for mapping them to the ontology descriptions. Altogether is embedded in a knowledge management framework forming the mediator for external software like simulation or CAD software. The use of the knowledge management framework is intended for a company applying it throughout several projects and storing the gained experience in the building criteria and the related functionalities.
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CR Baumgartel K, 2013, FORUM BAUINFORMATIK, V25, P25
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NR 6
TC 0
Z9 0
U1 2
U2 8
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4799-8215-8
PY 2015
BP 33
EP 38
PG 6
WC Computer Science, Artificial Intelligence; Energy & Fuels; Engineering,
Electrical & Electronic
SC Computer Science; Energy & Fuels; Engineering
GA BF1RB
UT WOS:000380429500007
DA 2018-05-03
ER

PT S
AU Kumar, JS
Swarup, KS
AF Kumar, J. Santosh
Swarup, K. Shanti
BE Pillai, P
Hu, YF
Otung, I
Giambene, G
TI Residential Energy Consumption Scheduling Techniques Under Smart Grid
Environment
SO WIRELESS AND SATELLITE SYSTEMS (WISATS 2015)
SE Lecture Notes of the Institute for Computer Sciences Social Informatics
and Telecommunications Engineering
LA English
DT Proceedings Paper
CT 7th International Conference on Wireless and Satellite Systems (WiSATS)
CY JUL 06-07, 2015
CL Univ Bradford, Norcroft Ctr, Bradford, ENGLAND
SP CREATE NET, Univ Bradford, Fac Engn & Informat, European Alliance Innovat, Inst Comp Sci, Social
Informat & Telecommunicat Engn
HO Univ Bradford, Norcroft Ctr
DE Smart grid; Demand side management; Energy consumption scheduling; Peak
load demand; Energy pricing
AB In recent years the load demand by residential consumers are rapidly increasing due to the usage of many electric appliances in daily needs. Load demand during peak hours is becoming increasingly larger than off-peak hours, which is the major reason for inefficiency in generation capacity. Introduction of smart grid technology in Demand Side Management programs provides an alternative to installation of new

generation units. Consumers can play a major role in reducing their energy consumption by communicating with utilities so that they can minimize their energy costs and get incentives, which also helps utilities in many ways. Smart grid technologies provide opportunities to employ different pricing schemes which also help in increasing the efficiency of appliance scheduling techniques. Optimal energy consumption scheduling reduces the peak load demand in peak hour. Peak average ratio (PAR) also minimizes the energy consumption cost. In this paper, we observes different energy consumption scheduling techniques that schedule the house hold appliances in real-time to achieve minimum energy consumption cost and to reduce peak load demand in peak hours to shape the peak load demand. Formulation and Solution methodology of residential energy consumption scheduling is presented with simulation results illustrating the working of the model.

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NR 11

TC 0

Z9 0

U1 0

U2 0

PU SPRINGER

PI NEW YORK

PA 233 SPRING STREET, NEW YORK, NY 10013, UNITED STATES

SN 1867-8211

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PY 2015

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PG 15

WC Computer Science, Information Systems; Engineering, Electrical & Electronic; Telecommunications

SC Computer Science; Engineering; Telecommunications

GA BE9GL

UT WOS:000377503500001

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ER

PT B

AU Lachhab, F

Essaaidi, M

Bakhouya, M

Ouladsine, R

AF Lachhab, Fadwa

Essaaidi, Mohammed

Bakhouya, Mohamed

Ouladsine, Radouane
BE Essaaidi, M
Zaz, Y
TI A State-Feedback Approach for Controlling Ventilation Systems in Energy Efficient Buildings
SO PROCEEDINGS OF 2015 3RD IEEE INTERNATIONAL RENEWABLE AND SUSTAINABLE ENERGY CONFERENCE (IRSEC'15)
LA English
DT Proceedings Paper
CT 3rd IEEE International Renewable and Sustainable Energy Conference (IRSEC)
CY DEC 10-13, 2015
CL Marrakech, MOROCCO
SP IEEE
DE Energy efficieny in real building; IAQ; CO2-based control; state feedback technique; Occupant comfort
ID MODEL
AB On the fast actual demographic trend and increasing comfort level, consumers are becoming more and more demanding in the areas of heating, cooling, ventilation, air conditioning, and lighting. Heating, Ventilating and Air Conditioning (HVAC) is one of most studied systems in energy efficient buildings within the aim to keep occupants' comfort with desired temperature ranges, a suitable level of humidity, and good air quality. Recent studies showed that using information and communication technologies will have a significant impact on improving energy efficiency in real buildings. The main aim of these studies is to develop energy control approaches to improve energy performance and occupant comfort in buildings. In this paper, a CO2-based strategy using a state feedback technique for controlling mechanical ventilation systems in energy-efficient building is proposed. The principal objective of the developed controller is to improve optimal balance between energy efficiency and indoor air quality by maintaining the indoor CO2 concentration at the comfort set point with an efficient ventilation rate while reducing energy consumption. The ventilation system is analysed, modeled, and simulated. The simulation results are reported to show the efficiency of the proposed control approach compared to the traditional On/Off and the PI ventilation control.
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CR BERG-MUNCH B, 1986, Environment International, V12, P195, DOI 10.1016/0160-4120(86)90030-9
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Yeh L. W., 2010, SENSORS J IEEE, V10, P1029, DOI DOI 10.1109/JSEN.2010.2042442
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NR 20
TC 0

Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4673-7894-9
PY 2015
BP 665
EP 670
PG 6
WC Energy & Fuels; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BF5KQ
UT WOS:000382162300064
DA 2018-05-03
ER

PT J
AU Laicane, I
Blumberga, A
Rosa, M
Blumberga, D
Bariss, U
AF Laicane, Ilze
Blumberga, Andra
Rosa, Marika
Blumberga, Dagnija
Bariss, Uldis
TI Development of methodology for the assessment of changes in household electricity consumption and calculation of CO2 emissions
SO INTERNATIONAL JOURNAL OF GLOBAL WARMING
LA English
DT Article
DE smart metering; household electricity consumption; CO2 emissions; global warming
ID ENERGY-CONSERVATION; BEHAVIOR; FEEDBACK; DETERMINANTS; PREFERENCES; FEATURES; CLIMATE; DEMAND; POLICY; CHINA
AB This study outlines a methodology for assessing changes in household electricity consumption and CO2 emissions. The method is proposed to analyse large datasets of residential electricity consumption in the case study of the first smart metering pilot project in Latvia. The goal of the project is to achieve a reduction of electricity consumption in households by 10%. In order to do so project aims to increase household user's awareness of smart technologies, as well as to promote households' involvement in energy efficiency measures. The proposed methodology is based on several steps, including: 1) baseline situation analysis; 2) normalisation of electricity consumption data; 3) identification of the factors affecting household electricity consumption; 4) an empirical analysis of households' electricity consumption using regression analysis; 5) assessment of changes in electricity consumption at the end of evaluation period and 6) calculation of CO2 emissions. Finally, the first results of the smart metering pilot project in nine-month period have been presented. The recommendations for policy development on promoting smart metering have been raised at the end of this paper.
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SN 1758-2083
EI 1758-2091
J9 INT J GLOBAL WARM
JI Int. J. Glob. Warm.
PY 2015
VL 8
IS 1
BP 114
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WC Environmental Sciences
SC Environmental Sciences & Ecology
GA CV4FG
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AU Lee, YC
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AF Lee, Yuan-Cheng
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GP IEEE
TI An Efficient Scheduling Mechanism for Building Energy Management Systems
SO 2015 IEEE INTERNATIONAL CONFERENCE ON BUILDING ENERGY EFFICIENCY AND SUSTAINABLE TECHNOLOGIES (ICBEST)
LA English
DT Proceedings Paper
CT IEEE International Conference on Building Energy Efficiency and Sustainable Technologies (ICBEST)
CY AUG 31-SEP 01, 2015
CL Singapore, SINGAPORE
SP IEEE, IEEE Ind Applicat Soc, IEEE Power Elect Soc
DE building energy management; energy consumption; real-time systems; scheduling
AB The continuous growth of energy consumption has become a critical issue globally. According to the international energy agency, the energy consumed in residential and commercial buildings contributed about 40% of the total energy consumption in 2014. In recent years, building energy management has become a popular research topic. The techniques used in automatic control have evolved from static schedules specified manually into real-time sensing through wireless sensor network. The demand for a dedicated platform for building energy management systems has emerged later. Many proposed platforms focused on the high-level architecture and were based on existing standards and technologies. However, there was little research about the fundamental aspects of the infrastructure. In this paper, we propose a scheduling mechanism for the fundamental infrastructure based on the distributed pinwheel model. It addresses the issues of distributed real-time computing, and provides a more predictable system behavior for potential improvement of energy consumption of the infrastructure itself. Unlike the original distributed pinwheel model, we also take network delay into account, and present an adaptive method to

mitigate the effects of variable network delay. The simulation results suggest that the total end-to-end delay can be reduced to 20% or lower for more than half of the input task sets without the presence of variable network delay. The adaptive method shows an improvement of 10.06% to 61.16% with the presence of variable network delay.

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PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
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PY 2015
BP 17
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WC Construction & Building Technology; GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY
SC Construction & Building Technology; Science & Technology - Other Topics
GA BG8IJ
UT WOS:000392316600003
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ER
FN Clarivate Analytics Web of Science
VR 1.0
PT S
AU Li, WF
AF Li Weifang
BE Choi, SB
TI The Study on Green Energy-saving Buildings Design
SO PROCEEDINGS OF THE 2015 INTERNATIONAL FORUM ON ENERGY, ENVIRONMENT SCIENCE AND MATERIALS
SE AER-Advances in Engineering Research
LA English
DT Proceedings Paper

CT International Forum on Energy, Environment Science and Materials (IFEESM)
CY SEP 25-26, 2015
CL Shenzhen, PEOPLES R CHINA
DE Green Buildings; Energy-saving; Design; Implementing Proposals
AB As advocating a low-carbon lifestyle and increasing resources crisis, the green energy-saving buildings have profound implications for our country's development and environment protection. Analyzing key techniques of energy-saving about green buildings from design link, because of design is a starting point for green buildings. In China, there are some problems in energy-saving design of green buildings because of lacking in experience and still immature technology. In order to improve the design quality of green energy-saving buildings, positive passive techniques and high efficient active techniques and design ideas according to local conditions should be adopted in China.
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CR Building energy efficiency research center of Tsinghua university, 2012, 2012 ANN REP CHIN BU, P2
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PU ATLANTIS PRESS
PI PARIS
PA 29 AVENUE LAVMIERE, PARIS, 75019, FRANCE
SN 2352-5401
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J9 AER ADV ENG RES
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BP 1149
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WC Energy & Fuels; Engineering, Multidisciplinary; Environmental Sciences
SC Energy & Fuels; Engineering; Environmental Sciences & Ecology
GA BE3NR
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AF Marquez, Leorey
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Seo, Seongwon
Walton, Andrea
Moglia, Magnus
Higgins, Andrew
Gardner, John
BE Weber, T
McPhee, MJ

Anderssen, RS
TI Modeling the adoption of energy efficient retrofits by mid-tier commercial buildings
SO 21ST INTERNATIONAL CONGRESS ON MODELLING AND SIMULATION (MODSIM2015)
LA English
DT Proceedings Paper
CT 21st International Congress on Modelling and Simulation (MODSIM) held jointly with the 23rd National Conference of the Australian-Society-for-Operations-Research / DSTO led Defence Operations Research Symposium (DORS
CY NOV 29-DEC 04, 2015
CL Gold Coast, AUSTRALIA
SP BMT WBM, CSIRO, UNSW Australia Canberra, Griffith Univ, Deltares, Modelling & Simulat Soc Australia & New Zealand, Australian Soc Operat Res, DSTO, Gold Coast Tourism Corp
DE Agent-based modeling; simulation modeling; energy efficient retrofits; commercial buildings
AB The low uptake of cost effective, energy efficient retrofits for commercial buildings suggests that economic considerations are not the sole determinant for their adoption. Socio-psychological surveys provide additional insights into consumption behaviour reflecting important lifestyle, attitudinal, risk, familiarity of technology, cultural and other forms of demographic preferences. There is a need for an evidence based tool that can forecast the effectiveness of intervention options for commercial buildings whilst removing the confounding effects of business-as-usual strategies. This paper describes a framework for evaluating the uptake of building retrofits under various government policy and behaviour program interventions aimed at reducing carbon emissions. The framework incorporates socio-psychological factors into an agent based model, applying diffusion and discrete choice modeling in evaluating the effectiveness of intervention programs, especially those involving direct subsidies (e.g. rebate to upfront costs, tax deductions) to facilitate the uptake of low carbon living practices. This framework is implemented in the ZEO Uptake Analysis Tool which allows planners, researchers and policy makers to assess the relative impact of assumptions about future technology and policy using a defined baseline (or "business as usual" scenario) for comparison. The Tool uses agent-based modeling and simulation (ABMS) to encapsulate the attributes and behaviour of various elements and entities in the building retrofit problem. The paper presents preliminary results from application of the agent-based model to the State of Victoria building stock, in a case study to understand the potential of the Energy Efficient Office Buildings Program in the uptake of energy efficient retrofits. The analysis indicates that the proposed policy options offered by EEOB have very little impact when we consider small building owners and limit the application to building tuning only. There is improvement in uptake when we expand the eligibility to all technologies (excluding lighting) and this is dominated by HVAC (Chiller) upgrades.
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PU MODELLING & SIMULATION SOC AUSTRALIA & NEW ZEALAND INC
PI CHRISTCHURCH
PA MSSANZ, CHRISTCHURCH, 00000, NEW ZEALAND
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BP 1909
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WC Computer Science, Interdisciplinary Applications; Operations Research & Management Science; Mathematics, Applied
SC Computer Science; Operations Research & Management Science; Mathematics
GA BI2XC
UT WOS:000410535400274
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ER

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AU Moga, L
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AF Moga, Ligia
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GP SGEM
TI SUSTAINABLE SOLUTIONS FOR ENERGY EFFICIENCY OF BUILDINGS
SO NANO, BIO AND GREEN - TECHNOLOGIES FOR A SUSTAINABLE FUTURE, VOL II (SGEM 2015)
SE International Multidisciplinary Scientific GeoConference-SGEM
LA English
DT Proceedings Paper
CT 15th International Multidisciplinary Scientific Geoconference (SGEM)
CY JUN 18-24, 2015
CL Albena, BULGARIA
SP Bulgarian Acad Sci, Acad Sci Czech Repub, Latvian Acad Sci, Polish Acad Sci, Russian Acad Sci, Serbian Acad Sci & Arts, Slovak Acad Sci, Natl Acad Sci Ukraine, Inst Water Problem & Hydropower NAS KR, Natl Acad Sci Armenia, Sci Council Japan, World Acad Sci, European Acad Sci Arts & Letters, Acad Sci Maldova, Montenegrin Acad Sci & Arts, Croatian Acad Sci & Arts, Georgian Natl Acad Sci, Acad Fine Arts & Design Bratislava, Turkish Acad Sci, Bulgarian Ind Assoc, Bulgarian Minist Environ & Water
DE energy efficiency; energy management; green technologies; sustainable buildings; NZEB
AB A significant percentage of the energy used on a national and international level is consumed in buildings, which means there are considerable potential for savings and a corresponding need for responsible behaviour. Careful use of energy and resources represents a technical, economic and ecological challenge as well as being one which is important for survival and sustainable living. The continuous modernization of cities will cause a growth of the global energy use in buildings. Thus, there is a need in optimizing the design process of building in order to reduce de energy consumptions and the environmental impact. The paper will present briefly the assessment of several green technologies used for building services and principles of green design of a building and their impact in the energy management of buildings.
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PU STEF92 TECHNOLOGY LTD
PI SOFIA
PA 1 ANDREY LYAPCHEV BLVD, SOFIA, 1797, BULGARIA
SN 1314-2704
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J9 INT MULTI SCI GEOCO
PY 2015
BP 303
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WC Construction & Building Technology; Geosciences, Multidisciplinary; Nanoscience & Nanotechnology
SC Construction & Building Technology; Geology; Science & Technology - Other Topics
GA BE4DX
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AU Ofori-Boadu, AN
Shofoluwe, MA
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Holt, GD
Edwards, D
AF Ofori-Boadu, Andrea N.
Shofoluwe, Musibau A.
Owusu-Manu, De-Graft
Holt, Gary D.
Edwards, David
TI Analysis of US commercial buildings' energy efficiency programs
SO BUILT ENVIRONMENT PROJECT AND ASSET MANAGEMENT
LA English
DT Article
DE USA; Energy efficiency; Commercial buildings; Electricity consumption; Energy programs; Foreign oil
ID STATE-LEVEL; IMPLEMENTATION; ELECTRICITY; INTENSITY; MARKET; POLICY
AB Purpose - The purpose of this paper is to investigate relationships between five energy efficiency programs and electricity intensities in the US commercial buildings sector.
Design/methodology/approach - Regression methods analyze state-level secondary data from 2006 through 2009 to identify significant energy program drivers of electricity efficiency.
Findings - Combined, the five programs studied account for approximately nine percent reduction in commercial electricity intensity.
Practical implications - Outcomes will inform stakeholders' decision-making regarding adoption or continuation of energy programs. Social implications - Electricity efficiency gains will help reduce negative environmental aspects and the present dependence on foreign oil.
Originality/value - Very little research has considered the impact of multiple programs on commercial electricity efficiency within their complex implementation environment.
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PA HOWARD HOUSE, WAGON LANE, BINGLEY BD16 1WA, W YORKSHIRE, ENGLAND
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JI Built Environ. Proj. Asset Manag.
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IS 4
BP 349
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WC Engineering, Civil
SC Engineering
GA CQ4HI
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Vlachostergiou, Aggeliki
Siolas, Georgios
Caridakis, George
Mylonas, Phivos
Stafylopatis, Andreas
Kollias, Stefanos
GP IEEE
TI User and home appliances pervasive interaction in a sensor driven Smart Home environment: the SandS approach
SO 10TH INTERNATIONAL WORKSHOP ON SEMANTIC AND SOCIAL MEDIA ADAPTATION AND PERSONALIZATION SMAP 2015
LA English
DT Proceedings Paper
CT 10th International Workshop on Semantic and Social Media Adaptation and Personalization (SMAP)
CY NOV 05-06, 2015
CL Trento, ITALY
SP IEEE Comp Soc, IEEE Computat Intelligence Soc, Univ Trento, Univ Peloponnese
DE Pervasive Computing; Smart Homes; Sensors; Context Awareness; Semantic Interoperability; Smart Cities
ID CONTEXT
AB EU FIRE research project "Social and Smart" aims to formalize and build a complete ecosystem of users, context sensors and smart home appliances that interact following the ubiquitous computing paradigm in order to adapt and enhance the everyday user-appliance interaction. In this framework a user is modeled

through the use of Personas stereotypes. Contextual information is collected via wireless ambient sensors, such as temperature and humidity ones, but can also include Smart City sensors and services. This contextual information is further related to each user's model through the enforcement of home rules, expressed in a high level language. Knowledge representation is supported through Semantic Web technologies that also ensure the interoperability between all the actors of the ecosystem. Preliminary experimental results have been carried in a small scale Smart Home setting, but also in a larger scale using the FIWARE(1) framework provided by the SmartSandander testbed.

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TC 0
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PU IEEE
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PT B
AU Sugarman, V
Lank, E
AF Sugarman, Valerie
Lank, Edward
GP Assoc Comp Machinery
TI Designing Persuasive Technology to Manage Peak Electricity Demand in Ontario Homes
SO CHI 2015: PROCEEDINGS OF THE 33RD ANNUAL CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS
LA English
DT Proceedings Paper
CT 33rd Annual CHI Conference on Human Factors in Computing Systems (CHI)
CY APR 18-23, 2015
CL Seoul, SOUTH KOREA
SP Assoc Comp Machinery, Assoc Comp Machinery Special Interest Grp Comp Human Interact
DE Sustainability; Peak Electricity Load; Persuasive Technology; Design
AB When it comes to environmental sustainability, the time that electricity is consumed matters. For example, using an air conditioner on a hot summer afternoon as the power grid is strained necessitates the use of more polluting sources to meet demand. In this paper, we analyze end-user response to two utility-driven conservation programs in Ontario, Canada: Time-of-Use pricing and the peaksaver program. We find that time-of-use pricing encourages shifting some electricity demand, but only when it is convenient. We also find that while potentially effective at a larger scale, the peaksaver program in its current form is unattractive to participants. These results are discussed in the context of Fogg's Behavior Model for Persuasive Design, which allows us to explore the design space for improvement to these programs and ground our design implications for the design of technologies to encourage reduction of peak electricity demand.
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FU Natural Science and Engineering Research Council of Canada (NSERC); Networks of Centres of Excellence for Graphics, Animation and New Media (NCE-GRAND)
FX Funding provided by the Natural Science and Engineering Research Council of Canada (NSERC) and the Networks of Centres of Excellence for Graphics, Animation and New Media (NCE-GRAND).
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NR 34
TC 0
Z9 0
U1 0
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PU ASSOC COMPUTING MACHINERY
PI NEW YORK
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DI 10.1145/2702123.2702364
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WC Computer Science, Cybernetics; Computer Science, Information Systems; Computer Science, Interdisciplinary Applications; Computer Science, Theory & Methods
SC Computer Science
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PT B
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GP Destech Publicat Inc
TI The Application Research of BIM Technology in Energy Efficiency Evaluation About High-rise Building

SO 2015 4TH INTERNATIONAL CONFERENCE ON ENERGY AND ENVIRONMENTAL PROTECTION (ICEEP 2015)
LA English
DT Proceedings Paper
CT 4th International Conference on Energy and Environmental Protection (ICEEP)
CY JUN 02-04, 2015
CL Shenzhen, PEOPLES R CHINA
DE BIM; energy efficiency evaluation; analysis of solar radiation; building energy consumption
AB This paper studies the method of BIM technology application in the field of building energy efficiency by combining BIM technology and building energy consumption analysis. Through establish the building information model to integrate and manage the building information such as the function of architectural space geometry information, space information, building materials and equipment established by a building information model. This information can provide necessary basis for the green building design and energy efficiency evaluation. Based on the model of information and data format conversion, we can use professional tools to analysis the building energy efficiency and then according to the analysis results to adjust design, achieve the goal of building energy efficiency design.
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NR 11
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PT S
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TI Improving data center energy efficiency using a cyber-physical systems approach: integration of building information modeling and wireless sensor networks
SO DEFINING THE FUTURE OF SUSTAINABILITY AND RESILIENCE IN DESIGN, ENGINEERING AND CONSTRUCTION
SE Procedia Engineering
LA English
DT Proceedings Paper
CT Defining the Future of Sustainability and Resilience in Design, Engineering and Construction
CY MAY 10-13, 2015
CL Chicago, CA
SP ASCE, ICSDEC
DE Data center; energy efficiency; building information modeling; wireless sensor network; cyber-physical systems
ID CONSUMPTION
AB The increase in data center operating costs is driving innovation to improve their energy efficiency. Previous research has investigated computational and physical control intervention strategies to alleviate the competition between energy consumption and thermal performance in data center operation. This study contributes to the body of knowledge by proposing a cyber-physical systems (CPS) approach to innovatively integrate building information modeling (BIM) and wireless sensor networks (WSN). In the proposed framework, wireless sensors are deployed strategically to monitor thermal performance parameters in response to runtime server load distribution. Sensor data are collected and contextualized in reference to the building information model that captures the geometric and functional characteristics of the data center, which will be used as inputs of continuous simulations aiming to predict real-time thermal performance of server working environment. Comparing the simulation results against historical performance data via machine learning and data mining, facility managers can quickly pinpoint thermal hot zones and actuate intervention procedures to improve energy efficiency. This BIM-WSN integration also facilitates smarter power management by capping runtime power demand within peak power capacity of data centers and alerting power outage emergencies. This paper lays out the BIM-WSN integration framework, explains the working mechanism, and discusses the feasibility of implementation in future work. (C) 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license.
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NR 34
TC 0
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U1 2
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PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
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WC GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Multidisciplinary
SC Science & Technology - Other Topics; Engineering
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PT S
AU Yu, C
Pan, W
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Li, YG
AF Yu, Cong
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Pei, J
TI Challenges for Modeling Energy Use in High-rise Office Buildings in Hong Kong
SO 9TH INTERNATIONAL SYMPOSIUM ON HEATING, VENTILATION AND AIR CONDITIONING (ISHVAC) JOINT WITH THE 3RD INTERNATIONAL CONFERENCE ON BUILDING ENERGY AND ENVIRONMENT (COBEE)
SE Procedia Engineering
LA English
DT Proceedings Paper
CT 9th International Symposium on Heating Ventilation and Air Conditioning ISHVAC Joint with the 3rd International Conference on Building Energy and Environment COBEE
CY JUL 12-15, 2015
CL Tianjin, PEOPLES R CHINA
DE High-rise; Office building; Energy modeling; Energy use
ID PERFORMANCE; DESIGN
AB Modeling buildings' energy use is an effective strategy for identifying energy saving potential and seeking for energy efficient building solutions. However, there exist significant challenges for such modeling, particularly of high-rise buildings. The aim of this paper is to examine such challenges drawing on the case of high-density high-rise office buildings in the hot and humid climate of Hong Kong. The challenges are examined in relation to four aspects, namely, modeling approach, modelling tools, data availability and atmospheric conditions. A framework of strategies is developed for addressing the challenges. The strategies are then illustrated through a case study with a hypothesized high-rise office building in Hong Kong. Essential to achieving accuracy of modeling buildings' energy use are found to be the collection and verification of building information and specification of thermal zones and schedules for modeling. The lack of usable data of energy use in high-rise buildings is considered to be a major barrier to verifying modeled results. To establish an integrated model with energy modelling and CFD software should effectively address the challenges. (C) 2015 The Authors. Published by Elsevier Ltd.
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CR Buildings Department, 1996, MONTHL DIG 1975 1995
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NR 17
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WC Construction & Building Technology; Engineering, Multidisciplinary
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PT S
AU Yuan, ZF
AF Yuan, Zhifen
BE Liang, Z
Li, X
TI Research on Decision Model of Building Energy Efficiency
SO PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON MECHATRONICS, MATERIALS, CHEMISTRY AND COMPUTER ENGINEERING 2015 (ICMMCCE 2015)
SE ACSR-Advances in Comptuer Science Research
LA English
DT Proceedings Paper
CT 4th International Conference on Mechatronics, Materials, Chemistry and Computer Engineering (ICMMCCE)
CY DEC 12-13, 2015
CL Xian, PEOPLES R CHINA
DE Existing building energy efficiency retrofitting (EBEER); Decision model; Uncertainty; Multi-objective optimization
AB Following the overall building energy-saving situation in China and reflecting the rationality and flexibility, the paper aims to investigate the decision methods of existing building energy efficiency retrofitting (EBEER) projects under uncertainty to facilitate comprehensive and objective assessment in such projects. In this paper, the internal and external uncertainties affecting energy efficiency are identified and their random fluctuation characteristics are qualified and introduced into the analysis of decisions. By taking into account life-cycle costs, energy savings, carbon emission and thermal comfort, a project revenue optimization model under uncertainty is established to explore the dynamic quantitative relationship between energy-saving technology solutions and the costs and benefits over a long horizon for EBEER projects. By means of optimizing analysis, the multi-stage optimal scales and energy-saving technology solutions for EBEER projects are achieved. This paper will provide a new perspective for solving EBEER projects' and financing fatigue to contribute to the returns and the smooth implementation of EBEER projects in China.
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CR Chidiac SE, 2011, ENERG BUILDINGS, V43, P614, DOI 10.1016/j.enbuild.2010.11.002
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PY 2015
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WC Engineering, Electrical & Electronic; Engineering, Mechanical; Materials Science, Multidisciplinary
SC Engineering; Materials Science
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PT S
AU Zhang, L
Chang, TY
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AF Zhang Lin
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Cui Hongliang
Tian Xianzhong
Wang Zhongmin
GP IEEE
TI Multi-agent System Design for Energy Saving in Intelligent Building
SO 2015 8TH INTERNATIONAL SYMPOSIUM ON COMPUTATIONAL INTELLIGENCE AND DESIGN (ISCID), VOL 1
SE International Symposium on Computational Intelligence and Design
LA English
DT Proceedings Paper
CT 8th International Symposium on Computational Intelligence and Design (ISCID)
CY DEC 12-13, 2015
CL Hangzhou, PEOPLES R CHINA
SP IEEE Nanjing Computat Intelligence Chapter, Univ Bristol, Zhejiang Univ, Zhejiang Sci Tech Univ, Zhejiang Univ, Coll Comp Sci, IEEE Comp Soc
DE multi-agent system; intelligent buildings; wireless sensor network; energy saving
AB With the rapid development of artificial intelligence, intelligent agent techniques have provided a new way for intelligent buildings to a higher level. Although the multi- agentsystem application in intelligent buildings, especially for energysaving application is just in its initial stage, it has drawn more and more attention. With the advance of agent technology, wireless sensor network and open standards in building automation systems, it is now feasible to build an intelligent multi- agent system for energy conservation. In this paper, we present a building control system architecture based on multiagent and the way to realize energy efficiency without compromising occupants' comfort.
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NR 10
TC 0
Z9 0
U1 2
U2 3
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2165-1701
BN 978-1-4673-9587-8
J9 INT SYM COMPUT INTEL
PY 2015
BP 297
EP 300
DI 10.1109/ISCID.2015.168
PG 4
WC Computer Science, Artificial Intelligence; Engineering, Electrical &
Electronic
SC Computer Science; Engineering
GA BH2FU
UT WOS:000398912400071
DA 2018-05-03
ER

PT S
AU Zhao, SG
Feng, W
Zhang, SC
Hou, J
Zhou, N
Levine, M
AF Zhao, Shanguo
Feng, Wei
Zhang, Shicong
Hou, Jing
Zhou, Nan
Levine, Mark
BE Sun, Y

Pei, J
TI Energy Savings and Cost-benefit Analysis of the New Commercial Building Standard in China
SO 9TH INTERNATIONAL SYMPOSIUM ON HEATING, VENTILATION AND AIR CONDITIONING (ISHVAC) JOINT WITH THE 3RD INTERNATIONAL CONFERENCE ON BUILDING ENERGY AND ENVIRONMENT (COBEE)
SE Procedia Engineering
LA English
DT Proceedings Paper
CT 9th International Symposium on Heating Ventilation and Air Conditioning ISHVAC Joint with the 3rd International Conference on Building Energy and Environment COBEE
CY JUL 12-15, 2015
CL Tianjin, PEOPLES R CHINA
DE Commercial building; Energy efficiency standard; Reference building; Cost-benefit; Simulation
ID CONSUMPTION
AB In this paper, a comprehensive comparison of the commercial building energy efficiency standard between the previous 2005 version and the new proposed version is conducted, including the energy efficiency analysis and cost-benefit analysis. To better understand the tech-economic performance of the new Chinese standard, energy models were set up based on a typical commercial office building in Chinese climate zones. The building energy standard in 2005 is used as the baseline for this analysis. Key building technologies measures are analyzed individually, including roof, wall, window, lighting and chiller and so on and finally whole building cost-benefit analysis was conducted. Results show that the new commercial building energy standard demonstrates good cost-effective performance, with whole building payback period around 4 years (C) 2015 Published by Elsevier Ltd.
C1 [Zhao, Shanguo; Feng, Wei; Zhou, Nan; Levine, Mark] Lawrence Berkeley Natl Lab, Berkeley, CA 94720 USA.
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RP Feng, W (reprint author), Lawrence Berkeley Natl Lab, Berkeley, CA 94720 USA.
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[Anonymous], 2015, CFEEPL CHINA FENESTR
NR 9
TC 0
Z9 0
U1 0
U2 2
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1877-7058
J9 PROCEDIA ENGINEER
PY 2015
VL 121
BP 317
EP 324
DI 10.1016/j.proeng.2015.08.1074
PG 8

WC Construction & Building Technology; Engineering, Multidisciplinary
SC Construction & Building Technology; Engineering
GA BF2TP
UT WOS:000380499000045
OA gold
DA 2018-05-03
ER

PT J
AU Bhattacharyya, SC
AF Bhattacharyya, Subhes C.
TI Structural and macro-economic changes in India and the implications for the residential energy demand
SO WILEY INTERDISCIPLINARY REVIEWS-ENERGY AND ENVIRONMENT
LA English
DT Article
AB India, as a rising economic power, has undergone significant macro-economic and structural changes in recent decades. The accelerated economic growth in recent times has brought wide-ranging changes in life styles and behaviors of its growing population. At the same time, the population is undergoing a structural change and as this continues in the future, the country has the potential to reap the population dividend. As a consequence of these changes, the country is experiencing increased migration to urban areas, visible signs of consumerism in the fast-growing middle-class segment of the population, and an increasing trend of mimicking international styles. This paper provides an overview of the macro-economic and structural changes in India and considers the implications of such changes on India's residential energy needs. It suggests that life-style changes will have a significant implication on Indian future energy demand but there is a window of opportunity to follow a low-carbon pathway by adopting 'smart' technologies and creating efficient infrastructure. However, it requires a coordinated effort at various levels. (C) 2014 John Wiley & Sons, Ltd.
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CR Bhattacharyya SC, 2013, GLOBAL CHALLENGE OF ENCOURAGING SUSTAINABLE LIVING: OPPORTUNITIES, BARRIERS, POLICY AND PRACTICE, P208
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The World Bank, 2008, RES CONS EL IND DOC
World Bank, 2013, IND DEV UPD OCT 2013
NR 16
TC 0
Z9 0
U1 0
U2 4
PU WILEY PERIODICALS, INC
PI SAN FRANCISCO

PA ONE MONTGOMERY ST, SUITE 1200, SAN FRANCISCO, CA 94104 USA
SN 2041-8396
EI 2041-840X
J9 WIRES ENERGY ENVIRON
JI Wiley Interdiscip. Rev. Energy Environ.
PD NOV-DEC
PY 2014
VL 3
IS 6
BP 535
EP 539
DI 10.1002/wene.108
PG 5
WC Energy & Fuels
SC Energy & Fuels
GA AQ9WS
UT WOS:000343209300001
DA 2018-05-03
ER

PT J
AU Penzes, J
Teperics, K
Radics, Z
Kulcsar, B
Kozma, G
Molnar, E
AF Penzes, Janos
Teperics, Karoly
Radics, Zsolt
Kulcsar, Balazs
Kozma, Gabor
Molnar, Erno
TI SOCIAL EMBEDDEDNESS OF ENERGY-EFFICIENT BUILDING METHODS IN THE NORTHERN GREAT PLAIN REGION
SO ENVIRONMENTAL ENGINEERING AND MANAGEMENT JOURNAL
LA English
DT Article
DE energy efficiency; Northern Great Plain Region; public knowledge
ID COUNTRIES
AB The aim of the study is to reveal the energy-efficient technologies, related knowledge and information sources of the population in the Hungarian Northern Great Plain Region and to gain a understanding of their attitude towards the implementation of these technologies. The survey included questions about the alternative building technologies as well as the cost burden limits of considering their application. Special attention was given to getting information about the energy characteristics and maintenance problems of the dwellings.
The lessons learned from the data analysis are sufficient for the more successful promotion of the energy-efficiency issue and for changing current public attitudes.
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FU European Union; European Social Fund; [TAMOP-4.2.2.A-11/1/KONV-2012-0041]
FX The work is supported by the TAMOP-4.2.2.A-11/1/KONV-2012-0041 project. The project is co-financed by the European Union and the European Social Fund.

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NR 25
TC 0
Z9 0
U1 0
U2 1
PU GH ASACHI TECHNICAL UNIV IASI
PI IASI
PA 71 MANGERON BLVD, IASI, 700050, ROMANIA
SN 1582-9596
EI 1843-3707
J9 ENVIRON ENG MANAG J
JI Environ. Eng. Manag. J.
PD NOV
PY 2014
VL 13
IS 11
BP 2859
EP 2866
PG 8
WC Environmental Sciences
SC Environmental Sciences & Ecology
GA AY4JR
UT WOS:000347544700022
DA 2018-05-03
ER

PT J
AU Tappler, R
Munoz-Czemy, U
Damberger, B
Twrdik, F
Ringer, W

Hutter, HP
AF Tappler, R.
Munoz-Czemy, U.
Damberger, B.
Twrdik, F.
Ringer, W.
Hutter, H. -P
TI Occupants' health and indoor air quality in new built, energy efficient homes
SO GEFAHRSTOFFE REINHALTUNG DER LUFT
LA German
DT Article
AB In new buildings with tight building envelopes different systems of mechanical ventilation by a heat recovery ventilator are often used. However, many builders are still sceptical to what extent these innovative systems might lead to risks for occupants. The study, which is reported here, included indoor air pollution measurements (e.g. formaldehyde, volatile organic compounds and allergens) both in mechanically ventilated houses and in naturally ventilated homes as well as a medical survey among the occupants of these homes in order to determine the air pollution levels, the relationship between indoor air pollution and occupants' health and the changes during the period of one year period in these two different types of homes.
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NR 10
TC 0
Z9 0
U1 1
U2 11
PU SPRINGER-V D I VERLAG GMBH & CO KG
PI DUSSELDORF
PA VDI-PLATZ 1, D-40468 DUSSELDORF, GERMANY
SN 0949-8036
EI 1436-4891
J9 GEFAHRST REINHALT L
JI Gefahrst. Reinhalt. Luft
PD MAR
PY 2014
VL 74
IS 3
BP 75
EP 78
PG 4
WC Engineering, Environmental; Engineering, Civil; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA AF0HQ
UT WOS:000334395300004

DA 2018-05-03
ER

PT J
AU Barkhudaryan, N
Orosa, JA
Roshan, G
AF Barkhudaryan, Naira
Orosa, Jose A.
Roshan, Gholamreza
TI A new procedure to analyze the effect of air changes in building energy consumption
SO JOURNAL OF ENVIRONMENTAL HEALTH SCIENCE AND ENGINEERING
LA English
DT Article
DE Energy; Ventilation; ISO13790; Climate change; Monte Carlo
AB Background: Today, the International Energy Agency is working under good practice guides that integrate appropriate and cost effective technologies. In this paper a new procedure to define building energy consumption in accordance with the ISO 13790 standard was performed and tested based on real data from a Spanish region.
Results: Results showed that the effect of air changes on building energy consumption can be defined using the Weibull peak function model. Furthermore, the effect of climate change on building energy consumption under several different air changes was nearly nil during the summer season.
Conclusions: The procedure obtained could be the much sought-after solution to the problem stated by researchers in the past and future research works relating to this new methodology could help us define the optimal improvement in real buildings to reduce energy consumption, and its related carbon dioxide emissions, at minimal economical cost.
C1 [Barkhudaryan, Naira; Orosa, Jose A.] Univ A Coruna, Dept Energy & MP, La Coruna 15011, Spain.
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NR 9
TC 0
Z9 0
U1 0
U2 3
PU BIOMED CENTRAL LTD
PI LONDON
PA 236 GRAYS INN RD, FLOOR 6, LONDON WC1X 8HL, ENGLAND
SN 2052-336X
J9 J ENVIRON HEALTH SCI
JI J. Environ. Health Sci. Eng
PD JAN 21
PY 2014
VL 12
AR 37
DI 10.1186/2052-336X-12-37
PG 12

WC Engineering, Environmental; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA AB0AH
UT WOS:000331453700001
PM 24456655
OA gold
DA 2018-05-03
ER

PT S
AU Chabrol, M
AF Chabrol, Maximin
BE Lejoux, P
Ortar, N
TI Residential practices and household electricity consumption: a territorial approach to energy transition in the Provence-Alpes-Cote d'Azur region
SO TRANSITION ENERGETIQUE : VRAIS ENJEUX, FAUX DEPARTS?
SE SHS Web of Conferences
LA French
DT Proceedings Paper
CT Conference on Energy Transition - Real Issues, False Starts
CY OCT 21-22, 2013
CL Lyon, FRANCE
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Charre J., 1995, STAT TERRITOIRE
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Rifkin Jeremy, 2012, TROISIEME REVOLUTION
NR 10
TC 0
Z9 0
U1 0
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PU E D P SCIENCES
PI CEDEX A
PA 17 AVE DU HOGGAR PARC D ACTIVITES COUTABOEUF BP 112, F-91944 CEDEX A, FRANCE
SN 2261-2424
J9 SHS WEB CONF
PY 2014
VL 9
DI 10.1051/shsconf/20140904002
PG 10
WC Environmental Studies; Social Sciences, Interdisciplinary
SC Environmental Sciences & Ecology; Social Sciences - Other Topics
GA BB9FC
UT WOS:000348252300011
OA gold
DA 2018-05-03
ER

PT S
AU Cheng, W
AF Cheng, Wei
BE Rui, H
TI Study of Residential Energy-saving Green Technology
SO ADVANCED RESEARCH IN MATERIAL SCIENCE AND MECHANICAL ENGINEERING, PTS 1 AND 2
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT 2nd International Conference on Mechanics and Control Engineering (ICMCE 2013)
CY SEP 01-02, 2013
CL Beijing, PEOPLES R CHINA
SP SW Jiaotong Univ
DE Ecological Technology; Energy-Saving; Residence
AB The green house is a green building technology in residential application of the specific embodiment .It is the use of ecological principles and following the principles of sustainable development, ecological balance that is to design, organize indoor and outdoor spaces in residential buildings of various material factors and create no pollution, ecological smooth the built environment. Ecological Housing characteristics summarize in four aspects, namely, comfortable, healthy, efficient and beautiful. The pursuit of comfort and health are the basis of ecological residence and the pursuit of efficiency is the core of ecological residence as well as the pursuit of beauty is in harmony with nature ecological house of perfection. At present, the construction market in the application of ecological and energy-saving technologies exist errors, green technology does not mean that the ecological high-tech and high cost. Green paper from the overall current situation of residential construction, and ecological building techniques are used in a variety of ecological and energy-saving technologies that were specific research in the "Ecological housing design," The profound basis of knowledge and research focusing on ecological housing should be adopted by the design principles of appropriate technology through the specific architectural practice. It summarizes the key on the actual project that should be considered and applied technology.
C1 Wuhan Univ Sci & Technol, Sch Urban Construct, Wuhan, Peoples R China.
RP Cheng, W (reprint author), Wuhan Univ Sci & Technol, Sch Urban Construct, Wuhan, Peoples R China.
EM chengweiwh@126.com
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NR 8
TC 0
Z9 0
U1 1
U2 11
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1660-9336
BN 978-3-03785-908-7
J9 APPL MECH MATER
PY 2014
VL 446-447
BP 1552
EP 1557
DI 10.4028/www.scientific.net/AMM.446-447.1552

PG 6
WC Engineering, Mechanical; Materials Science, Multidisciplinary; Mechanics
SC Engineering; Materials Science; Mechanics
GA BA8WW
UT WOS:000338976600290
DA 2018-05-03
ER

PT S
AU Cowan, D
Maidment, G
Chaer, I
AF Cowan, David
Maidment, Graeme
Chaer, Issa
GP ASHRAE
TI Estimation of Cooling Energy Demand and Carbon Emissions from Urban Buildings using a Quasi-dynamic Model
SO ASHRAE TRANSACTIONS 2014, VOL 120, PT 1
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT ASHRAE Winter Conference
CY 2014
CL New York, NY
SP ASHRAE
ID SIMULATION
AB Global warming and the urban heat island effect in large towns and cities demand new approaches to cooling buildings in an efficient and sustainable way. Modern refrigeration, air conditioning and heat pump (RACHP) systems can achieve a high coefficient of performance and low emissions, but refrigeration technology already accounts for around 15% of worldwide electricity use and up to 10% of all greenhouse gas emissions, so in the context of international agreements to reduce global greenhouse gas emissions by up to 80% RACHP systems alone cannot provide a sustainable cooling solution for cities. The purpose of the model described in this paper is to provide a simple and easy to use tool to estimate the impact of different heating and cooling technologies, alternative building design and operating parameters and future global warming, on the energy demands and carbon emissions of buildings. Existing software tools for analysis of buildings can provide high quality results for a given scenario, but the determination of an optimal solution demands multiple simulations, which can be time consuming and require post processing to interpret the results. The Excel based tool uses a quasi-dynamic energy balance model and reduced weather data set to generate rapid results, allowing the user to view the building's temperature profile, energy demands and carbon emissions in near real time and to develop an optimum cooling strategy. Results are presented for a single building version of the tool. When fully developed, it will allow the user to model clusters of buildings in an urban environment.
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FU UK Engineering and Physical Sciences Research Council; London Development Agency; Institute of Refrigeration
FX This work has been funded by the UK Engineering and Physical Sciences Research Council, London Development Agency and Institute of Refrigeration. This publication reflects the views only of the authors, and the funding bodies cannot be held responsible for any use which may be made of the information contained therein.
CR Attia S., 2011, STATE ART EXISTING E
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Chartered Institution of Building Services Engineers (CIBSE), 2006, GUID A
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Trcka M, 2010, AUTOMAT CONSTR, V19, P93, DOI 10.1016/j.autcon.2009.11.019
NR 11
TC 0
Z9 0
U1 0
U2 2
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
J9 ASHRAE TRAN
PY 2014
VL 120
IS 1
PG 8
WC Thermodynamics; Construction & Building Technology
SC Thermodynamics; Construction & Building Technology
GA BB3GM
UT WOS:000342765800056
DA 2018-05-03
ER

PT B
AU De Rose, R
Felicetti, C
Raso, C
Felicetti, AM
AF De Rose, Raffaele
Felicetti, Carmelo
Raso, Cinzia
Felicetti, Alberto Michele
BE Carlucci, D
Spender, JC
Schiuma, G
TI Modelling Smart Home Environments for energy-efficiency and quality of life.
SO IFKAD 2014: 9TH INTERNATIONAL FORUM ON KNOWLEDGE ASSET DYNAMICS: KNOWLEDGE AND MANAGEMENT MODELS FOR SUSTAINABLE GROWTH
LA English
DT Proceedings Paper
CT 9th International Forum on Knowledge Asset Dynamics (IFKAD)
CY JUN 11-13, 2014
CL Matera, ITALY
SP Inst Knowledge Asset Management, Univ Basilicata, Arts Business Inst, Univ Basilicata, DIMIE
DE Smart Home Environment; Sustainability; Energy Efficiency; Home Energy Management System
ID LOAD FORECASTING METHODS; ELECTRICITY CONSUMPTION; MANAGEMENT-SYSTEM; NEURAL NETWORKS; IMPLEMENTATION; PREDICTION; SECTOR
AB Purpose - Recent years have been characterized by a growing interest toward sustainability issues. In fact, themes such as a more efficient use of the energy resources have taken a central role in the debate on

energy policies of developed countries. In particular, it has been demonstrated that energy efficiency in residential buildings is one of the keys to reducing overall energy consumption and greenhouse emissions. In this work, we propose an innovative system for monitoring and managing energy consumption in "Smart Home Environments" (SHEs), according to the needs of users and to the particular state conditions of the considered environment.

Design/methodology/approach - The paper focuses on a methodological approach to design a SHE based on the following steps:

Identify and apply technological solutions to provide additional intelligence and connectivity services to existing heterogeneous home devices.

Define an architecture of SHE, supported by a centralized management system featuring a smart Central Control Unit (CCU) and different peripheral devices of sensing and actuating.

Define a data management model in order to handle machine-to-machine and machine-to-human interactions.

Define a set of decision algorithms and interoperability rules to perform energy-control services, basing on quantitative forecasting methodologies for analysis of historical data.

Originality/value - Different approaches to the design of SHEs are emerging in literature, emphasizing the importance of such a type of applications as a mean to guarantee energy and cost saving. However, most of these approaches are essentially focused on the technological issues, relying primarily on the architectural characteristics of the Home Energy Management Systems (HEMS). In this work, we intend to highlight how a knowledge-based management model can support the design of innovative HEMSs, providing the energy performance improvements of the considered environment and the adaptability to the user's habits and needs.

Practical implications - In line with the goals of Europe 2020 strategy, energy resource saving represent a key issue for sustainable development. Among the various technological solutions for reducing energy consumption in home environments, the so called "Building Automation and Control Systems" (BACS) represent high performance and low impact solutions for energy efficiency. In this context, the proposed system, whose development is ongoing, offers in prospect the opportunity to improve the energy performance and electricity cost saving of residential buildings, featuring at the same time a low architectural impact due to the use of wireless and/or powerline technologies.

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NR 25
TC 0
Z9 0
U1 1
U2 7
PU IKAM-INST KNOWLEDGE ASSET MANAGEMENT
PI MATERA
PA VIA D SCHIAVONE 1, MATERA, MT 75100, ITALY
BN 978-88-96687-04-8
PY 2014
BP 3567
EP 3579
PG 13
WC Social Sciences, Interdisciplinary
SC Social Sciences - Other Topics
GA BD0JD
UT WOS:000357262304015
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Srija
Santos, JR
AF Dirienzo, Thomas P.
Krishnan, Nathan A.
Srija
Santos, Joost R.
GP IEEE
TI Effects of Smart Appliances on Residential Consumption Patterns
SO 2014 SYSTEMS AND INFORMATION ENGINEERING DESIGN SYMPOSIUM (SIEDS)
LA English
DT Proceedings Paper
CT IEEE Systems and Information Engineering Design Symposium (SIEDS)
CY APR 25, 2014
CL Univ Virginia, Charlottesville, VA
SP IEEE, IEEE Syst Man & Cybernet Soc
HO Univ Virginia
DE behavioral patterns; energy consumption; smart appliance; scenario analysis
AB Despite the growing attention on environmental sustainability and technological advances to create new ways to reduce energy use, the U.S. remains the largest global energy consumer. Changing individuals' patterns of consumption is crucial to addressing the issue. While smart appliances are becoming prominent in the consumer market, only a few studies have been focused on their ability to influence individual decision-making. Smart appliance technologies have data storage capabilities that can be remotely accessed through modern user interfaces. This affords the ability for data-driven decision making through visual analytics. When given quantitative results, consumers tend to be more aware of their consumption behavior. Smart appliances can be utilized to reduce individual energy usage through incentivizing savings, while reducing greenhouse emissions. Through a systems-based scenario analysis, this paper analyzes the consumption of three residential user categories. The data is aggregated to depict the cost of annual energy usage, which is then optimized to show areas for cost savings. The benefits of these behavioral changes can be further expanded through interdisciplinary approaches. Future enhancements to smart appliance applications are also explored, particularly in areas of user interface, design, and

"gamification" of savings. These improvements, coupled with government home energy incentive programs, make the benefits of smart appliances more plausible. Empowering consumers with this technology can encourage sustainable behaviors that lead to reductions of the national carbon footprint.
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NR 20
TC 0
Z9 0
U1 1
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PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4799-4836-9
PY 2014
PG 5
WC Computer Science, Information Systems; Engineering, Electrical & Electronic
SC Computer Science; Engineering
GA BC9JP
UT WOS:000356499600031
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ER

PT S
AU Garabuau-Moussaoui, I
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AF Garabuau-Moussaoui, Isabelle
Thiriot, Sarah
BE Lejoux, P
Ortar, N
TI The occupants of performance tertiary buildings in energy: between logics of use, wage and domestic
SO TRANSITION ENERGETIQUE : VRAIS ENJEUX, FAUX DEPARTS?
SE SHS Web of Conferences

LA French
DT Proceedings Paper
CT Conference on Energy Transition - Real Issues, False Starts
CY OCT 21-22, 2013
CL Lyon, FRANCE
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SN 2261-2424
J9 SHS WEB CONF
PY 2014
VL 9
DI 10.1051/shsconf/20140903001
PG 12
WC Environmental Studies; Social Sciences, Interdisciplinary
SC Environmental Sciences & Ecology; Social Sciences - Other Topics
GA BB9FC
UT WOS:000348252300007
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Aljuhaishi, Nasser
Gaouda, Ahmed
Shuaib, Khaled
Abdel-Hafez, Mohammed
GP IEEE
TI Energy Node Locator - A Pathway to Track Energy At The Point of Use, Remotely, in Buildings
SO IECON 2014 - 40TH ANNUAL CONFERENCE OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY
SE IEEE Industrial Electronics Society
LA English
DT Proceedings Paper
CT 40th Annual Conference of the IEEE-Industrial-Electronics-Society (IECON)
CY OCT 29-NOV 01, 2014
CL Dallas, TX
SP Inst Elect & Elect Engineers, IEEE Ind Elect Soc
DE energy conservation; real-time monitoring; node monitoring; Time Domain Reflectometry
AB The smart grid will increase building energy efficiency and conservation via combining information and communication technologies, advanced instrumentations, system intelligence, and information on the end user. Specifically Demand Side Management (DSM) programs serve as an aid in energy conservation and management strategies as well as in the collection of real-time consumption information data. As proposed in this paper, real-time, fine-grain consumption data at the point of use in buildings can be used by building energy managers, utilities, and the end user for planning, load forecasting, and feedback for providing information that may lead to end user behavior change. This paper focuses on the development of a platform detecting every active node in the building remotely and using a combination of tools to monitor and locate these active nodes. The paper will discuss the main component of this platform, the energy node locator and how it works based on the principles of Time Domain Reflectometry (TDR). Preliminary results will be presented and used to evaluate the node locator principles. Summary and future work will be presented to discuss the framework moving forward.
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NR 29
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Z9 0
U1 0
U2 1
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SN 1553-572X
BN 978-1-4799-4032-5
J9 IEEE IND ELEC
PY 2014
BP 5363
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PG 6
WC Automation & Control Systems; Engineering, Industrial; Engineering, Electrical & Electronic
SC Automation & Control Systems; Engineering
GA BG5FY
UT WOS:000389471605018
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ER

PT S
AU Levorato, M
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AF Levorato, Marco
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Zhang, Yang Arthur
GP IEEE
TI Consumer in-the-Loop: Consumers as Part of Residential Smart Energy Systems
SO 2014 IEEE INTERNATIONAL CONFERENCE ON SMART GRID COMMUNICATIONS (SMARTGRIDCOMM)
SE International Conference on Smart Grid Communications
LA English
DT Proceedings Paper
CT 2014 IEEE International Conference on Smart Grid Communications (SmartGridComm)

CY NOV 03-06, 2014
CL Venice, ITALY
ID DEMAND RESPONSE
AB A novel framework for residential smart energy systems is proposed. The model integrates the consumer behavior in the dynamics of the technological and environmental components of the system. The objective is to classify and optimize the whole system, which includes the dynamics of the consumer. The framework is based on Markov process, model detection and Hidden Markov Model Theory. The behavior of the consumer is classified from a sequence of available observations within a set of reference classes. The detected class is used as prior information to detect the state of the system and provide feedback to the consumer to reduce the probability that undesirable states occur within a time window.
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NR 22
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2373-6836
BN 978-1-4799-4934-2
J9 INT CONF SMART GRID
PY 2014
BP 758
EP 763
PG 6
WC Engineering, Electrical & Electronic; Telecommunications
SC Engineering; Telecommunications
GA BF2FI
UT WOS:000380462700127

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ER

PT S
AU Li, C
Hong, TZ
AF Li, Cheng
Hong, Tianzhen
GP ASHRAE
TI Revisit of Energy Use and Technologies of High Performance Buildings
SO ASHRAE TRANSACTIONS 2014, VOL 120, PT 2
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT ASHRAE Annual Conference
CY JUN 28-JUL 02, 2014
CL Seattle, WA
SP ASHRAE
AB Energy consumed by buildings accounts for one third of the world's total primary energy use. Associated with the conscious of energy savings in buildings, High Performance Buildings (HPBs) has surged across the world, with wide promotion and adoption of various performance rating and certification systems. It is valuable to look into the actual energy performance of HPBs and to understand their influencing factors. To shed some light on this topic, this paper conducted a series of portfolio analysis based on a database of 51 high performance office buildings across the world. Analyses showed that the actual site Energy Use Intensity (EUI) of the 51 buildings varied by a factor of up to 11, indicating a large scale of variation of the actual energy performance of the current HPBs. Further analysis of the correlation between EUI and climate elucidated ubiquitous phenomenon of EUI scatter throughout all climate zones, implying that the weather is not a decisive factor, although important, for the actual energy consumption of an individual building. On the building size via EUI, analysis disclosed that smaller buildings have a tendency to achieving lower energy use. Even so, the correlation is not absolute since some large buildings demonstrated low energy use while some small buildings performed opposite. Concerning the technologies, statistics indicated that the application of some technologies had correlations with some specific building size and climate characteristic. However, it was still hard to pinpoint a set of technologies which was directly correlative with a group of low EUI buildings.
It is concluded that no a single factor essentially determines the actual energy performance of HPBs. To deliver energy-efficient buildings, an integrated design taking account of climate, technology, occupant behavior as well as operation and maintenance should be implemented.
C1 [Li, Cheng; Hong, Tianzhen] Univ Calif Berkeley, Lawrence Berkeley Natl Lab, Dept Bldg Technol & Urban Syst, Berkeley, CA 94720 USA.
RP Li, C (reprint author), Univ Calif Berkeley, Lawrence Berkeley Natl Lab, Dept Bldg Technol & Urban Syst, Berkeley, CA 94720 USA.
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NR 13
TC 0
Z9 0
U1 0

U2 1
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
BN 978-1-936504-82-4
J9 ASHRAE TRAN
PY 2014
VL 120
PN 2
PG 8
WC Thermodynamics; Construction & Building Technology
SC Thermodynamics; Construction & Building Technology
GA BB8GU
UT WOS:000346573500033
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ER

PT S
AU Li, ZJ
Qi, ZY
AF Li, Zhijie
Qi, Zhongying
BE Xu, Q
Li, H
Li, Q
TI Direct and Indirect Household Energy Consumption in China
SO SUSTAINABLE DEVELOPMENT OF INDUSTRY AND ECONOMY, PTS 1 AND 2
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 3rd International Conference on Energy, Environment and Sustainable Development (EESD 2013)
CY NOV 12-13, 2013
CL Shanghai, PEOPLES R CHINA
SP Shanghai Univ Elect Power, Shanghai Normal Univ
DE direct energy consumption; indirect energy consumption; input-output model
AB Nowadays, China has paid much attention to industrial energy consumption. In fact, household energy consumption, close related to everyone's daily life, is playing a more and more important role. In this paper, we utilize input-output model to obtain the value of indirect household energy consumption. We find out the structures of direct and indirect consumption and the gap between rural and urban energy consumption. The results show that the energy consumption structure is cleaner than before, and the gap between rural and urban energy consumption is narrowing. We make the suggestions that clean coal technology is badly needed and supplying more natural gas is helpful.
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Z9 0

U1 0
U2 6
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-975-9
J9 ADV MATER RES-SWITZ
PY 2014
VL 869-870
BP 844
EP 847
DI 10.4028/www.scientific.net/AMR.869-870.844
PG 4
WC Energy & Fuels; Environmental Sciences; Materials Science, Multidisciplinary
SC Energy & Fuels; Environmental Sciences & Ecology; Materials Science
GA BA9CI
UT WOS:000339125800160
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ER

PT S
AU Nikolaeva, EL
Kazeykin, VS
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AF Nikolaeva, E. L.
Kazeykin, V. S.
Eliseev, V. I.
Sedov, Artem V.
BE Drusa, M
Nikolic, RR
Marschalko, M
TI Scientific Fundamentals and Investment Mechanisms for the Implementation of Socially and Energy-Efficient Technologies of Creation and Intelligent Control of Low-Rise Building Lifecycle
SO XXIII R-S-P SEMINAR, THEORETICAL FOUNDATION OF CIVIL ENGINEERING (23RSP) (TFOCE 2014)
SE Procedia Engineering
LA English
DT Proceedings Paper
CT 23rd Russian-Polish-Slovak Seminar on Theoretical Foundation of Civil Engineering (RSP) (TFoCE)
CY AUG 25-29, 2014
CL Wroclaw, POLAND
SP Warsaw Univ, Fac Civil Engn Wroclaw, Univ Zilina, Fac Civil Engn
DE energy-efficient technologies; intelligent life-cycle control
AB This article is a description of the conducted work and analysis programs to address one of the key tasks facing Russia - the decision of a housing problem. The result must be qualitatively new level of the state of the housing facilities, they are based on the principles of creating a safe and comfortable, environment of human activities, compliance of the housing facilities with modern requirements for environmental and energy efficiency, creation of conditions for improvement of the demographic situation, the implementation of an effective migration policy, reduction of social tension in the society, increasing the share of people who have the opportunity to purchase or build individual homes by private and/or borrowed funds, improvement of public satisfaction with the level of housing and communal service. (C) 2014 The Authors. Published by Elsevier Ltd.
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RP Sedov, AV (reprint author), Moscow State Univ Civil Engn, Yaroslavskoe Shosse 26, Moscow 129327, Russia.
EM sedov.eit@gmail.com
CR Andrey V, 2014, ADV MATER RES-SWITZ, V838-841, P2973, DOI 10.4028/www.scientific.net/AMR.838-841.2973
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Volkov A.A., 2014, ADV MAT RES, P2864
Volkov A, 2014, ADV MAT RES, V838-841, P2969
NR 4
TC 0
Z9 0
U1 0
U2 0
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1877-7058
J9 PROCEDIA ENGINEER
PY 2014
VL 91
BP 390
EP 393
DI 10.1016/j.proeng.2014.12.081
PG 4
WC Engineering, Civil
SC Engineering
GA BH0WE
UT WOS:000396731100069
OA gold
DA 2018-05-03
ER

PT S
AU Qin, L
AF Qin, Liang
BE Zhang, X
Zhang, B
Jiang, L
Xie, M
TI Explore the Energy-saving comprehensive renovation of existing residential Buildings in cold areas-Taking Taiyuan University of Technology ChangFeng residential area as an example
SO CIVIL, STRUCTURAL AND ENVIRONMENTAL ENGINEERING, PTS 1-4
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 2nd Global Conference on Civil, Structural and Environmental Engineering (GCCSEE 2013)
CY SEP 28-29, 2013
CL Shenzhen, PEOPLES R CHINA
SP Liaoning Tech Univ
DE Existing housing; Building energy efficiency; Comprehensive reconstruction
AB With the environment increasingly worsening, global warming has become an environmental problem challenged around the world. The cognition of low carbon and environmental protection has been widely

spread and applied in urban planning construction. Universities are the frontiers of scientific research. At university such aspects like construction energy conservation and the use of new material have been put into practice, and under the guidance of planning, construction, management departments and others, the ideas of low carbon and ecology is promoted to build the campus with sustainable development. Universities play a leading role for all walks of life in society.

C1 Taiyuan Univ Technol, Architecture & Civil Engn Inst, Taiyuan, Shanxi, Peoples R China.
RP Qin, L (reprint author), Taiyuan Univ Technol, Architecture & Civil Engn Inst, Taiyuan, Shanxi, Peoples R China.
EM tyutql@163.com
CR Qing Xiaolong, 2007, DBJ042422012, P9
NR 1
TC 0
Z9 0
U1 2
U2 13
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-926-1
J9 ADV MATER RES-SWITZ
PY 2014
VL 838-841
BP 2865
EP 2869
DI 10.4028/www.scientific.net/AMR.838-841.2865
PG 5
WC Engineering, Multidisciplinary
SC Engineering
GA BA9LS
UT WOS:000339531701226
DA 2018-05-03
ER

PT B
AU Song, RS
AF Song, Runsheng
BE Kong, A
TI The Study of Household New Energy Vehicle Consumer Behavior Based on Cluster Analysis and AHP Consumer Decision Model
SO PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON MANAGEMENT AND ENGINEERING (CME 2014)
LA English
DT Proceedings Paper
CT International Conference on Management and Engineering (CME)
CY MAY 24-25, 2014
CL Shanghai, PEOPLES R CHINA
AB Up to now, the difficulty of promoting of new energy vehicles still lies in family car market. In this paper, I apply cluster analysis method, cluster household vehicle users by qualifying their travel characteristics, construct consumer purchase willingness model using Analytic Hierarchy Process (AHP) and then analyze each kind of user's acceptance of new energy vehicles. Finally I mine the potential market segment which new energy household vehicles may break in.
C1 Shenzhen Polytech, Sch Automot & Transportat Engn, Shenzhen, Guangdong, Peoples R China.
RP Song, RS (reprint author), Shenzhen Polytech, Sch Automot & Transportat Engn, Shenzhen, Guangdong, Peoples R China.
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Yongqing Yang, 1994, SYSTEM ENG, V12, P68
NR 9
TC 0
Z9 0
U1 0
U2 1
PU DESTECH PUBLICATIONS, INC
PI LANCASTER
PA 439 DUKE STREET, LANCASTER, PA 17602-4967 USA
BN 978-1-60595-174-4
PY 2014
BP 1275
EP 1280
PG 6
WC Business; Business, Finance; Management
SC Business & Economics
GA BC2LK
UT WOS:000351057000177
DA 2018-05-03
ER

PT S
AU Wang, ZL
Paranjape, R
AF Wang, Zhanle
Paranjape, Raman
GP IEEE
TI Agent-Based Simulation of Home Energy Management System in Residential Demand Response
SO 2014 IEEE 27TH CANADIAN CONFERENCE ON ELECTRICAL AND COMPUTER ENGINEERING (CCECE)
SE Canadian Conference on Electrical and Computer Engineering
LA English
DT Proceedings Paper
CT IEEE 27th Canadian Conference on Electrical and Computer Engineering (CCECE)
CY MAY 04-07, 2014
CL Toronto, CANADA
SP IEEE, Ryerson Univ, Fac Engn & Architectural Sci, The Personal, Mercer, Ontario Soc Profess Engineers, KPMG, IEEE Canada, IEEE Toronto Sect, IEEE Peterborough Sect, IEEE Canada, Kitchener Waterloo Sect, IEEE London Sect, IEEE Hamilton Sect, IEEE Kingston Sect
ID MULTIAGENT SYSTEMS
AB This paper presents an agent-base model to evaluate the home energy management system in residential demand response implementation. Residential demand response aims to change people's electricity consumption patterns to reduce the peak demand and therefore improve energy efficiency and power system stability. The home energy management system intelligently controls household loads with association of smart meters. It plays key roles in a success demand response implementation. In the proposed agent-based model, the main stakeholders are modelled by the software agents including Conventional Home Agents, Smart Home Agents, a Utility Agent, a Primary Plant Agent and Secondary Plant Agents. A mechanism of dynamic pricing is applied to both the Conventional Home Agent System (Scenario #1) and the Smart Home Agent System (Scenario #2). Comparing to the Scenario #1, the peak demand, average householder's bills and generation cost in the Scenario #2 is decreased by 24.6%, 7.4% and 14.7% respectively. This demonstrates the effectiveness of the home energy management system in the

residential demand response implementation. The proposed model can be a test-bed to evaluate various demand response strategies and technologies.
C1 [Wang, Zhanle; Paranjape, Raman] Univ Regina, Elect Syst Engn, Regina, SK S4S 0A2, Canada.
RP Wang, ZL (reprint author), Univ Regina, Elect Syst Engn, Regina, SK S4S 0A2, Canada.
EM Raman.Paranjape@uregina.ca
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NR 15
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 0840-7789
BN 978-1-4799-3099-9
J9 CAN CON EL COMP EN
PY 2014
PG 6
WC Computer Science, Theory & Methods; Engineering, Electrical & Electronic
SC Computer Science; Engineering
GA BD4QI
UT WOS:000361017900247
DA 2018-05-03
ER

PT S
AU Yong, Z
Jian, Z
Yu, WH
AF Yong, Zhang
Jian, Zhang
Yu, Wang Hui
BE Yarlagadda, P
Choi, SB
Kim, YH
TI Study on Energy-saving Control System of Smart Home
SO COMPUTER AND INFORMATION TECHNOLOGY
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT International Forum on Computer and Information Technology (IFCIT)
CY DEC 24-25, 2013
CL Shenzhen, PEOPLES R CHINA

DE Data Transmission; Energy Systems; System Design; Intelligent Control
ID INFORMATION
AB The wireless network technology can achieve harmony and coordination of residential environment, this paper studies the smart home system energy saving control system design, system design ensures the correct transmission of data in the system of communication protocols. This class smart home smart home system using traditional control technology and system improvements made, there is a certain degree of intelligence programs home improvement, cost, and power consumption is significantly reduced, improving the accuracy of the data transfer for the establishment of a targeted communication conflict-free data transmission protocol, and ultimately achieve intelligent energy control.
C1 [Yong, Zhang; Jian, Zhang; Yu, Wang Hui] Chongqing Water Resources & Elect Engn Coll, Chongqing 402160, Peoples R China.
RP Yong, Z (reprint author), Chongqing Water Resources & Elect Engn Coll, Chongqing 402160, Peoples R China.
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CR Al-Ali AR, 2011, ENRGY PROCED, V12, DOI 10.1016/j.egypro.2011.10.017
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NR 7
TC 0
Z9 0
U1 0
U2 1
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1660-9336
BN 978-3-03835-019-4
J9 APPL MECH MATER
PY 2014
VL 519-520
BP 1333
EP 1336
DI 10.4028/www.scientific.net/AMM.519-520.1333
PG 4
WC Computer Science, Artificial Intelligence; Computer Science, Hardware & Architecture; Computer Science, Interdisciplinary Applications
SC Computer Science
GA BC0BP
UT WOS:000348897600259
DA 2018-05-03
ER

PT S
AU Zhao, J
Khmelenko, V
Claridge, D
AF Zhao, Juan
Khmelenko, Vasiliy
Claridge, David
GP ASHRAE
TI Performance Study of an Under-floor Air Distribution System in an Education Building to Identify Building Energy Efficiency Improvement Opportunities

SO ASHRAE TRANSACTIONS 2014, VOL 120, PT 2
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT ASHRAE Annual Conference
CY JUN 28-JUL 02, 2014
CL Seattle, WA
SP ASHRAE
ID COMMERCIAL BUILDINGS; UFAD SYSTEM
AB The HVAC system accounts for 30 to 50 percent of a typical building's energy consumption; in hot and humid climates it is closer to the upper end of that range. Implementing effective energy saving measures for the building HVAC system can reduce the building energy consumption, reduce peak demand, and improve building comfort. In recent years, under-floor air distribution system (UFADS) is used as an innovative approach to HVAC system to offer utmost in occupant comfort, improved indoor air quality and energy savings. In this study, the operation and performance of a UFAD system in an education building located in a hot and humid area is evaluated. The study found the building was overcooled and the UFAD system was in reheat mode even in hot summer. Optimizing existing air handling unit (AHU) discharge air temperature (DAT) set point reset based on building load and reducing under-floor plenum static pressure in half are recommended to improve building comfort and energy performance. It is estimated that implementing the optimized AHU DAT set point reset schedule can potentially reduce about 30% of the UFAD system thermal decay. The reduction of the under-floor plenum static pressure in half can potentially reduce the system minimum airflow rate by about 30 %.
C1 [Zhao, Juan; Khmelenko, Vasiliy; Claridge, David] Texas A&M Univ, Energy Syst Lab, College Stn, TX 77834 USA.
RP Zhao, J (reprint author), Texas A&M Univ, Energy Syst Lab, College Stn, TX 77834 USA.
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NR 12
TC 0
Z9 0
U1 1
U2 3
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
BN 978-1-936504-82-4
J9 ASHRAE TRAN
PY 2014
VL 120
PN 2
PG 8
WC Thermodynamics; Construction & Building Technology
SC Thermodynamics; Construction & Building Technology
GA BB8GU
UT WOS:000346573500055
DA 2018-05-03
ER

PT B
AU Altan, H
Shiram, R
Kim, YK
Mohammadian, K
Zemleduch, B
AF Altan, Hasim
Shiram, Rohan
Kim, Young Ki
Mohammadian, Khashayar
Zemleduch, Blazej
BE Wurtz, E
TI USING ENERGY MODELLING FOR CALCULATIONS OF ENERGY SAVINGS, PAYBACK AND RETURN ON INVESTMENT FOR A TYPICAL COMMERCIAL OFFICE BUILDING WITH IBT SYSTEMS
SO BUILDING SIMULATION 2013: 13TH INTERNATIONAL CONFERENCE OF THE INTERNATIONAL BUILDING PERFORMANCE SIMULATION ASSOCIATION
LA English
DT Proceedings Paper
CT 13th International Conference of the International-Building-Performance-Simulation-Association (IBPSA)
CY AUG 25-28, 2013
CL Chambery, FRANCE
SP Int Bldg Performance Simulat Assoc
AB This paper describes and focuses on the applications of a new range of smart building products, particularly Integrated Building Technology (IBT) systems, with the aim to demonstrate savings for improving energy efficiency and indoor environments in buildings. A typical commercial office space has been modelled via dynamic computer simulation software, considering scenarios of before and after the installation of IBT systems. This has then been compared against different building regulations and standards e.g. UK Building Regulation 2006 and ASHRAE 90.1. The study revealed 35% of energy savings per year, a payback period of nearly 1 year, and the return on investment (ROI) of approximately 65% using the IBT systems.
C1 [Altan, Hasim; Shiram, Rohan; Kim, Young Ki; Mohammadian, Khashayar; Zemleduch, Blazej] Univ Sheffield, Sch Architecture, BEAU, Sheffield, S Yorkshire, England.
RP Altan, H (reprint author), Univ Sheffield, Sch Architecture, BEAU, Sheffield, S Yorkshire, England.
FU Engineering and Physical Sciences Research Council (EPSRC)
FX This paper is the result of the work undertaken as part of Crestron Integrated Building Technology (IBT) project between BEAU research centre at the University of Sheffield and Crestron UK Ltd through knowledge transfer funding provided by the Engineering and Physical Sciences Research Council (EPSRC).
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NR 19
TC 0
Z9 0
U1 0
U2 0
PU INT BUILDING PERFORMANCE SIMULATION ASSOC-IBPSA
PI TORONTO
PA C/O MILLER-THOMPSON, 40 KING ST W, STE 5800, TORONTO, M5H 3S1, CANADA
BN 978-2-7466-6294-0
PY 2013
BP 799
EP 805
PG 7
WC Construction & Building Technology
SC Construction & Building Technology
GA BI7ZP
UT WOS:000414802200104
DA 2018-05-03
ER

PT B
AU Aoki, T
Habara, H
Shimoda, Y
AF Aoki, Takuya
Habara, Hiromi
Shimoda, Yoshiyuki
BE Wurtz, E
TI DEVELOPMENT AND VALIDATION OF A RESIDENTIAL SECTOR ENERGY END-USE PREDICTION MODEL TO ESTIMATE RESIDENTIAL ENERGY CONSUMPTION IN JAPAN
SO BUILDING SIMULATION 2013: 13TH INTERNATIONAL CONFERENCE OF THE INTERNATIONAL BUILDING PERFORMANCE SIMULATION ASSOCIATION
LA English
DT Proceedings Paper
CT 13th International Conference of the International-Building-Performance-Simulation-Association (IBPSA)
CY AUG 25-28, 2013
CL Chambery, FRANCE
SP Int Bldg Performance Simulat Assoc
AB We developed a "data preparation model" to complement the database for the estimation of energy consumption in the Japanese residential sector from 1990 to 2010. In particular, we developed a "stock model" for water heaters to estimate the diffusion of high-efficiency water heaters. Energy consumption is estimated by a "residential sector energy end-use prediction model" which was developed originally by our research group. In addition, we validated the results and analyzed the dominant factors related to energy consumption in the residential sector. The simulated total energy consumption was within 17% of the actual energy supply in 1990 and 2000, while the result in 2010 was underestimated by 24-35%. The most important factor for reducing energy consumption was found to be an improvement in appliance efficiency.
C1 [Aoki, Takuya; Habara, Hiromi; Shimoda, Yoshiyuki] Osaka Univ, Grad Sch Engn, Div Sustainable Energy & Environm Engn, 2-1 Yamadaoka, Suita, Osaka 5650871, Japan.
RP Aoki, T (reprint author), Osaka Univ, Grad Sch Engn, Div Sustainable Energy & Environm Engn, 2-1 Yamadaoka, Suita, Osaka 5650871, Japan.
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Statistics Bureau and Statistics Center, 2010, POP CENS JAP
NR 10
TC 0
Z9 0
U1 0
U2 0
PU INT BUILDING PERFORMANCE SIMULATION ASSOC-IBPSA
PI TORONTO
PA C/O MILLER-THOMPSON, 40 KING ST W, STE 5800, TORONTO, M5H 3S1, CANADA
BN 978-2-7466-6294-0
PY 2013
BP 2519
EP 2526
PG 8
WC Construction & Building Technology
SC Construction & Building Technology
GA BI7ZP
UT WOS:000414802202070
DA 2018-05-03
ER

PT S
AU Arnold, D
Sankur, M
Auslander, DM
AF Arnold, Daniel
Sankur, Michael
Auslander, David M.
GP IEEE
TI The Next Generation Energy Information Gateway for use in Residential and Commercial Environments
SO 2013 IEEE POWER AND ENERGY SOCIETY GENERAL MEETING (PES)
SE IEEE Power and Energy Society General Meeting PESGM
LA English
DT Proceedings Paper
CT General Meeting of the IEEE-Power-and-Energy-Society (PES)
CY JUL 21-25, 2013
CL Vancouver, CANADA
SP IEEE Power & Energy Soc
DE Smart Grid; Demand Response; Energy Management System; Energy Information Gateway
AB Both the current state of technology as well as emerging trends in home/office automation and energy management necessitate the presence of a piece of software dedicated towards facilitating interoperability amongst heterogeneous components; therefore empowering occupants to manage these spaces more effectively. This paper outlines the software architecture of an Energy Information Gateway, which is the latest evolution of an open source reference design that utilizes a modular software architecture to create an environment where dissimilar communicable components can not only exchange energy related information, but participate in supervisory control efforts. This latest version of the software allows for the abstraction of physical devices into a common standard, thereby allowing unlike components to join the home or office energy network. In addition, the software allows for definitions to be made of the hierarchical relationship between devices in the physical world and for these relationships to be dynamically altered.

C1 [Arnold, Daniel; Sankur, Michael; Auslander, David M.] Univ Calif Berkeley, Dept Mech Engn, Berkeley, CA 94720 USA.
RP Arnold, D (reprint author), Univ Calif Berkeley, Dept Mech Engn, Berkeley, CA 94720 USA.
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Weng Thomas, 2011, P ACM WORKSH EMB SEN
NR 8
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1944-9925
BN 978-1-4799-1303-9
J9 IEEE POW ENER SOC GE
PY 2013
PG 5
WC Energy & Fuels; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BA0LX
UT WOS:000331874302031
DA 2018-05-03
ER

PT S
AU Bajada, J
Fox, M
Long, D
AF Bajada, Josef
Fox, Maria
Long, Derek
GP IEEE
TI Load Modelling and Simulation of Household Electricity Consumption for the Evaluation of Demand-Side Management Strategies
SO 2013 4TH IEEE/PES INNOVATIVE SMART GRID TECHNOLOGIES EUROPE (ISGT EUROPE)
SE IEEE PES Innovative Smart Grid Technologies Conference Europe
LA English
DT Proceedings Paper
CT 4th IEEE/PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)
CY OCT 06-09, 2013
CL Lyngby, DENMARK
SP IEEE PES
DE load modelling; stochastic systems; computer simulation; power demand
AB In order to evaluate the effectiveness of demand-side management techniques, mechanisms to simulate electricity consumption activities at a granular level are required. A bottom-up approach that uses a non-homogeneous Markov chain to model each appliance within each household is proposed. This model is time-aware and captures the variability of the transition probabilities as they change throughout the day. A simulator was developed based on this model and it was configured with data obtained from a household electricity survey conducted in the UK. The resultant load curves from a simulation of a thousand households are compared with the average hourly load reported in the survey, with significant

similarities observed between the two. The same model can be parametrised to simulate hypothetical scenarios, such as a future where electric vehicles are more popular. The simulation framework also supports a plug-in mechanism through which demand control policies can be integrated into the system such that the effects and performance of demand-side management strategies can be evaluated.
C1 [Bajada, Josef; Fox, Maria; Long, Derek] Kings Coll London, Dept Informat, London WC2R 2LS, England.
RP Bajada, J (reprint author), Kings Coll London, Dept Informat, London WC2R 2LS, England.
EM josef.bajada@kcl.ac.uk; maria.fox@kcl.ac.uk; derek.long@kcl.ac.uk
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Widen J, 2010, APPL ENERG, V87, P1880, DOI 10.1016/j.apenergy.2009.11.006
Zimmermann J.-P., 2012, HOUSEHOLD ELECT SURV
NR 16
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2165-4816
BN 978-1-4799-2984-9
J9 IEEE PES INNOV SMART
PY 2013
PG 5
WC Engineering, Electrical & Electronic
SC Engineering
GA BA0BX
UT WOS:000330939800020
DA 2018-05-03
ER

PT B
AU Balsamo, D
Paci, G
Benini, L
Davide, B
AF Balsamo, Domenico
Paci, Giacomo
Benini, Luca
Davide, Brunelli
GP IEEE
TI Long Term, Low Cost, Passive Environmental Monitoring of Heritage Buildings for Energy Efficiency Retrofitting
SO 2013 IEEE WORKSHOP ON ENVIRONMENTAL, ENERGY AND STRUCTURAL MONITORING SYSTEMS (EESMS 2013)

LA English
DT Proceedings Paper
CT IEEE Workshop on Environmental Energy and Structural Monitoring Systems (EESMS)
CY SEP 11-12, 2013
CL Trento, ITALY
SP Univ Trento, Dept Ind Engn, IEEE, IEEE Italy Sect, IEEE Italy Sect Syst Council Chapter, IEEE Italy Sect Instrumentat & Measurement Soc Chapter
AB Monitoring the structural health and the local climate of historical heritage buildings may be a hard task for civil engineers for assessing the energy efficiency of the environment, due to the lack of a pre-existing monitoring model, and due to the presence of deployments with strict installation constraints. This paper reports on the experience gathered during an European Project (3ENCULT Project - Efficient Energy for EU Cultural Heritage) regarding the design and implementation of an innovative technological network for monitoring heritage buildings. We present hardware and software solution developed to efficiently satisfy the requirements for long-term monitoring of a historical building, called 'Palazzina della Viola', and located in the centre of Bologna, Italy. The presented system provides real-time feedback to civil engineers which can retrieve sensed data using remote interfaces. Based on 7 months of operation, we show that the proposed solution, compared with other standard monitoring systems, is an effective low-cost alternative testing tool for assessing the environmental monitoring in heritage buildings. The system allows a reliable data transfer and we estimated the lifetime beyond two years.
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EM domenico.balsamo@unibo.it; giacomo.paci@unibo.it; luca.benini@unibo.it; davide.brunelli@unitn.it
RI Brunelli, Davide/H-7927-2012
OI Brunelli, Davide/0000-0001-5110-6823
FU EU
FX The research leading to these results has received funding from the projects 3ENCULT and GreenDataNet, both funded by the EU 7th Framework Programme. In addition, the authors would like to thank WISPES srl for the implementation of the prototypes.
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NR 24
TC 0
Z9 0
U1 1
U2 3
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4799-0628-4
PY 2013
BP 13
EP 18
PG 6
WC Energy & Fuels; Engineering, Civil; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BA4CK
UT WOS:000335332600003
DA 2018-05-03
ER

PT S
AU Di, P
Zhang, QY
AF Di, Peng
Zhang, Qinyao
BE Yang, W
Liang, JG
TI Analysis of the Rural House Energy-Saving Technology in Gansu
SO SUSTAINABLE DEVELOPMENT AND ENVIRONMENT II, PTS 1 AND 2
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT 2nd International Conference on Civil, Architectural and Hydraulic Engineering (ICCAHE 2013)
CY JUL 27-28, 2013
CL Zhuhai, PEOPLES R CHINA
DE Gansu rural house; energy-saving; building envelope; solar energy; biogas
AB In the context of China accelerates the new rural construction and promotes residential energy-saving, through a combination of Gansu climate, resources and rural house features, analyzed the material selection, forms and practices of rural house envelope, found the fundamental cause of leading the energy consumption and poor insulation in local rural house, and made some concrete improvements. Meanwhile, studied the application of passive solar houses, solar water heaters, as well as "four in one" type of biogas energy utilization system model in a local rural house, to improve energy efficiency and provide a reference to the new rural development.
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CR Gao Qian, 2011, CONSTRUCTION TECHNOL, V40, P98
Jian Fuhui, 2012, SCI TECHNICAL INFORM, V41, P70
Xie Xingqi, 2008, SCI TECHNOLOGY INNOV, V20, P98
Yan Ningna, 2010, J ANHUI AGR SCI, V38, P1006
Zhang Jizhuang, 2003, ENERG ENG, V4, P23
ZHENG Zhu-ling, 2008, BUILDING SCI, V24, P9
NR 6

TC 0
Z9 0
U1 1
U2 6
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1660-9336
BN 978-3-03785-858-5
J9 APPL MECH MATER
PY 2013
VL 409-410
BP 589
EP 592
DI 10.4028/www.scientific.net/AMM.409-410.589
PG 4
WC Engineering, Civil; Engineering, Mechanical; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA BA4VI
UT WOS:000336337400114
DA 2018-05-03
ER
FN Clarivate Analytics Web of Science
VR 1.0
PT S
AU Liu, HZ
Zhu, YH
AF Liu, Hanzhou
Zhu, Yahong
BE Huang, Y
Bao, T
Wang, H
TI Experiences and Enlightenment in Energy-Saving of Newly-Built House from Developed Countries
SO CONSTRUCTION AND URBAN PLANNING, PTS 1-4
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT International Conference on Structures and Building Materials (ICSBM 2013)
CY MAR 09-10, 2013
CL Guizhou, PEOPLES R CHINA
DE developed countries; residential energy-saving; experience; enlightenment
AB In the process to build a sustainable society, building energy consumption keeps raising with the people's living standard. Therefore, reducing building energy consumption is an important guarantee to lower the whole country's energy consumption and build an economical society. Also, the development and construction of energy-efficient building is an important guarantee to reduce building energy consumption. As newly-built house is a major part of building construction, energy consumption reduction for new house plays an influential role in the action to reduce building energy consumption. The practical experiences of new house energy-saving in the developed countries, Japan as an example, are introduced. In this paper, a support system to promote our country's newly-built house energy-saving is proposed as a scientific reference for managers from government, enterprise, industry association to make energy saving policy and development planning.

Developed countries, as Japan, have support systems and practical experience of residential housing energy-saving from laws and regulations, incentive policies, authentication and identification systems, technology innovation systems, energy-saving technology and some other fields. By learning the experience of newly-built house energy-saving from developed countries, we can build a support system

to promote our country's newly-built house energy-saving and it also can provide a scientific reference for managers from government, enterprise, industry association to make energy saving policy and development planning. It has huge practical significance to promote the overall development of the building energy-saving level and the development of energy-saving residential industrialization.
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CR Chen Haiyue, 2010, ENERGY SAVING ENV PR, P32
Jiang Yihua, 2007, INT EC COOPERATION, P73
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Zhang You, TOKYO SHANGHAI REPOR
NR 4
TC 0
Z9 0
U1 0
U2 4
PU TRANS TECH PUBLICATIONS LTD
PI DURNTEN-ZURICH
PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-661-1
J9 ADV MATER RES-SWITZ
PY 2013
VL 671-674
BP 2129
EP +
DI 10.4028/www.scientific.net/AMR.671-674.2129
PG 2
WC Construction & Building Technology; Engineering, Civil; Materials Science, Multidisciplinary
SC Construction & Building Technology; Engineering; Materials Science
GA BGJ02
UT WOS:000323185101097
DA 2018-05-03
ER

PT S
AU Lu, HW
Gong, HW
AF Lu Hongwei
Gong Hongwei
BE Wang, A
Che, LK
Dong, R
Zhao, G
TI An analysis of the seasonal energy consumption of culture and education comprehensive building
SO APPLIED ENERGY TECHNOLOGY, PTS 1 AND 2
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 2nd International Conference on Energy and Environmental Protection (ICEEP 2013)
CY APR 19-21, 2013
CL Guilin, PEOPLES R CHINA
SP Inner Mongolia Univ, Chinese Acad Sci, Res Ctr Eco Environm Sci, Key Lab Environm Biotechnol
DE Comprehensive building; analysis of energy consumption; itemized energy

consumption
AB Through a comparative analysis, this paper attempts to summarize the hourly variations of the total energy consumptions and itemized energy consumptions in a culture and education comprehensive building in summer, winter, and the transitional season. The results show a great difference in energy consumptions in the same building in different seasons. Energy consumption is highest in winter. There is a minor difference in energy consumptions between a typical day in summer vacation and a normal work day in summer. The lowest energy consumption is in winter vacation, but a typical day in winter vacation would still consume about half of the energy consumed on a normal working day in winter.
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CR PAN Hang, 2011, J METEOROLOGICAL SCI, V31, P742
Meijuan Zhao, 2008, CHINA CONSTRUCTION M, P11
NR 2
TC 0
Z9 0
U1 0
U2 0
PU TRANS TECH PUBLICATIONS LTD
PI DURNTEN-ZURICH
PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-741-0
J9 ADV MATER RES-SWITZ
PY 2013
VL 724-725
BP 874
EP +
DI 10.4028/www.scientific.net/AMR.724-725.874
PG 2
WC Construction & Building Technology; Energy & Fuels; Transportation Science & Technology
SC Construction & Building Technology; Energy & Fuels; Transportation
GA BJL87
UT WOS:000328999700162
DA 2018-05-03
ER

PT B
AU Simanaviciene, Z
Volochovic, A
Giziene, V
AF Simanaviciene, Zaneta
Volochovic, Andzej
Giziene, Vilda
GP EBES
TI ENERGY BEHAVIOUR IN HOUSEHOLDS: BASIC PATTERNS OF BEHAVIOR AND THEIR IMPACT ON ENERGY SAVINGS IN HOUSEHOLDS
SO PROCEEDINGS OF THE 11TH EURASIA BUSINESS AND ECONOMICS SOCIETY CONFERENCE (EBES)
LA English
DT Proceedings Paper
CT 11th Conference of the Eurasia-Business-and-Economics-Society (EBES)
CY SEP 12-14, 2013
CL Russian Acad Sci, Inst Econ, Ural Branch, Ekaterinburg, RUSSIA
SP Eurasia Business & Econ Soc
HO Russian Acad Sci, Inst Econ, Ural Branch

DE Behavior; Households; Energy Savings; Impact
ID CLIMATE-CHANGE; PLANNED BEHAVIOR; CONSERVATION; POWER; INTERVENTION; PREFERENCES; EFFICIENCY; ECONOMICS; ATTITUDES; POLICIES
AB Over the last three decades, energy savings in households is recognized as very relevant and important research topics by different authors. At present, the development of science in the world economy plays an important role in behavioral economics research for irrational market behavior insights. Behavioral changes primarily related to the implementation of the principles of sustainable consumption. The objective of this paper is to examine behavioral concepts, modeling them from the energy perspective, conveying them to show the behavior of links with energy consumption, developing patterns of behavior reprehensible. Studies have shown that behavior can affect and attitude in certain situations. The analysis of studies dealing with behavioral patterns revealed that the patterns of behavior overcame some of the cultural theory ideas, and stressed that the different environmental policy choices require hierarchical (preferred by traditions or institutions) or individual (preference for innovation and individual choice) types option. All of these theories and models have certain limitations, and to develop energy saving potential in changing people's behavior, the evaluation model is necessary to take advantage of all of these theories strengths and to pay attention to their limitations.
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NR 46
TC 0
Z9 0
U1 2
U2 5
PU EURASIAN BUSINESS & ECONOMICS SOC
PI ISTANBUL
PA AKSEMSETTIN MAH KOCASINAN CAD NO 8-4, ISTANBUL, FATIH 34080, TURKEY
BN 978-605-64002-3-0
PY 2013
BP 216
EP 226
PG 11
WC Business; Business, Finance; Economics
SC Business & Economics
GA BA4MA
UT WOS:000336000900019
DA 2018-05-03
ER

PT S
AU Su, MF
Guo, H
AF Su, Minfang
Guo, Hong
BE Yang, W
Liang, JG
TI Energy-saving renovation in existing high-rise residential building
SO SUSTAINABLE DEVELOPMENT AND ENVIRONMENT II, PTS 1 AND 2
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT 2nd International Conference on Civil, Architectural and Hydraulic Engineering (ICCAHE 2013)
CY JUL 27-28, 2013
CL Zhuhai, PEOPLES R CHINA
DE High-rise residential building; Energy-saving renovation; Energy efficiency; Building envelope
AB Based on the structure feature and energy consumption situation of high-rise reinforced concrete residential buildings which built in end of last century, it discussed the main energy-saving renovation technologies and methods. Demonstrating high-rise reinforced concrete residential building of Taiyuan as a case, it analyzed its heat loss problems and defects of original design. Energy-saving renovation plan proposed and put reconstruction technologies of building envelope and heating system in practice. It discusses energy-saving renovation effects, energy efficiency. Indoor thermal environment improved significantly after energy-saving renovation on building envelope and heat system.
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CR An Yanhua, J SHENYANG JIANZHU U, V12
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Ministry of Construction of the People's Republic of China, 2006, 503782006 GBT MIN CO
NR 5
TC 0
Z9 0
U1 1
U2 6
PU TRANS TECH PUBLICATIONS LTD
PI DURNTEN-ZURICH
PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
SN 1660-9336
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J9 APPL MECH MATER
PY 2013
VL 409-410
BP 526
EP +
DI 10.4028/www.scientific.net/AMM.409-410.526
PG 2
WC Engineering, Civil; Engineering, Mechanical; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA BA4VI
UT WOS:000336337400101
DA 2018-05-03
ER

PT B
AU Tong, QG
Liu, J
AF Tong Qing-gui
Liu Jing
GP IEEE
TI Adaptability Analysis of Passive Building Energy Efficiency Technology in Hot Summer and Warm Winter Region
SO 2013 FOURTH INTERNATIONAL CONFERENCE ON INTELLIGENT SYSTEMS DESIGN AND ENGINEERING APPLICATIONS
LA English
DT Proceedings Paper
CT 4th International Conference on Intelligent Systems Design and Engineering Applications (ISDEA)
CY NOV 06-07, 2013
CL Zhangjiajie, PEOPLES R CHINA
SP Cent S Univ, St Johns Univ, Hunan Univ Technol, Dept Elect Sci & Technol, Natl Univ Defense Technol, Intelligent Computat Technol & Automat Soci
DE Hot summer and warm winter; Passive technologies; Energy efficiency; Adaptability analysis
AB Passive building energy efficiency refers to utilizing ecological building design principles with natural climate resources to realize building energy efficiency, which is greener, more conducive to the sustainable development of the human living environment, and will actively advocate building energy efficiency. This paper will analysis the adaptability of six passive building energy efficiency technologies including passive solar heating, natural ventilation, thermal storage wall, induced and night ventilation, direct evaporative cooling and indirect evaporative cooling in typical cities of Shenzhen and Guangzhou in hot summer and cold winter region. In addition, this paper will establish adaptability model of passive building energy efficiency technology. According to the adaptability model, appropriate passive building energy efficiency technologies can be analyzed in typical cities in hot summer and cold winter region.

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FU NSFC [51108473]; MOE [20110191120036]
FX The work has been support by China NSFC project (51108473) and Doctoral Program Funding of MOE (20110191120036).
CR Fu Xiangzhao, CHIN INT BUILD EN EF
Fu Xiangzhao, 2002, ENERGY EFFICIENCY TE
Makun, 2011, ENERGY ENERGY EFFICI, P25
Zhuo Jinmian, 2012, FUJIAN CONSTRUCTION, V2, P60
NR 4
TC 0
Z9 0
U1 1
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4799-2791-3
PY 2013
BP 64
EP 68
DI 10.1109/ISDEA.2013.421
PG 5
WC Computer Science, Artificial Intelligence; Computer Science, Information Systems; Computer Science, Software Engineering
SC Computer Science
GA BB7ZJ
UT WOS:000346143900016
DA 2018-05-03
ER

PT B
AU Tundo, A
Lassandro, P
Galietti, U
AF Tundo, Antonella
Lassandro, Paola
Galietti, Umberto
BE Hajek, P
Tywoniak, J
Lupisek, A
Sojkova, K
TI IMPROVING ENVIRONMENTAL COMFORT AND ENERGY SAVING IN SCHOOL BUILDINGS: A CASE STUDY WITH THE STUDENTS' PARTICIPATION
SO SUSTAINABLE BUILDING AND REFURBISHMENT FOR NEXT GENERATIONS
LA English
DT Proceedings Paper
CT Conference on Central Europe towards Sustainable Building (CESB13)
CY JUN 26-28, 2013
CL Prague, CZECH REPUBLIC
SP Czech Tech Univ, Fac Civil Engn, iiSBE, UNEP, CIB, FIDIC
DE Retrofitting; energy-saving; thermography; comfort; participation
AB The study seeks to develop a replicable procedure in relation to environmental parameters of objective and subjective comfort perception, both through the use of dedicated Information Technologies and

diagnostic instrumental methods (thermal and lighting audit) and assessment data collected from users (students and teachers), actively participating in the quality judgment. The involvement of students is intended to increase their awareness towards sustainable building issues and the adoption of behaviours aimed at saving energy and improving comfort conditions.

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RI Galietti, Umberto/L-1545-2016
OI Galietti, Umberto/0000-0001-8725-5927; LASSANDRO, PAOLA/0000-0001-6611-2820

CR [Anonymous], 2011, ADV EN DES GUID K 12
[Anonymous], 2004, EU PROJ
TELI D., 2012, P 7 WINDS C CLANG CO

NR 3
TC 0
Z9 0
U1 1
U2 5
PU CZECH TECHNICAL UNIV PRAGUE
PI PRAGUE 6
PA ZIKOVA 4, PRAGUE 6 166 35, CZECH REPUBLIC
BN 978-80-247-5015-6
PY 2013
BP 863
EP 866
PG 4
WC Architecture; Construction & Building Technology; GREEN & SUSTAINABLE SCIENCE & TECHNOLOGY; Engineering, Civil; Urban Studies
SC Architecture; Construction & Building Technology; Science & Technology - Other Topics; Engineering; Urban Studies
GA BE4FL
UT WOS:000371647300213
DA 2018-05-03
ER

PT S
AU Wang, YZ
Juang, LH
Liu, WH
AF Wang, Yi-Zi
Juang, Li-Hong
Liu, Wen-Hua
BE Kao, JCM
Sung, WP
Chen, R
TI A New Design Concept by Using BIM for Reforming an Energy-saving Campus Building
SO FRONTIERS OF GREEN BUILDING, MATERIALS AND CIVIL ENGINEERING III, PTS 1-3
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT 3rd International Conference on Green Building, Materials and Civil Engineering (GBMCE 2013)

CY AUG 21-23, 2013
CL Taiwan, PEOPLES R CHINA
SP Natl Chin Yi Univ Technol, Natl Cheng Kung Univ, Natl Sun Yan Sen Univ, Natl Chi Nun Univ, ChienKuo Technol Univ, Control Engn & Informat Sci Res Assoc, Int Frontiers Sci & Technol Res Assoc, Trans Tech Publicat
DE BIM(Building Information Modeling); Green building; Energy-saving; Reform
AB Firstly, this article induces out the theme of reforming the energy-saving of campus buildings through the current situation about huge energy consumption from campus construction. Secondly, taking the buildings of Shantou University's "Engineering Institute, CDIO innovation center" as an example and combining BIM(Building Information Modeling) with green building come up with every green reform strategy we will use to reach the purpose that changing the current building into a kind of better building which is water-saving, electricity-saving, ventilation and heat protection. Finally, we will make a conclusion that combining BIM with green building is a good way to make a feasible design for guide construction.
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CR Liu Chao, 2011, J GREEN BUILD, V4, P48
Pei Xiang-Yu, 2011, J POPULAR SCI, V1, P65
Song Zhen-Ning, 2012, J SCI TECHNOLOGY ASS, V9, P131
Sun Zhong, 2011, J JIANG SU CONSTRUCT, V5, P100
[??? ZENG Xudong], 2006, [????????, Journal of Chongqing Jianzhu University], V28, P33
NR 5
TC 0
Z9 0
U1 0
U2 7
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1660-9336
BN 978-3-03785-792-2
J9 APPL MECH MATER
PY 2013
VL 368-370
BP 1191
EP 1195
DI 10.4028/www.scientific.net/AMM.368-370.1191
PG 5
WC Construction & Building Technology; Environmental Sciences
SC Construction & Building Technology; Environmental Sciences & Ecology
GA BA9HV
UT WOS:000339411600238
DA 2018-05-03
ER

PT S
AU Yu, FQ
Tian, B
Zhang, X
Wang, Q
Yu, DS
Zhao, R
AF Yu, Fengqin
Tian, Bei
Zhang, Xin

Wang, Qiang
Yu, Danshi
Zhao, Rang
BE Tang, X
Chen, X
Dong, Y
Wei, X
Yang, Q
TI Perception and Management System for Building Energy Consumption Based on Internet of Things Technology
SO ADVANCES IN ENERGY SCIENCE AND TECHNOLOGY, PTS 1-4
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT International Conference on Sustainable Energy and Environmental Engineering (ICSEEE 2012)
CY DEC 29-30, 2012
CL Guangzhou, PEOPLES R CHINA
SP Guangdong Univ Business Studies
DE Energy-saving Buildings; Building Energy Consumption; Internet of Things; Energy Consumption Perception; Energy Consumption Monitoring; Energy Consumption Management
AB The building energy consumption is one of three in China's energy consumption, the detection and monitoring for energy consumption of building is the basis for the work of building energy efficiency. This article describes a perception, monitoring and management system of building energy consumption based on Internet of Things technology architecture, in the system, various energy instrumentation is installed inside the building and measurement all kinds of energy consumption data in the perception layer, collection daterminal data connected to the RS485 bus access gateway for data transmission via Ethernet or mobile communication network in the network layer and transport layer, deal with the statistical analysis of the energy consumption data in the application layer. The system has been successfully applied to more than 50 large-scale public building to implement energy consumption monitoring and management, and the support of the underlying data for building energy efficiency.
C1 [Yu, Fengqin; Tian, Bei; Zhang, Xin; Wang, Qiang; Yu, Danshi; Zhao, Rang] Jiangnan Univ, Jiangnan Energy Res Inst, Internet Things Engn Coll, Wuxi City 214122, Jiangsu, Peoples R China.
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NR 3
TC 0
Z9 0
U1 2
U2 11
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
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J9 APPL MECH MATER
PY 2013
VL 291-294
BP 945
EP 948
DI 10.4028/www.scientific.net/AMM.291-294.945
PG 4
WC Energy & Fuels; Materials Science, Multidisciplinary

SC Energy & Fuels; Materials Science
GA BFM20
UT WOS:000320478400179
DA 2018-05-03
ER

PT S
AU Zhong, M
Chen, SS
Wang, H
Yan, HG
AF Zhong, Ming
Chen, Songsong
Wang, He
Yan, Huaguang
BE Zhang, XD
Li, HN
Feng, X
Chen, Z
TI The interaction and monitoring system for energy saving in building
SO SUSTAINABLE DEVELOPMENT OF URBAN INFRASTRUCTURE, PTS 1-3
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT 2nd International Conference on Civil Engineering and Transportation (ICCET 2012)
CY OCT 27-28, 2012
CL Guilin, PEOPLES R CHINA
SP Liaoning Tech Univ, Hong Kong Ind Technol Res Ctr
DE wireless sensor; energy saving; monitoring; energy services company; energy saving and emission reduction
AB The continuous advance of the policy about 'Energy saving and emission reduction', along with the continuous development of information technology, control technology, which bring profitable conditions for the monitoring and control over the building (here mainly refers to the large building of government, commercial or industrial user). In particular, a interaction and monitoring system is proposed, which is used to monitor the parameters about energy consumption of energy consumption system or equipment inside the building, in addition the information about the running of the energy consumption system or equipment. At the same time, the relevant units of the energy consumption system or equipment is controlled by the interaction and monitoring system. The interaction and monitoring system for energy saving in building consists of the node for energy saving and monitoring, wireless sensor network (hereinafter referred to as WSN), the platform for energy saving and monitoring, making up the three-layer structure of the interaction and monitoring system inside the building. The node for energy saving and monitoring is a wireless sensor actually, which plays the role as collecting data and controlling. Along with the other nodes for energy saving and monitoring, as well as the nodes acting as repeater, router, coordinator, all nodes inside the building compose the WSN. The node acting as the repeater is of great significance for the transmission of data, especially when some nodes for energy saving and monitoring is located in underground building and some other places where the signal of WSN is blocked, as well as the places far away from the neighbor nodes of WSN. The coordinator is located on the platform for energy saving and monitoring, meanwhile the function of gateway is integrated in the node acting as the coordinator. This node converge the data of the WSN, and transfers the data to the server of the platform for energy saving and monitoring.
C1 [Zhong, Ming; Wang, He; Yan, Huaguang] China Elect Power Res Inst, Beijing 100192, Peoples R China. [Chen, Songsong] North China Elect Power Univ, Sch Elect & Elect Engn, Beijing 102206, Peoples R China.
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Corucci F., 2011, 2011 IEEE Symposium on Computers and Communications (ISCC 2011), P990, DOI 10.1109/ISCC.2011.5983971
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Zhiyu Huangl, 2011, 2011 10 IEEE INT C C, P324
Jung C.K., 2009, J AUTOMATION TECHNOL, P54
Jung J.Y., 2008, P 10 INT C ADV COMM, P795
Luo QB, 2009, CCDC 2009: 21ST CHINESE CONTROL AND DECISION CONFERENCE, VOLS 1-6, PROCEEDINGS, P3622, DOI 10.1109/CCDC.2009.5192836
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Wang Bo, 2011, 2011 Second International Conference on Mechanic Automation and Control Engineering, P3613
Wang Ruozhu, 2012, 4 INT C TECHN ARCH S, P374
NR 12
TC 0
Z9 0
U1 0
U2 4
PU TRANS TECH PUBLICATIONS LTD
PI DURNTEN-ZURICH
PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
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J9 APPL MECH MATER
PY 2013
VL 253-255
BP 724
EP +
DI 10.4028/www.scientific.net/AMM.253-255.724
PN 1-3
PG 2
WC Engineering, Civil
SC Engineering
GA BFD17
UT WOS:000319231600142
DA 2018-05-03
ER

PT S
AU Bai, W
Long, WD
AF Bai, Wei
Long, Weiding
BE Ren, N
Che, LK
Jin, B
Dong, R
Su, H
TI Potentials Analysis of Carbon Mitigation and Energy Consumption Reduction of Shanghai Non-Residential Buildings
SO RENEWABLE AND SUSTAINABLE ENERGY II, PTS 1-4
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 1st International Conference on Energy and Environmental Protection (ICEEP 2012)
CY JUN 23-24, 2012

CL Hohhot, PEOPLES R CHINA
SP Inner Mongolia Univ
DE building energy use; carbon emission; scenario analysis; system dynamic simulation
AB The aim of this study is to analyze the potentials of energy consumption and the energy-related carbon reduction of Shanghai non-residential buildings, to discuss the contributions of positive policies. This study uses system dynamic tool to examine the behaviour of the complex social-economic-energy system over time. This study defines three types of scenarios, BAU (business-as-usual), reference and ambitious scenarios in which policies on sustainability and technology progress are different. In order to highlight the importance of policies, this study adds several sub-scenarios and compares the contributions of them. The results show that Shanghai can reduce by at most 22% of building energy use and 30.9% of the energy-related carbon emissions by 2020 on the 2005 baseline. The strong economic incentives, including both encouraging and punishment measures are quite helpful for Shanghai building energy efficiency and CO2 reduction.
C1 [Bai, Wei; Long, Weiding] Tongji Univ, Sino German Sch Appl Sci, Shahghai 200092, Peoples R China.
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CR Bai W., 2008, THESIS TONGJI U
Forrester JW., 1961, IND DYNAMICS
Metz B, 2007, CLIMATE CHANGE 2007
Varoolu Demet, 1997, P 15 INT C SYST DYN
[Anonymous], 1987, A42427 WORLD COMM EN
NR 5
TC 0
Z9 0
U1 0
U2 3
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
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J9 ADV MATER RES-SWITZ
PY 2012
VL 512-515
BP 2766
EP 2774
DI 10.4028/www.scientific.net/AMR.512-515.2766
PG 9
WC Energy & Fuels; Materials Science, Multidisciplinary
SC Energy & Fuels; Materials Science
GA BCZ11
UT WOS:000312119901241
DA 2018-05-03
ER

PT S
AU Fang, TY
Chen, J
Fang, MX
Wang, J
AF Fang, Tingyong
Chen, Jun
Fang, Meixiang
Wang, Jing
BE Yang, WJ
TI Research of the Building Energy Efficiency Data Analysis Based on Time Series Algorithm in Anhui Province, China

SO SUSTAINABLE CITIES DEVELOPMENT AND ENVIRONMENT, PTS 1-3
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT International Conference on Civil, Architectural and Hydraulic Engineering (ICCAHE 2012)
CY AUG 10-12, 2012
CL Zhangjiajie, PEOPLES R CHINA
SP Changsha Univ Sci & Technol, Hunan Univ, Xiangtan Univ, Nanhua Univ, Hunan Univ Sci & Technol, Hunan City Univ
DE Time series algorithm; Building energy efficiency; Exponential smoothing; Energy consumption; Energy saving
ID HONG-KONG
AB Nowadays the researches of building energy efficiency mainly focus on the development of the related technologies and management measures, but the regional policy EIA have a greater impact on the development of building energy efficiency in China. In this paper, the statistical data combined with the actual situation of building energy efficiency during the period of the Eleventh-Five-Year in Anhui Province, China. Use exponential smoothing method of time series algorithm for forecast and analysis of building energy consumption and energy saving in Anhui Province. First, take six different values as the exponential smoothing constants, the predictive values are calculated under the different exponential smoothing constants. Then compare and analyze the curves through the errors between the predictive values and the actual values, and determine the group of the curves of which the trend closest to the trend of actual values. For the actual data are affected by many kinds of factors that exist fluctuations, the method for predictive values correction was put forward. Using the trend extrapolation, the predictive values is corrected. Also provides theoretical guidance for the future work in Anhui Province and other similar places.
C1 [Fang, Tingyong; Chen, Jun; Fang, Meixiang; Wang, Jing] Minist Educ, Engn Res Ctr Bldg Energy Efficient Control & Eval, Hefei 230022, Anhui, Peoples R China.
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NR 11
TC 0
Z9 0
U1 0
U2 3
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
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J9 APPL MECH MATER
PY 2012
VL 209-211
BP 1836
EP 1842

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PN 1-3
PG 7
WC Engineering, Environmental; Engineering, Civil
SC Engineering
GA BFD16
UT WOS:000319231001081
DA 2018-05-03
ER

PT S
AU Gravouniotis, P
Bauen, A
Pearson, P
AF Gravouniotis, Paris
Bauen, Ausilio
Pearson, Peter
BE Salame, C
Aillerie, M
Khoury, G
TI Building markets for energy saving equipment and modelling subsidy strategies in tourism dependent economies
SO TERRAGREEN 2012: CLEAN ENERGY SOLUTIONS FOR SUSTAINABLE ENVIRONMENT (CESSE)
SE Energy Procedia
LA English
DT Proceedings Paper
CT International Conference on Clean Energy Solutions for Sustainable Environment (TerraGreen)
CY FEB 16-19, 2012
CL Beirut, LEBANON
DE technology diffusion; subsidies; tourism; energy saving; learning curve; islands; Greece; System Dynamics
AB The paper presents selected results of a dynamic non-linear model that simulates critical factors in the diffusion of demand-side energy saving equipment. The modelling exercise is customised to the particular characteristics of the Greek islands of the Aegean Sea. Through a sample set of alternative diffusion scenarios, it tests socio-economic and techno-economic system behaviour providing helpful insights in market development and programme design in the wider energy policy debate on effective introduction of new technology. The paper discusses the usefulness of simulation modelling along critical interactions and feedbacks among policy makers (government), the utility operator, consumers and the adopters. (C) 2012 Published by Elsevier Ltd. Selection and/or peer review under responsibility of The TerraGreen Society
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RI Pearson, Peter/I-7144-2012
CR Betzios G., 2003, CRET GREEC EREC INT, P45
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PPC, 2002, ANN REV PROGR ISL AU
NR 8
TC 0

Z9 0
U1 0
U2 1
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2012
VL 18
BP 131
EP 146
DI 10.1016/j.egypro.2012.05.025
PG 16
WC Energy & Fuels; Environmental Sciences
SC Energy & Fuels; Environmental Sciences & Ecology
GA BAR42
UT WOS:000305286700014
OA gold
DA 2018-05-03
ER

PT B
AU Junghans, A
AF Junghans, A.
BE Gudnason, G
Scherer, R
TI Building use as source of innovation for energy efficiency improvement of non-residential buildings
SO EWORK AND EBUSINESS IN ARCHITECTURE, ENGINEERING AND CONSTRUCTION
LA English
DT Proceedings Paper
CT 9th European Conference on Product and Process Modelling
CY JUL 25-27, 2012
CL Reykjavik, ICELAND
AB The paper examines the extent to which facility managers are lead users and innovation drivers for improvements to buildings' energy efficiency. Eric von Hippel's lead user theory is used to apply established criteria, as there is a general need to study how buildings are used and operated in order to maximize their full potential for energy saving. The study indicates that facility managers can be considered as the link between energy-efficient buildings and their energy-efficient management and use, and can contribute to improvements in energy efficiency. However, lead user theory does not yet meet all the requirements of service innovation. The paper shows how the three main lead user roles can be applied to the different facilities management (FM) roles of in-house and external FM service providers. Non-residential buildings such as public and private office buildings and hospitals are discussed as having the highest potential for energy saving.
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OI Junghans, Antje/0000-0001-7063-9457
CR Aune M., 2005, BUILDINGS LEARN ROLE
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Von Hippel E., 1988, SOURCES INNOVATION
von Hippel Eric, 2005, DEMOCRATIZING INNOVA
NR 16
TC 0
Z9 0
U1 0
U2 1
PU CRC PRESS-TAYLOR & FRANCIS GROUP
PI BOCA RATON
PA 6000 BROKEN SOUND PARKWAY NW, STE 300, BOCA RATON, FL 33487-2742 USA
BN 978-0-415-62128-1
PY 2012
BP 89
EP 95
PG 7
WC Computer Science, Hardware & Architecture; Computer Science, Information Systems; Construction & Building Technology
SC Computer Science; Construction & Building Technology
GA BA6JU
UT WOS:000337164500013
DA 2018-05-03
ER

PT S
AU Kerzmann, TL
Werner, EJ
AF Kerzmann, Tony Lee
Werner, Eugene Joseph, Jr.
GP ASEE
TI TURBOFLOW: INTEGRATED ENGINEERING DESIGN THROUGH AN ENERGY EFFICIENT BUILDING COMPETITION
SO 2012 ASEE ANNUAL CONFERENCE
SE ASEE Annual Conference & Exposition
LA English
DT Proceedings Paper
CT ASEE Annual Conference
CY JUN 10-13, 2012
CL San Antonio, TX
SP ASEE
AB Students learn best when there is interest in the topic and what better way to induce interest than to couple classroom theory with real-world application in the form of a competition. Senior engineering students at Robert Morris University established a design team to compete in the 2011 Energy Efficient Building Technologies Challenge which is sponsored by the Mascaro Center for Sustainable Innovation. The students were not only excited to be a part of a design competition that rewarded a cash prize, but there was a remarkable level of enthusiasm associated with the sustainability aspect of the design project. The Energy Efficient Building Technologies Challenge was held over the fall and spring semesters of the 2010-2011 school year. During the fall semester the design team developed an idea for the competition and submitted a proposal. After being accepted into Stage 2 of the competition, the students designed, analyzed and fabricated the "TurboFlow" generation device for their Integrated Engineering and Design course. This prototype was demonstrated for the competition and the design team won first place, with a $5000 cash prize. Because of the competition, the design team went above and beyond the classroom expectations to design, analyze, fabricate and demonstrate a device with considerable market potential. The students not only analyzed the TurboFlow from an engineering standpoint, but from economic and

sustainability standpoints as well. The famous saying, "Competition Breeds Excellence," could not be more true for this group of students.
C1 [Kerzmann, Tony Lee] Robert Morris Univ, Moon, PA 15108 USA.
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NR 6
TC 0
Z9 0
U1 0
U2 0
PU AMER SOC ENGINEERING EDUCATION
PI WASHINGTON
PA 1818 N STREET, NW SUITE 600, WASHINGTON, DC 20036 USA
SN 2153-5965
J9 ASEE ANNU CONF EXPO
PY 2012
PG 10
WC Education & Educational Research; Education, Scientific Disciplines;
Engineering, Multidisciplinary
SC Education & Educational Research; Engineering
GA BF1AU
UT WOS:000380253704036
DA 2018-05-03
ER

PT S
AU Kumar, B
Katsinis, C
AF Kumar, Brijesh
Katsinis, Constantine
GP IEEE
TI An Architectural Framework for Mobile Device Interaction with Consumer
Home Network Appliances
SO 2012 IEEE CONSUMER COMMUNICATIONS AND NETWORKING CONFERENCE (CCNC)
SE IEEE Consumer Communications and Networking Conference
LA English
DT Proceedings Paper
CT IEEE Consumer Communications and Networking Conference (CCNC)
CY JAN 14-17, 2012
CL Las Vegas, NV
SP IEEE
DE Consumer Networking; Session Initiation Protocol (SIP); Universal Plug
and Play (UPnP); Service Discovery; Mobile Applications; Home Networks
AB With the proliferation of digital contents and the expanding variety of connected and IP-enabled consumer electronics (CE) devices, consumers are increasingly seeking ways to efficiently integrate their mobile devices with home networked devices. Expanding wireless coverage is enabling exciting new set of consumer-focused applications between CE devices, mobile handsets, home appliances and personal computers. In this paper, we discuss an architectural framework for mobile device interaction with consumer home network appliances and devices. A number of technological elements such as service discovery, addressing and numbering, control and data transport protocols and security requirements are presented and discussed. A realization of this framework will allow mobile devices to interact with home appliances and other consumer electronic devices in a heterogeneous network from remote locations.

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NR 10
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2331-9852
BN 978-1-4577-2071-0
J9 CONSUM COMM NETWORK
PY 2012
BP 661
EP 666
PG 6
WC Engineering, Electrical & Electronic; Telecommunications
SC Engineering; Telecommunications
GA BDD68
UT WOS:000312834500149
DA 2018-05-03
ER

PT S
AU Luo, J
AF Luo, Jian
BE Zhong, S
Qu, XL
TI Study of Building Energy-Saving Based on TRIZ
SO SMART MATERIALS AND INTELLIGENT SYSTEMS
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT International Conference on Smart Materials and Intelligent Systems (SMIS 2011)
CY DEC 23-25, 2011
CL Chongqing, PEOPLES R CHINA
SP Shanghai Jiao Tong Univ, Nanyang Normal Univ, Henan Inst Sci & Technol, Hunan Inst Engn, Chongqing Normal Univ
DE Building Energy Saving; Energy saving reconstruction; TRIZ; innovation
AB Energy saving always attracts many countries'attentions. Energy saving reform of the existing buildings was accepted in many countries. There are a lot of innovation in energy saving. In this paper, we believe that TRIZ can solve these problems in energy saving. Then, we constructed a model of energy-saving

based on TRIZ. This model proposed preliminary solutions by using TRIZ in energy saving. TRIZ will be applied more in this field.
C1 Cent S Univ, Sch Ciivil Engn & Architectrue, Changsha 410075, Hunan, Peoples R China.
RP Luo, J (reprint author), Cent S Univ, Sch Ciivil Engn & Architectrue, Changsha 410075, Hunan, Peoples R China.
EM luojianwork@163.com
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NR 6
TC 0
Z9 0
U1 1
U2 4
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-345-0
J9 ADV MATER RES-SWITZ
PY 2012
VL 442
BP 58
EP 61
DI 10.4028/www.scientific.net/AMR.442.58
PG 4
WC Computer Science, Interdisciplinary Applications; Engineering, Multidisciplinary; Materials Science, Multidisciplinary
SC Computer Science; Engineering; Materials Science
GA BBB73
UT WOS:000306347500013
DA 2018-05-03
ER

PT B
AU Shi, Z
Liu, Y
Tong, X
Zeng, P
Yu, HB
AF Shi, Zhao
Liu, Yang
Tong, Xing
Zeng, Peng
Yu, Haibin
BE Mao, HQ
TI A System Architecture for Energy Saving in Buildings
SO PROCEEDINGS OF THE 2ND INTERNATIONAL CONFERENCE ON COMPUTER AND INFORMATION APPLICATIONS (ICCIA 2012)
LA English
DT Proceedings Paper
CT 2nd International Conference on Computer and Information Applications (ICCIA)
CY DEC 08-09, 2012
CL Taiyuan, PEOPLES R CHINA

SP Comp Sci & Elect Technol Int Soc
DE smart grid; energy consumption statistic; person-device interaction; user energy consumption behaviors; cloud computing
ID SERVICES
AB Advances in smart grid technologies have been proven to improve energy efficiency. These technologies will drive significant changes of energy consumption operation, energy management, energy using patterns, and customer services. In order to achieve energy saving efficiently and provide smart services automatically for users, the architecture of a smart energy monitoring and management system is proposed in this paper. By monitoring the power consumption information, environment information and users' situation information, the system based on the architecture can calculate the proportion of wasted energy consumption based on the energy consumption statistic, provide smart services based on the person-device interaction, and forecast the energy consumption based on the user energy consumption behaviors. The system is combined with cloud computing for data storage and processing. This paper describes the design and partial implementation of the system architecture.
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FU Strategic Priority Research Program of the Chinese Academy of Sciences [XDA06020302]; Important National Science and Technology Specific Project [2010ZX03006-005-01]; National High Technology Research and Development Program of China under 863 Program [2011AA040103]; Natural Science Foundation of China [61100159]
FX The authors acknowledge the financial support of the Strategic Priority Research Program of the Chinese Academy of Sciences under Grant No. XDA06020302, the Important National Science and Technology Specific Project under Contact No. 2010ZX03006-005-01, the National High Technology Research and Development Program of China under 863 Program No. 2011AA040103, and the Natural Science Foundation of China under Contact No. 61100159.
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Yuriyama M., 2010, 13 INT C NETW BAS IN
NR 8
TC 0
Z9 0
U1 0
U2 0
PU ATLANTIS PRESS
PI PARIS
PA 29 AVENUE LAVMIERE, PARIS, 75019, FRANCE
BN 978-94-91216-41-1
PY 2012
BP 1074
EP 1077
PG 4
WC Computer Science, Theory & Methods; Engineering, Electrical & Electronic
SC Computer Science; Engineering
GA BG9AT
UT WOS:000392928800263
DA 2018-05-03

ER

PT S
AU Song, Q
Zhang, XJ
AF Song, Qi
Zhang, Xiao-jie
BE Yang, Q
Zhu, LH
He, JJ
Yan, ZF
Ren, R
TI Building Energy-efficiency Running Mode of Large-scale Public Building:
Based on Energy Performance Contracting
SO ADVANCES IN CIVIL ENGINEERING AND ARCHITECTURE INNOVATION, PTS 1-6
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 4th International Conference on Technology of Architecture and Structure
(ICTAS 2011)
CY SEP 22-24, 2011
CL Xian Univ Architecture & Technol, Xian, PEOPLES R CHINA
SP Chinese Acad Engn, Div Civil Hydraulic & Architecture Engn, China Civil Engn Soc
HO Xian Univ Architecture & Technol
DE large-scale public building; energy efficiency running mode; energy
performance contracting; property management company
AB Energy performance contracting plays a key role in improving the building energy-efficiency in China. This paper introduces the current situation of energy-efficiency of large-scale public building in China and provides an overview of energy performance contracting, and then puts forward an innovative energy-efficiency running mode. This paper tries to offer theoretical references for the development of EMC in energy-saving field of large-scale public buildings.
C1 [Song, Qi; Zhang, Xiao-jie] Xian Univ Architecture & Technol, Sch Management, Xian 710055, Peoples R China.
RP Song, Q (reprint author), Xian Univ Architecture & Technol, Sch Management, Xian 710055, Peoples R China.
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NR 3
TC 0
Z9 0
U1 0
U2 10
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-278-1
J9 ADV MATER RES-SWITZ
PY 2012
VL 368-373
BP 3663
EP 3666
DI 10.4028/www.scientific.net/AMR.368-373.3663
PG 4
WC Construction & Building Technology; Engineering, Civil; Materials
Science, Multidisciplinary

SC Construction & Building Technology; Engineering; Materials Science
GA BBY80
UT WOS:000308895900730
DA 2018-05-03
ER

PT S
AU Sweetser, R
AF Sweetser, Richard
GP ASHRAE
TI Retrofit Energy Efficiency Modeling, Assessments, and Integrated Technologies: Seeking Solutions for Small and Medium Sized Buildings
SO ASHRAE TRANSACTIONS 2012, VOL 118, PT 1
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT ASHRAE Winter Conference
CY 2012
CL Chicago, IL
SP ASHRAE
AB Incorporating full spectrum energy efficiency retrofits into average sized commercial buildings requires significant change in assessment and modeling tools. Ills necessary to reduce assessment cost and time, and improve ease of use and accuracy of models while reducing economic risk. Existing small and medium sized building energy efficiency retrofits are often problematic because high assessment cost and degree of uncertainty. Market insertion of decision level analytical tools that provide practitioners with user friendly, accurate, verified, and cost effective energy assessments is an essential first step in gaining market acceptance of energy retrofits. Integrated system design for building renovation, similar to the automotive and aerospace system design practice, is conceptually easy for most engineers to understand. In practice, it remains the most challenging effort to achieve improved building energy retrofits. The system performance driven approach to building renovation requires: selecting component technologies, subsystem architectures and dynamically coordinated controls to meet internal and envelope loads while producing a measurably improved indoor environment for a given cost constraint. The systems performance approach requires a change in assessment and modeling tools and equipment selection evaluated with whole building performance metrics rather than component efficiencies. Finally, new integrated hardware and software is not enough to move this complex market. Public policy and even human behavior' will need to change, education and workforce transformation must occur and new business models must be developed. This paper focuses on the strategy to deliver these near-term cost effective retrofit solutions to the market.
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US Department of Energy, 2011, US DEP EN EN EFF REN
NR 9
TC 0
Z9 0
U1 0
U2 3
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
J9 ASHRAE TRAN
PY 2012

VL 118
BP 341
EP 350
PN 1
PG 10
WC Thermodynamics; Construction & Building Technology
SC Thermodynamics; Construction & Building Technology
GA BDC57
UT WOS:000312640000043
DA 2018-05-03
ER

PT S
AU Tu, JS
Li, RX
Qin, FY
AF Tu, Jinsong
Li, Ruixia
Qin, Fengyan
BE Chu, MJ
Xu, HH
Jia, Z
Fan, Y
Xu, JP
TI Study on Residential Building Energy-saving Comprehensive Evaluation System in Hot Summer and Cold Winter Zone Based on AHP
SO SUSTAINABLE ENVIRONMENT AND TRANSPORTATION, PTS 1-4
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT 2nd International Conference on Civil Engineering, Architecture and Building Materials (CEABM 2012)
CY MAY 25-27, 2012
CL Yantai, PEOPLES R CHINA
SP Yantai Univ, Sch Civil Engn, Guizhou Univ, Coll Civil & Architecture Engn, Hainan Soc Theoret & Appl Mech
DE AHP; hot summer and cold winter; residential buildings energy-saving; comprehensive evaluation
AB A new evaluation method was proposed for hot -summer and cold -winter zone, which based on domestic and foreign energy-saving standard and evaluation technology as well as the current situation. The residential building energy-saving system evaluation model was established by referencing the AHP method model, its weight of each evaluation index came from the experts' investigation method, and was modified by entropy technology to index. The results show that, this method can not only simplified the qualitative and quantitative evaluation index quantification process but also improve the whole evaluation system operability. At last, we made a empirical analysis and evaluation of comprehensive of a small unit residential in Lu'an, the result shows that although the residential building energy conservation in the basically meet the national building energy efficiency requirements,it still needs to be improved in some other aspects.
C1 [Tu, Jinsong; Qin, Fengyan] W Anhui Univ, Inst Architecture & Civil Engn, Luan 237012, Peoples R China. [Li, Ruixia] W Anhui Univ, Inst Informat Engn, Luan 237012, Peoples R China.
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FU education department of Anhui province provincial scientific research projects in universities [KJ2011B214]
FX The author would like to thank fund project support of the education department of Anhui province provincial scientific research projects in universities (KJ2011B214).
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NR 7
TC 0
Z9 0
U1 0
U2 2
PU TRANS TECH PUBLICATIONS LTD
PI DURNTEN-ZURICH
PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
SN 1660-9336
BN 978-3-03785-424-2
J9 APPL MECH MATER
PY 2012
VL 178-181
BP 102
EP +
DI 10.4028/www.scientific.net/AMM.178-181.102
PG 3
WC Construction & Building Technology; Engineering, Environmental; Engineering, Civil; Transportation Science & Technology
SC Construction & Building Technology; Engineering; Transportation
GA BCY56
UT WOS:000312044400021
DA 2018-05-03
ER

PT B
AU Twomey, KM
Conover, S
Webber, ME
AF Twomey, Kelly M.
Conover, Susan
Webber, Michael E.
GP ASME
TI REDUCING RESIDENTIAL AND COMMERCIAL ENERGY CONSUMPTION IN THE US: THE ROLE OF WATER HEATERS
SO PROCEEDINGS OF THE ASME 6TH INTERNATIONAL CONFERENCE ON ENERGY SUSTAINABILITY - 2012, PTS A AND B
LA English
DT Proceedings Paper
CT 6th ASME International Conference on Energy Sustainability
CY JUL 23-26, 2012
CL San Diego, CA
SP ASME, Adv Energy Syst Div, ASME, Solar Energy Div
DE Energy Water Nexus; Water Heating; Residential; Commercial
AB Residential and commercial water heating in the United States consumed nearly 3,700 trillion British Thermal Units (BTUs) of primary energy in 2010. Nearly half of this primary energy was lost as waste heat at the point of power generation to provide electricity for electric water heaters. In the residential sector alone, water heating accounted for 17% of total 2010 onsite energy, use or about 1,960 trillion BTUs. Of this amount, about 22%, or 440 trillion BTUs, was consumed by residential electric water heaters. However, 1,380 trillion BTUs of primary energy was required to produce this retail electric power at the power station, indicating that electricity generation is much less efficient than directly burning fuels for water heating.

This study analyzes 2010 baseline primary energy consumption for water heating in the US by considering energy conversions and end-use efficiencies in the residential and commercial sectors. In order to assess more energy and carbon-efficient means of heating water, we defined four additional scenarios in order to quantify potential energy savings by replacing electric water heaters with more efficient, commercially available technologies. The scenarios ranged in scope and technology deployment, and resulted in energy savings of 10-25% and carbon dioxide emission reductions of 10-20%. Although future deployment of water heating technologies is not likely to replicate any specific scenario, the conclusions drawn from this study are useful in guiding policy incentives and consumer behavior in regards to choosing between water heating technologies.

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US Census Bureau, 2011, 2010 CENS BUR STAT
NR 16
TC 0
Z9 0
U1 0
U2 2
PU AMER SOC MECHANICAL ENGINEERS
PI NEW YORK
PA THREE PARK AVENUE, NEW YORK, NY 10016-5990 USA
BN 978-0-7918-4481-6
PY 2012
BP 1155
EP 1162
PG 8
WC Energy & Fuels; Engineering, Mechanical
SC Energy & Fuels; Engineering
GA BA4HE
UT WOS:000335710300133
DA 2018-05-03
ER

PT S
AU Wang, L
AF Wang Li
BE Ren, N
Che, LK
Jin, B
Dong, R
Su, H
TI A Study on Building Energy Efficiency and Low-Carbon Building

SO RENEWABLE AND SUSTAINABLE ENERGY II, PTS 1-4
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 1st International Conference on Energy and Environmental Protection (ICEEP 2012)
CY JUN 23-24, 2012
CL Hohhot, PEOPLES R CHINA
SP Inner Mongolia Univ
DE building energy efficiency; low-carbon buildings; CO2 emission reduction
AB Resource shortage and people's concern about carbon emissions will greatly influence building energy efficiency. Building energy efficiency is the basis for achieving carbon reduction and it should develop into low-carbon building. After introducing the concept of low-carbon buildings, this paper analyzes the important role technology plays in low-carbon building development and proposes several energy-efficiency measures concerning new building construction, old building transformation and low carbon lifestyle. The paper aims to be of help in promoting the development of low-carbon buildings.
C1 Univ Sci & Technol Liaoning, Dept Architecture & Arts Design, Anshan 114051, Liaoning, South Korea.
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CR Wu Liangyong, 1989, GENERALIZED ARCHITEC, P77
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NR 4
TC 0
Z9 0
U1 0
U2 5
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-414-3
J9 ADV MATER RES-SWITZ
PY 2012
VL 512-515
BP 2848
EP 2853
DI 10.4028/www.scientific.net/AMR.512-515.2848
PG 6
WC Energy & Fuels; Materials Science, Multidisciplinary
SC Energy & Fuels; Materials Science
GA BCZ11
UT WOS:000312119901256
DA 2018-05-03
ER

PT B
AU Xu, G
Ding, GF
AF Xu, Gang
Ding, Gefei
BE Wang, Y
Bai, Y
Shen, GQP
TI Research on the Expression of Energy Consumption Information of Public Buildings in BIM
SO PROCEEDINGS OF 2012 INTERNATIONAL CONFERENCE ON CONSTRUCTION & REAL

ESTATE MANAGEMENT, VOLS 1 AND 2
LA English
DT Proceedings Paper
CT International Conference on Construction and Real Estate Management
CY OCT 01-02, 2012
CL Kansas City, KS
SP Harbin Inst Technol, N Dakota State Univ, Univ Kansas, Hong Kong Polytechn Univ, Queensland Univ Technol, Univ Florida, Purdue Univ, Univ Salford, Univ W England, Florida Int Univ, Natl Univ Singapore, Amer Soc Civil Engn, Construct Inst, China Construct Ind Assoc, Modernizat Management Comm
DE BIM; public buildings; energy consumption calculation
ID DESIGN
AB BIM (Building Information Model) technology is the foundation to realize the computer simulation of design and construction of buildings. It is great important to improve the development of construction industry informatization. At present, its application in collaborative design, green buildings, building components prefabrication and so on is successful in developed countries. In order to simplify the currently complicated situation of the energy consumption calculation of public buildings, this paper discusses how to make use of the information in BIM of the given public building to calculate its total energy consumption in its lifecycle to simplify its energy consumption simulation in the design phase and to improve the collaboration of architectural design and energy consumption control.
C1 [Xu, Gang; Ding, Gefei] Soochow Univ, Gold Mantis Sch Architecture & Urban Environm, Suzhou 215123, Peoples R China.
EM bufengman@yahoo.com.cn; dgf1977@126.com
CR International Alliance for Interoperability (IAI), 2000, IFC TECHN GUID
Khanzode A., 2008, ELECT J INFORM TECHN, V13, P205
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Sanguinetti P, 2012, ADV ENG INFORM, V26, P317, DOI 10.1016/j.aei.2011.12.001
Suermann Patrick C., 2009, J ITCON, V14, P574
Yuan Y, 2011, PROCEDIA ENGINEER, V15, DOI 10.1016/j.proeng.2011.08.987
NR 6
TC 0
Z9 0
U1 1
U2 7
PU CHINA ARCHITECTURE & BUILDING PRESS
PI BEIJING
PA BAIWANZHUANG XICHENGGU, BEIJING, 10037, PEOPLES R CHINA
BN 978-7-112-14631-4
PY 2012
BP 424
EP 427
PG 4
WC Business, Finance; Construction & Building Technology; Engineering, Industrial; Management
SC Business & Economics; Construction & Building Technology; Engineering
GA BGY26
UT WOS:000324566700089
DA 2018-05-03
ER

PT S
AU Xue, JH
Li, HM
AF Xue Jianhua
Li Huimin
BE Li, H
Liu, YF
Guo, M

Zhang, R
Du, J
TI Firms and government behaviors for sustainable buildings energy-saving
SO SUSTAINABLE DEVELOPMENT OF URBAN ENVIRONMENT AND BUILDING MATERIAL, PTS 1-4
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 4th International Conference on Technology of Architecture and Structure (ICTAS 2011)
CY SEP 22-24, 2011
CL Xian Univ Architecture & Technol, Xian, PEOPLES R CHINA
SP Chinese Acad Engn, Div Civil Hydraulic & Architecture Engn, China Civil Engn Soc
HO Xian Univ Architecture & Technol
DE Buildings energy-saving; Sustainable development; Government behaviors; Transparadox
AB Both firms and government characterized dual and simultaneous behaviors about sustainable buildings energy-saving. This study will formulate 2*2 matrixes to construct four different interactive types about firms and government behaviors such as reaction, leadership, acceptance, and transparadox. In addition, we also analyze that how different types impact sustainable buildings energy-saving. This study not only makes important theoretical contributions on analyzing and exploring firms' and governmental behavior portfolios for sustainable buildings energy-saving, but also makes significant managerial implication on transferring other three portfolios into transparadox type in order to growing sustainable buildings energy-saving.
C1 [Xue Jianhua; Li Huimin] Xian Univ Architecture & Technol, Sch Civil Engn, Xian, Shaanxi, Peoples R China.
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Xie Y, 2011, ADV MATER RES-SWITZ, V201-203, P2466, DOI 10.4028/www.scientific.net/AMR.201-203.2466
Yik FWH, 2004, BUILD RES INF, V32, P235, DOI 10.1080/0961321042000189653
NR 6
TC 0
Z9 0
U1 2
U2 5
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-279-8
J9 ADV MATER RES-SWITZ
PY 2012
VL 374-377
BP 14
EP 17
DI 10.4028/www.scientific.net/AMR.374-377.14
PN 1-4
PG 4
WC Engineering, Civil; Materials Science, Multidisciplinary
SC Engineering; Materials Science
GA BBZ57
UT WOS:000309192500003

DA 2018-05-03
ER

PT S
AU Zhang, GQ
Zhang, L
Wang, M
Shen, B
Li, CD
Yan, Q
AF Zhang Guiqing
Zhang Lin
Wang Ming
Shen Bin
Li Chengdong
Yan Qiao
BE Fan, W
TI Design of Building Heating Supply Energy-Saving Control System Based on Information Fusion
SO MANUFACTURING SCIENCE AND TECHNOLOGY, PTS 1-8
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT International Conference on Manufacturing Science and Technology (ICMST 2011)
CY SEP 16-18, 2011
CL Singapore, SINGAPORE
SP Singapore Inst Elect
DE Information Fusion; Building Heating Supply System; Energy Saving Control
AB An energy-saving control system for building heating supply system is presented in this paper. Its design and implementation are on the basis of occupancy detection in buildings. By taking advantage of the information fusion technology, the control system will determine human's location and control the heating equipments automatically according to non-human zone and human zone to realize the energy saving. The information fusion technology fuses three categories of information, which are the people counting information, the infrared sensors information and the RFID information. How to design and implement the heating energy-saving control system is described explicitly in this paper. Since the system has developed with platform concept based on the wireless network and the Internet, it can be used to other building electrical equipment systems with less modification.
C1 [Zhang Guiqing; Zhang Lin; Wang Ming; Li Chengdong; Yan Qiao] Shandong Jianzhu Univ, Sch Informat & Elect Engn, Jinan, Peoples R China.
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FU Natural Science Foundation of China [61074149]
FX This work is supported by Natural Science Foundation of China(61074149).
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NR 9

TC 0
Z9 0
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PU TRANS TECH PUBLICATIONS LTD
PI DURNTEN-ZURICH
PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
SN 1022-6680
BN 978-3-03785-295-8
J9 ADV MATER RES-SWITZ
PY 2012
VL 383-390
BP 5484
EP +
DI 10.4028/www.scientific.net/AMR.383-390.5484
PG 2
WC Computer Science, Interdisciplinary Applications; Engineering, Manufacturing; Engineering, Mechanical; Materials Science, Multidisciplinary
SC Computer Science; Engineering; Materials Science
GA BBY99
UT WOS:000309016402272
DA 2018-05-03
ER

PT B
AU Zhao, GM
AF Zhao Guomin
GP IEEE
TI The Research of the Application of Energy Saving Technology in Rural House in Cold Region
SO 2012 WORLD AUTOMATION CONGRESS (WAC)
LA English
DT Proceedings Paper
CT World Automation Congress (WAC)
CY JUN 24-28, 2012
CL Puerto Vallarta, MEXICO
SP TSI Enterprises Inc
DE cold regions; rural house; new energy; energy-saving technologies
AB Energy-efficient housing construction village is a complex systematic project, involving political, economic, social, cultural, environmental, technological and other aspects of the content. By stage of development and economic conditions, towns and villages residential building energy efficiency-related technology development is very slow. Although China has carried out some basic research, but the village due to lack of systematic energy-saving technology and with the support of key technologies, towns and villages to promote energy-saving technologies falter. In this paper, according to China's towns and villages in the northern cold regions technology development status and energy saving technology to carry out the actual needs of towns and villages, Taking Tianjin, Maojiayu village construction project as a example, the paper research the energy-saving technologies and new energy in our villages in northern cold regions construction applications.
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CR Dong hairong, 2005, ENERGY SAVING LAND I, P12
Ge cuiyu, 2004, EXPLORE RURAL RESIDE, P8
Liu yuan, 2007, THESIS XIAN U ARCHIT
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Wu yanlin, THESIS BEIJING FORES
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NR 7
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4673-4497-5
PY 2012
PG 4
WC Automation & Control Systems; Engineering, Electrical & Electronic
SC Automation & Control Systems; Engineering
GA BCJ87
UT WOS:000310335801099
DA 2018-05-03
ER

PT S
AU Addy, P
Webb, D
AF Addy, Pat
Webb, Dave
BE Howlett, RJ
Jain, LC
Lee, SH
TI Energy Saving Technologies for Conventional Dwellings - A 'Whole House'
Concept
SO SUSTAINABILITY IN ENERGY AND BUILDINGS
SE Smart Innovation Systems and Technologies
LA English
DT Proceedings Paper
CT 2nd International Conference on Sustainability in Energy and Buildings
(SEB 2010)
CY MAY 06-07, 2010
CL Brighton, ENGLAND
AB The concept of a 'whole house' is rarely applied to individual dwellings because each is generally regarded as a loosely connected collection of stand-alone systems that are provided by different manufacturers with hardly any account being given to interconnectability within the overall concept of a house as a single entity. Most houses have very basic systems for the control of major energy sources including heating and lighting. Electronic control systems requiring only basic skills to install and service can give occupants an ongoing overview of their energy use and facilitate minor changes in habit! lifestyle to allow further savings. The effects and lifetime of these control systems will be improved if they include the ability to be reprogrammed by the user to take into account future improvement projects such as upgrades in insulation or the fitting of double glazing or a change in energy supply. Lifestyle and occupation patterns will have a major effect on energy saving within domestic premises. Any proposed system must be adaptable to suit different living patterns. Interfaces between various components therefore need to be as simple as possible to allow 'mixing' of different technologies and possible future developments. It is concluded that a whole house control system that is practical, cost effective, future proof and easy to use is viable but that it could not utilise a single processor design. Instead, a hierarchical system is proposed that presents the possibility of a simple, future proof whole house control system that will accept inputs that are not specified at the time of installation.
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NR 13
TC 0
Z9 0
U1 0
U2 2
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 2190-3018
BN 978-3-642-17386-8
J9 SMART INNOV SYST TEC
PY 2011
VL 7
BP 45
EP 55
PG 11
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA BBM02
UT WOS:000307329200005
DA 2018-05-03
ER

PT B
AU Cowan, KR
Daim, TU
AF Cowan, Kelly R.
Daim, Tugrul U.
BE Kocaoglu, DF
Anderson, TR
Daim, TU
TI Understanding Adoption of Energy Efficiency Technologies: Applying Behavioral Theories of Technology Acceptance & Use to Understand the Case of LED Lighting for Commercial, Residential, and Industrial End-Users
SO 2011 PROCEEDINGS OF PICMET 11: TECHNOLOGY MANAGEMENT IN THE ENERGY-SMART WORLD (PICMET)
LA English
DT Proceedings Paper
CT Portland International Center for Management of Engineering and Technology (PICMET) Conference on Technology Management in the Energy-Smart World
CY JUL 31-AUG 04, 2011
CL Portland, OR
SP Portland State Univ, Maseeh Coll Engn & Comp Sci, Dept Engn & Technol Management, Portland State Univ, Off Informat Technol, IKON Off Solut

ID FLUORESCENT LAMPS; BUILDINGS; PROGRAMS; DESIGN

AB What factors are most significant in understanding adoption behavior for energy efficiency technologies by commercial, residential, and industrial customers? The case of energy efficient lighting technologies is specifically examined. Several types of lighting technologies are compared to indoor LED lighting to determine how the technology meets the needs the various user types. What factors are most significant in motivating technology adoption for such technologies, and preventing subsequent technology disadoption? This is particularly important for energy efficient lighting technologies, as both technology adoption and technology disadoption can be extremely rapid, and ongoing user involvement is often required to recognize full benefits from these technologies. The Unified Theory of Acceptance and Use of Technology (UTAUT) is useful in explaining adoption behavior related to stakeholder expectation and buy-in for the new technologies. UTAUT contains four elements that can be adapted to fit this research: (1) Performance Expectancy; (2) Effort Expectancy; (3) Social Influences; and (4) Facilitating Conditions. In the case of energy efficient lighting adoption, and LED adoption in particular, performance expectancy and effort expectancy can be related to factors such as future energy price expectancies, actual savings results, and ease of energy savings. Factors involving social influences include perceptions of environmental friendliness among different user groups, and facilitating conditions include policies, incentives, and educational programs to encourage adoption. Some conclusions are then drawn regarding adoption factors for emerging energy efficient lighting technologies.

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NR 63
TC 0
Z9 0
U1 4
U2 14
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-890843-23-6
PY 2011
PG 9
WC Engineering, Electrical & Electronic; Operations Research & Management Science
SC Engineering; Operations Research & Management Science
GA BYF23
UT WOS:000298384400270
DA 2018-05-03
ER

PT B
AU Huang, ZY
Shen, LY
AF Huang, Zhiyu
Shen, Liyin
GP EBM Org Comm
TI A Study to the Application of Energy Saving Measures in Urban Residential Buildings: A Chongqing Case Study
SO INTERNATIONAL CONFERENCE ON ENGINEERING AND BUSINESS MANAGEMENT (EBM2011), VOLS 1-6
LA Chinese
DT Proceedings Paper

CT 2nd International Conference on Engineering and Business Management
CY MAR 22-24, 2011
CL Wuhan, PEOPLES R CHINA
SP Wuhan Univ, Zhejiang Univ, Chung Hua Univ, James Madison Univ, Sci Res Publishing, Engn Informat Inst, Chongqing VIP Informat Co Ltd
DE residential building; energy-saving measures; application level; Chongqing
AB Energy saving in urban residential buildings is one of the essential means for implementing and promoting low carbon living environment and sustainable urban development. Therefore, adopting effective energy saving measures is very important. In line with the world-wide promotion and appeal for saving natural resources and protecting the environment, significance progress has been made in saving energy and utilizing the energy effectively by adopting advanced technologies and management methods. Various energy saving technologies have been developed and progressively applied to residential buildings particularly in urban areas. Nevertheless, it appears that little has been investigated on the effectiveness of these technologies in practice. In this paper, taking Chongqing as an example, questionnaire survey was carried out among relevant experts in Energy Conservation Association, Architectural Design Unit as well as Construction Unit considering energy-saving measures of residential building. It was aimed to understand the application level of various energy-saving measures in urban residential building and analyze the difference statistically. Based on the questionnaire survey results, it discussed the deficiencies of energy-saving measures in urban residential building, and the results would provide important reference material for further research to improve the residential building's energy-saving.
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NR 9
TC 0
Z9 0
U1 0
U2 2
PU SCI RES PUBL, INC-SRP
PI IRVIN
PA 5005 PASEO SEGOVIA, IRVIN, CA 92603-3334 USA
BN 978-1-935068-19-8
PY 2011
BP 3103
EP +
PG 3
WC Business; Computer Science, Information Systems; Engineering, Industrial; Management
SC Business & Economics; Computer Science; Engineering
GA BUL45
UT WOS:000289742701064
DA 2018-05-03
ER

PT B
AU Huang, ZY

Huang, Y
AF Huang, Zhiyu
Huang, Yin
BE Xu, M
Shen, L
Fang, Y
TI A Study to the Application of Energy-saving Measures in Urban Residential Buildings
SO PROCEEDINGS OF THE 16TH INTERNATIONAL SYMPOSIUM ON ADVANCEMENT OF CONSTRUCTION MANAGEMENT AND REAL ESTATE (CRIOCM2011)
LA English
DT Proceedings Paper
CT 16th International Symposium on Advancement of Construction Management and Real Estate (CRIOCM 2011)
CY SEP 23-25, 2011
CL Chongqing, PEOPLES R CHINA
DE Residential building; energy-saving measures; application level
AB Energy saving in urban residential buildings is one of the essential means for implementing and promoting low carbon living environment and sustainable urban development. Therefore, adopting effective energy saving measures is very important. Various energy saving technologies have been developed and progressively applied to residential buildings particularly in urban areas. Nevertheless, it appears that little has been investigated on the effectiveness of these technologies in practice. In this paper, taking Chongqing as an example, questionnaire survey was carried out among relevant experts, considering energy-saving measures of residential building. It was aimed to understand the application level of various energy-saving measures in urban residential building. Based on the questionnaire survey results, it discussed the deficiencies of energy-saving measures in urban residential building, and the results would provide important reference material for further research to improve the residential building's energy-saving.
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NR 10
TC 0
Z9 0
U1 0
U2 1
PU HONG KONG POLYTECHNIC UNIV
PI KOWLOON
PA INST TEXTILES & CLOTHING, YUK CHOI RD, HUNG HOM, KOWLOON, 00000, PEOPLES R CHINA
BN 978-962-367-721-9
PY 2011
BP 324
EP 328
PG 5
WC Business; Urban Studies
SC Business & Economics; Urban Studies
GA BAF35
UT WOS:000304017000069

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PT S
AU Poess, M
Nambiar, R
AF Poess, Meikel
Nambiar, Raghunath
BE Castellanos, M
Dayal, U
Markl, V
TI Building Enterprise Class Real-Time Energy Efficient Decision Support Systems
SO ENABLING REAL-TIME BUSINESS INTELLIGENCE
SE Lecture Notes in Business Information Processing
LA English
DT Proceedings Paper
CT 36th International Conference on Very Large Databases
CY SEP 13, 2010
CL Singapore, SINGAPORE
DE Real-Time Decision Support Systems; Lessons learned from large practical applications of real-time Business Intelligence; Industrial experience and challenges
AB In today's highly competitive marketplace. companies have an insatiable need for up-to-the-second information about their business' operational state, while generating Terabytes of data per day [2]. The ability to convert this data into meaningful business information in a timely, cost effective manner is critical to their competitiveness. For many, it is no longer acceptable to move operational data into specialized analytical tools because of the delay this additional step would take. In certain cases they prefer to directly run queries on their operational data. To keep the response time of these queries low while data volume increases. IT departments are forced to buy faster processors or increase the number of processors per system. At the same time they need to scale the I/O subsystem to keep their systems balanced. While processor performance has been doubling every two years in accordance with Moore's Law, I/O performance is lagging far behind. As a consequence, storage subsystems not only have to cope with the increase in data capacity, but, foremost, with the increase in I/O throughput demand, which is often limited by the disk drive performance and the wire bandwidth between the server and storage.
A solution to this problem is to scale the I/O subsystem for capacity and to cache the database in main memory for performance. This approach not only reduces the I/O requirements, but also significantly reduces power consumption. As the database is physically located on durable media just like traditional databases, all ACID requirements are met.
While such an in-memory solution is feasible today for small data amounts using custom built systems, such a solution seems unfeasible for Multi-Terabyte systems running main-stream relational database management systems (RDBMS) simply because today's systems use CPUs with built-in memory controllers that support only a limited number of memory channels per CPU. In this paper we discuss the viability of building an enterprise class real-time Multi-Terabyte decision support infrastructure by combining the power of Oracle's RDBMS technologies and Cisco's extended memory technology [4]. We believe that Oracle and Cisco combined can deliver effective enterprise class real-time data warehouse infrastructure can deliver value by helping companies to respond to competitive pressures and new opportunities.
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NR 8
TC 0
Z9 0
U1 0
U2 2
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
SN 1865-1348
BN 978-3-642-22969-5
J9 LECT NOTES BUS INF P
PY 2011
VL 84
BP 36
EP +
PG 3
WC Computer Science, Hardware & Architecture; Computer Science, Information Systems
SC Computer Science
GA BZL82
UT WOS:000301963000004
DA 2018-05-03
ER

PT S
AU Qiu, L
Li, Q
AF Qiu Lin
Li Qiang
GP IEEE
TI Analysis on Video Behavior Analysis in Building Energy Saving Applications
SO 2011 30TH CHINESE CONTROL CONFERENCE (CCC)
SE Chinese Control Conference
LA Chinese
DT Proceedings Paper
CT 30th Chinese Control Conference
CY JUL 22-24, 2011
CL Yantai, PEOPLES R CHINA
DE Video Behavior; Building Energy-Saving; Air-Conditioning; Building Automatic Control
AB By the video behavior analysis technology, it can be access from the video screen according to the study area reached the required target information and changes, which provided a feasible method. for the energy saving to run of building air conditioning systems In this paper proposed the idea that target detection method using air-conditioning system to adjust the run load with actual load time to time and discussed the realized process of video behavior analysis applications in air conditioning systems control. It can obtained the increase or decrease of actual personnel number to monitoring the area to adjust the air conditioning load, and will play a positive role for air-conditioning system make reasonable adjustments to achieve both environment comfort and energy saving effect.
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CR DALAL N, 2008, HISTOGRAMS ORIENTED
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NR 4
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2161-2927
BN 978-988-17255-9-2
J9 CHIN CONTR CONF
PY 2011
BP 5205
EP 5207
PG 3
WC Automation & Control Systems; Engineering, Electrical & Electronic
SC Automation & Control Systems; Engineering
GA BDC62
UT WOS:000312652105062
DA 2018-05-03
ER

PT J
AU Rubinova, S
AF Rubinova, Stela
TI REACTION OF HOUSEHOLD ENERGY DEMAND TO IMPROVEMENTS IN ENERGY EFFICIENCY: THEORY AND ITS IMPLICATIONS FOR THE CONSTRUCTION OF EMPIRICALLY TESTED MODELS
SO POLITICKA EKONOMIE
LA Czech
DT Article
DE rebound effect; energy efficiency; energy demand; household demand
ID CONSUMPTION; FALLACIES
AB Energy efficiency improvements have become a major hope for decoupling the energy demand from economic growth and for achieving environmental goals. Nevertheless, the effectiveness of policies based on promoting energy efficiency may be undermined by behavioral responses. A more efficiently produced energy service becomes cheaper and economic theory then suggests that consumers should demand more of it, which will cause a loss of the potential technological saving. The phenomenon is called the rebound effect and it has become a focus of energy economists since early 80s. However, even today there is no clear consensus on its importance. Quantification of the rebound effect is mainly hampered by poor data availability and the comparison of results is not straightforward due to methodological differences. Our study concentrates right on the economic theory of the demand for energy services, definitions and their applicability to empirical estimation. It summarizes the state of knowledge and elaborates on plausible models for empirical quantification of the rebound effect which should bear consistent results.
C1 [Rubinova, Stela] Charles Univ Prague, Charles Univ Environm Ctr, CH-1211 Geneva 21, Switzerland. [Rubinova, Stela] Grad Inst Int & Dev Studies, CH-1211 Geneva 21, Switzerland.
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CR BECKER GS, 1965, ECON J, V75, P493, DOI 10.2307/2228949
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NR 26
TC 0
Z9 0
U1 1
U2 6
PU VYSOKA SKOLA EKONOMICKA
PI PRAGUE
PA NAM W CHURCHILLA 4, PRAGUE 13067, CZECH REPUBLIC
SN 0032-3233
J9 POLIT EKON
JI Polit. Ekon.
PY 2011
VL 59
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BP 359
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DI 10.18267/j.polek.796
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WC Economics; Political Science
SC Business & Economics; Government & Law
GA 795RL
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OA gold
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PT S
AU Sun, Y
Feng, LF
AF Sun Yan
Feng Lifang
BE Zhang, W
TI Influence of psychological, family and contextual factors on residential energy use behaviour: An empirical study of China
SO 2010 INTERNATIONAL CONFERENCE ON ENERGY, ENVIRONMENT AND DEVELOPMENT (ICEED2010)
SE Energy Procedia
LA English
DT Proceedings Paper
CT International Conference on Energy, Environment and Development (ICEED)
CY DEC 08-09, 2010

CL Kuala Lumpur, MALAYSIA
DE Residential energy use behaviour; Influencing factors; Psychological factors; Family; Contextual factors
ID ENVIRONMENTAL BEHAVIOR
AB The study is reported on the effect of psychological, family and contextual factors on residential energy use behaviour. A survey of 1376 residents was carried out in Dalian, a coastal city in the northeast of China. Results show that energy concern, biospheric value, barriers to behaviour, money saving and personal norm are the most powerful predictors for residential energy use behaviour. It is of Chinese characteristics that the aged has a positive impact on household energy conservation. The paper argues that government and society should make effective instruments to guide residents live in a low carbon lifestyle. (C) 2011 Published by Elsevier Ltd. Selection and peer-review under responsibility of RIUDS
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CR Abrahamse W, 2009, J ECON PSYCHOL, V30, P711, DOI 10.1016/j.joep.2009.05.006
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Thogersen J, 1996, ENVIRON BEHAV, V28, P536, DOI 10.1177/0013916596284006
NR 14
TC 0
Z9 1
U1 0
U2 7
PU ELSEVIER SCIENCE BV
PI AMSTERDAM
PA SARA BURGERHARTSTRAAT 25, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
SN 1876-6102
J9 ENRGY PROCED
PY 2011
VL 5
BP 910
EP 915
DI 10.1016/j.egypro.2011.03.161
PG 6
WC Energy & Fuels; Environmental Sciences
SC Energy & Fuels; Environmental Sciences & Ecology
GA BYE95
UT WOS:000298299400161
OA gold
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PT S
AU Wang, LY
Hao, QS
AF Wang, Liying
Hao, Qiushi
BE Sun, D

Sung, WP
Chen, R
TI The Existing Architecture Energy-saving Technologies' Application in the Residential Community's Transformation
SO FRONTIERS OF GREEN BUILDING, MATERIALS AND CIVIL ENGINEERING, PTS 1-8
SE Applied Mechanics and Materials
LA English
DT Proceedings Paper
CT International Conference on Green Building, Materials and Civil Engineering (GBMCE 2011)
CY AUG 22-23, 2011
CL Shangri La, PEOPLES R CHINA
SP Control Engn & Informat Sci Res Assoc, Int Frontiers Sci & Technol Res Assoc, Trans Tech Publicat, Chongqing Xueya Conf Cater Co Ltd
DE Shield machine; Carrier; Finite Element method; Strength
AB In this thesis, it starts from the status of China's energy consumption and energy efficiency application, analysis our country's existing architecture common problems and causes, combined with engineering practice, put forward the technological measures to the existing architecture energy-saving's transformation.
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CR Li Jiancheng, 2006, ARCHITECTURAL DESIGN
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Zhang Hai-Wen, 2007, JILIN ARCHITECTURAL
NR 3
TC 0
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U2 3
PU TRANS TECH PUBLICATIONS LTD
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PA KREUZSTRASSE 10, 8635 DURNTEN-ZURICH, SWITZERLAND
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J9 APPL MECH MATER
PY 2011
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PN 1-8
PG 2
WC Construction & Building Technology; Engineering, Civil; Materials Science, Multidisciplinary
SC Construction & Building Technology; Engineering; Materials Science
GA BBJ20
UT WOS:000307034500016
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ER
FN Clarivate Analytics Web of Science
VR 1.0
PT B
AU Xiao, J
Lin, BR

Zhu, YX
AF Xiao, J.
Lin, B. R.
Zhu, Y. X.
BE Zhang, X
Li, Z
Gao, N
Zhou, X
TI THE OPERATION ENERGY CONSUMPTION AND ENERGY-SAVING TECHNOLOGIES OF THREE GREEN BUILDINGS IN CHINA
SO 7TH INTERNATIONAL SYMPOSIUM ON HEATING, VENTILATING AND AIR CONDITIONING, PROCEEDINGS OF ISHVAC 2011, VOLS I-IV
LA English
DT Proceedings Paper
CT 7TH International Symposium on Heating, Ventilating and Air Conditioning, ISHVAC 2011
CY NOV 06-09, 2011
CL Shanghai, PEOPLES R CHINA
SP TONGJI UNIV, Tsinghua Univ, Univ Hong Kong
DE Green buildings; Energy-saving technologies; Operation energy consumption; Air-condition system perfoimance
AB Although amounts of green buildings have been built in China in recent 8 years, there lacks systematized research on their operation performances. An on -site investigation and measurement of 3 green office buildings in China has been carried out in this paper, covering study of envelope thermal performance, comparison of application of energy -efficient technologies and the actual operation energy consumption data, evaluation on the performance of the temperature and humidity independent control air-condition systems in the buildings. The conclusion is that the green office buildings concerned in the study are energy-efficient, but with quite low occupancy rate. Passive technologies such as natural ventilation and natural lighting perform quite well. Based on the value of coefficient of performance (COP), the air-condition systems for building SH and building BJ perform better than that of building SZ.
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Thomsen KE, 2005, ENERG BUILDINGS, V37, P111, DOI 10.1016/j.enbuild.2004.01.036
THUBERC, 2009, 2009 ANN REP CHIN BU, P133
NR 3
TC 0
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U1 0
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PU TONGJI UNIV PRESS
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PA EDITORIAL BOARD 1239 SIPING RD, SHANGHAI, PEOPLES R CHINA
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WC Construction & Building Technology
SC Construction & Building Technology
GA BH0EE
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PT S
AU Yang, J

Tang, ZH
Song, Y
AF Yang, Jie
Tang, Zhonghua
Song, Yu
BE Li, G
Huang, Y
Chen, C
TI Probe into the Problem of Water-Saving and Energy-Saving in Building
SO ADVANCED BUILDING MATERIALS, PTS 1-4
SE Advanced Materials Research
LA English
DT Proceedings Paper
CT 1st International Conference on Civil Engineering, Architecture and Building Materials (CEABM 2011)
CY JUN 18-20, 2011
CL Haikou, PEOPLES R CHINA
SP Hainan Univ, Coll Civil Engn & Architecture, Guizhou Univ, Coll Civil & Architecture Engn, Hainan Soc Theoret & Appl Mech
DE water supply and drainage; Energy-saving; water-saving
AB With the fast development of economy in China, some questions have come out gradually, and more and more obviously. For instance the energy in short supply, the water resource exhausted. I have made a simple analysis on the issue that some extant energy is wasted and the water resource wasted in the water supply and sewerage engineering in China, and have put forward some corresponding measures, such as full use of available municipal water supply network head, reasonable control of the flow of overpressure and decompression cost saving measures, promotion of the technology of water reuse and rainwater reuse and other measures. These measures can effectively reduce the energy and water waste in the water supply and sewerage engineering.
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Hong Yan, 2010, SCI TECHNOLOGY INNOV, P37
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NR 5
TC 0
Z9 0
U1 0
U2 15
PU TRANS TECH PUBLICATIONS LTD
PI STAFA-ZURICH
PA LAUBLSRUTISTR 24, CH-8717 STAFA-ZURICH, SWITZERLAND
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WC Construction & Building Technology; Engineering, Environmental; Engineering, Civil

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AU Yoshino, H
Hu, T
Levine, M
Jiang, Y
Pietilainen, J
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Andre, P
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AF Yoshino, H.
Hu, T.
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Pietilainen, J.
Corgnati, S.
Ghiaus, C.
Andre, P.
van der Aa, A.
BE Zhang, X
Li, Z
Gao, N
Zhou, X
TI OVERVIEW OF IEA/ECBCS/ANNEX 53 "TOTAL ENERGY USE IN BUILDINGS - ANALYSIS AND EVALUATION METHODS-"
SO 7TH INTERNATIONAL SYMPOSIUM ON HEATING, VENTILATING AND AIR CONDITIONING, PROCEEDINGS OF ISHVAC 2011, VOLS I-IV
LA English
DT Proceedings Paper
CT 7TH International Symposium on Heating, Ventilating and Air Conditioning, ISHVAC 2011
CY NOV 06-09, 2011
CL Shanghai, PEOPLES R CHINA
SP TONGJI UNIV, Tsinghua Univ, Univ Hong Kong
DE Overview; IEA/ ECBCS/Annex 53; Subtasks; Present status
AB One of the most significant barriers for achieving the goal of substantially improving energy efficiency of buildings is the lack of knowledge about the factors determining the real energy use. There is often a significant discrepancy between the designed and the real total energy use in buildings, in which a complex array of factors play a significant role, including the user/occupant behavior. The reasons for this discrepancy are generally poorly understood, and often have more to do with the role of human behavior than the building design. For that, the IEA/ECBCS/Annex entitled as "Total Energy use in Buildings - Analysis and evaluation methods-" was initiated in the November 2009 and started on first of January, 2010 as working phase. The ultimate outcome of this annex is to strengthen the robust prediction of energy usage in buildings, thus enabling the proper assessment of short- and long-term energy measures, policies, and technologies. This paper deals with Annex 53 research works, present status and expected outcomes.
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OI Ghiaus, Christian/0000-0001-5561-1245
FU IEA/ECBCS (International Energy Agency/Energy Conservation in Buildings and Community Systems)
FX This search was supported by IEA/ECBCS (International Energy Agency/Energy Conservation in Buildings and Community Systems). Authors also would like to give many thanks to executive committee members of ECBCS and participants from different countries involved in this project.
CR Yoshino H, 2010, NEWSLETTER IEA ECBCS, V53
NR 1
TC 0
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U1 1
U2 1
PU TONGJI UNIV PRESS
PI SHANGHAI
PA EDITORIAL BOARD 1239 SIPING RD, SHANGHAI, PEOPLES R CHINA
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WC Construction & Building Technology
SC Construction & Building Technology
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PT B
AU Du Bois, E
Horvath, I
Van Doorsselaer, K
AF Du Bois, Els
Horvath, Imre
Van Doorsselaer, Karine
BE Horvath, I
Mandorli, F
Rusak, Z
TI CRITICAL REVIEW OF SMART ENERGY SAVING IN HOUSEHOLD ELECTRONICS
SO TOOLS AND METHODS OF COMPETITIVE ENGINEERING, VOLS 1-2
LA English
DT Proceedings Paper
CT 8th International Symposium on Tools and Methods of Competitive Engineering (TMCE 2010)
CY APR 12-16, 2010
CL Ancona, ITALY
DE Design of household electronics; smart energy saving; ubiquitous controllers; forecasting software tool; trade-off calculation
ID ELECTRICITY CONSUMPTION; DOMESTIC APPLIANCES; PRODUCT DEFINITION; DESIGN; SYSTEMS; METHODOLOGY; INTEGRATION; INTERFACES; SIMULATION; EQUIPMENT
AB This research combines the necessity of energy saving and the opportunities of applying ubiquitous technologies. More precisely, its objective is to use ubiquitous technologies to provide smart control functions in electronic consumer products to save energy. This paper investigates the status of knowledge

related to the development of software tools that are able to assist designers in making decisions on smart energy saving. This paper brings together five seemingly not interrelated knowledge domains and synthesizes a concept for a trade-off forecasting software tool. Trade-off calculation is important because, on the one hand, smart controllers increase the cost of the product, and on the other hand, they consume extra energy. If there are no direct economic advantages, designers should not apply ubiquitous technologies for energy saving in electronic appliances. A major finding of the completed literature study is that the research efforts into this direction are scarce, and just very few system concepts have been proposed. Based on the aggregated knowledge, this paper tries to circumscribe a predictive theory with the intention to underpin the functional and structural framework of the sought software tool. The compiled theory explains not only how the tool can forecast, but also how designers can use it. The follow-up research will further refine and extend the theory, and will transform it to a comprehensive specification of the technical framework.

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NR 53
TC 0
Z9 0
U1 0
U2 0
PU DELFT UNIV TECHNOLOGY, FAC INDUST DESIGN ENG
PI DELFT
PA LANDBERGSTRAAT 15, DELFT, 2628 CE, NETHERLANDS
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WC Engineering, Industrial
SC Engineering
GA BG9SI
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PT B
AU Hartungi, R
Pye, C
AF Hartungi, Rusdy
Pye, Chris
BE Hajek, P
Tywoniak, J
Lupisek, A
Ruzicka, J
Sojkova, K
TI ENERGY EFFICIENCY PRACTICE IN OFFICE BUILDING
SO CESB 10: CENTRAL EUROPE TOWARDS SUSTAINABLE BUILDING - FROM THEORY TO PRACTICE
LA English
DT Proceedings Paper
CT Conference on Central Europe towards Sustainable Building
CY JUN, 2010
CL Prague, CZECH REPUBLIC
SP Czech Techn Univ, CIDEAS, Czech Sustainable Building Soc, iiSBE, UNEP SBSI, CIB
DE Sustainable Building; Office Building; Energy Conservation; Building Services; Building Regulation
ID CONSERVATION; PERFORMANCE

AB The conflicting demands of growing building energy use against targets for reducing carbon emissions coming from the building sector has gained widespread attention. Energy efficiency is one of the few techniques which has been used to tackle the great concern of increased energy use and carbon emissions in many countries. Energy effic:.ency is considered a key element of energy conservation and a contributor to the reduction of carbon emission in many countries throughout the world, not least because of the high proportion of the total energy used by the buildings the building sector. Some countries have now introduced building regulations concerning energy conservation and the use of energy efficiency measures.

In the UK, the government has introduced the Building Regulations Approved Document Part L regarding the conservation of fuel and power. This paper presents a showcase of a newly built office buildings in the UK and demonstartes how the energy efficiency technology in buildings might contribute towards energy conservation and fully comply with the building regulations. A large array of energy efficiency solutions are used such as a ventilation system with an efficient high heat recovery system, lighting controls linked to daylighting, etc. Using energy efficiency technology the office building in case study has shown compliance with the building regulations and has also conserved energy. This paper will demonstrate that energy conservation and compliance with building regulations are achieved through early incorporation into the building design.

The show case of an office building in this paper brings practical applications to building services engineers and consulting engineers who might want to design an office building that conserves the energy. Certainly, Part L of the Building Regulations has statutory standing as legislation in the UK, however this regulation has been amended and synchronised with the Directive on the Energy Performance of Buildings (EPBD) set up by the European Parliament and Council on energy efficiency of buildings. So this study will not be only useful for building engineers in the UK but also in the EU as well as any part of the globe which use EPBD as the basis to develop local energy codes.

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WC Construction & Building Technology; Ecology; Energy & Fuels; Engineering, Civil; Environmental Sciences
SC Construction & Building Technology; Environmental Sciences & Ecology; Energy & Fuels; Engineering
GA BTY08
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ER

PT B
AU Li, C
Li, ZR
Yao, WX
AF Li, Cui
Li, Zheng Rong
Yao, Wan Xiang
BE Liu, Q
Ou, Y
Qu, M
Sun, K
Tang, L
Tao, L
Wang, Y
Zeng, C
Zhang, Y
TI STUDY INFLUENCES OF INDIVIDUAL BEHAVIOR CONSCIOUS ON ENERGY-SAVING IN BUILDING
SO PROCEEDINGS OF THE SECOND INTERNATIONAL POSTGRADUATE CONFERENCE ON INFRASTRUCTURE AND ENVIRONMENT, VOL 1
LA English
DT Proceedings Paper
CT 2nd International Postgraduate Conference on Infrastructure and Environment
CY JUN 01-02, 2010
CL Hong Kong Polytechn Univ, Hong Kong, PEOPLES R CHINA
SP Hong Kong Polytechn Univ, Fac Construct & Land Use
HO Hong Kong Polytechn Univ
DE energy-saving; awareness; individual behavior; energy consumption
ID CONSERVATION; POLICY; CONSUMPTION; HOUSEHOLDS; DESIGN
AB Energy-saving has become more and more important as rapid economic growth and urbanization development, Electric appliances, plant management and people's energy usage habits have an effect on energy consumption in buildings. All the people of society take part in using the building directly, therefore, the behavior of all people who utilize the energy should be take into account. The behavioral consciousness of the individual has an immense impact on energy-saving. This paper will discuss public knowledge of energy-saving related information in buildings. Take Shanghai, for example. Awareness of energy-saving and the stimulating factors of individual behavior were investigated through questionnaire survey. Of the total random sample of 400 people, 364 were found availably. The results of the survey indicate that public knowledge and awareness of energy-saving in buildings is not good enough, and the lack of such awareness leads to a low acceptance of energy efficiency policy. The reason that the public pays attention to energy-savings in buildings is often because of home energy bills. Media and colleagues are ways the public gets energy-efficiency related information. Compelling policies are good for implementing energy-savings in buildings. The purpose of this study is to enhance the public people awareness of energy efficient, and can help the government to carry out energy-saving plans.
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FU Science and Technology Commission of Shanghai Municipality [08DZ1207800]
FX This study supported by Science and Technology Commission of Shanghai

Municipality the number of this program is 08DZ1207800. It is about green architecture technology applicability in occupant environment of zoology in Shanghai.

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NR 27
TC 0
Z9 0
U1 0
U2 0
PU HONG KONG POLYTECHNIC UNIV, FAC CONSTRUCTION & LAND USE
PI HUNG HOM
PA HONG KONG POLYTECHNIC UNIV, FAC CONSTRUCTION & LAND USE, HUNG HOM, KOWLOON 00000, HONG KONG
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PY 2010
BP 40
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WC Engineering, Civil
SC Engineering
GA BG8RT
UT WOS:000392691700005
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PT S
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Chen, T
Jia, QS
Yuan, RX
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Ding, R

AF Pan, L. L.
Chen, T.
Jia, Q. S.
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Wang, H. T.
Ding, R.
BE Lu, JWZ
Leung, AYT
Iu, VP
Mok, KM
TI An Occupant Behavior Model for Building Energy Efficiency and Safety
SO ISCM II AND EPMESC XII, PTS 1 AND 2
SE AIP Conference Proceedings
LA English
DT Proceedings Paper
CT 2nd International Symposium on Computational Mechanics
CT 12th International Conference on the Enhancement and Promotion of Computational Methods in Engineering and Science
CY NOV 30-DEC 03, 2009
CY DEC 02-03, 2009
CL Hong Kong, PEOPLES R CHINA
CL Macau, PEOPLES R CHINA
SP K C Wong Educ Fdn, Macao Fdn, Macau Govt Tourist Off, Sci & Technol Dev Fund Macao SAR
SP K C Wong Educ Fdn, Macao Fdn, Macau Govt Tourist Off, Sci & Technol Dev Fund Macao SAR
DE Occupant behavior; Energy Saving; Building Control; Safety Evacuation
ID CONSUMPTION; SUMMER
AB An occupant behavior model is suggested to improve building energy efficiency and safety. This paper provides a generic outline of the model, which includes occupancy behavior abstraction, model framework and primary structure, input and output, computer simulation results as well as summary and outlook. Using information technology, now it's possible to collect large amount of information of occupancy. Yet this can only provide partial and historical information, so it's important to develop a model to have full view of the researched building as well as prediction. We used the infrared monitoring system which is set at the front door of the Low Energy Demo Building (LEDB) at Tsinghua University in China, to provide the time variation of the total number of occupants in the LEDB building. This information is used as input data for the model. While the RFID system is set on the 1(st) floor, which provides the time variation of the occupants' localization in each region. The collected data are used to validate the model. The simulation results show that this presented model provides a feasible framework to simulate occupants' behavior and predict the time variation of the number of occupants in the building. Further development and application of the model is also discussed.
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FU UTRC (United Technologies Research Centre)
FX The contents presented in this paper were supported partially by the Research Grants from UTRC (United Technologies Research Centre).
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NR 11
TC 0
Z9 0
U1 1
U2 16
PU AMER INST PHYSICS
PI MELVILLE
PA 2 HUNTINGTON QUADRANGLE, STE 1NO1, MELVILLE, NY 11747-4501 USA
SN 0094-243X
BN 978-0-7354-0778-7
J9 AIP CONF PROC
PY 2010
VL 1233
BP 191
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DI 10.1063/1.3452164
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WC Engineering, Civil; Engineering, Mechanical; Mathematics, Applied; Mechanics
SC Engineering; Mathematics; Mechanics
GA BRL16
UT WOS:000283003800031
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ER

PT S
AU Zhivov, AM
Liesen, R
Fisher, D
Hand, J
Wilson, B
AF Zhivov, Alexander M.
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Wilson, Barry
GP ASHRAE
TI Screening of Energy Efficient Technologies for Industrial Buildings' Retrofits
SO ASHRAE TRANSACTIONS 2010, VOL 116, PT 2
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT ASHRAE Transactions 2010 Annual Conference
CY JUN 26-30, 2010
CL Albuquerque, NM
AB During the past few years, U.S. Army Corps of Engineers' Engineer Research and Development Center (ERDC) has led energy and process optimization initiatives to help Department of Defense installations to meet energy efficiency and environmental compliance requirements and to create an improved work environment. Thia effort was also a part of the IEA-ECBCS "International Energy Agency-Energy Conservation in Buildings and Community Systems" Annex 46, "Holistic Assessment Tool-kit on Energy Efficient Retrofit Measures for Government Buildings-EnERGo."
One of the important tasks of both programs was to analyze a series of international experiences of retrofitted industrial buildings and based on these best practice examples to develop a database of Promising energy saving technologies and measures (current, proven, well known or underused). The database includes technologies/measures that relate to building envelope, internal load reduction, lighting, HVAC systems, energy consuming processes in the building, supplemental energy systems (e.g.,

compressed air steam system), etc. The listed technologies and measures cover a wide spectrum, from proven operations and maintenance procedures to installation of technologies that have recently entered the market and are not yet well understood by end users, engineers, and decision makers. They also span a wide range of capital investment costs, from no cost/low cost measures to installations that may require several hundred thousand dollars of investment. Applicability and savings from using some energy conservation technologies and measures are not affected by outdoor climate conditions, while others are climate dependent.

Careful evaluation of candidate energy conservation measures for applicability and cost efficiency is critical to building energy managers, engineers, contractors, and decision makers in crafting and implementing successful energy conservation building retrofits. This paper presents a simulation based methodology for screening energy conservation technologies and measures for representative conditions (building type, climatic conditions, energy costs, etc.) The study demonstrates the feasibility of applying the methodology using an example of heated and ventilated (not air-conditioned) industrial buildings for six selected energy conservation measures. A simple payback is calculated using electricity and gas savings throughout a year-round operation cycle. Also, a cost/saving analysis shows that application of internal load reducing technologies in non-air-conditioned facilities affect their thermal environment and has a significant impact on worker's productivity. Consideration of worker's productivity improvement as a component of operating cost reduction has a significant impact on the overall pay-back calculation results.

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NR 12
TC 0
Z9 0
U1 0
U2 4
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
J9 ASHRAE TRAN
PY 2010
VL 116
BP 401
EP +
PN 2
PG 3
WC Thermodynamics
SC Thermodynamics
GA BTY96
UT WOS:000288475800043
DA 2018-05-03

ER

PT B
AU Krarti, M
Hajiah, A
AF Krarti, Moncef
Hajiah, Ali
GP ASME
TI ANALYSIS OF IMPACT OF DAYLIGHT TIME SAVINGS ON ENERGY USE OF BUILDINGS IN KUWAIT
SO ES2009: PROCEEDINGS OF THE ASME 3RD INTERNATIONAL CONFERENCE ON ENERGY SUSTAINABILITY, VOL 2
LA English
DT Proceedings Paper
CT 3rd International Conference on Energy Sustainability
CY JUL 19-23, 2009
CL San Francisco, CA
SP ASME, Adv Energy Syst Div, ASME, Solar Energy Div
DE Night ventilation; cooling energy saving; simplified method; theoretical model
AB In this paper, a detailed simulation-based analysis is conducted to assess the impact of adopting Daylight-Saving Time (DST) on the electrical energy use and peak demand in Kuwait. The analysis focused on the impact of DST in the building sector since it represents 90% of electrical energy usage of Kuwait.
The simulation results indicate that the adoption of DST has mixed impacts for Kuwait. While the commercial and the governmental sectors may benefit from the DST, the private residences and apartment buildings can see both their annual energy use and peak demand increase slightly by adopting DST. The overall impact of the DST implementation is rather minimal with a slight increase energy use of about 0.07% and a slight reduction in peak demand of 0.14% or about 12 MW based on 2005 electrical peak demand for Kuwait.
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PA THREE PARK AVENUE, NEW YORK, NY 10016-5990 USA
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PY 2009
BP 393
EP 403
PG 11
WC Engineering, Mechanical
SC Engineering
GA BQV53
UT WOS:000281966900045
DA 2018-05-03
ER

PT B
AU Lee, BH
Baek, JM
Won, JR
Kim, JH
AF Lee, Byung Ha
Baek, Jung Myeong
Won, Jong-Ryul
Kim, Jung Hoon
GP IEEE
TI A Study on Economic Analysis Corresponding to Enhancement of Energy Efficiency for Residential Air Conditioners
SO T& D ASIA: 2009 TRANSMISSION & DISTRIBUTION CONFERENCE & EXPOSITION: ASIA AND PACIFIC
LA English
DT Proceedings Paper
CT Transmission and Distribution Conference and Exposition - Asia and Pacific
CY OCT 26-30, 2009
CL Seoul, SOUTH KOREA
DE Bass diffusion model; residential air conditioner; efficiency standard; avoided cost
ID STANDARDS
AB Reducing energy use is a great target of the energy policies for solving the problems of high oil price and CO2 emission, and the authorities have applied energy efficiency standards to principal appliances such as air conditioners and refrigerators in order to reduce energy consumption. In this paper the distribution of residential air conditioners is estimated using the Bass diffusion model and then economic analysis corresponding to enhancement of energy efficiency is performed more precisely than existing methods.
C1 [Lee, Byung Ha; Baek, Jung Myeong] Univ Incheon, Dept Elect Engn, Inchon, South Korea.
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FU KESRI [R-2005-7-150]; MKE(Ministry of Knowledge Economy)
FX This work has been supported by KESRI(R-2005-7-150), Which is funded by MKE(Ministry of Knowledge Economy).
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NR 8
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4244-5229-3
PY 2009
BP 853
EP +

PG 2
WC Energy & Fuels; Engineering, Electrical & Electronic
SC Energy & Fuels; Engineering
GA BPG12
UT WOS:000278799700202
DA 2018-05-03
ER

PT B
AU Li, YM
Pan, YQ
Chen, C
AF Li, Yuming
Pan, Yiqun
Chen, Chen
GP ASME
TI STUDY ON ENERGY SAVING RETROFITTING STRATEGIES FOR EXISTING PUBLIC BUILDINGS IN SHANGHAI
SO ES2009: PROCEEDINGS OF THE ASME 3RD INTERNATIONAL CONFERENCE ON ENERGY SUSTAINABILITY, VOL 2
LA English
DT Proceedings Paper
CT 3rd International Conference on Energy Sustainability
CY JUL 19-23, 2009
CL San Francisco, CA
SP ASME, Adv Energy Syst Div, ASME, Solar Energy Div
ID OFFICE PROJECT; PERFORMANCE
AB Public buildings include office building, schools, hotels, hospitals, retails and others. This paper selects two types of existing public buildings office and hotel to conduct research. It firstly introduces and analyzes the feasible energy saving retrofitting strategies and technologies for existing public buildings in Shanghai, mainly about building envelope, HVAC system and lighting system. Then it builds up prototypical models, with whole building energy analysis software Energy Plus, for office and hotel respectively to simulate and calculate the annual energy saving and payback period of the various strategies. Therefore the different features of the two types of buildings and the energy saving effects of various strategies used on them are studied.
The results show that the energy saved by each one strategy may be different for different types of existing buildings. For office buildings, such ECMs (energy conservation measures) as external shading, energy efficient lighting system, daylighting in perimeter area and variable pumps have short payback period. While for hotels, external shading, variable pumps and temperature reset have short payback period.
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NR 17
TC 0
Z9 0
U1 0
U2 3
PU AMER SOC MECHANICAL ENGINEERS
PI NEW YORK
PA THREE PARK AVENUE, NEW YORK, NY 10016-5990 USA
BN 978-0-7918-4890-6
PY 2009
BP 301
EP 307
PG 7
WC Engineering, Mechanical
SC Engineering
GA BQV53
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ER

PT B
AU Ota, N
Arens, E
Wright, P
AF Ota, Nathan
Arens, Ed
Wright, Paul
GP ASME
TI ENERGY EFFICIENT RESIDENTIAL THERMAL CONTROL WITH WIRELESS SENSOR NETWORKS: A CASE STUDY FOR AIR CONDITIONING IN CALIFORNIA
SO IMECE 2008: PROCEEDINGS OF THE ASME INTERNATIONAL MECHANICAL ENGINEERING CONGRESS AND EXPOSITION - 2008, VOL 8
LA English
DT Proceedings Paper
CT ASME International Mechanical Engineering Congress and Exposition
CY OCT 31-NOV 06, 2008
CL Boston, MA
SP Amer Soc Mech Engineers
AB Residential thermostats are sensor-limited devices, but low-cost wireless sensor network technology is enabling new spatially distributed sensing capabilities. This paper evaluates the energy and comfort performance of three multi-sensor control strategies that use wireless temperature and humidity sensors in each room and that can be applied to existing on-off residential central systems. The multi-sensor control strategies adjust the temperature set point of a thermostat to control the average of all room temperatures using a temperature threshold logic, minimize aggregate discomfort of all rooms, or maximize the number of rooms within a comfort zone. The strategies were tested using a custom wireless sensor network control system in a seven room, 2,100 square foot single-story house located in Pleasanton, CA during August and September. Performance was benchmarked against an implementation of a single-sensor constant temperature set point control logic using the custom control system and against a constant temperature set point using the original thermostat. Results show multi-sensor strategies may produce simultaneous improvements in energy consumption, room-to-room temperature distributions, and average comfort, compared to the single-sensor constant temperature set point threshold logic.
C1 [Ota, Nathan; Wright, Paul] Univ Calif Berkeley, Dept Mech Engn, Berkeley, CA 94720 USA.
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NR 20
TC 0
Z9 0
U1 0
U2 2
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PI NEW YORK
PA THREE PARK AVENUE, NEW YORK, NY 10016-5990 USA
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PY 2009
BP 43
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WC Thermodynamics; Energy & Fuels; Engineering, Mechanical
SC Thermodynamics; Energy & Fuels; Engineering
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ER

PT S
AU Pan, YQ
Huang, ZZ
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AF Pan, Yiqun
Huang, Zhizhong
Zheng, Xiaowei
GP ASHRAE
TI Data Processing and Data Mining on Energy Consumption Database of Commercial Buildings in Shanghai
SO ASHRAE TRANSACTIONS 2009, VOL 115, PT 1
SE ASHRAE Transactions
LA English
DT Proceedings Paper
CT Winter Meeting of the American-Society-of-Heating-Refrigerating-and-Air-Conditioning-Engineers
CY JAN 25-28, 2009
CL Chicago, IL
SP Amer Soc Heating, Refrigerating & Air Conditioning Engineers
ID REGRESSION; PERFORMANCE
AB This paper adopts data processing methods and data mining technology to develop a building energy consumption model, based on an energy consumption database of commercial buildings that includes 95 commercial buildings in Shanghai. Data transformation and data reduction are conducted to clear up data

relations in the database. Three methods for missing data handling as well as outlier inspection are used for data processing. The software SAS is used as the tool for data processing and data mining. An optimum regression model of building energy consumption is made for each missing data element. Through comparing the three optimum regression models and their prediction results of building energy consumption, it is found that the Regression Imputation Method was the best method to handle missing data, and a regression model with operation time of HVAC system, cooling capacity, ratio of office area to total gross area, and hotel area to total gross area was the most reasonable prediction model of the energy consumption of commercial buildings in Shanghai.

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NR 10
TC 0
Z9 0
U1 0
U2 2
PU AMER SOC HEATING, REFRIGERATING AND AIR-CONDITIONING ENGS
PI ATLANTA
PA 1791 TULLIE CIRCLE NE, ATLANTA, GA 30329 USA
SN 0001-2505
J9 ASHRAE TRAN
PY 2009
VL 115
BP 382
EP +
PN 1
PG 2
WC Thermodynamics; Construction & Building Technology
SC Thermodynamics; Construction & Building Technology
GA BMG17
UT WOS:000272254800039
DA 2018-05-03
ER

PT B
AU Reichard, G
Bhattacharjee, S
AF Reichard, Georg
Bhattacharjee, Suchismita
GP ASME
TI A COMPARISON OF FOCUS AND EFFECTIVENESS OF EUROPEAN VERSUS US ENERGY EFFICIENCY PROGRAMS FOR BUILDINGS
SO ES2009: PROCEEDINGS OF THE ASME 3RD INTERNATIONAL CONFERENCE ON ENERGY SUSTAINABILITY, VOL 1
LA English
DT Proceedings Paper
CT 3rd International Conference on Energy Sustainability

CY JUL 19-23, 2009
CL San Francisco, CA
SP ASME, Adv Energy Syst Div, ASME, Solar Energy Div
ID BARRIERS; SAVINGS
AB The authors present a comparative study on effectiveness of energy policies for the building sector that are presently implemented in selected countries in Europe versus selected states in the U.S. Socio-economic factors affecting energy consumption on both sides of the Atlantic are identified from a human behavior perspective. Various identified factors known to affect energy efficiency and consumption have been positioned in diagrams based on four primary directions: lifestyle, economy, environment, and technology. In a second step various programs and incentives are positioned in the same diagram to demonstrate how well these strategies address the factors identified before. This is done for selected countries and continents in sub-diagrams to allow a comparison of effectiveness and provide a tool for predicting the effectiveness of a possible policy or program transfer to other nations. The research conducted so far suggests that energy efficiency policies and measures implemented in the United States do not always target the factors that have been identified to most significantly influence energy consumption. The results indicate that there might be a significant gap between parameters that arc guiding factors affecting energy consumption, and parameters targeting a proper implementation of energy efficient policies. The authors strive to provide a tool that will help policy makers and other decision makers to evaluate and compare their incentives and programs against those from other countries and benefit from lessons learned by mapping various policies towards specific efficiency parameters.
C1 [Reichard, Georg; Bhattacharjee, Suchismita] Virginia Tech, Myers Lawson Sch Construct, Blacksburg, VA 24061 USA.
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Oikonomou V, 2007, ENERG POLICY, V35, P1147, DOI 10.1016/j.enpol.2006.02.017
NR 12
TC 0
Z9 0
U1 1
U2 2
PU AMER SOC MECHANICAL ENGINEERS
PI NEW YORK
PA THREE PARK AVENUE, NEW YORK, NY 10016-5990 USA
BN 978-0-7918-4889-0
PY 2009
BP 75
EP 84
PG 10
WC Engineering, Mechanical
SC Engineering
GA BQV06
UT WOS:000281910700009
DA 2018-05-03
ER

PT B
AU Sun, FM

Dang, KC
Wang, Z
Liu, ZM
AF Sun Fengming
Dang Kaichun
Wang Zhen
Liu Zhuanmei
BE Zhang, H
Zhang, H
TI Research of Large Public Building Energy Consumption On-Line Monitoring System
SO DYNAMICS OF URBAN AGGLOMERATION IN CHINA: PREFERENCES OF ENERGY-SAVING AND ENVIRONMENT-FRIENDLY SOCIETY
LA English
DT Proceedings Paper
CT International Symposium on Sustainable-Development-of-City-Group
CY NOV 16, 2009
CL Changsha, PEOPLES R CHINA
SP Sustainable Dev City Grp, Cent S Univ, Hunan Inst Syst Engn & Management
DE building energy efficiency; large public building; energy efficiency management; on-line monitoring
AB The large public building consumes huge amounts of electricity, heat, gas and other resources. Completely gathered statistics of energy consumption status of large public buildings in China is the foundation to implement public building energy conservation management. Through methods of research and develop large public building energy consumption on-line monitoring system and conduct real-time statistic on public building energy use efficiency and consumption level, is enabled to report energy consumption statue every hour and day, and supply necessary data basis for energy conservation managers. This paper has brought out the online monitoring system of the energy consumption of the public buildings, based on the mature auto technology and information technology, according to the principles of accuracy, real-time and continuous.
The online monitoring system includes the energy subitem metering and collection system, energy consumption data remote transmission systems, energy data management center. Energy subitem metering and collection is the focus of on-line monitoring system, through the current situation analysis of electricity supply, gas supply and heat supply system in public buildings to create energy consumption model. It aims to probe the installation requirements of the metering equipments, and to implement subitem and real-time collection function of building energy consumption; In aspect of energy consumption data remote transmission systems, transmit energy consumption data to energy conservation management center through Internet; Energy data anagement center mainly gathers up and analyzes real-time data sent back by every subitem metering device, to provide feedback information to building energy conservation management department and project owner. Therefore, relevant management measures can be taken to reduce energy consumption total volume of large public building.
Take one large public building of Tangshan city as example, realty administrative bureau and conducted systematic analysis and studies on the approach and method to create large public building energy consumption on-line monitoring system, and also made relevant statements on energy subitem metering and collection system, energy data management center and other relevant points of focus.
Promotion of the large public building energy consumption on-line monitoring system, creation of the rapid, efficient and comprehensive energy consumption and collection channels will meet the demands of building data collection and application from building energy conservation management department and users. This will make public building operation system develop to the direction of efficient and saving energy usage, and reach the goal of saving building operation energy consumption.
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RP Sun, FM (reprint author), HeBei Univ Engn, Dept Architecture, Handan, Peoples R China.
EM zsunfm@163.com
CR FENG YP, 2007, HV AC, V37, P8
Jarnagin R, 2000, ASHRAE J, V42, P31
MAO Y, 1999, ASHRAE T, V105, P231

Paay J, 2008, COMPUT SUPP COOP W J, V17, P275, DOI 10.1007/s10606-007-9072-1
YING JY, 2006, INTELLIGENT BUILDING, P38
NR 5
TC 0
Z9 0
U1 0
U2 4
PU AUSSINO ACAD PUBL HOUSE
PI MARRICKVILLE
PA PO BOX 893, MARRICKVILLE, NSW 2204 00000, AUSTRALIA
BN 978-1-921712-03-6
PY 2009
BP 280
EP +
PG 2
WC Engineering, Environmental; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA BQC51
UT WOS:000280689300053
DA 2018-05-03
ER

PT S
AU Krstic, H
Culo, K
AF Krstic, H.
Culo, K.
BE Broadbent, G
Brebbia, CA
TI Cost benefit analysis of energy efficient family houses
SO ECO-ARCHITECTURE II: HARMONISATION BETWEEN ARCHITECTURE AND NATURE
SE WIT TRANSACTIONS ON ECOLOGY AND THE ENVIRONMENT
LA English
DT Proceedings Paper
CT 2nd International Conference on Harmonisation between Architecture and Nature
CY 2008
CL Algarve, PORTUGAL
DE energy efficiency; family housing; cost-benefit analysis
AB Buildings have a significant environmental impact. It is estimated that buildings are responsible for 40 per cent of the total energy consumption in the European Union. In this respect it should be taken into account that the major demand for housing and primary market area for eco-efficient construction is single-family housing. A practical goal of a low energy building is to try to achieve the highest energy efficiency with the lowest possible need for energy within the economic limits of reason. In the last 15-20 years, a number of projects have been carried out aiming. at energy-efficient and environmentally friendly housing. Also, technological possibilities to reduce a building's energy consumption have been available for a long time. However, despite the existing vast amount of information, no clear market change has happened. Therefore, special measures are needed to promote commercialization. They should target both, the demand and supply sides. On the demand side there is a need for pilot projects and case studies that should demonstrate that the higher initial construction costs of an energy efficient house can be offset in a short period of time by energy consumption savings. To these end, cost-benefit analyses are needed, that would take into account, beside the direct financial results, also the impact on the environment. This article considers a range of variables that should be included in such analyses. The article is part of a scientific project titled Evaluation of the correlation between investment projects and the environment financed by the Ministry of Science, Education and Sport of the Republic of Croatia.
C1 [Krstic, H.; Culo, K.] Univ Osijek, Fac Civil Engn, Organizat Technol & Management Dept, Osijek, Croatia.
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*UNDP PROJ UR, PROJ POT EN UC HRV
*WORLD BANK, 1996, HDB EC AN INV OP
WEB PORTAL NET
AM BUILDING PERFORMA
WEB PORTAL GRADIMO
WEB PORTAL KORAK
NR 10
TC 0
Z9 0
U1 0
U2 1
PU WIT PRESS
PI SOUTHAMPTON
PA ASHURST LODGE, SOUTHAMPTON SO40 7AA, ASHURST, ENGLAND
SN 1746-448X
BN 978-1-84564-119-1
J9 WIT TRANS ECOL ENVIR
PY 2008
VL 113
BP 191
EP 199
PG 9
WC Architecture; Construction & Building Technology; Ecology; Environmental Sciences; Environmental Studies
SC Architecture; Construction & Building Technology; Environmental Sciences & Ecology
GA BIA50
UT WOS:000257927900019
DA 2018-05-03
ER

PT B
AU Marino, C
Nucara, A
Piccolo, A
Pietrafesa, M
Pudano, A
AF Marino, Concettina
Nucara, Antonino
Piccolo, Antonio
Pietrafesa, Matilde
Pudano, Alfredo
BE Liu, JJ
Zhang, TF
Zhai, ZQ
TI Energy saving and indoor comfort features in residential buildings using electro-chromic windows
SO FIRST INTERNATIONAL CONFERENCE ON BUILDING ENERGY AND ENVIRONMENT, PROCEEDINGS VOLS 1-3
LA English
DT Proceedings Paper
CT 1st International Conference on Building Energy and Environment (COBEE 2008)
CY JUL 13-16, 2008
CL Dalian, PEOPLES R CHINA
SP Tianjin Univ, Dalian Univ Technol, Purdue Univ, Univ Colorado Boulder

DE energy saving; visual comfort; electro-chromic windows
ID PERFORMANCE
AB The need to optimize the energetic performances of buildings without compromising indoor comfort conditions has induced in the past few years a technological improvement of material typologies used in the building industry. Particular attention, indeed, was dedicated by researchers to transparent materials with the aim of improving the energetic and optical performances of windows through an optimal utilization of solar radiation. In this context, the present work analyzes the behaviour of electro-chromic windows with respect to their visual and energetic performances shown in two typical Italian climates. For two Italian cities the influence of the glasses on energy savings and indoor visual conditions has been investigated and compared with the performances of a simple double panel windows. In addition, an analysis of the influence of window surface on energetic and visual features has been carried out.
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Yik F, 2006, ENERG BUILDINGS, V38, P463, DOI 10.1016/j.enbuild.2005.08.006
NR 9
TC 0
Z9 0
U1 0
U2 1
PU DALIAN UNIV TECHNOL PRESS
PI DALIAN
PA 2 LINGGONG RD, DALIAN 116024, PEOPLES R CHINA
BN 978-0-9816881-6-9
PY 2008
BP 1692
EP 1700
PG 9
WC Energy & Fuels; Engineering, Environmental; Engineering, Civil
SC Energy & Fuels; Engineering
GA BIH81
UT WOS:000259578900223
DA 2018-05-03
ER

PT B
AU Oh, HW
Han, IT
Park, KR
AF Oh, Hyun Woo
Han, In Tark
Park, Kwang Roh
GP IEEE
TI A power saving system based on Energy-aware Control Elements in ubiquitous home network
SO 2008 IEEE INTERNATIONAL SYMPOSIUM ON CONSUMER ELECTRONICS, VOLS 1 AND 2
SE IEEE International Symposium on Consumer Electronics
LA English

DT Proceedings Paper
CT IEEE International Symposium on Consumer Electronics
CY APR 14-16, 2008
CL Vilamoura, PORTUGAL
SP IEEE
DE ECE; Energy-aware; power consumption
AB in this paper, we propose the system reducing the power consumption based on the Energy-aware Control Elements (ECE). ECE refers to the minimum unit Module providing a service within the single system. For example, the home gateway system provides the visitor identification service. If it is the case, the main processor, the Ethernet module, the MPEG encoding module built-in camera, and etc. are needed. We classify the main ECE, the Ethernet ECE, the mpeg encoder ECE, and etc.
The home gateway system provides the service like not only the visitor identification service but also internet service, VoIP service, IPTV service and the home automation service. This kind of services can be independently carried out and be performed together with other devices. The home gateway system can save the power consumption by activating only ECE which it is necessary according to the performed service. Also, we suggest the method for saving the power consumption by controlling only ECE required based on the communication traffic. We implement the technology monitoring the communication traffic in the home gateway system through FPGA. This FPGA monitors the communication traffic and distinguishes between the user valid packet and invalid packet The software embedded in FPGA notifies so that the high layer application can control required ECE according to the user valid packet We show the marvelous effect for power saving through the ECE base power saving system implementation.
EM hyunwoo@etri.re.kr; ithan@etri.re.kr; krpark@etri.re.kr
CR *CEA, 2004, CEA WHIT PAP POW MAN
*COMP COMP CORP PH, 2002, ADV CONF POW INT SPE
*IEEE, 2005, 1621 IEEE
Pillai P., 2001, P 18 ACM S OP SYST P, P89, DOI DOI 10.1145/502034.502044
*UPNP, 2002, UPNP POW DEV FRAM 0
*UPNP, 2007, UPNP LOW POE ARCH UP
NR 6
TC 0
Z9 0
U1 0
U2 0
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 978-1-4244-2422-1
J9 I SYMP CONSUM ELECTR
PY 2008
BP 493
EP 496
PG 4
WC Engineering, Electrical & Electronic
SC Engineering
GA BID21
UT WOS:000258521400130
DA 2018-05-03
ER

PT S
AU Tsuji, H
Kojoma, M
Takahashi, A
Nakano, M
Aoki, S
Inoue, S
Asari, K
Mimura, E

AF Tsuji, Hiroshi
Kojoma, Masatomo
Takahashi, Atsushi
Nakano, Masayuki
Aoki, Shingo
Inoue, Shuuki
Asari, Kazunari
Mimura, Eiji
GP IEEE
TI Preference Mining for Future Home Energy Consumption
SO 2008 IEEE INTERNATIONAL CONFERENCE ON SYSTEMS, MAN AND CYBERNETICS (SMC), VOLS 1-6
SE IEEE International Conference on Systems Man and Cybernetics Conference Proceedings
LA English
DT Proceedings Paper
CT IEEE International Conference on System, Man, and Cybernetic
CY OCT 12-15, 2008
CL Singapore, SINGAPORE
SP IEEE
DE Knowledge Mining; Marketing Analysis; Home Energy Consumption; Value Analysis
AB To assess the demand "what kinds of home equipment will be unveiled in the future?", this paper presents an experimental analysis for consumers preference. The experimentation consists of four steps: (1) based on the seeds map of technology for energy consumption, six services and their related products for future home are drawn, (2) For the services, questionnaire which collects consumers' preference is designed, (3) to clarify the causal relation among the preference, personal demography and value sense, three kinds of methods (VS-map, VAUD-table, Stepwise Bayesian Network) are proposed, (4) The methods are applied to the collected 1,030 responses to the questionnaire. For example, the experimentation has found the preference such that the unmarried persons make points of convenience in daily life rather than other classes of persons.
C1 [Tsuji, Hiroshi; Kojoma, Masatomo; Takahashi, Atsushi; Nakano, Masayuki; Aoki, Shingo] Osaka Prefecture Univ, Grad Sch Engn, Sakai, Osaka 591, Japan.
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EM tsuji@cs.osakafu-u.ac.jp; inoue.shuuki@d4.kepco.co.jp
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TAKAHASHI A, 2008, LECT NOTES IN PRESS
TOYOTA H, 2004, COVARIANCE STRUCTURE
NR 10
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 1062-922X
BN 978-1-4244-2383-5
J9 IEEE SYS MAN CYBERN

PY 2008
BP 3696
EP +
PG 2
WC Computer Science, Artificial Intelligence; Computer Science, Cybernetics; Engineering, Electrical & Electronic; Imaging Science & Photographic Technology
SC Computer Science; Engineering; Imaging Science & Photographic Technology
GA BKT54
UT WOS:000269197301313
DA 2018-05-03
ER

PT B
AU Zhou, L
Morofsky, E
Haghighat, F
AF Zhou, Liang
Morofsky, Edward
Haghighat, Fariborz
BE Liu, JJ
Zhang, TF
Zhai, ZQ
TI Applying simulation-based optimization to improve energy efficiency in two generic office buildings
SO FIRST INTERNATIONAL CONFERENCE ON BUILDING ENERGY AND ENVIRONMENT, PROCEEDINGS VOLS 1-3
LA English
DT Proceedings Paper
CT 1st International Conference on Building Energy and Environment (COBEE 2008)
CY JUL 13-16, 2008
CL Dalian, PEOPLES R CHINA
SP Tianjin Univ, Dalian Univ Technol, Purdue Univ, Univ Colorado Boulder
DE survey; energy effective measures; energy simulation; Artificial Neural Network; genetic algorithm
AB This study was geared at optimizing the applications of low energy technologies in office buildings. Energy and resource saving measures were extracted from existing high performance buildings practices through a subjective survey among building professionals, which provided guidelines for further optimization work on adapting building parameters and components. The two reference buildings were conceived to meet the requirements of the Canadian Model National Energy Code for Buildings. The path taken for optimization divided the problem into three phases. First, TRNSYS models were developed to predict the energy performance of the two buildings, and the simulation outputs were compared to the results in literature for accuracy confirmation. Then, building characteristics and components were varied in the TRNSYS models to build a database, for training and testing Artificial Neural Network (ANN) models for Response Surface Approximations (RSA). Finally, the ANN model was invoked inside Genetic Algorithm loops, in an attempt to search for the best combination of building parameters that could reduce the energy consumption of the target buildings to the most. The final optimization results demonstrated that up to 39% energy saving could be achieved in both buildings by upgrading the building envelop, enhancing the ventilation regulation, reducing lighting power density, and improving the efficiency of electrical appliance and HVAC systems.
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EM grace_zhouliang@yahoo.com
CR MOROFSKY E, 2003, P 9 INT C THERM STOR
*NAT RES CAN, 2005, EN US DAT HDB TABL C
*NAT RES COUNC CAN, 1997, CAN MOD NAT EN COD B

NR 3
TC 0
Z9 0
U1 0
U2 4
PU DALIAN UNIV TECHNOL PRESS
PI DALIAN
PA 2 LINGGONG RD, DALIAN 116024, PEOPLES R CHINA
BN 978-0-9816881-6-9
PY 2008
BP 371
EP 378
PG 8
WC Energy & Fuels; Engineering, Environmental; Engineering, Civil
SC Energy & Fuels; Engineering
GA BIH81
UT WOS:000259578900046
DA 2018-05-03
ER

PT B
AU Chowdhury, AA
Rasul, MG
Khan, MMK
AF Chowdhury, Ashfaque Ahmed
Rasul, M. G.
Khan, M. M. K.
BE Jiang, Y
Zhu, YX
Yang, XD
Li, XT
TI Modelling and simulation of building energy consumption: A case study on an institutional building in Central Queensland, Australia
SO BUILDING SIMULATION 2007, VOLS 1-3, PROCEEDINGS
LA English
DT Proceedings Paper
CT 10th Conference of the International-Building-Performance-Simulation-Association
CY SEP 03-06, 2007
CL Tsinghua Univ, Beijing, PEOPLES R CHINA
SP China HVAC&R Soc, Amer Soc Heating, Refrigerat & Air Condit Engineers, Energy Conservat Buildings & Community Syst, Federat European Heating & Air Conditioning Assoc, US DOE, Int Bldg Performance Simulat Assoc
HO Tsinghua Univ
DE building energy; modelling and simulation; institutional building; DesignBuilder; EnergyPlus
AB Modelling and simulation of energy consumption in Information Technology (IT) building on the Rockhampton campus of Central Queensland University, Australia is presented. Design Builder, commercially available software, was used for the prediction of energy consumption. All the possible sources and uses of energy in building were accounted in the modelling and simulation. The operation of the Heating, Ventilation and Air Conditioning (HVAC) system and the lighting energy consumption of the whole building has been studied in detailed. The factors that affect building energy performance and thermal comforts of the occupants during summer and winter have been identified. Further studies are being carried out to evaluate whole building annual thermal performance and retrofit decision making.
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CHOWDHURY AA, 2006, P SIMBUILD 2006 MIT
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*DESIGNBUILDER SOF, 2006, DESIGNBUILDER US MAN
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Krarti M., 2000, ENERGY AUDIT BUILDIN
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Zhu Y., 2005, ENERG BUILDINGS, V38, P421
2006, ENERGYPLUS MANUAL DO
NR 10
TC 0
Z9 0
U1 0
U2 1
PU TSINGHUA UNIVERSITY PRESS
PI BEIJING
PA TSINGHUA UNIVERSITY HAIDIANQU, BEIJING 100084, PEOPLES R CHINA
BN 978-0-9771706-3-0
PY 2007
BP 1916
EP 1923
PG 8
WC Construction & Building Technology; Engineering, Civil; Mathematics, Applied
SC Construction & Building Technology; Engineering; Mathematics
GA BHI13
UT WOS:000253394500278
DA 2018-05-03
ER

PT B
AU Li, Q
Liu, CB
AF Li Qian
Liu Chang bin
BE Zhang, H
Chen, L
TI Evaluation of applicable energy-saving technology for buildings
SO PROCEEDINGS OF THE 2007 INTERNATIONAL CONFERENCE ON MANAGEMENT SCIENCE AND ENGINEERING - MANAGEMENT AND ORGANIZATION STUDIES SECTION
LA English
DT Proceedings Paper
CT Henan-Polytechnic-University International Conference on Management Science and Engineering
CY AUG 20, 2007
CL Jiaozhu, PEOPLES R CHINA
SP Orient Acad Forum, Blue Mt Grp Pty Ltd, Beijing Zhongjing Shiji Investment Co Ltd, Henan Polytech Univ
DE applicable energy-saving technology for buildings; evaluation of technology; life cycle assessment; comprehensive evaluation; sustainable development
AB Energy saving of buildings is an important part of energy saving strategic planning for our country, and choosing the energy-saving technology scientifically is one of the core works in such process. Reasonable energy-saving technology for buildings will bring great influence in the aspect of effect and profit, and it is also the foundation of establishing feasible economic prompting policy. This paper will analyze the choosing principle of applicable energy-saving technology for buildings, put for-ward the evaluation mode

with the guidance of sustainable development theory and environment economics theory, and give some advice to the work of energy saving of buildings.
C1 [Li Qian; Liu Chang bin] Beijing Jiaotong Univ, Sch Economy & Management, Beijing 100044, Peoples R China.
CR GRAEDEL TE, 2004, IND ECOLOGY, P205
HUANG ZL, 2005, CONSTRUCTION SCI TEC, V13, P48
LIU GP, 2006, ARCHITECTURE TECHNOL, V10, P746
TANG Y, 2003, THESIS TIANJIN U, P23
NR 4
TC 0
Z9 0
U1 0
U2 0
PU ORIENT ACAD FORUM
PI MARRICKVILLE
PA PO BOX 893, MARRICKVILLE, NSW 2204, AUSTRALIA
BN 978-0-646-47827-2
PY 2007
BP 1246
EP 1250
PG 5
WC Economics; Management
SC Business & Economics
GA BHB14
UT WOS:000252035500224
DA 2018-05-03
ER

PT S
AU Sun, JY
Liu, CB
Xi, B
Xiao, G
AF Sun, Jinying
Liu, Changbin
Xi, Bao
Xiao, Gang
GP IEEE
TI Research on financing environment for building energy efficient service market in China based on dynamic actor network analysis
SO 2007 INTERNATIONAL CONFERENCE ON SERVICE SYSTEMS AND SERVICE MANAGEMENT, VOLS 1-3
SE International Conference on Service Systems and Service Management
LA English
DT Proceedings Paper
CT 4th International Conference on Service Systems and Service Management
CY JUN 09-11, 2007
CL Chengdu, PEOPLES R CHINA
SP IEEE Syst Man & Cybernet Soc, Tsinghua Univ, Res Ctr Contemporary Management
DE BEE service market; financing environment; concept model; dynamic actor network analysis
AB With more attentions to environment and energy, building energy efficiency (BEE) becomes the consequential selection to protect global environment and realize sustainable development. BEE service is the important part of BEE market and it can directly affect the healthy development of total market. Nowadays, the market is in the initial stages and capital is scare. The research is little and centralized on qualitative analysis and index appraisement. Therefore, this study mainly analyzes financing environment for BEE service market adopting the research method combining with qualitative and quantitative analysis, identify the main influence factors for BEE service market through questionnaires, make concept

model for participants of BEE service market by strategic thought and dynamic actor network analysis (DANA) software platform. Construct the relevant relationships between different agents based on attribute and behavior. Finally, improve the analysis model on financing model for BEE service market and explore the effective ways to improve financing environment. The research result proves that government promulgating economic incentive policy, establishing building energy efficient supervision management system, improving building energy efficient service content and strengthening knowledge diffusion mode can promote BEE service market development.
C1 [Sun, Jinying; Xi, Bao] Harbin Inst Technol, Sch Management, Harbin 150001, Peoples R China.
[Liu, Changbin] Beijing Inst Architecture & Engn, Sch Econ & Management Engn, Beijing 100044, Peoples R China.
[Xiao, Gang] Accenture Consultant Co, Beijing 100020, Peoples R China.
RP Sun, JY (reprint author), Harbin Inst Technol, Sch Management, Harbin 150001, Peoples R China.
EM jinyingsun@hit.edu.cn; Changbin_liu@163.com; xib@hit.edu.cn; x_gang@163.com
FU National Development and Reform Commission; United Nations Development Programme; Global Energy Fund [EUEEP-B2.5-20060915]
FX This work is supported by National Development and Reform Commission, United Nations Development Programme, Global Energy Fund, Grant No.EUEEP-B2.5-20060915.
CR BOTS P, 2003, DYNAMIC ACTOR NETWOR
EPSTEIN MJ, 1996, MEASURING CORPORATE, P32
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JIN JY, 2005, J S W JIAOTONG U, V4, P379
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ZHOU SJ, 2003, OPTIMIZATION CAPITAL, V24, P13
NR 11
TC 0
Z9 0
U1 0
U2 8
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
SN 2161-1890
BN 978-1-4244-0884-9
J9 I C SERV SYST SERV M
PY 2007
BP 1175
EP +
PG 2
WC Business; Computer Science, Interdisciplinary Applications; Economics; Engineering, Industrial; Management; Operations Research & Management Science
SC Business & Economics; Computer Science; Engineering; Operations Research & Management Science
GA BGX76
UT WOS:000251162500220
DA 2018-05-03
ER

PT B
AU Zhang, XW
Chen, J

Tian, H
AF Zhang, Xuewen
Chen, Jin
Tian, Hua
BE Chen, J
Xu, QR
Wu, XB
TI Endogenous innovation strategy: Matching product architecture and organizational capability - Use information household appliance enterprises in japan as case
SO ISMOT'07: PROCEEDINGS OF THE FIFTH INTERNATIONAL SYMPOSIUM ON MANAGEMENT OF TECHNOLOGY, VOLS 1 AND 2: MANAGING TOTAL INNOVATION AND OPEN INNOVATION IN THE 21ST CENTURY
LA English
DT Proceedings Paper
CT 5th International Symposium on Management of Technology
CY JUN 01-03, 2007
CL Hangzhou, PEOPLES R CHINA
SP Res Ctr Innovat & Dev, Natl Innovat Management, Zhejiang Univ, NSFC, State Minist Educ, Sci & Technol Dept Zhejiang Prov, TRIUMF, Haier Grp, CIMC, Baoshan Steel Corp, China Potevio Corp
DE endogenous innovation strategy; product architecture; organization capability; modularization product; integrity product
AB In the era of knowledge-based economy, innovation has become a key factor for enterprise to gain international competitiveness. In this paper, we made an in-depth empirical study which based on the Japanese information household appliance enterprises, and analyzed the success and failure of how their information household appliance products could obtain an international competitiveness. Study found that Japanese information household appliance enterprises in the raw material areas of the upstream of industry and the components areas of the middle-stream of industry have greater national competitiveness, but have lower competitiveness in the final products areas of the downstream of industry. It is apparent that the Japanese information household appliance enterprises have strong capacity in running the holistic products. However the power of assembling the module products is very weak, as we studied, which is the typical dual-pattern of the Japanese enterprises. From the paradigm of matching product architecture and organizational capability, we divided product architecture into two categories, that is, the modularization product and the integrity product. Then, we classified the modularization product into the stable-type product and the variable-type product. In addition, we indicated that different types of product architecture need enterprise to build suitable organization capability, whether the product architecture matches the organizational capability or not plays the crucial endogenous role for innovation. Finally, the strategic model of matching product architecture and organizational capability has been made in detail.
C1 Zhejiang Univ, Rcstep, Zhengzhou, Peoples R China.
RP Zhang, XW (reprint author), Zhejiang Univ, Rcstep, Zhengzhou, Peoples R China.
EM zhxwen_68@sohu.com; cjhd@cma.zju.edu.cn; tianhua77@zju.edu.cn
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YANG LK, 2003, ASME SED ENG TECHN C
NR 14
TC 0

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PU ZHEJIANG UNIV PRESS
PI HANGZHOU
PA YUGU ROAD 20,, HANGZHOU, ZHEJIANG 310027, PEOPLES R CHINA
BN 978-7-89490-375-4
PY 2007
BP 202
EP 206
PG 5
WC Management; Operations Research & Management Science
SC Business & Economics; Operations Research & Management Science
GA BGL01
UT WOS:000248091800041
DA 2018-05-03
ER

PT B
AU Vivoda, E
Kurek, J
AF Vivoda, Eduard
Kurek, Juraj
BE Frankovic, B
TI Directive 2002/91/EC EU about energy performance of buildings -
Possibilities and efects of use in Croatia
SO ENERGY AND THE ENVIRONMENT 2006, VOL I
LA English
DT Proceedings Paper
CT 20th International Congress on Energy and the Environment
CY OCT 25-27, 2006
CL Opatija, CROATIA
DE energy performances of buildings; energy certificates; rational energy
consuption; energy services; energy certificates forum; energy
efficiency standard kWh/m(2)/a
AB In order to gain insight into the relationship between Directive 2002/91/EC of the EU about energy performances of buildings, Directive 2006/32/EG of the European Parliament for efficient use of energy and the Technical regulation of the Republic of Croatia about rational use of heath energy in the buildings, these acts are briefly presented in the paper. Emphasis is on the role of energy certificates in accomplishment of goals and application in the Republic of Croatia. Possibilities of rational use of electrical energy are shown on particular objects: on the model of a hotel 85,71 kWh/m(2) year on 54,64 kWh/m(2)/year, and on the family house 220 kWh/m(2)/year at unshaded construction up to 50 kWh/m(2)/year, where new technologies are used in construction, as well as in the use of energy.
C1 [Vivoda, Eduard; Kurek, Juraj] Elteh Doo Rijeka, Rijeka, Croatia.
RP Vivoda, E (reprint author), Elteh Doo Rijeka, Rijeka, Croatia.
EM e.vivoda@elteh-rijeka.hr
CR *EIHP, EU DIR EN KAR ZGRAD
HUTTLER W, EU RICHTLINIE GESAMT
*MOZOPUG RH, 2005, TECHN PROP REP HRAV
*OSW, WOSAN REFERENZPROJEK
VIVODA E, 2006, PRIMJENA PLINA DIR E, P297
2003, EU GEBAUDERICHTLINIE
NR 6
TC 0
Z9 0
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U2 0
PU HRVATSKO UDRUZENJE SUNCEVU ENERGIJU RIJEKA-CROATION SOLAR ENERGY ASSOC

PI HRVATSKA
PA VUKOVARSKA 58, HRVATSKA, 00000, CROATIA
BN 978-953-6886-09-8
PY 2006
BP 153
EP +
PG 2
WC Energy & Fuels; Engineering, Environmental; Environmental Sciences
SC Energy & Fuels; Engineering; Environmental Sciences & Ecology
GA BGN89
UT WOS:000248878300013
DA 2018-05-03
ER

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AU Jin, YL
Ma, X
Wei, HZ
Liu, F
Chen, XN
Lan, YJ
Tang, N
Zhou, Z
Yuan, P
Cheng, YB
Kai, S
Baris, E
Ezzati, M
AF Jin, YL
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Lan, YJ
Tang, N
Zhou, Z
Yuan, P
Cheng, YB
Kai, S
Baris, E
Ezzati, M
BE Yang, X
Zhao, B
Zhao, R
TI Knowledge of hazards from indoor air pollution from household energy use in rural China
SO INDOOR AIR 2005: PROCEEDINGS OF THE 10TH INTERNATIONAL CONFERENCE ON INDOOR AIR QUALITY AND CLIMATE, VOLS 1-5
LA English
DT Proceedings Paper
CT 10th International Conference on Indoor Air Quality and Climate (Indoor Air 2005)
CY SEP 04-09, 2005
CL Beijing, PEOPLES R CHINA
SP Tsinghua Univ, Minist Educ China, Natl Nat Sci Fdn China, Beijing Municipal Commiss Sci & Technol, Shanghai Municipal Commiss Sci & Technol, US EPA, Amer Ind Hyg Assoc, Amer Soc Heating, Refrigerating & Air Conditioning Engineers, Int Commiss Occupat Hlth, SC Indoor Air Qual & Hlth, Int

Council Res & Innovat Bldg & Construct, European Commiss Asia Pro Eco Programme Promot Sustainable Solut Environm Europe & Asia, Korean Soc Indoor Environm, Soc Indoor Environm
DE household energy; indoor air pollution; technology diffusion; knowledge
AB Indoor air pollution from household use of biomass and coal is a leading environmental health risk in many developing nations, and directly or indirectly linked to a number of the Millennium Development Goals, such as environmental sustainability, reducing child mortality, and gender equity. We use data from four poor provinces in China (Gansu, Guizhou, Shaanxi, and Neimeng) to assess the knowledge of hazards associated with indoor air pollution. Using this detailed comparative study in these four Chinese provinces, we conclude that broad health education - which simply provides information on the hazards of risk and available interventions - is insufficient for successful risk mitigation. Rather, there should be emphasis on the economic and infrastructure needs of technology dissemination, coupled with understanding the details of behaviors that affect exposure and presenting users with alternative behaviors.
C1 China Ctr Dis Control & Prevent, Inst Environm Hlth & Related Prod Safety, Beijing, Peoples R China.
RP Ezzati, M (reprint author), China Ctr Dis Control & Prevent, Inst Environm Hlth & Related Prod Safety, Beijing, Peoples R China.
EM mezzati@hsph.harvard.edu
CR Ezzati M, 2004, ANNU REV ENV RESOUR, V29, P383, DOI 10.1146/annurev.energy.29.062103.121246
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PU TSINGHUA UNIVERSITY PRESS
PI BEIJING
PA TSINGHUA UNIVERSITY HAIDIANQU, BEIJING 100084, PEOPLES R CHINA
BN 978-7-89494-830-4
PY 2005
BP 3681
EP 3684
PG 4
WC Construction & Building Technology; Engineering, Environmental; Public, Environmental & Occupational Health
SC Construction & Building Technology; Engineering; Public, Environmental & Occupational Health
GA BDJ55
UT WOS:000233831206032
DA 2018-05-03
ER
FN Clarivate Analytics Web of Science
VR 1.0
PT B
AU Zhang, GD
Liu, CB
AF Zhang, GD
Liu, CB
BE Wang, Y
TI Analysis of present status of development of building energy efficiency in China
SO PROCEEDINGS OF 2005 INTERNATIONAL CONFERENCE ON CONSTRUCTION & REAL ESTATE MANAGEMENT, VOLS 1 AND 2: CHALLENGE OF INNOVATION IN CONSTRUCTION AND REAL ESTATE
LA English

DT Proceedings Paper
CT International Conference on Construction and Real Estate Management
CY DEC 12-13, 2005
CL Penang, MALAYSIA
SP Harbin Inst Technol, Univ Sains Malaysia, Hong Kong Polytech Univ, Natl Univ Singapore, Purdue Univ, Univ Salford, Int Council Res & Innovat Bldg & Construct, Malaysian Airline Syst
DE building energy efficiency (BEE); present status analysis; problems and measures
AB The present status of development of building energy efficiency (BEE) in China has been introduced in this paper, and the necessity of implementing the strategy of sustainable development and constructing the energy-efficient-and-land-saving buildings is proposed. By analyzing the present status, the main problems are raised out, including: (1) lack of corresponding stimulating policies and administrative regulations and rules; (2) slow development of BEE market, and incomplete system of energy efficiency technologies; (3) scarcity of special channels for financing; and (4) poverty of consciousness about BEE, etc. Aiming at the above-mentioned problems, with the reference to advanced concepts and experiences from developed countries, it is emphasized on promoting the development of BEE in China through integrating the market adjustment system, government control system and social adaptation system. The detailed measures include: to improve policies, rules and regulations; to realize financing for BEE by market; to cultivate the BEE industry, to develop BEE technologies, and to establish the BEE certificating and labeling system; and to strengthen dissemination, education. and training of BEE.
C1 Harbin Inst Technol, Sch Management, Harbin, Peoples R China.
Beijing Inst Civil Engn & Architecture, Management Engn Dept, Beijing, Peoples R China.
EM zhangguodong@hit.edu.cn; changbin_liu@yahoo.com.cn
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NR 4
TC 0
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U2 0
PU CHINA ARCHITECTURE & BUILDING PRESS
PI BEIJING
PA BAIWANZHUANG XICHENGGU, BEIJING, 10037, PEOPLES R CHINA
BN 7-112-07871-7
PY 2005
BP 1441
EP 1443
PG 3
WC Computer Science, Information Systems; Construction & Building Technology; Management
SC Computer Science; Construction & Building Technology; Business & Economics
GA BDN53
UT WOS:000234475300348
DA 2018-05-03
ER

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Usami, C
Shimizutani, T
Yanagibashi, Y
Takahashi, S
Mano, T
AF Aizawa, M

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Usami, C
Shimizutani, T
Yanagibashi, Y
Takahashi, S
Mano, T
GP IEEE
TI Quantitative environmental evaluation of Japanese electrical home appliances using eco-efficiency potential assessment method
SO 2003 3RD INTERNATIONAL SYMPOSIUM ON ENVIRONMENTALLY CONSCIOUS DESIGN AND INVERSE MANUFACTURING - ECODESIGN '03
LA English
DT Proceedings Paper
CT 3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing (EcoDesign 03)
CY DEC 08-11, 2003
CL Tokyo, JAPAN
SP IEEE, Assoc EcoDesign Soc Japan
AB E2-PA (Eco-Efficiency Potential Assessment) quantitatively evaluates eco-efficiency by evaluating the environmental performance as the potential environmental impacts of the product. Proposed by Professor Katsuya Nagata of Waseda University, E2-PA was co-developed by Professor Nagata and Environmental Management for Sustainability. Inc.(EMSI) at the Inverse Manufacturing Forum (sponsored by Manufacturing Science and Technology Center).
E2-PA can be used to evaluate products, set-vices and society. Material Intensity, Energy Intensity, Hazardous Material Intensity, Recovery Intensity, and Duration Intensity are the factors that are taken into account within the evaluation using E2-PA. In addition, computer software is currently tinder development, commissioned by Japan Small and Medium Enterprise Corporation.
In this research, E2-PA was used to quantitatively evaluate the environmental-consciousness of plastic bottles and electrical home appliances. The reduction of environmental load was compared between the appliances and then their environmental-consciousness improvements were evaluated.
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NAGATA K, 2002, P C 2002 JAP SOC MEC
NAGATA K, 2002, P 10 C JAP I EN
NAGATA K, 2002, P 2002 C JAP SOC WAS
*PLAST WAST MAN I, 1995, LIF CYCL CONS MUN PL
*PLAST WAST MAN I, 1995, ASS ENV IMP PACK MAT
NR 8
TC 0
Z9 0
U1 0
U2 1
PU IEEE
PI NEW YORK
PA 345 E 47TH ST, NEW YORK, NY 10017 USA
BN 0-7803-8590-X
PY 2003
BP 741
EP 746
DI 10.1109/VETECF.2003.240469
PG 6
WC Engineering, Environmental; Engineering, Industrial; Engineering, Manufacturing
SC Engineering
GA BAJ29
UT WOS:000222499500137
DA 2018-05-03

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PT B
AU Kristl, Z
Zbasnik-Senegacnik, M
AF Kristl, Ziva
Zbasnik-Senegacnik, Martina
BE Frankovic, B
TI Architectural and energy saving refurbishment of buildings
SO Energy and the Environment 2002, Vol I
LA English
DT Proceedings Paper
CT 18th International Congress on Energy and the Environment
CY OCT 23-25, 2002
CL Opatija, CROATIA
SP Univ Rijeka Fac Engn, Croatian Solar Energy Assoc Rijeka, Univ Ljubljana, Fac Mech Engn, UN Econ Commiss Europe, Energy Inst
DE energy retrofitting of buildings
AB In the paper an energy-retrofitting study of an existing building in Ljubljana is presented, which was carried out during a research project of rehabilitation of large neighbourhoods in Slovenia that were constructed in the period between 1945 and 1965. In the first phase of the project, the state-of-the-art was established via a poll carried out among the residents of several neighbourhoods and via expert inspection. In the second phase, a method was applied to an existing neighbourhood in Ljubljana. According to the technology of that period, the buildings were made of brick walls, mont panels, fibre-cement roofing and box windows all of which does not comply with the present quality of living or technical standards. The energy refurbishment project comprises use of better thermal insulation and low-E windows, glazing of balconies and active solar systems. The case study shows that energy consumption can be lowered by more than 60%, compared to the present state, not taking into account electricity savings. The project presents a model for future energy revitalizations of multi-storey residential buildings. A similar method can be applied to holiday apartment buildings and small hotels from the same period, which need to be renovated.
C1 Univ Ljubljana, Fac Civil & Geodet Engn, Chair Buildings & Construct Complexes, Ljubljana 1000, Slovenia.
RP Kristl, Z (reprint author), Univ Ljubljana, Fac Civil & Geodet Engn, Chair Buildings & Construct Complexes, Jamova Cesta 2,POB 3422, Ljubljana 1000, Slovenia.
CR KOVIC S, 1990, MODEL ENERGY RETROFU
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MARTINA ZS, 1996, NEGATIVNI VPLIVI GRA
SOLAR CONTROL INTEGR
NR 6
TC 0
Z9 0
U1 0
U2 4
PU HRVATSKO UDRUZENJE SUNCEVU ENERGIJU RIJEKA-CROATION SOLAR ENERGY ASSOC
PI HRVATSKA
PA VUKOVARSKA 58, HRVATSKA, 00000, CROATIA
BN 978-953-6886-03-6
PY 2002
BP 281
EP 289
PG 9
WC Energy & Fuels; Engineering, Environmental; Environmental Sciences
SC Energy & Fuels; Engineering; Environmental Sciences & Ecology
GA BGO10
UT WOS:000248909800031

DA 2018-05-03
ER

PT B
AU Lollini, R
Meroni, I
De Salvia, A
AF Lollini, R
Meroni, I
De Salvia, A
BE Ural, O
Abrantes, V
Tadeu, A
TI Assessment of performances of envelope and plant components able to improve energy efficiency of the building-plant system
SO XXX IAHS WORLD CONGRESS ON HOUSING, HOUSING CONSTRUCTION: AN INTERDISCIPLINARY TASK, VOLS 1-3
LA English
DT Proceedings Paper
CT 30th IAHS World Congress on Housing
CY SEP 09-13, 2002
CL UNIV COIMBRA, COIMBRA, PORTUGAL
SP Int Assoc Housing Sci
HO UNIV COIMBRA
DE energy performance; degree-day; experimental building
AB The paper describes tools and techniques mainly based on the full-scale testing facilities available at ITC, which make up the assessment methodologies of envelope and plant components. In fact, experimental buildings have been arranged and used to assess the energy performances of HVAC plants and their components and innovative dynamic envelope systems which allow to heat and cool the indoor environment in a sustainable way, also using solar energy. Some case studies are presented, together with relative data analysis methods. The common study methods used to carry out the experimental campaigns consist in analysing the response of the devices under test to the endogenous and exogenous load in a real working condition. The energy saving was assessed also by developing original data analysis, such as degree-day analysis and others, conceived to evaluate the building energy performance based on the availability of short period data.

The results of the experimentation were the assessment of the energy behaviour of several heating plant configurations (boiler with small or big technologic contents, cast iron radiator compared with radiant panel, high or low flow temperature that means high or low energy), obtaining in some cases, in spite of a sophisticated plant, but much oversized, a higher energy consumption and ambient discomfort compared with a cheaper one. Again novel boiler control systems have been tested, whose development was promoted by the EU, reaching energy saving from about 10% if compared with the control systems at present available on the market. Finally, tests were performed on several envelope systems whose energy contribution allows integrating traditional plants with a beneficial effect on the indoor comfort.
C1 CNR, ITC, I-20098 S Giuliano Mil, MI, Italy.
RP Lollini, R (reprint author), CNR, ITC, Via Lombardia 49, I-20098 S Giuliano Mil, MI, Italy.
CR Brunello P., 1997, CDA, V2, P129
*EN EFF OFF, 1993, FUEL EFF BOOKL
LOLLINI R, 2001, P CLIMA 2000 NAPOLI
MERONI I, 2001, P ENERGIE SOLAIRE BA
SAPORITO A, 2000, OVERVIEW WEATHER NOR
NR 5
TC 0
Z9 0
U1 0
U2 0
PU WIDE DREAMS PROJECTOS MULTIMEDIA LDA
PI COIMBRA
PA AV DR ELISIO DE MOURA, 417-1 G, COIMBRA 3030-183, PORTUGAL

BN 972-9027-31-5
PY 2002
BP 1455
EP 1462
PG 8
WC Architecture; Construction & Building Technology; Engineering, Civil;
Environmental Studies; Urban Studies
SC Architecture; Construction & Building Technology; Engineering;
Environmental Sciences & Ecology; Urban Studies
GA BV58K
UT WOS:000179444800175
DA 2018-05-03
ER

PT B
AU Faberi, S
Mebane, W
Presutto, M
AF Faberi, S
Mebane, W
Presutto, M
BE Bertoldi, P
Ricci, A
DeAlmeida, A
TI High efficiency household appliances and low income families in Italy
SO ENERGY EFFICIENCY IN HOUSEHOLD APPLIANCES AND LIGHTING
LA English
DT Proceedings Paper
CT 2nd International Conference on Energy Efficiency in Household
Appliances and Lighting
CY SEP 27-29, 2000
CL NAPLES, ITALY
SP SAVE II Programme, ANPA, ADEME, ASSIL, ASSOLUCE, CECED, ENEA, ENEL, Federelettrica,
Napoletanagas, Saes Getters
AB With increasing globalisation of the economy, income distribution and consumer preferences are changing. This may impact upon the possibility for low-income families to purchase and utilise energy efficient home appliances.

The aim of the study is to access the present degree of difficulty that low income families in Italy have in purchasing high efficiency refrigerator/freezers and clothes washers.

Results show that, given their substantially lower level of expenditure for household appliances, the higher prices of energy efficient models represent an obstacle for these families in Italy to overcome energy inefficiency and energy poverty. an important input to energy policy. Over two million 600 thousand families, 11.9 percent of the total families in 1999 are estimated to be below the poverty threshold based upon consumption. An independent survey shows that these families possess less technologically advanced models, keeping them for a much longer period of 36 years, more than double the recommended lifetime of 15 years, and four times the national average of nine years. This technical disadvantage is aggravated by the additional operating costs of the more inefficient models. The higher prices of the more efficient models make it difficult for the poor families to afford them. Even at the annualised price of the average refrigerator - belonging to the energy efficiency C class - the annual expenditure of the poor families in Italy is less than half that necessary to purchase this model, consistent with the longer turnover rates. According to latest statistics in 1999, the B model is priced 70% above the C model in Italy, making it very difficult for poor families to purchase the more efficient models. Extrapolating the relative consumption data to other European countries and comparing it to local prices indicates that the situation may be similar in other EU Member States.

The implications for energy and social policy are clear: without some form of public incentive it is unlikely that poor families in Italy will purchase the energy efficient models, remaining in an energy poverty trap for many years to come.
CR *3A EUROSTAT ECHP, 1999, SEL IND 1995 WAV

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*ANIE, 1997, IND IT APP DOM NEL
*ANIE ENEA, 1994, MON EL APPL CONS HAB
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*EUROSTAT EUR COMM, 1994, 1 WAV
*I POL ZECC STAT, 1997, POV IT 1980 1995
*IFR, 1999, APP EL, V11
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NR 9
TC 0
Z9 0
U1 0
U2 0
PU SPRINGER-VERLAG BERLIN
PI BERLIN
PA HEIDELBERGER PLATZ 3, D-14197 BERLIN, GERMANY
BN 3-540-41482-7
PY 2001
BP 529
EP 540
PG 12
WC Business; Energy & Fuels; Engineering, Electrical & Electronic
SC Business & Economics; Energy & Fuels; Engineering
GA BR77Z
UT WOS:000167495500056
DA 2018-05-03
ER

PT J
AU Radford, J
Addison, MS
Smith, T
AF Radford, J
Addison, MS
Smith, T
TI Energy-efficient design of large office buildings
SO ENERGY ENGINEERING
LA English
DT Article
AB This article describes the implementation of a new method of designing state buildings in the state of Louisiana to cut energy consumption in several large state office buildings, as well as provide a demonstration of energy efficient design of large office buildings which will be accessible to the public. Included in this article are discussions of the proposed energy conservation measures and the determination of their energy and cost savings. It is apparent from the analysis that the initial costs associated with the installation of the energy conservation measures are far outweighed by the benefits gained over the life of the measures.
Some of the cases presented are standard practice construction items currently used in Louisiana, and some are innovative technologies. They are simulated using new state-of-the-art building energy simulation software and compared to the ASHRAE 90.1-1989 base case, which Louisiana has adopted as a minimum standard for all new commercial construction in the state. These buildings are expected to demonstrate the effectiveness of the energy saving measures and will hopefully change the way future buildings for the state of Louisiana are designed.
C1 Arizona State Univ, Bldg Energy Simulat Lab, Tempe, AZ 85287 USA.
NR 0
TC 0
Z9 0
U1 1
U2 3

PU ENERGY ENGINEERING
PI LILBURN
PA 700 INDIAN TRAIL, LILBURN, GA 30047 USA
SN 0199-8595
J9 ENERG ENG
JI Energy Eng.
PY 2001
VL 98
IS 1
BP 61
EP +
PG 17
WC Energy & Fuels
SC Energy & Fuels
GA 379MX
UT WOS:000165647600005
DA 2018-05-03
ER

PT B
AU Uitdenbogerd, ID
AF Uitdenbogerd, ID
BE Williams, DJ
Durie, B
McMullan, P
Paulson, C
Smith, A
TI Demand side acceptance of energy reduction options - A household perspective on behavioural change
SO GREENHOUSE GAS CONTROL TECHNOLOGIES
LA English
DT Proceedings Paper
CT 5th International Conference on Greenshouse Gas Control Technologies
CY 2000
CL CAIRNS, AUSTRALIA
SP Int Energy Agcy, Australian Consortium, BHP, BP Amoco, CRIRO, Australian Greenhouse Off, Rio Tinto, Res Inst Innovat Technol Earth, Black Coal Utilisat Cooperat Res Ctr, Asea Brown Boveri, NOVEM
C1 Wageningen Univ, Wageningen, Netherlands.
RP Uitdenbogerd, ID (reprint author), Wageningen Univ, Wageningen, Netherlands.
CR BROUWER NM, 1998, 9801 H C WAG U HOUS
*CBS, 1994, NAT BUDG RES 1990
KRAMER KJ, 1998, 9801 IVEM
RAZENBERG BJ, 2000, THESIS U UTRECHT NET
UITDENBOGERD DE, 1998, 2 H C WAG U HOUS CON
UITDENBOGERD DE, 1995, ECN195010
NR 6
TC 0
Z9 0
U1 0
U2 0
PU C S I R O
PI EAST MELBOURNE
PA PO BOX 89 (EAST ALBERT ST), EAST MELBOURNE, 3002, AUSTRALIA
BN 0-643-06672-1
PY 2001
BP 1203
EP 1208
PG 6

WC Engineering, Environmental; Environmental Sciences
SC Engineering; Environmental Sciences & Ecology
GA BX21Q
UT WOS:000184645800198
DA 2018-05-03
ER

PT B
AU Yang, L
Liu, JP
Wang, D
Zhao, Q
Wang, Y
AF Yang, L
Liu, JP
Wang, D
Zhao, Q
Wang, Y
GP CUHK
CUHK
CUHK
TI Improving residential building environment through the energy-efficient designs and sustainable technologies - On a case study of Chinese Yaodong Community
SO PROCEEDINGS OF THE 4TH INTERNATIONAL CONFERENCE ON INDOOR AIR QUALITY, VENTILATION AND ENERGY CONSERVATION IN BUILDINGS, VOLS I-III
LA English
DT Proceedings Paper
CT 4th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC 2001)
CY OCT 02-05, 2001
CL CHANGSHA, PEOPLES R CHINA
SP City Univ Hong Kong, Minist Educ, K C Wong Educ Fdn, Broad Air Conditioning Co Ltd, Int Energy Agcy, WHO, Int Council Building Res Stud & Documentat, Amer Soc Heating, Refrigerating & Air-Conditioning Engineers, Int Soc Indoor Air Quality & Climate, Air Infiltrat & Ventilat Ctr, Amer Ind Hygiene Assoc, Chartered Inst Building Serv Engineers, China Assoc Refrigerat, Comm Heating, Ventilat & Air Conditioning, Chinese Architecture Assoc, Hong Kong Inst Engineers, Natl Resource Canada, Building Grp, CANMET Energy Technol Ctr, Hunan Univ
AB This paper introduces the combination methods of energy-efficient design and sustainable technologies for improving living environment of Chinese Folk Dwellings, Yaodong Dwelling Community. A demonstration project having been built in Yan'an City will be used as an initial, sustainable, prototype in suburban regions in Northwestern China. The experimental research and objective sense investigation of occupants have been carries out to evaluate the design strategies. It is hope that this method will bring to a new sense and concept for the architectural design.
C1 Xian Univ Archtiecture & Technol, Coll Architecture, Xian 710055, Shanxi, Peoples R China.
RP Yang, L (reprint author), Xian Univ Archtiecture & Technol, Coll Architecture, Xian 710055, Shanxi, Peoples R China.
CR EDWARDS B, 1999, SUSTAINABLE ARCHITEC, P79
LI YZ, THERMAL DESIGN HDB P
QING W, 2000, THESIS XIAN U ARCHIT
WANG D, 2000, YAODONG CAVE DWELLIN
YANG L, 1999, 4 UND SPAC C
[Anonymous], CHINA STAT YB
NR 6
TC 0
Z9 0
U1 1
U2 3

PU CITY UNIVERSITY HONG KONG
PI KOWLOON
PA TAT CHEE AV, KOWLOON, HONG KONG, PEOPLES R CHINA
BN 962-442-190-0
PY 2001
BP 1901
EP 1908
PG 8
WC Construction & Building Technology; Engineering, Environmental
SC Construction & Building Technology; Engineering
GA BV29H
UT WOS:000178473300240
DA 2018-05-03
ER

PT B
AU Radford, J
Addison, MS
Smith, T
AF Radford, J
Addison, MS
Smith, T
BE Sioros, D
TI Energy efficient design of large office buildings
SO BUILDING FOR THE 21ST CENTURY: ENERGY & THE ENVIRONMENT
LA English
DT Proceedings Paper
CT 22nd World Energy Engineering Congress
CY OCT 20-22, 1999
CL ATLANTA, GA
SP Geothermal Heat Pump Consortium, Int Ground Source Heat Pump Assoc, Alliance Save Energy, Natl Assoc State Energy Officials, US Dept Commerce, US DOE, Fed Energy Management Programs, US Gen Serv Adm,, US EPA Reg IV Headquarters, Natl Fire Protect Assoc, Natl Roofing Contractors Assoc, Power Mkt Assoc, Amer Soc Ind Secur, Natl Assoc Energy Serv Co
AB This paper describes the implementation of a new method of designing state buildings in the state of Louisiana, designed to cut energy consumption in several large state office buildings, as well as provide a demonstration of energy efficient design of large office buildings, which will be accessible to the public. Included in this paper are discussions of the proposed energy conservation measures and the determination of their energy and cost savings. It is apparent from the analysis that the initial costs associated with the installation of the energy conservation measures are far outweighed by the benefits gained over the life of the measures.
Some of the cases presented are standard practice construction items currently used in Louisiana, and some are innovative technologies. They are simulated using new state-of-the-art building energy simulation software, and compared to the ASHRAE 90.1-1989 base case, which Louisiana has adopted as a minimum standard for all new commercial construction in the state. These buildings are expected to demonstrate the effectiveness of the energy saving measures, and will hopefully change the way future buildings for the state of Louisiana are designed.
NR 0
TC 0
Z9 0
U1 0
U2 0
PU FAIRMONT PRESS INC
PI LILBURN
PA 700 INDIAN TRAIL, LILBURN, GA 30047 USA
BN 0-88173-338-5
PY 2000
BP 125

EP 130
PG 6
WC Construction & Building Technology; Energy & Fuels; Engineering,
Electrical & Electronic; Environmental Sciences
SC Construction & Building Technology; Energy & Fuels; Engineering;
Environmental Sciences & Ecology
GA BS02W
UT WOS:000168377200020
DA 2018-05-03
ER

PT B
AU Saur, K
Meyer, A
Hesselbach, J
AF Saur, K
Meyer, A
Hesselbach, J
BE Mostagaci, H
TI Towards eco-efficient ways of household heating - System comparison of
gas, oil and solar based systems
SO ENVIRONMENT CONSCIOUS MATERIALS - ECOMATERIALS
LA English
DT Proceedings Paper
CT International Symposium on Ecomaterials held in conjunction with the
39th Annual Conference of Metallurgists of CIM
CY AUG 20-23, 2000
CL OTTAWA, CANADA
SP Met Soc CIM, Mat Sci & Engn Sect
AB Key drivers in our global economy are mainly cost. The growing importance of environmental themes does not change this view. Today very often economic performance and environmental friendliness are considered to be non-compatible.
The reasoning for this is mainly, that environmental protection is seen defensive and end-of-pipe oriented. If an organizations emphasis is only legal compliance, such arguments are especially true. Here filters, sewage plants and waste management are real cost drivers. In order to overcome this non-beneficial situation, new approaches are inevitable. Offensive approaches are required to meet both, economic and environmental targets.
LCA has in the past only been used to assess a systems environmental system performances. Therefore many information were collected and assessed, but only from an environmental standpoint. However, this time and cost intensive data collection has also significantly contributed to a arguments against the use of LCA.
The authors propose a different solution. The high quality LCA data on substance and energy flow, could easily be used to better describe to cost drivers within the manufacturing operations. Very often, these data are not available (therefore LCA's are so expensive!) and not available for cost accounting. A proper data collection and analysis could substantially improve the cost-relevant data processing.
On this basis, improvements can not only be achieved form the environmental perspective. Major improvements can be found on the economic side, too. The systematic analysis of processes gives access to activity based costing approaches.
The aim of this paper is to show cases for the private household heating systems, where such methods have been used beneficially. Systems like natural gas, fuel oil, solar, and combinations thereof have been examined und studied and assessed. The optimization of the system requires the more holistic perspective.
C1 PE Prod Engn GmbH, D-73265 Dettingen Unter Teck, Germany.
RP Saur, K (reprint author), PE Prod Engn GmbH, Kirchheimerstr 76, D-73265 Dettingen Unter Teck,
Germany.
CR EYERER P, 1999, LIFE CYCLE ENG REAL
ISO, 1997, 14040 ISO
*U STUTTG IKP PE P, 1998, GABI3 SOFTW SYST LIF
NR 3

TC 0
Z9 0
U1 0
U2 0
PU CANADIAN INST MINING, METALLURGY AND PETROLEUM
PI MONTREAL
PA XEROX TOWER, 1 PLACE ALEXIS NIHON, 1210-3400 DE MAISONNEUVE BLVD, MONTREAL, PQ H3Z 3B8, CANADA
BN 1-894475-04-6
PY 2000
BP 149
EP 157
PG 9
WC Environmental Sciences; Materials Science, Multidisciplinary
SC Environmental Sciences & Ecology; Materials Science
GA BU81N
UT WOS:000177116800013
DA 2018-05-03
ER

PT B
AU Kau, SW
Cho, MY
AF Kau, SW
Cho, MY
GP ICEMI
ICEMI
ICEMI
TI Energy saving in office buildings using neural network technology
SO ICEMI'99: FOURTH INTERNATIONAL CONFERENCE ON ELECTRONIC MEASUREMENT & INSTRUMENTS, VOLS 1 AND 2, CONFERENCE PROCEEDINGS
LA English
DT Proceedings Paper
CT 4th International Conference on Electronic Measurement and Instruments
CY AUG 18-21, 1999
CL HARBIN, PEOPLES R CHINA
SP Chinese Inst Electr, IEEE Beijing Sect, Chinese Instrumentat Soc, Natl Nat Sci Fdn China, KC Wong Educ Fdn, Hong Kong, Harbin Inst Technol, CIE, Electr Measurement & Instrumentat Soc
ID SYSTEMS
AB This papers describes an energy-saving Study in office buildings using neural network technology. Ln order to control its temperature, several actuators and sensors were installed and connected to data acquisition and control system based on PC 586. Several experiments showed the various effects of different methods. Feedback signals such as room temperatures, room occupation and its duration, status of air condition system are converted to digital code. The software development is based on visual C++ with support from Matlab, and its fuzzy toolbox. various Feedback.
C1 Natl Kaohsiung Inst Technol, Dept Elect Engn, Kaohsiung, Taiwan.
RP Kau, SW (reprint author), Natl Kaohsiung Inst Technol, Dept Elect Engn, Kaohsiung, Taiwan.
CR BARGIOTAS D, 1988, IEEE T POWER DELIVER, V3, P2119, DOI 10.1109/61.194024
DUHAMEL P, 1979, IEEE T CIRCUITS SYST, V26, P411, DOI 10.1109/TCS.1979.1084676
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ONO T, 1987, IEEE T IND ELECTRON, V34, P285, DOI 10.1109/TIE.1987.350967
NR 5
TC 0
Z9 0
U1 0
U2 0
PU CHINESE INSTITUTE ELECTRONICS

PI HARBIN
PA HARBIN INSTITUTE TECHNOLOGY NO. 92, WEST DA-ZHI STREET, HEILONGJIANG, HARBIN 150001, PEOPLES R CHINA
PY 1999
BP 968
EP 973
PG 6
WC Engineering, Electrical & Electronic; Instruments & Instrumentation
SC Engineering; Instruments & Instrumentation
GA BP39F
UT WOS:000084980200206
DA 2018-05-03
ER

PT B
AU Zoechling, J
Haas, R
Schipper, L
AF Zoechling, J
Haas, R
Schipper, L
GP IAEE
IAEE
TI Understanding the development of energy consumption in the residential sector linking econometric and bottom up approaches
SO NEW EQUILIBRIA IN THE ENERGY MARKETS: THE ROLE OF NEW REGIONS AND AREAS - VOL 2, CONFERENCE PROCEEDINGS
LA English
DT Proceedings Paper
CT Conference of the International-Association-for-Energy-Economics (IAEE)
CY JUN 09-12, 1999
CL ROME, ITALY
SP Int Assoc Energy Econ, ACEA SpA, ASSOMINERARIA, BG Italy, EDISON, EDS, ENEL SpA, ERG Petroleum Italia SpA, EXXON Co, Inst Francais Petrole, Price Waterhouse Coopers, Kuwait Petroleum Italia SpA, Shell Italia SpA, Tamoil Italia SpA, UNAPACE
ID DEMAND
AB Along with industry, transport, and services, residences are one of the major energy consuming sectors in all OECD countries. In no other sector did such dramatic changes in the energy consumption patterns and the fuel mix take place, which was mainly influenced by two important and opposing trends. A huge growth if household income led to a huge increase of energy service. This expansion of energy services per se would have multiplied energy consumption in all countries, but instead actual final household consumption rose by 25% to 75% (except Japan) and even fell in Denmark from 1970 to 1995. Some of this development occurs, because more efficient heating systems, appliances, better thermal quality and saturation effects. In the case of CO2 emissions the fuel switching effect in addition helped to stabilize emissions. This paper studies these developments of total residential energy- and electricity demand in five selected OECD countries (Austria, Denmark, Japan, Western Germany and the US)(2) After an introducing chapter an extensive econometric analysis with special focus on non-linear income aspects is done, since the augmentation of the standard dynamic demand equations with non-linear (quadratic terms as a proxy) terms of income leads to better model characteristics. The major conclusion of this investigation is that the theory of constant income elasticities has to be rejected. Income, one of the major driver of residential energy- and electricity demand has become less important with regard to energy (but NOT to service) demand in comparison with the 1970s and 1980s because of efficiency improvements and some saturation effects.
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WIRL F, 1991, RESOUR ENERG, V13, P241, DOI 10.1016/0165-0572(91)90008-Q
NR 10
TC 0
Z9 0
U1 0
U2 1
PU INTERNATIONAL ASSOCIATION FOR ENERGY ECONOMICS
PI CLEVELAND
PA 28790 CHAGRIN BLVD, SUITE 210, CLEVELAND, OH 44122 USA
PY 1999
BP 285
EP 294
PG 10
WC Economics; Environmental Studies
SC Business & Economics; Environmental Sciences & Ecology
GA BQ25J
UT WOS:000087729700031
DA 2018-05-03
ER

PT B
AU Albieri, L
AF Albieri, L
BE Butera, F
Grassi, A
Helm, P
Landabaso, A
Zervos, A
TI Rehabilitation with a bio-ecological approach: Less energy consumption and healthy buildings - A training experience
SO REBUILD - THE EUROPEAN CITIES OF TOMORROW: SHAPING OUR EUROPEAN CITIES FOR THE 21ST CENTURY
LA English
DT Proceedings Paper
CT 2nd European Conference on Shaping our European Cities for the 21st Century
CY APR 01-03, 1998
CL FLORENCE, ITALY
SP Commiss European Communities
AB In Italy, over 200,000 dwellings are re-structured every year. Rehabilitation according to bio-building criteria provides a better guarantee of duration and therefore greater financial advantages in time. Often indeed, rather than eliminating the causes of deterioration, new and synthetic components and materials worsen these problems.
In "bio-ecological architecture", houses are defined as a "third skin" for man, that is to say they must allow an exchange with the outside air and allow cosmic radiation to pass through the walls, This exchange is essential for the health of human beings. Indeed, man spends about three quarters of his time, on the average, in enclosed environments.
The: air inside buildings is often worse than that outside, the so-called sick building syndrome. Pollution due to electromagnetic fields is aggravated by the presence of considerable quantities of metal in the load-bearing structures. Historical buildings and those erected using traditional technologies are healthier and more comfortable. This is the philosophy underlying the training course for "Bio-building technical experts" in accordance with with a definition of health provided by the World Health Organisation: "Health is a state of profound well-being of the body, of the: psyche and of social life".
C1 Scuola Edile Genovese, I-16135 Genoa, Italy.

RP Albieri, L (reprint author), Scuola Edile Genovese, Via Borzoli 61 A-B, I-16135 Genoa, Italy.
NR 0
TC 0
Z9 0
U1 1
U2 2
PU ETA-FLORENCE
PI FLORENCE
PA PIAZZA SAVONAROLA 10, I-50132 FLORENCE, ITALY
PY 1998
BP 86
EP 89
PG 4
WC Construction & Building Technology; Energy & Fuels; Engineering, Civil
SC Construction & Building Technology; Energy & Fuels; Engineering
GA BL78A
UT WOS:000076709300024
DA 2018-05-03
ER

PT B
AU Brohard, GJ
Elberling, LE
Hernandez, GR
AF Brohard, GJ
Elberling, LE
Hernandez, GR
BE Ricketts, J
TI Lessons learned in whole-building integrated energy efficiency
SO ENERGY & ENVIRONMENTAL VISIONS FOR THE NEW MILLENNIUM
LA English
DT Proceedings Paper
CT 20th World Energy Engineering Congress (WEEC)
CY NOV 19-21, 1997
CL ATLANTA, GA
SP Natl Assoc State Energy Officials, US Dept Commerce, US DOE, Off Natl Programs, US Gen Serv Adm, Natl Assoc Energy Serv Co, Power Marketing Assoc, Atlanta Gas Light Co, Gas Res Inst, Amer Gas Cooling Ctr, Ind Ctr Inc
AB In 1990, Pacific Gas & Electric Company initiated a Research & Development project entitled the Advanced Customer Technology Test for Maximum Energy Efficiency (ACT(2)) to determine the maximum energy savings achievable in a customers' facility, at or below utility supply cost, using integrated packages of state-of-the-art energy efficient measures. The theory is that much more energy can be saved through the synergistic interaction of individual energy efficient measures, packaged expressly for that purpose, than would be realized if the measures were implemented individually. For example, a superior building shell and/or glazing will decrease the required size of an air conditioning system such that a smaller, more efficient system can be installed for the same or lower cost than the larger less efficient system. By combining the two energy efficient measures (glazing and a new A/C system), the resulting energy consumption is less than it would be if the measures were evaluated and implemented separately. Nine facilities were ultimately investigated as part of the project, both new construction and retrofit, residential and commercial, with one rear of pre-retrofit (retrofit sites) energy monitoring, implementation of the energy efficient measures and one year of post retrofit energy monitoring. Data collection was completed by the end of 1996. The evaluations of the sites were completed in early 1997. Energy savings ranged from 40% to 509/0 of baseline energy consumption for the retrofit projects to 70% of the projected energy consumption for the new construction sites had they been built to satisfy California's Title 24 energy standards. Although the pending electric industry deregulation has watered down the economic assumptions used, many valuable lessons were learned in the areas of implemented technologies, building and construction industry barriers and energy efficient measure installation techniques as well. This paper

discusses some of the major lessons learned in the hope that these barriers and deficiencies can be overcome to create ultra-efficient buildings in the future.
NR 0
TC 0
Z9 0
U1 0
U2 2
PU FAIRMONT PRESS INC
PI LILBURN
PA 700 INDIAN TRAIL, LILBURN, GA 30047 USA
BN 0-88173-289-3
PY 1998
BP 83
EP 90
PG 8
WC Energy & Fuels; Environmental Sciences
SC Energy & Fuels; Environmental Sciences & Ecology
GA BR93V
UT WOS:000168119300011
DA 2018-05-03
ER

PT B
AU Matsukawa, I
Asano, H
Kakimoto, H
AF Matsukawa, I
Asano, H
Kakimoto, H
GP IAEE
IAEE
TI Use of information technology in residential time-of-day electricity pricing: Customer response to electricity-use monitors in a Japanese experiment
SO TECHNOLOGY'S CRITICAL ROLE IN ENERGY & ENVIRONMENTAL MARKETS, CONFERENCE PROCEEDINGS
LA English
DT Proceedings Paper
CT 19th Annual North American IAEE/USAEE Conference on Technology Critical Role in Energy and Environmental Markets
CY OCT 18-21, 1998
CL ALBUQUERQUE, NM
SP Int Assoc Energy Econ, US Assoc Energy Econ, Aramco Serv Co, Atlantic Richfield Co, Conoco Inc, EDS, Elect Power Res Inst, Exxon Corp, Petr Econ Ltd, PNM Gas Serv, Sandia Natl Labs, TransCanada Pipelines Ltd
AB We attempted to measure the effects of information on residential time-of-day (TOD) electricity demand in summer, using data from a residential TOD electricity pricing experiment in Kyushu. During the experiment, only TOD groups were offered information on their load profiles and monthly electricity usage. electricity use monitor at home. TOD groups could also receive incentive payments if they reduce their peak usage share. The estimation results based on an econometric model indicate that both monitor-provided electricity information and incentive payment significantly affected time-of-day usage of electricity. Information provision to households was found to enhance load shifting from the peak to off-peak period. However it was also found to have an adverse impact on load shifting by reducing household response to incentive payment. The adverse impact increased along with incentive payments.
C1 Musashi Univ, Tokyo, Japan.
CR GOLDMAN C, 1996, 1996 ACEEE SUMM STUD
MATSUKAWA I, 1997, 18 ANN N AM C USAEE
MATSUKAWA I, 1996, 17 ANN N AM C USAEE

Pollak R. A., 1992, DEMAND SYSTEM SPECIF
SEXTON RJ, 1989, LAND ECON, V65, P272, DOI 10.2307/3146671
NR 5
TC 0
Z9 0
U1 0
U2 0
PU INTERNATIONAL ASSOCIATION FOR ENERGY ECONOMICS
PI CLEVELAND
PA 28790 CHAGRIN BLVD, SUITE 210, CLEVELAND, OH 44122 USA
PY 1998
BP 9
EP 18
PG 10
WC Business; Economics; Environmental Studies
SC Business & Economics; Environmental Sciences & Ecology
GA BP27B
UT WOS:000084536600002
DA 2018-05-03
ER

PT B
AU D'Alessio, G
AF D'Alessio, G
BE Hickey, KL
Kantarelis, D
TI Increasing the diffusion of energy efficient housing vs. energy
inefficient housing: Finding early adopters among potential owners of
newly constructed houses
SO OUR NATURAL ENVIRONMENT: AT A CROSSROAD, PROCEEDINGS
LA English
DT Proceedings Paper
CT 3rd International Interdisciplinary Conference on the Environment
CY JUN 25-28, 1997
CL WORCESTER, MA
SP Interdisciplinary Environm Assoc
AB The aim of this research is to increase the diffusion of energy. efficient housing which, to date, has been a slow process.
The neighborhood effect of nord of mouth does not greatly increase the diffusion of energy efficient housing as it is taking place. People moving into a nea neighborhood often do not know. the people there, nor do energy efficient houses look different than energy inefficient houses; therefore, energy. efficient houses. when they do not have exterior solar collectors, do not make good status symbols to relative strangers.
Small to moderate economic incentives aimed at getting people to buy energy efficient houses have not been extremely effective. Consumers of neu houses are not extremely rational about the economics of owning energy efficient houses For several reasons. Heat loss is not readily. apparent, so buying a house to avoid it is not a primary concern to most people. Furthermore, most home owners do not consider paying for heat to be difficult. Also most homeowners think their houses are more energy efficient than they actually are. A final negative perception many people have of energy efficient houses is that energy efficient houses have poor indoor air quality and will rot and deteriorate faster than non-energy efficient houses. These ideas are incorrect.
By currently sampling, with a written questionnaire, New England owner occupants of recently constructed energy efficient and energy. inefficient homes, characteristics unique to each group are being delineated. The resultant profile of an early adopter of an innovation who owns an energy efficient house could he used with a similar questionnaire, in the future, to find among people in the market for newly constructed houses, the early adopter type of potential homeowners. These early adopter type of potential homeowners could be contacted face to face by change agents - many of whom might be satisfied owners

of energy efficient homes who would promote energy efficient houses, and serve as surrogate consumers to help the homebuyers choose energy efficient products and services of quality.
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Tarde Gabriel, 1969, COMMUNICATION SOCIAL
*US DEP COMM, 1996, STAT ABSTR US 1996
WILK RR, 1987, ENERGY EFFICIENCY PE, P51
YEARNS MEH, 1984, HOME ENERGY AUDIT PR
NR 29
TC 0
Z9 0
U1 0
U2 2
PU INTERDISCIPLINARY ENVIRONMENT ASSOCIATION
PI WORCESTER
PA ASSUMPTION COLLEGE 500 SALISBURY ST PO BOX 15005, WORCESTER, MA 01615-0005 USA
BN 0-9654033-2-7
PY 1997
BP 56
EP 70
PG 5
WC Environmental Sciences
SC Environmental Sciences & Ecology
GA BN12G
UT WOS:000080781300006
DA 2018-05-03
ER

PT B
AU Strickland, RM
Dux, DL
AF Strickland, RM
Dux, DL
BE Zazueta, FS

MartinezAustria, P
Xin, JN
GarciaVillanueva, NH
TI Residential energy efficiency software
SO SIXTH INTERNATIONAL CONFERENCE ON COMPUTERS IN AGRICULTURE
LA English
DT Proceedings Paper
CT 6th International Conference on Computers in Agriculture
CY JUN, 1996
CL CANCUN, MEXICO
SP ASAE, Informat & Elect Technol Div, Univ Florida, Inst Food & Agr Sci, Inst Mexicano Tecnol Agua, Mexico
AB The Unites States has the highest per capita energy use in the world and this extremely large demand for energy results in numerous negative environmental impacts. Home energy use accounts for about 20 percent of the total energy used in the United States; Thus, this program is designed to educate the homeowner, renter, apartment dweller, and other interested parties on various ways to reduce energy consumption; while maintaining the same desired level of comfort in the home. in addition, the program addresses the monetary savings, pollution prevention benefits and the possible indoor air quality impacts of implementing certain energy efficient practices and technologies. The program was developed in conjunction with U.S. EPA, who provided much of che graphics and information contained in the program. The program uses the hypertext based Knowledge Pro for windows interface, so that both textual and high resolution graphics can be presented at the same time. The program is available from U.S. EPA, the Center for Technology Transfer and Pollution Prevention at Purdue University, and from several public domain bulletin boards.
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