



# Photovoltaic Systems Engineering, Third Edition

*Roger Messenger, Amir Abtahi*

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The U.S. Department of Energy now estimates a factor of 14 increase in grid-connected systems between 2009 and 2017, depending upon various factors such as incentives for renewables and availability and price of conventional fuels.

With this fact in mind, **Photovoltaic Systems Engineering, Third Edition** presents a comprehensive engineering basis for photovoltaic (PV) system design, so engineers can understand the what, why, and how associated with the electrical, mechanical, economic, and aesthetic aspects of PV system design. Building on the popularity of the first two editions, esteemed authors Roger Messenger and Jerry Ventre explore the significant growth and new ideas in the PV industry. They integrate their experience in system design and installation gained since publication of the last edition.

**Intellectual tools to help engineers and students to understand new technologies and ideas in this rapidly evolving field**

The book educates about the design of PV systems so that when engineering judgment is needed, the engineer can make intelligent decisions based on a clear understanding of the parameters involved. This goal differentiates this textbook from the many design and installation manuals that train the reader how to make design decisions, but not why. The authors explain why a PV design is executed a certain way, and how the design process is actually implemented.

In exploring these ideas, this cutting-edge book presents:

- An updated background of energy production and consumption
- Mathematical background for understanding energy supply and demand
- A summary of the solar spectrum, how to locate the sun, and how to optimize the capture of its energy
- Analysis of the components used in PV systems

Also useful for students, the text is full of additional practical considerations added to the theoretical background associated with mechanical and structural design. A modified top-down approach organizes the material to quickly cover the building blocks of the PV system. The focus is on adjusting the parameters of PV systems to optimize performance. The last two chapters present the physical basis of PV cell operation and optimization.

Presenting new problems based upon contemporary technology, this book covers a wide range of

topics—including chemistry, circuit analysis, electronics, solid state device theory, and economics—this book will become a relied upon addition to any engineer's library.

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