

# Efficiency And Sustainability In The Energy And Chemical Industries Scientific Principles And Case Studies Second Edition Green Chemistry And Chemical Engineering

A Joined Goal of Energy Efficiency and Environmental Impact  
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## VANESSA WERNER

**A Joined Goal of Energy Efficiency and Environmental Impact** Springer Nature

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Geology, Mining, Processing, Economics, Safety and Environmental Management Efficiency and Sustainability in the Energy and Chemical Industries Scientific Principles and Case Studies

A retro-fit offers many benefits: cutting electricity and heating bills, increasing the resale value of homes, slashing carbon emissions and creating a healthier place to live. This book is the guide to making it happen. It looks at: draught-proofing, insulation and damp ventilation, heating and cooling electrical efficiency and renewable energy water use and re-use materials' life cycles and incorporating nature protection from climate change impacts - modelling energy flows and embodied energy how we can meet the need to cut carbon emissions from dwellings by eighty percent by 2050.

Projects can apply to apartment blocks, recent builds and older, solid-walled properties. Enlivened with helpful diagrams and photographs, plus plenty of pointers for further information, it provides a comprehensive resource handbook for any building professional and contractor, students - or any homeowner serious about efficiency (cash and carbon) savings.

*The Business Link to Sustainable Development* LAP Lambert Academic Publishing

For well over a decade, there has been a drive towards sustainability in planning throughout the Nordic countries. But are these countries experiencing a paradigm shift in planning research and practice with regards to sustainability? Or is the sustainability discourse leading them into an impasse in planning? This book includes overviews of the planning systems in the five Nordic countries, drawing attention to their increasing focus on sustainability. A leading team of scholars from the fields of planning, urban design, architecture, landscape, economics, real estate and tourism explore how the notion of sustainability has shaped planning research in the Nordic countries. Case studies from Iceland, Sweden, Finland, Norway and Denmark shed light on what lessons can be learned and some possible future developments. By focusing on the actual settings and practices of local and regional planning activities, it enables a discussion on the current state of planning for a more sustainable future. This book will be valuable reading for students and academics interested in planning policy, environmental policy, architecture and urban design work.

### Novel Incisive Approaches to Sustainability Earthscan

'A vital read' Saurabh Kumar, Executive Vice Chairman, Energy Efficiency Services Ltd Group 'Authoritative' Arunabha Ghosh, CEO, Council on Energy, Environment and Water, India 'A must-read' Ashok Sarkar, Senior energy specialist, World Bank The historic oil crisis of 1973, which permanently altered significant economic policies worldwide, marked a turning point in India's energy odyssey, putting the country on the path towards energy efficiency. A young energy researcher at the National Productivity Council at the time, Padu Padmanabhan soon found himself at a juncture that would lead him to the many watershed moments of this journey. Drawing on his extensive subsequent experience at the United States Agency for International Development in India and the World Bank, Padu takes us from the Nehruvian years of idealism, through the five-decade-long quest for fuel efficiency and energy conservation that ultimately paved the way for the shift towards energy-efficient practices. Simple yet highly effective, energy efficiency has come to be known as our first fuel – an inexhaustible source of energy that may be one of the most viable means of combating the consequences of climate change and the indiscriminate use of natural resources. Through lessons gleaned from the implementation of past energy-efficient technology, Padu shows us how this 'fuel' can be harnessed for a sustainable future. First Fuel is an invaluable account for not only energy-sector professionals but anyone interested in understanding what it takes to achieve energy efficiency and why we need to urgently adopt such practices. It recommends vital policy and regulatory changes and, in so doing, presents a radical new vision for energy and all its users living in the most critical of times.

### Efficiency & Sustainability: Information and electronic technologies Springer Nature

New innovations are needed for the invention of more efficient, affordable, sustainable and renewable energy systems, as well as for the mitigation of climate change and global environmental issues. In response to a fast-growing interest in the realm of renewable energy, Renewable Energy Systems: Efficiency, Innovation and Sustainability identifies a need to synthesize relevant and up-to-date information in a single volume. This book describes a systems approach to renewable energy, including technological, political, economic, social and environmental viewpoints, as well as policies and benefits. This unique and concise text, encompassing all aspects of the field in a single source, focuses on truly promising innovative and affordable renewable energy systems. Key Features: Focuses on innovations in renewable energy systems that are affordable and sustainable Collates the most relevant and up-to-date information on renewable energy systems, in a single and unique volume Discusses lifecycle assessment, cost and availability of systems Emphasizes bio-related topics Provides a systems approach to the renewable energy technologies and discusses technological, political, economic, social, and environmental viewpoints as well as policies

### Scientific Principles and Case Studies Pan Macmillan

Business-as-usual, it is widely accepted, will exceed the Earth's carrying capacity in an alarmingly short space of time. In simple terms, we need to learn to use the world's rapidly depleting resources in a significantly more efficient manner. Practical and readily adopted solutions are needed now. Eco-efficiency-or "produce more with less" – is achieved when goods and services satisfy human needs, increase the quality of life at competitive prices and when environmental impacts and resource intensity are decreased to a degree that keeps them within the limits of Earth's expected carrying capacity. Eco-efficiency – a term first proposed by the World Business Council for Sustainable Development in 1992 – is a management approach that allows businesses to carry out environmental protection measures from a market-oriented point of view, with the aim of illustrating that ecology and the economy do not need to be a contradiction. Indeed, eco-efficiency has been portrayed as a win-win-for both business and the environment. This book, which developed out of two conferences on eco-efficiency held in Düsseldorf in 1998 and 2001, is edited by Ernst Ulrich von Weizsäcker and his team from the Wuppertal Institute for Climate, Environment and Energy, one of the world's leading research programmes on resource productivity. The aim is not simply to explain the past and present of eco-efficiency but to look forward to and encourage a future where the comprehensive take-up of the concept by business, government and consumers could lead to innovation on a grand scale and the possibility of a giant leap beyond towards overall sustainability. There have been considerable achievements to date. The Dow Jones Sustainability Index, which aims to list the most sustainable corporations for investors, includes companies such as BASF, Climatex, Henkel and Matsushita/Panasonic (all represented in this book), who are implementing eco-efficiency measures. A number of political initiatives have also been formed. In December 2001, the German government suggested a National Sustainability Strategy to measure Germany's sustainable development. While this not yet an accepted political target or even law, it shows that politics is moving toward binding targets for increasing efficiency. Eco-Efficiency and Beyond collects together the leading thinkers on the topic and aims to illustrate not only that the concept should be part of every business strategy but that it is a key trigger for innovation. Innovation cuts through paradoxes. It is the creation of solutions to conflicting demands. Flying in a vacuum gave us rockets and satellites; switching electrons through insulators gave us Silicon Valley and the digital age. Sustainable development presents a similar field of paradoxical innovation forces: i.e. provide affordable products and services for the growing unmet needs of the world population while reducing environmental impacts. This book is the definitive collection on eco-efficiency and will be required reading for business, government, NGOs and academicians.

### Enhancement of Industrial Energy Efficiency and Sustainability CRC Press

Thermal comfort and indoor air quality (IAQ) issues have gained significant interest in the scientific and technical community involved in building performance analysis and other related subjects. In terms of thermal comfort, the achievement and maintenance of a thermally acceptable indoor environment is affected by energy costs, and energy poverty is a widespread problem globally. There is a call for energy-efficient architecture for a developed and sustainable world. However, with the use of renewable energy that increased considerably in recent years, new technical challenges arose for the energy sector. Consumers are key players in this context, as flexibility in demand is crucial to cope with the intermittent nature of most renewable energy sources. Active demand-side participation is particularly important to ensure the efficient use of locally and globally available energy. Sustainability, human comfort, and healthy living environments have become top priorities. Advancements in Sustainable Architecture and Energy Efficiency explores how housing is a key health factor for individuals and looks at factors such as air quality, ventilation, hygrothermal comfort, lighting, physical environment, building efficiency, and other areas as important pieces in healthy architecture. It discusses how the poor application of these parameters can directly affect human health and how sustainable architecture provides a solution. Beyond just labeling the important facets

of architecture for healthy living, this book will look at different perspectives of energy consumption and demand to ensure sustainable energy, increased energy efficiency, improved energy policies, and reasonable energy costs for homes. This book is ideal for architects, designers, engineers, energy engineers, environmental scientists, practitioners, researchers, academicians, and students interested in architecture that is both conducive to healthy living and energy efficiency.

### Handbook of Energy Efficiency in Buildings Springer

The Jevons Paradox, which was first expressed in 1865 by William Stanley Jevons in relation to use of coal, states that an increase in efficiency in using a resource leads to increased use of that resource rather than to a reduction. This has subsequently been proved to apply not just to fossil fuels, but other resource use scenarios. For example, doubling the efficiency of food production per hectare over the last 50 years (due to the Green Revolution) did not solve the problem of hunger. The increase in efficiency increased production and worsened hunger because of the resulting increase in population. The implications of this in today's world are substantial. Many scientists and policymakers argue that future technological innovations will reduce consumption of resources; the Jevons Paradox explains why this may be a false hope. This is the first book to provide a historical overview of the Jevons Paradox, provide evidence for its existence and apply it to complex systems. Written and edited by world experts in the fields of economics, ecological economics, technology and the environment, it explains the myth of efficiency and explores its implications for resource usage (particularly oil). It is a must-read for policymakers, natural resource managers, academics and students concerned with the effects of efficiency on resource use.

### International Economics of Resource Efficiency CRC Press

Human societies face a threatening future of resource scarcity and environmental damages. This book addresses the challenge of turning these risks into opportunities and policies. It is a collection of high level contributions from experts of sustainable growth and sustainable resource management. Focussing on economics, sustainability, technology and policy, the book highlights system innovation, leapfrogging strategies of emerging economies, possible rebound effects and international market development. It puts natural resources centre stage and will make an important contribution to achieving the goal of a 21st century Green Economy.

### Efficiency and Sustainability in the Energy and Chemical Industries BoD – Books on Demand

This book addresses key issues across the field of sustainable urban planning, and provides a unique reference tool for planners, engineers, architects, public administrators, and other experts. The evolution of cities and communities is giving rise to pressing energy and environmental problems that demand concrete solutions. In this context, urban planning is inevitably a complex activity that requires a sound analytical interpretation of ongoing developments, multidisciplinary analysis of the available tools and technologies, appropriate political management, and the ability to monitor progress objectively in order to verify the effectiveness of the policies implemented. This book is exceptional in both the breadth of its coverage and its focus on the interactions between different elements. Individual sections focus on strategies and tools for green planning, energy efficiency and sustainability in city planning, sustainable mobility, rating systems, and the smart city approach to improving urban-scale sustainability. The authors draw on their extensive practical experience to provide operational content supplementing the theoretical and methodological elements covered in the text, and each section features informative case studies.

### ICT - Energy Concepts for Energy Efficiency and Sustainability Springer

This book provides a solid foundation for a comprehensive, systemic and water-centric approach to water management. Said approach integrates two performance principles essential for sustainable water use systems, namely equity and efficiency. Further, it decreases the policy space for decision-making encountered by water managers and makes it easier to arrive at reasonable solutions because of the bounded rationality inherent in its development. By combining the distributive and aggregative principles, the approach offers a transparent and autonomous structure for gathering water data and enabling stakeholder involvement. Lastly, it employs and promotes a unifying language for all types of water use systems, e.g. urban, agricultural and industrial.

### Finding a Better Way to Achieve a Sustainable Energy Future Routledge

A critical aspect of sustainability associated with water and wastewater systems is to maintain and manage infrastructure in the most efficient and economical manner while complying with environmental regulations and keeping rates at acceptable levels. Given the high cost of fuel, our growing population, and the associated increase in energy needs,

### An Ecosystem Approach to Sustainable Agriculture Springer Science & Business Media

Strategies that enable organizations to succeed as businesses and as responsible corporate citizens Based on the authors' many years of research and hands-on experience, this book provides tested and proven practical strategies that make it possible for organizations to develop, maintain, or extend their competitive advantage without causing harm to the environment and society. Moreover, it explains how to set goals and objectives and then monitor, measure, and report on progress towards achieving corporate social responsibility and environmental sustainability. Most importantly, readers will discover that this can all be accomplished while, at the same time, improving bottom-line profitability. Practical Sustainability Strategies: How to Gain a Competitive Advantage is divided into four parts: Part 1, Introduction to Sustainability, underscores the urgency for organizations to adopt and develop sustainable practices Part 2, Sustainable Strategies, details numerous strategies that have been proven to work, including environmental innovation through biomimicry, green buildings, and green chemistry Part 3, Tools and Metrics, offers practical information on implementing strategies and measuring sustainability and reporting, including global standards and guidelines for managing sustainability, life-cycle analysis, carbon and water footprints such as GRI, GHG Protocol, UN Global Compact Part 4, Conclusion, provides an expert forecast of the future of sustainability Case studies based on the authors' research and fieldwork illustrate how leading companies have implemented each of the sustainability strategies discussed in the book. There's also an appendix with additional case studies exploring various aspects of business practices and sustainability. Practical Sustainability Strategies is ideal as a graduate textbook as well as a reference for business managers. All readers will not only gain a greater appreciation for sustainable development, but also the skills needed to integrate sustainability into all aspects of their organization's business practices.

**Efficiency & Sustainability: Commercial buildings : program design, implementation, and evaluation** CRC Press

Water is a vital part of every ecosystem on the planet. It is a prerequisite for the basic function and productive efficiency of life on Earth. Today, approximately a third of the earth's population suffers because of water scarcity, and by the year 2025, this percentage is likely rise to two-thirds. *Water Resources: Efficient, Sustainable and Equitable Use* shows what conflicts this will entail, and provides a basis for possible solutions.

*Towards the Sustainable Enterprise* MDPI

This book challenges conventional wisdom by showing how, in some circumstances, improved energy efficiency may increase energy consumption. Relying upon energy efficiency to reduce carbon emissions could therefore be misguided. This book explores the broader implications for climate change and sustainable consumption.

**Transparent Water Management Theory** Butterworth-Heinemann

Modern industrial agriculture is not sustainable because of its heavy reliance on petroleum, a non-renewable source of the energy used in farming, and because of pollution caused by petroleum products such as fertilizers and pesticides. A systems analysis of farming suggests that agriculture will be more sustainable when services of nature, such as nutrient recycling by soil micro-organisms and natural controls of insects, replace the services now provided by energy from petroleum. Examples are drawn from the Southeastern USA, but lessons learned can be applied worldwide.

*Practical Sustainability Strategies* John Wiley & Sons

The lighting of both exteriors and interiors is a field within electrical and lighting engineering, where important technological changes have been taking place oriented towards environmental sustainability and energy efficiency. LED technology has been gradually gaining ground in the world of lighting over other technologies due to its high lighting and energy efficiency and savings. However, some problems related to overheating or associated regulation are emerging. This has prompted the search for new, more efficient, and sustainable forms of lighting. This book presents successful cases related to energy efficiency and lighting that may be of great interest to those trying to enter the world of scientific research.

*First Fuel: India's Energy Efficiency Journey and a Radical Vision for Sustainability* Routledge

This book outlines the principles of eco-efficiency and presents case studies of their application from a number of international companies, including 3M and the Dow Chemical Company. The term "eco-efficiency" describes business activities that create economic value while reducing ecological impact and resource use. This book outlines the principles of eco-efficiency and presents case studies of their application from a number of international companies, including 3M and the Dow Chemical Company. It also discusses the value of partnerships--with other companies, business

associations, communities, regulators, and environmental and other nongovernmental groups. In the conclusion, the authors argue that business must become more eco-efficient and that governments need to change the conditions under which business operates, including tax and regulatory regimes, to make them more conducive to eco-efficiency.

*Water & Wastewater Infrastructure* BoD - Books on Demand

*Handbook of Energy Efficiency in Buildings: A Life Cycle Approach* offers a comprehensive and in-depth coverage of the subject with a further focus on the Life Cycle. The editors, renowned academics, invited a diverse group of researchers to develop original chapters for the book and managed to well integrate all contributions in a consistent volume. Sections cover the role of the building sector on energy consumption and greenhouse gas emissions, international technical standards, laws and regulations, building energy efficiency and zero energy consumption buildings, the life cycle assessment of buildings, from construction to decommissioning, and other timely topics. The multidisciplinary approach to the subject makes it valuable for researchers and industry based Civil, Construction, and Architectural Engineers. Researchers in related fields as built environment, energy and sustainability at an urban scale will also benefit from the books integrated perspective. Presents a complete and thorough coverage of energy efficiency in buildings Provides an integrated approach to all the different elements that impact energy efficiency Contains coverage of worldwide regulation

**The Efficiency Trap** Springer Nature

*Energy Efficiency in the Urban Environment* is a study of energy crisis, urbanisation, and climate change, as well as a discussion of how to combat these global challenges. With a special focus on Egypt, this book addresses the macroscale of urbanism from the perspective of city dwellers' quality of life, and explores the microscale of buildings and the perspective of ensuring indoor air quality within the boundaries of energy efficiency. Offering an integrated view of energy systems and urban planning supported by extensive data, references, and case studies, this text: Examines the energy efficiency performance of cities following sustainable urbanism principles Investigates how informal areas in developing countries achieve sustainable development Presents energy-efficient urban planning as a tool for improving city energy performance Proposes the development of a common procedure for obtaining an energy performance certificate Calculates the energy performance of buildings, accounting for heating/cooling systems and other variables *Energy Efficiency in the Urban Environment* demonstrates the importance of implementing an energy performance directive to aid energy savings in large buildings and set regulations for energy-efficient designs based on standard calculation methods. This book provides engineers working with sustainable energy systems, urban planners needing information on energy systems and optimisation, and professors and students of engineering, environmental science, and urban planning with a valuable reference on energy sustainability.

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