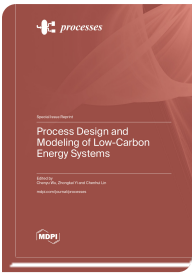
processes

IMPACT FACTOR 2.8

CITESCORE 5.5

Special Issue Reprint

Process Design and Modeling of Low-Carbon Energy Systems



www.mdpi.com/books/reprint/10976

Edited by
Chenyu Wu
Zhongkai Yi
Chenhui Lin

ISBN 978-3-7258-4125-7 (Hardback)
ISBN 978-3-7258-4126-4 (PDF)

This reprint addresses the urgent global challenge of decarbonizing energy systems while ensuring reliability, affordability, and sustainability. Curating 14 interdisciplinary studies, it bridges engineering, economics, and policy to advance renewable integration, carbon market mechanisms, energy storage, and socio-technical solutions. Key innovations include AI-driven prediction models like the IAO-LSTM for solar forecasting and the VMD-AOA-GRU hybrid model for wind power optimization, alongside robust dispatch frameworks leveraging pumped hydro storage and reinforcement learning. The issue also explores carbon-internalized thermoeconomic models, resilient multi-energy network planning, and nanomaterials such as nanoporous alumina sheets for anti-frosting applications. Contributions emphasize cross-sector integration (electricity–hydrogen–thermal networks), scalable technology deployment, and adaptive policy frameworks to align with sustainability goals. By synthesizing cutting-edge research, this collection provides actionable insights for policymakers, industry stakeholders, and researchers, highlighting pathways to overcome technical, economic, and regulatory barriers in the energy transition. Future directions call for deeper system coupling, industrial scalability of lab innovations, and equitable policy design to accelerate global decarbonization efforts.

MDPI

Order Your Print Copy
You can order print copies at
www.mdpi.com/books/reprint/10976

MDPI Books

Publishing Open Access Books & Series

MDPI Books offers quality open access book publishing to promote the exchange of ideas and knowledge in a globalized world. MDPI Books encompasses all the benefits of open access – high availability and visibility, as well as wide and rapid dissemination. With MDPI Books, you can complement the digital version of your work with a high quality printed counterpart.

Open Access

Your scholarly work is accessible worldwide without any restrictions. All authors retain the copyright for their work distributed under the terms of the Creative Commons Attribution License.

Author Focus

Authors and editors profit from MDPI's over two decades of experience in open access publishing, our customized personal support throughout the entire publication process, and competitive processing charges as well as unique contributor discounts on book purchases.

High Quality & Rapid Publication

MDPI ensures a thorough review for all published items and provides a fast publication procedure. State-of-the-art research and time-sensitive topics are released with a minimum amount of delay.

High Visibility

Due to our global network and well-known channel partners, we ensure maximum visibility and broad dissemination. Title information of books is sent to international indexing databases and archives, such as the Directory of Open Access Books (DOAB), and the Verzeichnis Lieferbarer Bücher (VLB).

Print on Demand and Multiple Formats

MDPI Books are available for purchase and to read online at any time. Our print-on-demand service offers a sustainable, cost-effective and fast way to publish MDPI Books printed versions.

MDPI AG
Grosspeteranlage 5
4052 Basel
Switzerland
Tel: +41 61 683 77 34
www.mdpi.com/books
books@mdpi.com