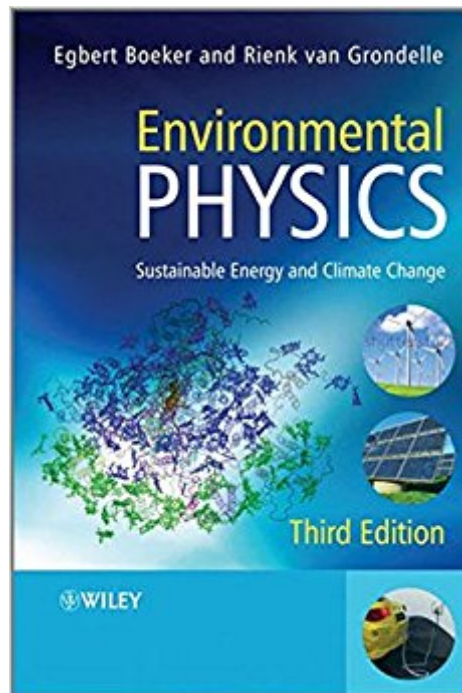




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# Environmental Physics: Sustainable Energy And Climate Change



## Synopsis

This thoroughly revised and updated third edition focuses on the utilization of sustainable energy and mitigating climate change, serving as an introduction to physics in the context of societal problems. A distinguishing feature of the text is the discussion of spectroscopy and spectroscopic methods as a crucial means to quantitatively analyze and monitor the condition of the environment, the factors determining climate change, and all aspects of energy conversion. This textbook will be invaluable to students in physics and related subjects, and supplementary materials are available on a companion website.

## Book Information

Paperback: 456 pages

Publisher: Wiley; 3 edition (September 19, 2011)

Language: English

ISBN-10: 0470666765

ISBN-13: 978-0470666760

Product Dimensions: 6.7 x 0.9 x 9.6 inches

Shipping Weight: 1.8 pounds (View shipping rates and policies)

Average Customer Review: 4.8 out of 5 stars 11 customer reviews

Best Sellers Rank: #695,825 in Books (See Top 100 in Books) #118 in [Books > Science & Math > Physics > Applied](#) #372 in [Books > Textbooks > Engineering > Environmental Engineering](#) #1649 in [Books > Engineering & Transportation > Engineering > Civil & Environmental > Environmental](#)

## Customer Reviews

“In conclusion, this is a first-rate volume but one to be taken in small doses.”  
(Chromatographia, 1 May 2014) --This text refers to the Hardcover edition.

Environmental Physics, Third Edition serves as an introduction to physics in the context of societal problems such as energy supply, pollution, climate change and finite resources of fossil fuels and uranium. The emphasis of this text is on physics, i.e. the concepts and principles that help in understanding the ways to produce energy efficiently or to mitigate climate change. Extra attention is given to photosynthesis due to its importance in the field of renewable energy. This thoroughly revised and updated third edition focuses on the utilization of sustainable energy and mitigating climate change. The text explains the physical mechanisms behind climate change and discusses

the physics of renewable energy options. Nuclear power is treated in a separate chapter because of its social and political importance. In the final chapter political and social aspects of 'renewable energy and climate change' are reviewed. A distinguishing feature of the text is the discussion of spectroscopy and spectroscopic methods, again from basic concepts, as a crucial means to quantitatively analyze and monitor the condition of the environment, the factors determining climate change and all aspects of energy conversion. This textbook will be invaluable to students in physics and related subjects such as physical chemistry and geophysics. It assumes a basic knowledge in physics and mathematics, and all equations are derived from first principles and explained in a physical way. Supplementary material including sections from earlier editions of this book, a description of environmental experiments for a student's labs and computer codes to expand some of the books' content are available from [www.few.vu.nl/environmentalphysics](http://www.few.vu.nl/environmentalphysics)

A comprehensive book on the physics aspects related to the environment. Highly recommended to those that want to know the details behind the predictions of the models.

This physics text is an excellent one. The expositions, both textual and mathematical, are accurate and, for the level, thorough. I actually enjoyed reading through the book, hopping from one interesting topic to another. As a former physics professor myself, I have but one caveat, just where in a typical American physics curriculum does this book best fit? Undergraduate physics students currently enjoy a course of study that follows both historical development and a logical path through the several branches, classical mechanics, electricity and magnetism, statistical physics, etc. My own belief is that, to leap into some politically motivated change in curriculum accentuating "environmental" issues would be an unforgivable betrayal and disservice to students entrusted to our care. It's one thing for a post-PhD person in a fully realized career to retrospectively believe that the environment is all-important. It's very much another thing to distort an undergraduate education to accommodate this new viewpoint. Thus, I would recommend a constructive compromise. I suggest that following this text could form a very valuable core to an undergraduate honors course, at the upper division level, very advanced juniors and competent seniors. In fact, I'd love to do this myself!

Environmental Physics Sustainable Energy and Climate Change, Third Edition, is a textbook for the physicist, mathematician, or environmental chemist with a special interest in the physics of human environmental impact and climate change. The book does not confine itself to its title, as a great

deal of the book is dedicated to environmental pollution and societal changes which must be made to preserve our biosphere in a clean, sustainable, survivable manner. Each chapter is followed by relevant exercises which both reinforce the concepts learned and are actually quite challenging and fun. One thing I must stress, however, is you must be firmly grounded in mathematics to appreciate much of this book. Minimum prerequisites should include calculus and analytic geometry and further study in differential equations. Some students who do not require this type of mathematics background may not be able to appreciate the book. Overall, the book was a challenging presentation of a very challenging problem. This would make an excellent textbook for elective study in physics, geochemistry, bioengineering, and Mathematics. For students of Environmental Physics, it is a "must have" item. I compare it to the Energy for a Technological Society course textbook I read thirty odd years ago and find much has changed, all is not hopeless, and if we as a society play our cards correctly we can make our technological society a win-win for both us and our biosphere. This text will inspire many leaders in the changes which must come for the human species to continue to survive and thrive. I must thank the Authors Egbert Boeker and Rienk van Grondelle for their superb work on a subject of utmost importance. I also thank for giving me the privilege of reviewing this text. It was profound.

As Textbook: I've taught classes similar to this material, but at a lower, less technical, level. This book looks like it would work for junior or senior physics majors in a well-organized manner. It covers not just solar and nuclear power, and climate change, but has the single best (to my eye) coverage of photosynthesis I've seen in a textbook and a considerable amount of material on spectroscopic techniques for monitoring the climate and environment. As Self-study book: The level of math isn't too high, typical undergraduate calculus and differential equations, and the math is well-integrated into the text so it needs to be understood in order to understand the book. Beyond the mathematics, the problem sets look well written and well coupled to the chapters. This would take dedication to use as a self-study book, but would reward it... More general interest: Some sections are understandable without carefully following the math, but there are better choices for nontechnical looks at many of the issues in this book.

I am not an expert. I read this out of interest only. The book is long enough to cover most topics in which I have an interest and provide an adequate level of detail necessary for me to better understand and to go off and research other ideas using the information contained in this book as a springboard. It pulled me in, but, honestly, is not a highly engaging ... for fun ... topic for me. Its

mission, I assume, is to provide necessary information and its not to entertain. It, for me, is an excellent book and very much worth acquisition. I recommend it for individuals with an interest in physics, environmental engineering, public libraries, and university libraries. I give everything a grade, and this book, I believe, merits a grade of A-.

Let me first say that this book is, first and foremost, an excellent handbook for undergraduate environmental engineers and/or energy generation studies. In order to appreciate it, you will need a working knowledge of mathematics through differential equations as well as an understanding of mechanical physics, thermodynamics and organic chemistry. I believe the sustainable energy field of study is the most vital for the future of our planet so that both humans and the Earth can coexist for the next 10,000 years. Understanding the concepts presented in this book will certainly help steer more of our future scientists and engineers to this field.

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