



Introduction to Renewable Energy (Energy and the Environment)

By Vaughn C. Nelson

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Introduction to Renewable Energy (Energy and the Environment) By Vaughn C. Nelson

As the world population grows and places more demand on limited fossil fuels, renewable energy becomes more relevant as part of the solution to the impending energy dilemma. Renewable energy is now included in national policies, with goals for it to be a significant percentage of generated energy within the coming decades. A comprehensive overview, **Introduction to Renewable Energy** explores how we can use the sun, wind, biomass, geothermal resources, and water to generate more sustainable energy.

Taking a multidisciplinary approach, the book integrates economic, social, environmental, policy, and engineering issues related to renewable energy. It explains the fundamentals of energy, including the transfer of energy, as well as the limitations of natural resources. Starting with solar power, the text illustrates how energy from the sun is transferred and stored; used for heating, cooling, and lighting; collected and concentrated; and converted into electricity. A chapter describes residential power usage?including underground and off-grid homes?and houses that are designed to use energy more efficiently or to be completely self-sufficient. Other chapters cover wind power; bioenergy, including biofuel; and geothermal heat pumps; as well as hydro, tidal, and ocean energy.

Describing storage as a billion-dollar idea, the book discusses the challenges of storing energy and gives an overview of technologies from flywheels to batteries. It also examines institutional issues such as environmental regulations, incentives, infrastructure, and social costs and benefits. Emphasizing the concept of life-cycle cost, the book analyzes the costs associated with different sources of energy.

With recommendations for further reading, formulas, case studies, and extensive use of figures and diagrams, this textbook is suitable for undergraduates in Renewable Energy courses as well as for non-specialists seeking an introduction

to renewable energy.

Pedagogical Features:

- End-of-chapter problems
- Numerous case studies
- More than 150 figures and illustrations
- A solutions manual is available upon qualifying course adoption

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Editorial Review

About the Author

Dr. Vaughn Nelson has been involved with renewable energy, primarily wind energy, since the early 1970s; is the author of six books (five books on CD); has published over 50 articles and reports; was the principal investigator on numerous grants; and has given over 60 workshops and seminars from the local to international level. His primary work has been on wind resource assessment, education and training, applied research and development, and rural applications of wind energy.

Although retired, he is still associated with the Alternative Energy Institute (AEI), West Texas A&M University (WTAMU). He was director of AEI from its inception in 1977 through 2003 and then returned for another year in July 2009. He retired as dean of the Graduate School, Research and Information Technology, WTAMU, in 2001. He taught courses in physics, participated in a joint program with other state universities of physics courses over interactive TV, and also developed online courses in wind energy and solar energy at WTAMU. Dr. Nelson developed the material for a new online course in renewable energy at WTAMU, spring 2010, and this book is the result. He is also the author of *Wind Energy, Renewable Energy and the Environment* (CRC Press, Boca Raton, FL, 2009).

Dr. Nelson holds a PhD in physics from the University of Kansas; an EdM from Harvard University; and a BSE from Kansas State Teachers College, Emporia. He was at the Departamento de Física, Universidad de Oriente, Cumana, Venezuela, for two years and then at WTAMU from 1969 to the present. Dr. Nelson received a lifetime achievement award from the American Wind Energy Association in 2003.

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