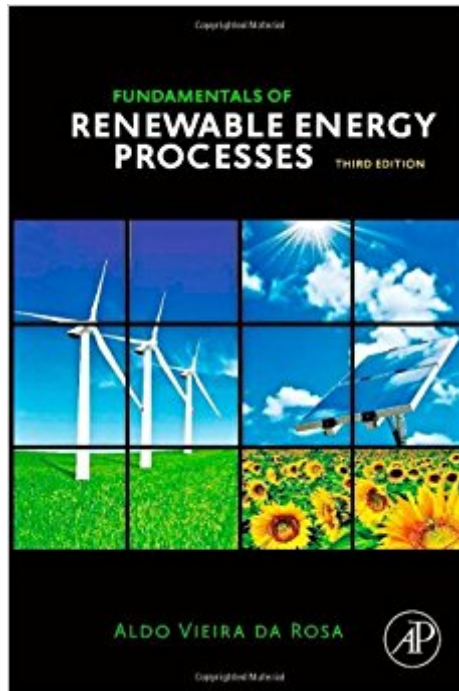




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# Fundamentals Of Renewable Energy Processes, Third Edition



## Synopsis

With energy sustainability and security at the forefront of public discourse worldwide, there is a pressing need to foster an understanding of clean, safe alternative energy sources such as solar and wind power. Aldo da Rosa's highly respected and comprehensive resource fulfills this need; it has provided thousands of engineers, scientists, students and professionals alike with a thorough grounding in the scientific principles underlying the complex world of renewable energy technologies. This new third edition of the classic text highlights advances in this vital area, which are proceeding at an unprecedented pace, allowing everyone interested in this burgeoning field to keep up with the latest developments in diverse topics from solar cooling to renewable energy storage. Illuminates the basic principles behind all key renewable power sources- solar, wind, biomass, hydropower & fuel cells Connects scientific theory with practical implementation through physical examples; end-of-chapter questions help readers apply their knowledge Written by one of the world's foremost experts in renewable energy, drawing from his decades of experience in academia and industry

**NEW TO THIS EDITION:** -All new chapter on pivotal renewable energy storage technologies -Now includes discussion of power grid and transmission issues -Expanded coverage of Hydropower and advances in PV cells -New and improved figures and additional end-of-chapter problems

## Book Information

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## Customer Reviews

"A very helpful to serious students in this rapidly advancing field" includes key introductory material

with the technical detail needed to understand the engineering principles that govern renewable energy applications, making the work suitable for core energy courses. Clear theory, physical examples, and end-of-chapter questions will prompt students to apply the theory to practical cases."

--CHOICE April 2013

Dr. da Rosa taught the perennially popular Renewable Energy course at Stanford University for over 30 years. Former Chairman of the Brazilian National Research Council, Director of the Aeronautical Technical Center, and founder of Brazilian NASA, he also served as the CEO of a tech start-up, Chairman of the Board for a microprocessor manufacturer, and as a member of Siemens Corporation's scientific advisory board.

I love this book! It has just the right level of technical detail for me and my purposes, as I am teaching about Renewable Energy in a University setting for the first time. It is too technical for my current students but gives me the background information I need to feel confident and prepared. I was surprised that there is not information on hydro and not more on storage, but can understand why they might be left to other sources. It's great to have the problems at the end of each chapter, and I really like the author's style, although I was a bit unnerved by the references to wikipedia, I guess it's becoming a standard resource.

Good book, written in understandable way, having pictures and so on. I recognized not the answers to the good exercises included to the book. Can they be found somewhere? I have asked two Finnish libraries to buy the book and now they have them....My good is reserved only to my own usage,.

It is a rather complete, of very good scientific quality and a well structured text. Easy to read and understand. R B Pinheiro

Just like a brand new book - but with a really low price. Though it has some page differences compared to the 3rd edition.

it is a good

The product was as it was described and got the book within couple of days...no problems at all

This textbook should be used for upper level undergraduate renewable energy courses for engineers (Chemical, Mechanical, Electrical, etc.) and scientists (Physicists and Chemists). This book has an excellent scope of technologies, techniques, and approaches to renewable energy processes from hydrogen fuel cells to current nonrenewable energy processes like fossil fuels. There are mathematical models, background, general theory, worked out examples, practice problems at the end of each chapter, but no solutions key to check your work. It is recommended for the student to have taken or to independently have learned Differential Equations in order to use this text since differential equations are found in the text. Knowledge General Physics and Thermodynamics with Calculus and General Chemistry with some Organic Chemistry are also assumed in the text. Some have complained about this text's funky historical analysis on energy consumption and assessment of costs of usage of energy, however, it should be noted that this text's main strength is in the explanatory scope of presenting the theories and models behind each renewable energy processes. This is the core of this text. All else is negligible. It should be noted and remembered that all textbooks contain errors or uncertainties that are sometimes visible. For this Rosa may have some fault, but this is the way textbooks have been written throughout history. Textbooks are meant to be looked at and calibrated with other similar sources and also are always pending upon research. It would be wise to remember this when looking at any textbook and to also look for good merit in the textbook as well. Here are the Chapter titles with some stuff discussed in these chapters:

- 1) Generalities : units and constants, Law of Conservation of Energy, quantity of solar energy, energy resources on earth, World and US energy consumption, ecological sources of energy, nuclear energy
- Part 1 : Heat Engines
- 2) A Minimum of Thermodynamics and of the Kinetic Theory of Gases : motion of molecules, internal energy, 1st Law of Thermodynamics, work, specific heats, adiabatic and isothermal processes, degrees of freedom, entropy, Maxwellian and Fermi-Dirac Distribution, reversibility
- 3) Mechanical Heat Engines : Carnot and Otto efficiency, engine types, heats of combustion, gasoline, knocking, hybrid engines, Sterling and Cryogenic engines
- 4) Ocean Thermal Energy Converters : heat exchangers, turbines, siting
- 5) Thermoelectricity : thermoelectric thermometers, thermal conductivities, thermoelectric generators, batteries, thermoelectric materials
- 6) Thermionics : thermionic emission, electron transport, diodes with neutralization, open circuits, heat conduction, power output
- 7) AMTEC : operating principle, vapor pressure, pressure drop, thermodynamics of AMTEC
- 8) Radio-Noise Generators : general information
- Part 2 : The World of Hydrogen
- 9) Fuel Cells : voltaic cells, fuel cell classification, state and chemical nature of electrolytes, multiple fuel cell reactions, typical fuel cells, fuel cell applications, fuel cell thermodynamics, performances of real fuel cells
- 10) Hydrogen Production :

chemical approaches to making hydrogen, electrolytic/thermolytic/photolytic hydrogen11) Hydrogen Storage : compressed gas, adsorption, carriers, hydride heat pumpsPart 3 : Energy From the Sun12) Solar Radiation : insolation, surfaces, solar collectors, Solar Plant configurations13) Biomass : some organic chemistry, ethanol, anaerobic digestion14) Photovoltaic Converters : efficiency, beam splitting, thermophotovoltaic cells, Dye-Sensitized solar cells, organic photovoltaic cells, solar power satellites, microwave generation, future space solar power projects, space transportation and space constructionPart 4 : Wind and Water15) Wind Energy : wind machine configurations, wind measurements, wind availability, wind turbines, principles of aerodynamics, reynold's number16) Ocean Engines : wave energy, tidal energy, current energy, osmosis, salination energyMore stuff can be found in the textbook. It's a very good introduction to different approaches people have used in creating renewable energy. This text should be in the library of anyone interested in the theoretical foundations of many current renewable energy processes. If it is desired look at other textbooks for further reading on related topics likeÂ ElectrochemistryÂ which has information on fuel cells and the like. Research does not have to stop at one book. It should continue beyond.Bravo for Rosa and his wonderful contribution to the knowledge of nature!

Does't require too much background knowledge. However, you should have the math and science background of a college sophomore, ei physics, chemistry, calc 2.Explanations are clear. However, the material is often inadequate to do homework. You will require lots of outside sources to do hw. Much of the material is so complicated and obscure that there will be no other source.The author frequently references research papers which are nearly impossible to find so it is hard to get help if you don't understand something. You will need to ask professor or TAs for help often. This makes me feel like I'm learning something you can't just get from the internet.No answers to any homework problems so it is hard to practice for exams. Homework problems are very hard so you know you are prepared if you can do them.Lastly, I feel the book was unfinished but the publisher still printed this edition. Some explanations seem incomplete. Homework problems are sometime half way written with no question being asked. One question reads " The french engineer Guy Negre invented an eco taxi, a low pollution vehicle to be built in mexico." It just ends there. We all know that this edition was published mostly to make money, rather than update the book. In a few years there will be another edition that fixes these problems but introduces other problems so more editions can be published over and over. The textbook scam continues. However, the author put a lot of work into the first edition so I hope they are doing well.

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