

# Smart Grid Standards

Specifications, Requirements,  
and Technologies

Takuro Sato | Daniel M. Kammen | Bin Duan  
Martin Macuha | Zhenyu Zhou | Jun Wu  
Muhammad Tariq | Solomon Abebe Asfaw

WILEY

# **SMART GRID STANDARDS**

## **SPECIFICATIONS, REQUIREMENTS, AND TECHNOLOGIES**

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# **SMART GRID STANDARDS**



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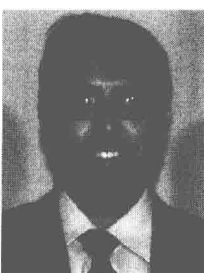
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# Preface

The adverse effects of climate change as well as the achievements of sustained development require changing the present-day practice of energy production, transmission, distribution, and consumption. Developing smarter electric power grids is believed to be a key path to realizing this goal. Here, we could simply consider a Smart Grid as a hub of heterogeneous technological and policy measures that will make the future power grid more efficient, reliable, and clean. Nowadays, various Standard Developing Organizations (SDOs) and industries are working to develop Smart Grid-related standards and technologies, while governments throughout the world are gradually issuing conducive directives toward modernizing their power grids. This book “Smart Grid Standards: Specifications, Requirements, and Technologies,” presents a summary of worldwide progress in creating Smart Grid standards and their future trends, Smart Grid development policies, and key projects initiated by countries around the world, as well as the cooperation and collaboration between national, regional, and international SDOs.

The book is not intended to provide a comprehensive description of the wide range of Smart Grid technologies. Rather, it is a result of collaboration between authors working in various research areas. Their research interests include, *inter alia*, environment and sustainability, energy technology, electric power, power electronics, and information and communication technologies. Thus, the primary purpose of the book is to bring together various aspects of Smart Grid, such as advances in grid automation, clean energy technologies, and challenges on their interoperability, potential technological, and policy paths to overcome some of the challenges, and advances in the area of smart home and demand response measures. We hope that this book provides a broader picture of the Smart Grid concept. Moreover, this book should especially be a suitable text for a course on the Smart Grid that may be taken by both undergraduate and graduate engineering students. It should also be useful, as a concise reference on Smart Grid, for researchers working in a wide variety of fields in physical, policy, and engineering sciences.

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The Smart Grid incorporates one of the key technological advances required to overcome various challenges related to energy production, transmission, distribution, and consumption. Nowadays various standard development organizations (SDOs) and industries are working to develop Smart Grid–related standards and technologies, while governments throughout the world are gradually issuing conducive directives toward modernizing their power grids. This book “Smart Grid Standards: Specifications, Requirements, and Technologies,” presents a summary of worldwide progress in creating Smart Grid standards and their future trends, Smart Grid development policies, and key projects initiated by countries around the world, as well as the cooperation and collaboration between national, regional, and international SDOs.

This book is a result of collaborations between authors working in various research areas. Their research interests include, *inter alia*, environment, energy, electric power, power electronics, and information and communication technologies. We hope that this book provides a broader look into the concept of Smart Grid and could be useful for students, engineers, researchers, businessmen, and policy makers who are working in the field.

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*Takuro Sato*

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