



# Energy

Springer and Palgrave Essential Textbooks

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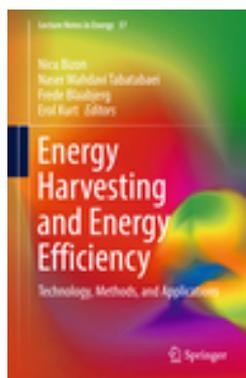
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ISBN : 978-3-319-49874-4

Bizon, N., Mahdavi Tabatabaei, N., Blaabjerg, F., Kurt, E. (Eds.), University of Pitești, Pitești, Romania

## Energy Harvesting and Energy Efficiency

### Technology, Methods, and Applications

- All chapters are based on the latest published research
- Comprehensively tackles energy harvesting and the energy efficiency of hybrid power systems
- Includes both fundamental and advanced coverage on energy harvesting and energy efficiency

This book presents basic and advanced concepts for energy harvesting and energy efficiency, as well as related technologies, methods, and their applications. The book provides up-to-date knowledge and discusses the state-of-the-art equipment and methods used for energy harvesting and energy efficiency, combining theory and practical applications. Containing over 200 illustrations and problems and solutions, the book begins with overview chapters on the status quo in this field. Subsequent chapters introduce readers to advanced concepts and methods. In turn, the final part of the book is dedicated to technical strategies, efficient methods ...

### Contents

Energy saving and efficient energy use by power electronics systems.- Energy harvesting sources and power interfaces—a review.- Micro-scale energy harvesting for battery less information technologies.- Efficient energy harvesting systems for vibration and wireless sensor applications.- Nonlinear problems in piezoelectric harvesters under magnetic field.- Energy harvesting from the photo voltaic hybrid power source based on xtremum seeking control schemes.- Energy efficiency of the photo voltaic systems.

### Fields of Interest

Energy Harvesting; Nanotechnology and Microengineering; Renewable and Green Energy; Engineering Thermodynamics, Heat and Mass Transfer

### Content Level

Graduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

1st ed. 2017,XXVI, 661 p. 440 illus., 106 illus. in color.(Lecture Notes in Energy, Volume 37) Hardcover

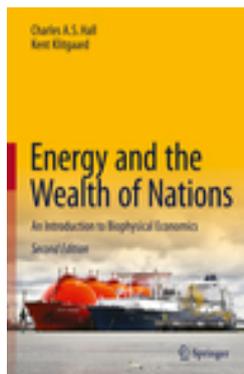
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-3-319-66217-6

Hall, Charles A.S., Klitgaard, Kent, State University of New York, Syracuse, NY, USA

## Energy and the Wealth of Nations

### An Introduction to Biophysical Economics

- Includes several new chapters and comprehensive updates addressing the implications of hydraulic fracturing (fracking), access to energy and social inequality, and climate science and planetary boundaries
- Integrates energy and economics by combining natural and social sciences
- Uses predictive tools and measures, such as EROI, to show how the economy is embedded in a biophysical world subject to scientific rules and constraints

In this updated edition of a groundbreaking text, concepts such as energy return on

investment (EROI) provide powerful insights into the real balance sheets that drive our “petroleum economy.” Hall and Klitgaard explore the relation between energy and the wealth explosion of the 20th century, and the interaction of internal limits to growth found in the investment process and rising inequality with the biophysical limits posed by finite energy resources. The authors focus attention on the failure of markets to recognize or efficiently allocate diminishing resources, the economic consequences of peak oil, the high cost and relatively low EROI ...

### Contents

Part I Energy and the Origins of Wealth.- Poverty, Wealth, and Human Ambition.- Energy and Wealth Production: An historical perspective.- The Petroleum Revolution I: The first half of the age of oil.- Part II Energy, Economics and the Structure of Society.- Explaining Economics from an Energy Perspective.- The Limits of Conventional Economics.- The Petroleum Revolution II: Concentrated Power and Concentrated Industries.- The Postwar Economic Order, Growth and the Hydrocarbon Economy.- Globalization and Efficiency.- Are there Limits to Growth? Examining the Evidence.- Part III Energy and Economics—the Basics.- What is Energy and How is it ...

### Fields of Interest

Energy Policy, Economics and Management; Sustainable Development; Environmental Economics; Energy Policy, Economics and Management; Data-driven Science, Modeling and Theory Building; Economic Geography

### Content Level

Graduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

2nd ed. 2018,XI, 511 p. 157 illus., 145 illus. in color. Hardcover

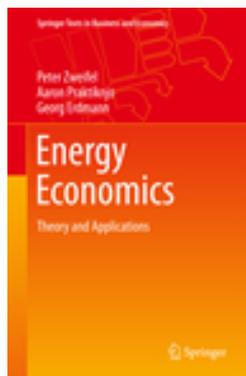
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-3-662-53020-7

Zweifel, P., Pratschnig, A., Erdmann, G., Bad Bleiberg, Austria

## Energy Economics

### Theory and Applications

- Explains the economic foundations as well as empirical methods necessary to understand energy markets
- Covers all types of energy markets including those for liquid, gaseous and solid fuels, as well as electricity
- Provides comprehensive references to data sources that allow readers to carry out their own empirical analysis

This book provides an introduction to energy economics. It shows how to apply general economic theory as well as empirical and advanced econometric methods to explain the drivers of energy markets and their development. Readers learn about the specific properties of energy markets as well as the physical, technological, environmental, and geopolitical particularities of energy sources and products. The book covers all types of energy markets, ranging from liquid fuels, gaseous fuels, and solid fuels to electricity. It also addresses emission allowances, energy efficiency, and nuclear risks. The authors discuss the engineering properties of ...

### Contents

Preface.- Introduction.- Energy in Science and Engineering.- Investment and Profitability Calculation.- Bottom-Up Analysis of Energy Demand.- Top-Down Analysis of Energy Demand.- Energy Reserves and Sustainability.- External Costs.- Markets for Liquid Fuels.- Markets for Gaseous Fuels.- Markets for Solid Fuels and CO<sub>2</sub> Emissions.- Uranium and Nuclear Energy.- Markets for Electricity.- Economics of Electrical Grids.

### Fields of Interest

Energy Policy, Economics and Management; Environmental Economics; Economic Policy; Energy Policy, Economics and Management; Industrial Organization

### Content Level

Upper undergraduate

### Product category

Undergraduate textbook

Available

### Bibliography

1st ed. 2017,XX, 324 p. 73 illus.(Springer Texts in Business and Economics) Hardcover

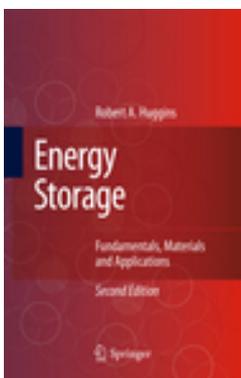
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-3-319-21238-8

Huggins, Robert, Stanford University, Stanford, CA, USA

## Energy Storage

### Fundamentals, Materials and Applications

- Explains the fundamentals of all major energy storage methods, from thermal and mechanical to electrochemical and magnetic
- Clarifies which methods are optimal for important current applications, including electric vehicles, off-grid power supply and demand response for variable energy resources such as wind and solar
- New and updated material focuses on cutting-edge advances including liquid batteries, sodium/sulfur cells, emerging electrochemical materials, natural gas applications and hybrid system strategies

Energy Storage explains the underlying scientific and engineering fundamentals of all major energy storage methods. These include the storage of energy as heat, in phase transitions and reversible chemical reactions, and in organic fuels and hydrogen, as well as in mechanical, electrostatic and magnetic systems. Updated coverage of electrochemical storage systems considers

exciting developments in materials and methods for applications such as rapid short-term storage in hybrid and intermittent energy generation systems, and battery optimization for increasingly prevalent EV and stop-start automotive technologies. This nuanced coverage of ...

### Contents

Introduction.- General Concepts.- Thermal Energy Storage.- Reversible Chemical Reactions.- Energy Storage in Organic Fuels.- Mechanical Energy Storage.- Electromagnetic Energy Storage.- Hydrogen Storage.- Introduction to Electrochemical Energy Storage.- Principles Determining the Voltages and Capacities of Electrochemical Cells.- Binary Electrodes Under Equilibrium or Near-Equilibrium Conditions.- Ternary Electrodes Under Equilibrium or Near-Equilibrium Conditions.- Potentials.- Insertion Reaction Electrodes.- Electrode Reactions That Deviate From Complete Equilibrium.- Primary, Non-Rechargeable Batteries.- Lead-Acid Batteries.- Negative ...

### Fields of Interest

Energy Storage; Optical and Electronic Materials; Renewable and Green Energy; Electrochemistry

### Content Level

Upper undergraduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

2nd ed. 2016,XXXVIII, 509 p. Hardcover

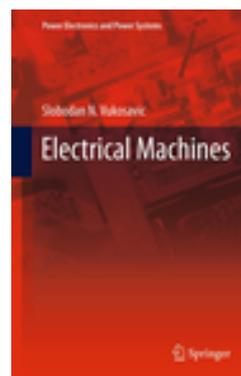
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-1-4614-0399-9

Vukosavic, Slobodan N., University of Belgrade, Belgrade, Serbia

## Electrical Machines

- Comprises fundamental knowledge on electric machines for readers applying math and physics and having modest knowledge in electromagnetics and circuit theory
- Covers key topics related to machine size, torque and power
- Offers a system perspective explaining the use and external characteristics of machines on their electrical and mechanical ports

Electrical Machines primarily covers the basic functionality and the role of electrical machines in their typical applications. The effort of applying coordinate transforms is justified by obtaining a more intuitive, concise and easy-to-use model. In this textbook, mathematics is reduced to a necessary minimum, and priority is given to bringing up the system view and explaining the use and external characteristics of machines on their electrical and mechanical ports. Covering the most relevant concepts relating to machine size, torque and power, the author explains the losses and secondary effects, outlining cases and conditions in which ...

### Contents

Introduction.- Electromechanical Energy Conversion.- Magnetic and Electrical Coupling Field.- Magnetic Circuit.- Routing Electrical Machines.- Modeling Electrical Machines.- Single Fed and Double Fed Converters.- Magnetic Field in the Air Gap.- Energy, Flux and Torque.- Electromotive Forces.- Introduction to DC Machines.- Modeling and Supplying DC Machines.- Characteristics of DC Machines.- Induction Machines.- Induction Machines at Steady State.- Variable Speed Induction Machines.- Synchronous Machines.- Mathematical Model of Synchronous Machine.- Steady State Operation.- Transients in Synchronous Machines.- Variable Frequency Synchronous ...

### Fields of Interest

Energy Systems; Power Electronics, Electrical Machines and Networks; Machinery and Machine Elements; Mechatronics; Industrial and Production Engineering

### Content Level

Graduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

2013,XXXIV, 650 p.(Power Electronics and Power Systems) Hardcover

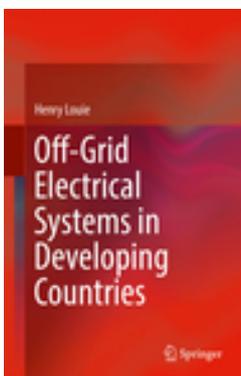
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-3-319-91889-1

Louie, Henry, Seattle University, Seattle, WA, USA

## Off-Grid Electrical Systems in Developing Countries

- Provides a technical foundation of off-grid electrical systems
- Contextualizes the technical aspects for developing countries
- Captures the current and state-of-the art in this rapidly developing field

This book provides students and practicing engineers with a comprehensive guide to off-grid electrification: from microgrids and energy kiosks to solar home systems and solar lanterns. As the off-grid electrification industry grows, universities are starting and expanding courses and programs in humanitarian engineering and appropriate technology. However, there is no textbook that serves this growing market. This book fills that gap by providing a technical foundation of off-grid electrical systems, putting into context the technical aspects for developing countries, and discussing best practices by utilizing real-world data. Chapters ...

### Contents

Energy Development.- Development of Fundamentals.- Grid Extension.- Off-Grid Systems.- Control of Off-Grid Systems.- Control of Off-Grid Systems.- Off-Grid Design Approaches.- Solar Home Systems & Solar Lanterns.- Economic and Business Considerations.- Practical Considerations.- Grid Connected Issues.- Case Studies.

### Fields of Interest

Renewable and Green Energy; Energy Systems; Energy Policy, Economics and

Management; Development and Sustainability

### Content Level

Graduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

1st ed. 2018,XXIII, 481 p. 269 illus., 110 illus. in color. Hardcover

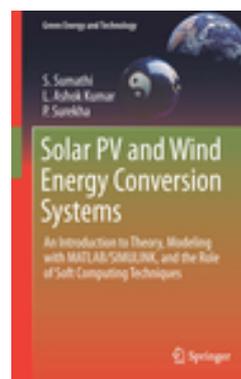
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-3-319-14940-0

Sumathi, S., Ashok Kumar, L., Surekha, P., PSG College of Technology, Coimbatore, India

## Solar PV and Wind Energy Conversion Systems

### An Introduction to Theory, Modeling with MATLAB/SIMULINK, and the Role of Soft Computing Techniques

- Each chapter includes "Learning Objectives" at the start, a "Summary" at the end and helpful Review Questions
- Includes MATLAB/SIMULINK models of different control strategies for power conditioning units in the context of Solar PV
- Presents soft computing techniques for Solar PV and WECS, as well as MATLAB/SIMULINK models, e.g. for wind turbine topologies and grid integration

This textbook starts with a review of the principles of operation, modeling and control of common solar energy and wind-power generation systems before moving on to discuss grid compatibility, power quality

issues and hybrid models of Solar PV and Wind Energy Conversion Systems (WECS). MATLAB/SIMULINK models of fuel cell technology and associated converters are discussed in detail. The impact of soft computing techniques such as neural networks, fuzzy logic and genetic algorithms in the context of solar and wind energy is explained with practical implementation using MATLAB/SIMULINK models. This book is intended for final year undergraduate, ...

### Contents

Introduction.- Application of MATLAB/SIMULINK in Solar PV Systems.- Soft Computing Techniques in Solar PV.- Wind Energy Conversion Systems.- Soft Computing Techniques in WECS.- Hybrid Energy Systems.- Grid Integration Techniques in Renewable Energy Systems.- Harmonic Reduction Techniques in Renewable Energy Systems.- Fuel Cell and Converters.- Appendices.

### Fields of Interest

Renewable and Green Energy; Energy Systems; Power Electronics, Electrical Machines and Networks; Energy Efficiency; Energy Harvesting

### Content Level

Graduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

2015,XXIV, 790 p. 677 illus., 334 illus. in color. (Green Energy and Technology) Hardcover

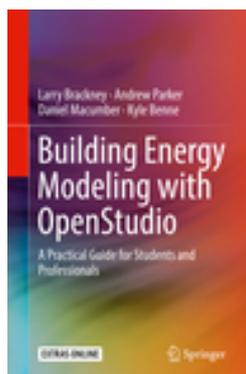
### Medium Type

Book

### Imprint

Springer

Order Quantity



ISBN : 978-3-319-77808-2

Brackney, L., Parker, A., Macumber, D., Benne, K., National Renewable Energy Laboratory, Golden, CO, USA

## Building Energy Modeling with OpenStudio

### A Practical Guide for Students and Professionals

- Includes assignable problems, worked examples, and online solutions to modeling exercises
- Teaches students and professionals the fundamentals of building energy modeling and analysis using US DOE's open source modeling platform, OpenStudio
- Presents methods for tackling complex new construction or retrofit projects quickly and cost-effectively

This textbook teaches the fundamentals of building energy modeling and analysis using open source example applications built with the US DOE's OpenStudio modeling platform and EnergyPlus simulation engine. Designed by researchers at US National Laboratories to support a new generation of high performance buildings, EnergyPlus and OpenStudio are revolutionizing how building energy modeling is taught in universities and applied by professional architects and engineers around the world. The authors, all researchers at National Renewable Energy Laboratory and members of the OpenStudio software development team, present modeling concepts using ...

### Contents

Chapter 1: Introduction to Building Energy Modeling.- Chapter 2: Building envelope specification.-Chapter 3: Space Type Definitions.- Chapter 4: Introduction to Mechanical Systems.- Chapter 5: Advanced HVAC Topics.- Chapter 6: OpenStudio Measures.- Chapter 7: Parametric Analysis.- Chapter 8: Daylighting Analysis.- Chapter 9: The OpenStudio Software Development Kit.- Appendix A – Resources.- Appendix B – HVAC System "Glossary".

### Fields of Interest

Sustainable Architecture/Green Buildings; Mechanical Engineering; Energy Efficiency; Building Physics, HVAC; Building Construction and Design

### Content Level

Upper undergraduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

1st ed. 2018,XXXVII, 325 p. 618 illus., 561 illus. in color. With online files/update. Hardcover

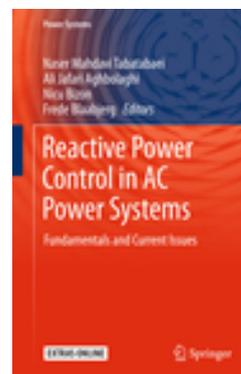
### Medium Type

Book w. online files / update

### Imprint

Springer

Order Quantity



ISBN : 978-3-319-51117-7

Mahdavi Tabatabaei, N., Jafari Aghbolaghi, A., Bizon, N., Blaabjerg, F. (Eds.), Seraj Higher Education Institute, Tabriz, Iran

## Reactive Power Control in AC Power Systems

### Fundamentals and Current Issues

- Offers an essential textbook for undergraduate and graduate courses on power control and power systems
- Includes related program files in MATLAB and DlgSILENT, which are available online
- Highlights the latest, state-of-the-art findings, presented by leading professionals from industry, research and academia

This textbook explores reactive power control and voltage stability and explains how they relate to different forms of power generation and transmission. Bringing together international experts in this field, it includes chapters on electric power analysis, design and operational strategies. The book explains fundamental concepts before moving on to report on the latest theoretical findings in reactive power control, including case studies and advice on practical implementation students can use to design their own research projects. Featuring numerous worked-out examples, problems and solutions, as well as over 400 illustrations, Reactive ...

### Contents

Preface.- Chapter1: Introduction.- Chapter2: Fundamentals of Reactive Power in AC Power Systems.- Chapter3: Reactive Power Role in AC Power Transmission Systems.- Chapter4: Reactive Power Compensation in Energy Transmission Systems With Sinusoidal and Nonsinusoidal Currents.- Chapter5: Reactive Power Importance in Wind Power Plants.-

Chapte6: Reactive Power Control and Voltage Stability Problem.- Part 1: Fundamentals and Contemporary Issues of Reactive Power Control in AC Power Systems.- Chapter7: Reactive Power Control and Voltage Stability Problem.- Part 2: Chaper8: Reactive Power Compensation in AC Power Systems.- Chapter9: Modern ...

### Fields of Interest

Power Electronics, Electrical Machines and Networks; Energy Systems; Control and Systems Theory

### Content Level

Graduate

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

1st ed. 2017,XXXVI, 634 p. 350 illus., 101 illus. in color.(Power Systems) Hardcover

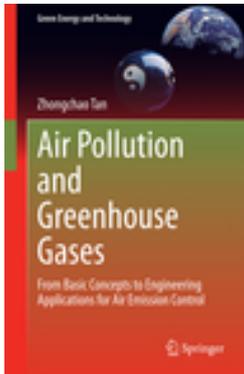
### Medium Type

Book

### Imprint

Springer

### Order Quantity



ISBN : 978-981-287-211-1

Tan, Zhongchao, University of Waterloo, Waterloo, ON, Canada

## Air Pollution and Greenhouse Gases

### From Basic Concepts to Engineering Applications for Air Emission Control

- Introduces students to underlying causes of air pollution and greenhouse gases
- Provides state-of-the-art knowledge in the control of air pollution and greenhouse gas emissions
- Includes examples that illustrate the

principles and designs of air pollution and greenhouse gas emission control technologies

This textbook discusses engineering principles relating to air pollution and greenhouse gases (GHGs); it focuses on engineering principles and designs of related devices and equipment for air emission control for a variety of industries such as energy, chemical, and transportation industries. The book aims primarily at senior undergraduate and graduate students in mechanical, chemical and/or environmental engineering departments; it can also be used as a reference book by technical staff and design engineers who are interested in and need to have technical knowledge in air pollution and GHGs. The book is motivated by recent rapid advances in ...

### Contents

From the Contents: Part I Fundamental Principles.- Combustion Basics.- Properties of Gaseous Pollutants.- Properties of Particles.- Separation of Gas Pollutants from Air.- Part II Engineering Designs and Applications.- Air Emissions From Actual Fuel Combustion.- Air Quality and Air Emission Monitoring.- Pre Combustion Air Emission Control.- Part III Special Topics.- Carbon Sequestration and Storage.

### Fields of Interest

Quality Control, Reliability, Safety and Risk; Atmospheric Protection/Air Quality Control/ Air Pollution; Environmental Engineering/ Biotechnology

### Content Level

Research

### Product category

Graduate/advanced undergraduate textbook

Available

### Bibliography

2014,XXVIII, 481 p. 128 illus.(Green Energy and Technology) Hardcover

### Medium Type

Book

### Imprint

Springer

### Order Quantity