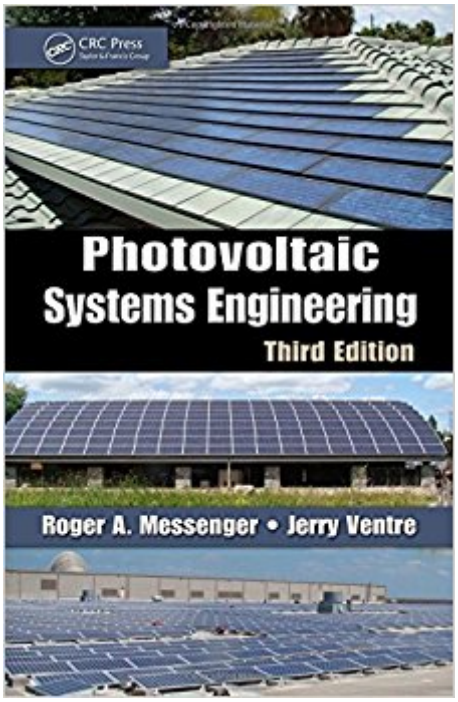
Photovoltaic Systems Engineering, Third Edition



Synopsis

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 topicsÃ¢â ¬â ¢including chemistry, circuit analysis, electronics, solid state device theory, and economicsÃ¢â ¬â ¢this book will become a relied upon addition to any engineerÃ¢â ¬â„¢s library.

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Customer Reviews

Roger Messenger is professor emeritus of electrical engineering at Florida Atlantic University in Boca Raton, FL. He received his Ph.D. in electrical engineering from the University of Minnesota and is a Registered Professional Engineer, a Certified Electrical Contractor, and a NABCEP Certified PV Installer, who enjoys working on a field installation as much as he enjoys teaching a class or working on the design of a system or contemplating the theory of operation of a system. His research work has ranged from electrical noise in gas discharge tubes to deep impurities in silicon to energy conservation. He worked on the development and promulgation of the original Code for Energy Efficiency in Building Construction in Florida and has conducted extensive field studies of energy consumption and conservation in buildings and swimming pools. Since his retirement from Florida Atlantic University in 2005, he has worked as vice president for engineering at VB Engineering, Inc., in Boca Raton. The VB Engineering team has completed several hundred PV designs to date, including the design of the 5808-module, 4-acre, 1 MW system on the roof of the Orange County Convention Center in Orlando, Florida. He has also been active in the Florida Solar Energy Industries Association and the Florida Alliance for Renewable Energy, has served as a peer reviewer for the U.S. Department of Energy, and has sat on the Florida Solar Energy Center Policy Advisory Board. He has conducted numerous seminars on designing, installing, and inspecting PV systems. Jerry Ventre is a consultant in photovoltaic systems engineering, specializing in system design, product certification, and workforce development. For 25 years, he led the photovoltaic and distributed power programs at the Florida Solar Energy Center, a research institute of the University of Central Florida. During that time, he also managed the Photovoltaic Southeast Regional Experimentation Station for the U.S. Department of Energy. He received his B.S., M.S., and Ph.D. degrees in aerospace engineering from the University of Cincinnati, and has more than 35 years of experience in research, development, design, and systems analysis. He served on the aerospace

engineering faculties of both the University of Cincinnati and the University of Central Florida, is a Registered Professional Engineer, and, among many courses, taught photovoltaic systems at the graduate level. He has designed solid rocket motors and jet engines for the Advanced Engine Technology Department of the General Electric Company, and has performed research for numerous agencies, including NASA, the National Renewable Energy Laboratory, Sandia National Laboratories, Oak Ridge National Laboratory, U.S. Navy, the FAA, and the U.S. Department of Energy. He has over 150 technical publications, has been active in technical societies, and has been the recipient of a number of awards for contributions to engineering and engineering education.

There is not much information on the internet about this book, so I am going to summarize it’s contents as succinctly as possible. I ordered this book a couple of weeks ago and it is not EXACTLY what I was expecting, but it’s still good.First off, it is written for professional engineers and/or graduate students. It assumes you already know/remember a lot of trigonometry and the basics of electricity and physics. If you’re looking for an introduction or how-to manual for installing PV, this is NOT it. As stated in the description, this book goes into great depth of the WHY and HOW everything works, down to the chemistry of how a battery charges/discharges. It is very thorough. Also, nothing is dumbed down. They do not try to make it easy to read. Which is not a bad thing in my mind, just letting everyone know.I don’t have an engineering background, but I’m still working through it, with LOTS of help from the web. When I’m done, I’ll definitely have a good understanding of everything (if I make it) covered in the book.Lastly, you can’t preview the book or see the table of contents, so I thought I’d quickly add them here at the bottom, just so people know what is covered.Ch 1 - BackgroundCh 2 - The SunCh 3 - Introduction to PV SystemsCh 4 - Grid-Connected Utility-Interactive PV SystemsCh 5 - Mechanical ConsiderationsCh 6 - Battery-Backup Grid-Connected PV SystemsCh 7 - Stand-Alone PV SystemsCh 8 - Economic ConsiderationsCh 9 -Externalities and PhotovoltaicsCh 10 - The Physics of PV CellsCh 11 - Present and Proposed PV Cells and Systems

Very informative book about PV systems, design and thoughts behind it. Its not a DIY on how to mount solar panels, but more of an engineering informative book, with alot of background information and details / aspects to consider regarding PV systems.

must have for people studying about photovoltaics. This book has helped me with two reports and

one course until now.

A very useful book to become familiar with the PV, battery, and micro-grid

I got my master degree based on this textbook !

Excellent book but why use inches and not use the metric system is better and is the world science metric system as an engineering book should be written in a metric system. Americans will never learn metric if authors don t start writting with it.

The book is excellent. Answers to questions would be nice. Mathematics and formulas explained in laymen’s terms can be added.

This is a great intro book for those wanting a well rounded overview of Photovoltaic Systems design and installation. Practicing engineers of all disciplines will find the material contained in this text useful and current.

Photovoltaic Systems Engineering, Third Edition Photovoltaic Systems Engineering, Fourth Edition Solar Energy: The Physics and Engineering of Photovoltaic Conversion, Technologies and Systems Third Eye: Third Eye Activation Mastery, Easy And Simple Guide To Activating Your Third Eye Within 24 Hours (Third Eye Awakening, Pineal Gland Activation, Opening the Third Eye) Solar Electricity Handbook: 2017 Edition: A simple, practical guide to solar energy ? designing and installing solar photovoltaic systems. Solar Electricity Handbook - 2013 Edition: A Simple Practical Guide to Solar Energy - Designing and Installing Photovoltaic Solar Electric Systems Solar Electricity Handbook - 2014 Edition: A Simple Practical Guide to Solar Energy - Designing and Installing Photovoltaic Solar Electric Systems Solar Electricity Handbook - 2012 Edition: A Simple Practical Guide to Solar Energy - Designing and Installing Photovoltaic Solar Electric Systems Solar Farms: The Earthscan Expert Guide to Design and Construction of Utility-scale Photovoltaic Systems Solar Photovoltaic Systems Installer Trainee Guide (Contren Learning) Photovoltaic Systems Systems Engineering and Analysis (5th Edition) (Prentice Hall International Series in Industrial & Systems Engineering) The Engineering Design of Systems: Models and Methods (Wiley Series in Systems Engineering and Management) Tissue Engineering I: Scaffold Systems for Tissue Engineering (Advances in Biochemical Engineering/Biotechnology) (v. 1) Solar Rooftop DIY:

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