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Photovoltaic Systems: Fundamentals and Applications

By Yaman Abou Jieb and Eklas Hossain
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Introduction to Photovoltaic Systems

This textbook serves as a comprehensive introduction to the fundamental principles and practical applications of solar photovoltaic (PV) systems. It bridges the gap between theoretical concepts of solar photovoltaics and their real-world implementation, emphasizing the critical role of this energy source.
The content is presented concisely and in straightforward language, ensuring clear explanations of complex concepts and principles. A particular focus is placed on humanitarian applications of PV systems and relatively small-scale systems, making the material highly relatable and accessible to a broad audience.

Core Content Overview

The book systematically covers various aspects of photovoltaic technology:

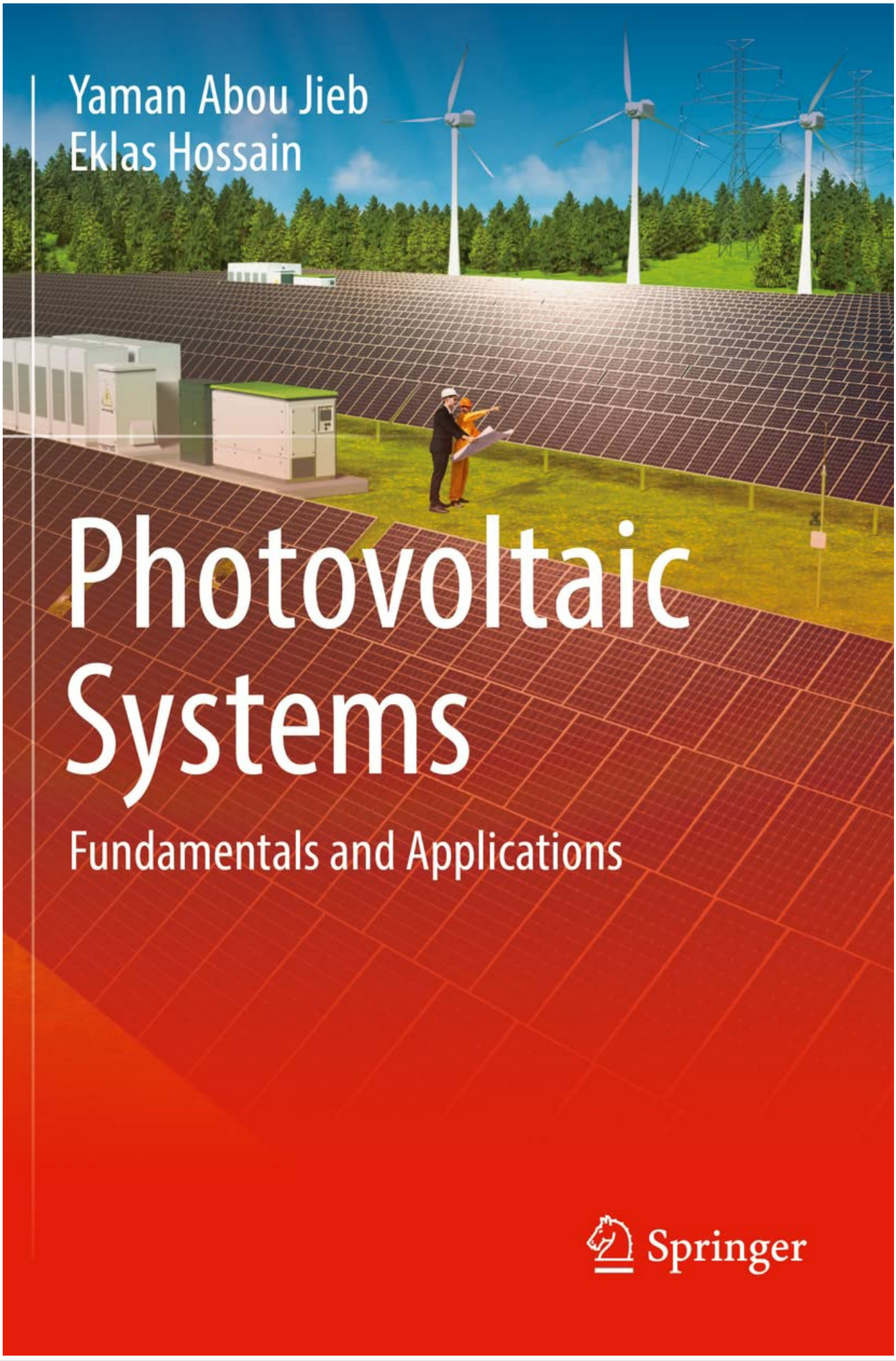
- **Fundamentals and Overview:** Begins with an introduction to solar cell fabrication, module design, and performance evaluation, alongside an assessment of solar resources.
- **Individual System Components:** Detailed discussion on the various components that constitute photovoltaic systems.
- **System Design:** Covers the design principles for off-grid, hybrid, distributed, and grid-tied photovoltaic systems, adhering to the National Electrical Code (NEC) standards.
- **Techno-Economic Analysis:** Provides insights into the economic viability and technical aspects of solar photovoltaics.
- **Challenges and Solutions:** Addresses the complexities and potential solutions related to PV system integration into the utility grid.
- **Future Potential:** Explores the evolving capabilities and future prospects of photovoltaic systems.

Intended Audience and Purpose

Photovoltaic Systems: Fundamentals and Applications is primarily designed as an introductory textbook for students. It also serves as a valuable professional training manual for engineers, technicians, and anyone interested in the solar energy industry.

The book offers both mathematical and conceptual insights, making it suitable for teaching core concepts, enhancing fundamental understanding, and guiding the sizing and design of practical PV systems. It includes numerous design examples and numerical/conceptual problems to reinforce learning.

Product Image



The book cover features a large solar photovoltaic array in a field, with two individuals reviewing blueprints. In the background, wind

turbines and electricity transmission lines are visible against a blue sky with green trees, symbolizing integrated renewable energy systems. The title 'Photovoltaic Systems: Fundamentals and Applications' is prominently displayed.

Specifications

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About the Authors

Yaman Abou Jieb

Yaman Abou Jieb is an electrical power engineer holding a master's degree in renewable energy engineering from Oregon Institute of Technology (OIT). He has experience as an instructor and teaching assistant for electrical circuits, power, and power electronics. Before OIT, he founded a company in the Middle East specializing in designing and installing off-grid PV applications, including water pumping, street lighting, telecommunication sites, and residential systems. He also designed commercial and utility-scale grid-tied systems. Currently, he serves as an electrical power engineer at Atwell, LLC, overseeing electrical supervision for utility-scale solar PV and battery storage design projects in the USA.

Eklas Hossain

Dr. Eklas Hossain is an Associate Professor in the Department of Electrical Engineering and Renewable Energy and an Associate Researcher with the Oregon Renewable Energy Center (OREC) at the Oregon Institute of Technology. His expertise lies in distributed power systems and renewable energy integration, with numerous publications in the field. He is involved in research projects on renewable energy and grid-tiered microgrid systems. Dr. Hossain holds a Ph.D. from the University of Wisconsin Milwaukee and is a registered Professional Engineer (PE) in Oregon, a Certified Energy Manager (CEM), and a Renewable Energy Professional (REP). His research interests include power electronic devices, energy storage, renewable energy sources, microgrid, and smart grid applications.

Support and Further Reading

For additional support or inquiries regarding the content of this book, please refer to the publisher's official website or contact the authors through academic channels. This book is intended as a foundational text; further specialized literature may be required for advanced topics or specific project implementations.

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Authors' Profiles: Yaman Abou Jieb, Eklas Hossain

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