Energy in Nature and Society

General Energetics of Complex Systems

VACLAV SMIL

Energy in Nature and Society is a systematic and comprehensive analysis of all the major energy sources, storages, flows, and conversions that have shaped the evolution of the biosphere and civilization. Vaclav Smil uses fundamental metric analysis (most notably for power density and energy intensity) to provide an integrated framework for analyzing all segments of energetics (the study of energy flows and their transformations). The book explores not only planetary energetics (such as solar radiation and geothermal processes) and biospheric energetics (photosynthesis, for example) but also human energetics (such as metabolism and thermogenesis), tracing them from hunter-gatherer and agricultural societies through modern industrial civilization. Included are contributions on anthropogenic conversions, traditional agriculture, preindustrial civilizations; food, fuel, and labor; the energetics of food; and the implications of energetics for the environment. The book concludes with an examination of general patterns, trends, and socioeconomic considerations of energy use today, looking at correlations between energy and value, energy and the economy, energy and quality of life, and energy futures.

Throughout the book, Smil chooses to emphasize the complex and peculiarities of the real world, and the counterintuities, outcomes of many of its processes, over abstract models. Energy in Nature and Society is a broad and unique single-volume analysis and reference source on all important energy matters, from detailed to industrial-energy flows, from fuel to food, from the Earth's formation to possible energy futures, and can serve as a test for courses in energy studies, global ecology, earth systems science, biology, and chemistry.

VACLAV SMIL is Distinguished Professor at the University of Manitoba and the author of many books, including Energy at the Crossroads (2003), The Earth's Biosphere: Evolution, Dynamics, and Change (2002), and Energies: An Illustrated Guide to the Biosphere and Civilization (1998), all of which are published by The MIT Press.

"The economist Julian Simon once called energy the 'master resource.' With this marvelously erudite, wonderfully detailed book, Vaclav Smil once again shows that when it comes to insightful discussions of the myriad complexities and consequences of the master resource, he is, without question, the master." —Robert Birkes, energy journalist and managing editor of Energy Tribune

"This is the book for the curious of any stripe who wants to dig in quantitatively and approach her or his topic with some understanding of the whole energy systems and their complex parts. In a sense, Smil has created a geography of biospheric energetics, the most complete one of its kind... The work needs the wisdom in this book and more." —John Katzmanberger, Aspen Global Change Institute

"Vaclav Smil's assessment of energy systems combines Thomas Edison and Isaac Kaka. He celebrates innovation and progress but also wisely sheds some strange facts and figures of what appear" to be some of humanity's best machines." —J. Stanley Anselin, Director, Program for the Human Environment, The Rockefeller University
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