

Collection and Special Issue List in Section

Topical Collection “Electrical Power and Energy System:
From Professors to Students”

Collection Editors: Prof. Dr. Oscar Barambones and Prof. Dr. Jose Antonio Cortajarena



Topical Collection “Young Researchers in Electrical Power and Energy System”

Collection Editors: Prof. Dr. Pierluigi Siano and Dr. Hassan Haes Alhelou



Computational Intelligence in Electrical Systems

Guest Editors: Prof. Dr. Massimo Panella, Dr. Antonello Rosato and Prof. Dr. Rodolfo Araneo

Deadline: 10 August 2021



Monitoring and Automation of Complex Power Systems

Guest Editors: Dr. Marco Pau and Prof. Dr. Paolo Attilio Pegoraro

Deadline: 20 August 2021



Integration of Electric Vehicles and Battery Storage Systems II

Guest Editor: Prof. Dr. Hrvoje Pandžić

Deadline: 30 September 2021



Stability Issues and Challenges in Modern Electric Power Systems

Guest Editor: Dr. Mazaher Karimi

Deadline: 30 September 2021



Advanced Electromagnetic Analysis and Modeling of Conventional
and Special Electrical Machines

Guest Editor: Prof. Dr. Mauro Andriollo

Deadline: 20 November 2021



For more information about our Special Issues, please visit:

https://www.mdpi.com/journal/energies/sections/electrical_power

MDPI is a member of



Follow Us



facebook.com/MDPIOpenAccessPublishing



twitter.com/MDPIOpenAccess



linkedin.com/company/mdpi



weibo.com/mdpicn



Wechat: MDPI-China



blog.mdpi.com

MDPI
St. Alban-Anlage 66
CH-4052 Basel
Switzerland
Tel: +41 61 683 77 34
Fax: +41 61 302 89 18



www.mdpi.com

mdpi.com/journal/energies

See www.mdpi.com for a full list of offices and contact information. MDPI is a company registered in Basel, Switzerland, No. CH-270.3.014.334-3, whose registered office is at St. Alban-Anlage 66, CH-4052 Basel, Switzerland.

Basel, July 2021



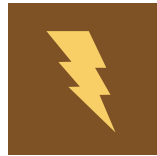
energies

an Open Access Journal by MDPI

IMPACT
FACTOR
3.004

CITESCORE
4.7
SCOPUS

Section
Electrical Power and Energy System



energies



an Open Access Journal by MDPI

Section Editor-in-Chief

Prof. Dr. Josep M. Guerrero

Department of Energy
Technology, Aalborg University,
Pontoppidanstræde 111, 9220
Aalborg Ø, Denmark

Section Information:

We are living nowadays an Energy transition. We are going more electrical than ever before in transportation: electrical vehicles and ships, electrical motors are every were. Back home, more electronics, electrical kitchens and electronic controlled devices are more and more present. In some houses is not rare to see photovoltaic systems, home batteries, electrical vehicle chargers, electrical grass cutting machines, even equipped with small batteries. It is clear that energy is going more to be electrical and this is a great chance to go more toward renewable energies. Photovoltaics, wind power generation, and other renewables are going to play an unprecedented role in the way that we generate, store and consume energy. This is a chance of the change in a sustainable world that has only one possible direction, with new technologies and ideas.

This section is devoted to present the new technologies, trends and breakthroughs to promote more renewable energies for a future 100% renewable energy reality. This section, focuses on original and new research results regarding electrical power and energy technologies, as well as in diverse applications. Thus, manuscripts on planning, design, implementation, theoretical studies, economical and viability studies, as well as on their application to traditional as well as novel scenarios are solicited. Submissions addressing reviews and surveys will also be welcome.

SectionElectrical Power and Energy System

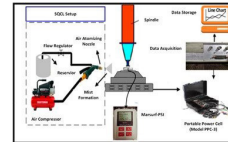
Featured Papers

DOI: 10.3390/en12040710

Multi-Objective Optimization of Energy Consumption and Surface Quality in Nanofluid SQCL Assisted Face Milling

Authors: Aqib Mashood Khan, Muhammad Jamil, Konstantinos Salonitis, Shoaib Sarfraz, Wei Zhao, Ning He, Mozammel Mia and GuoLong Zhao

Abstract: Considering the significance of improving the energy efficiency, surface quality and material removal quantity of machining processes, the present study is conducted in the form of an experimental investigation and a multi-objective optimization. The experiments were conducted by face milling AISI 1045 steel on a Computer Numerical Controlled (CNC) milling machine using a carbide cutting tool. The Cu-nano-fluid, dispersed in distilled water, was impinged in small quantity cooling lubrication (SQCL) spray applied to the cutting zone. The data of surface roughness and active cutting energy were measured while the material removal rate was calculated. A multi-objective optimization was performed by the integration of the Taguchi method, Grey Relational Analysis (GRA), and the Non-Dominated Sorting Genetic Algorithm (NSGA-II). The optimum results calculated were a cutting speed of 1200 rev/min, a feed rate of 320 mm/min, a depth of cut of 0.5 mm, and a width of cut of 15 mm. It was also endowed with a 20.7% reduction in energy consumption. Furthermore, the use of SQCL promoted sustainable manufacturing. The novelty of the work is in reducing energy consumption under nano fluid assisted machining while paying adequate attention to material removal quantity and the product's surface quality.

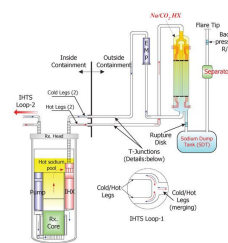


DOI: 10.3390/en12010001

Development of a Physics-Based Monitoring Algorithm Detecting CO₂ Ingress Accidents in a Sodium-Cooled Fast Reactor

Authors: Hyeonmin Kim, Jung-Taek Kim, Jaehyuk Eoh and Dong-Won Lim

Abstract: One of the benefits of the supercritical CO₂ Brayton cycle in Sodium-cooled Fast Reactors is an enhanced plant safety, since potential reactions of CO₂ with liquid sodium have been reported to be less stringent than a sodium-water reaction found in the Rankine cycle. However, moderate chemical interactions between CO₂ and liquid sodium make detecting CO₂ ingress accidents harder. Thus, this paper proposes a new physics-based detection algorithm by comparing the real-time pressure measurements of two identical heat exchangers for the early detection. The CO₂ ingress occurs owing to a crack at the pressure boundary wall, a certain self-recovery of structural damage does not happen over time, and an accident probabilistically starts at only one component of two. The proposed physics-based method with the probabilistic analysis was compared to the pure data-based method. Finally, the damage degradation was developed with a simplified mass and energy transfer model, and the proposed algorithm was verified with experimental data. The results show that a 99.99% detection probability can be achieved for the air ingress of 30 cc/s, which is equivalent to the 0.12 g/s CO₂ ingress, in a 70 s detection time, limiting down to 0.1% false alarms due to sensor noise.



DOI: 10.3390/en13215757

The Identification of Hotspots in the Bioenergy Production Chain

Authors: Magdalena Muradin and Joanna Kulczycka

Abstract: Increasing interest in bioenergy production in the context of the transition towards a circular economy and the promotion of renewable energy has produced demands for optimization of the value chain of energy production to improve the environmental viability of the system. Hotspot analysis based on life cycle assessment (LCA) contributes to the mitigation of environmental burdens and is a very important step towards the implementation of a bioeconomy strategy. In this study, hotspots identified using two parallel pathways: a literature review and empirical research on four different biogas plants located in Poland. LCA and energy return on investment (EROI) analysis of the whole bioenergy production chain were considered to identify unit processes or activities that are highly damaging to the environment. The biogas plants differ mainly in the type of raw materials used as an input and in the method of delivery. The results show that the most impactful processes are those in the delivery of biomass, especially road transport by tractor. The second contributor was crop cultivation, where fossil fuels are also used. Although the EROI analysis indicates a negligible impact of transport on the energy efficiency of bioenergy plants, the environmental burden of biomass transportation should be taken into consideration when planning further measures to support the development of the bioeconomy.



DOI: 10.3390/en13225867

Fluid Choice Based on Thermal Model and Performance Testing for Direct Cooled Electric Drive

Authors: Robert Lehmann, Arthur Petuchow, Matthias Moullion, Moritz Künzler, Christian Windel and Frank Gauterin

Abstract: In this publication, the cooling fluid for direct oil-cooled electric traction drive is investigated. A dedicated thermal resistance model was developed in order to show the influence of the fluid properties on the continuous performance. For this purpose, the heat transfer parameters are adjusted in the simulation using an exponential approach in order to evaluate the cooling fluid. In a sensitivity study, density, heat capacity, thermal conductivity, and viscosity are investigated. Because viscosity, within the range investigated, shows the largest percentage deviation from the reference fluid, the greatest effect on performance can be seen here. In order to check the plausibility of the calculated results of the thermal simulation, two fluids were chosen for performance testing on a dedicated electro motor cooling (EMC) test. Beyond the investigation of heat transfer, aging of the defined fluid at maximum heat input over several hours is also evaluated. Only slight changes of the fluid properties are detected. This publication presents a thermal model for direct oil-cooled drive trains, which consider fluid properties. Furthermore, the model was tested for plausibility on real hardware.

