

Principles of Sustainable Energy, by F. Kreith and J. F. Kreider, 1st ed. CRC Press, 2010, 855 pp., ISBN: 978-1-4398-1407-9

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This book is tailor-designed for a course on sustainable energy at the senior or graduate level in engineering and, as such, assumes that the reader has a basic understanding of thermodynamics and heat transfer. This book presents the fundamental principles and examines comprehensively practical issues surrounding energy efficiency and renewable energy concepts and systems. It recognizes that the transitioning from a fossil fuel-based economy to a sustainable energy system imposes challenges for engineering, while emphasizing the interrelation between the social, economic, environmental, and technical aspects of the sustainability challenge.

Chapter 1 presents an overview of the physical limitations that the global availability of water, food, and energy resources place upon a sustainable world population and discusses options of

future energy generation and conservation. Chapter 2 covers energy economics and the methodology for an economic assessment to give useful financial insights and enable comparisons between the various energy options. Chapters 3–11 are devoted to the fundamental and technological aspects of renewable energy conversion for: wind, biomass and biofuels, photovoltaics, solar heating and cooling, concentrated solar thermal power, passive solar design, and ocean energy. The intermittency of solar and wind resources is addressed in the final chapters dedicated to energy storage and transportation fuels, including fuel cells, hydrogen, and alternative powertrains. The extensive material contained in 855 pages is presented in a clear, logical, and compact manner, and spans from the basic governing equations to the state-of-the-art and future applications, accompanied with worked-out exercises illustrating engineering examples. Written by renowned scientist Prof. Frank Kreith, this first-rate book reflects his proficiency earned from decades of outstanding academic teaching and research.

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