}essentials{

Przemyslaw Komarnicki · Michael Kranhold · Zbigniew A. Styczynski

General Energy System (GES) of the Future

Sector Coupling through Electricity and Hydrogen



essentials

Springer essentials

Springer essentials provide up-to-date knowledge in a concentrated form. They aim to deliver the essence of what counts as "state-of-the-art" in the current academic discussion or in practice. With their quick, uncomplicated and comprehensible information, essentials provide:

- an introduction to a current issue within your field of expertise
- an introduction to a new topic of interest
- an insight, in order to be able to join in the discussion on a particular topic

Available in electronic and printed format, the books present expert knowledge from Springer specialist authors in a compact form. They are particularly suitable for use as eBooks on tablet PCs, eBook readers and smartphones. *Springer essentials* form modules of knowledge from the areas economics, social sciences and humanities, technology and natural sciences, as well as from medicine, psychology and health professions, written by renowned Springer-authors across many disciplines.

Przemyslaw Komarnicki · Michael Kranhold · Zbigniew A. Styczynski

General Energy System (GES) of the Future

Sector Coupling through Electricity and Hydrogen



Przemyslaw Komarnicki Politechnika Wrocławska, Polen, Hochschule Magdeburg-Stendal und Fraunhofer Institut für Fabrikbetrieb und -automatisierung Magdeburg, Sachsen-Anhalt, Germany Michael Kranhold 50Hertz Transmission GmbH Berlin, Germany

Zbigniew A. Styczynski Otto-von-Guericke-University Magdeburg Magdeburg, Sachsen-Anhalt, Germany

ISSN 2197-6708 ISSN 2197-6716 (electronic)

essentials

ISSN 2731-3107 ISSN 2731-3115 (electronic)

Springer essentials

ISBN 978-3-658-45573-6 ISBN 978-3-658-45574-3 (eBook)

https://doi.org/10.1007/978-3-658-45574-3

Translation from the German language edition: "Gesamtenergiesystem der Zukunft (GES)" by Przemyslaw Komarnicki et al., © Springer Fachmedien Wiesbaden GmbH 2023. Published by Springer Fachmedien Wiesbaden. All Rights Reserved.

This book is a translation of the original German edition "Gesamtenergiesystem der Zukunft (GES)" by Przemyslaw Komarnicki, published by Springer Fachmedien Wiesbaden GmbH in 2023. The translation was done with the help of an artificial intelligence machine translation tool. A subsequent human revision was done primarily in terms of content, so that the book will read stylistically differently from a conventional translation. Springer Nature works continuously to further the development of tools for the production of books and on the related technologies to support the authors.

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Fachmedien Wiesbaden GmbH, part of Springer Nature 2024

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use. The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Fachmedien Wiesbaden GmbH, part of Springer Nature.

The registered company address is: Abraham-Lincoln-Str. 46, 65189 Wiesbaden, Germany

What you can find in this essential

- You will learn about the technical-economic and ecological reasons for the necessity of the energy transition, which among other things, should lead to the creation of a general energy system (GES).
- For each subtopic, you will find references to important technical and organizational concepts and solutions that can contribute to the success of the process. If necessary, more in-depth information can also be found in the authors' five other specialist books [1–5].
- This essential focuses on the example of Germany, but is embedded in the European and global context.
- The provided keywords and literature references enable a quick search for available documents and sources on the Internet.