

Energy and the New Reality

1: Energy Efficiency and the Demand for Energy Services

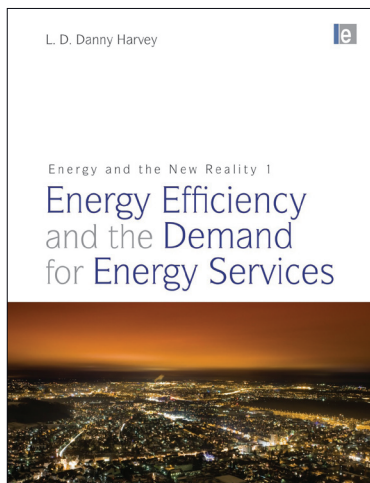
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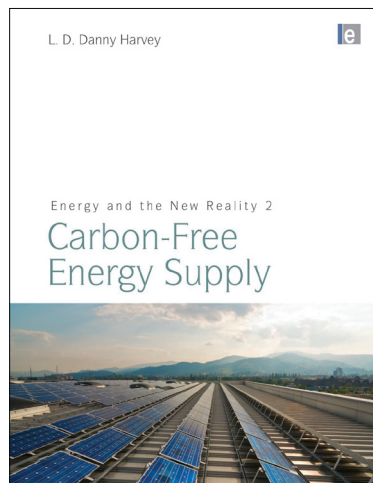
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L.D. Danny Harvey

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Volume 1

Reducing and managing humanity's demand for energy is a fundamental part of the effort to mitigate climate change. In this, the most comprehensive textbook ever written on the subject, L. Danny Harvey lays out the theory and practice of how things must change if we are to meet our energy needs sustainably. The book begins with a succinct summary of the scientific basis for concern over global warming, then outlines energy basics and current patterns and trends in energy use. This is followed by a discussion of current and advanced technologies for the generation of electricity from fossil fuels. The book then considers in detail how energy is used, and how this use can be dramatically reduced, in a range of end-use sectors.

The findings from these assessments are then applied to generate scenarios of how global energy demand could evolve over the coming decades. The book ends with a brief discussion of policies that can be used to reduce energy demand, but also addresses the limits of technologically-based improvements in efficiency in moderating demand and of the need to re-think some of our underlying assumptions concerning what we really need. Along with its companion volume, and accompanied by extensive supplementary online material, this is an essential resource for students and practitioners in engineering, architecture, environment and energy related fields.

Volume 2

Transforming our energy supplies to be more sustainable is seen by many to be the biggest challenge of our times. This comprehensive textbook opens by highlighting the importance of moving to low carbon technologies for generation, then moves on to explain the functioning, potential and social/environmental issues around solar, wind, biomass; geothermal, ocean and nuclear energy, and hydroelectric power.

It also covers the options for carbon capture and storage and the contexts in which low carbon energy can best be utilized (potential for community integrated systems, and the hydrogen economy). It closes with scenarios that combine the findings from Volume 1 with the findings from this volume to generate scenarios that succeed in limiting future atmospheric CO₂ concentration to no more than 450 ppmv. Detailed yet accessible, meticulously researched and reviewed, this work constitutes an indispensable textbook and reference for students and practitioners in sustainable energy and engineering.

Online material includes: Excel-based computational exercises, teaching slides for each chapter, spreadsheets for the generation of customized scenarios.

Danny Harvey is a Professor in the Department of Geography at the University of Toronto. He began his career over 25 years ago in the area of computer climate simulation and analysis, but has gradually shifted to the analysis of energy systems and prospects for stabilizing atmospheric greenhouse gas concentrations at relatively non-threatening levels. He is author of the *Handbook on Low-Energy Buildings and Community-Integrated Energy Systems*.

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'These volumes provide a balance of energy technology and energy systems tutorial, balanced with an excellent education in the climate-energy nexus. As energy advances to be the "front burner" issue that it needs to be and remain, texts like these are vitally needed for the new generation of energy researchers and leaders.'

Daniel M. Kammen, Distinguished Professor of Energy, University of California, Berkeley

Praise for Vol 1:

'From understanding the Carnot Cycle in power plants and electrochemical processes in fuel cells to examining waste heat recovery within industry, this is the "go to" book for those wanting to explore the many surprising opportunities for improving energy efficiency.'

John A. 'Skip' Laitner, Director of Economic and Social Analysis, American Council for an Energy-Efficient Economy

Praise for Vol 2:

'This book is a significant step forward for understanding how climate change mitigation can be effectively deployed. Technical and economic issues for each of the possible paths to achieve the goal are exhaustively presented, well documented and properly evaluated.'

Professor José Roberto Moreira, Brazilian Reference Center on Biomass, University of São Paulo, Brazil

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