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KEY=ANALYSIS - YAMILET DENISSE

Application of Exergy

BoD - Books on Demand The main scope of this study is to emphasize exergy efficiency in all fields of industry. The chapters collected in the book are contributed by invited researchers with a long-standing experience in different research areas. I hope that the material presented here is understandable to a wide audience, not only energy engineers but also scientists from various disciplines. The book contains seven chapters in three sections: (1) "General Information about Exergy," (2) "Exergy Applications," and (3) "Thermoeconomic Analysis." This book provides detailed and up-to-date evaluations in different areas written by academics with experience in their fields. It is anticipated that this book will make a scientific contribution to exergy workers, researchers, academics, PhD students, and other scientists in both the present and the future.

Exergy, Energy System Analysis and Optimization - Volume I

Exergy and Thermodynamic Analysis

EOLSS Publications Exergy, Energy System Analysis, and Optimization theme is a component of the Encyclopedia of Energy Sciences, Engineering and Technology Resources which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. These three volumes are organized into five different topics which represent the main scientific areas of the theme: 1. Exergy and Thermodynamic Analysis; 2. Thermoeconomic Analysis; 3. Modeling, Simulation and Optimization in Energy Systems; 4. Artificial Intelligence and Expert Systems in Energy Systems Analysis; 5. Sustainability Considerations in the Modeling of Energy Systems. Fundamentals and applications of characteristic methods are presented in these volumes. These three volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

MECHANICAL ENGINEERING, ENERGY SYSTEMS AND SUSTAINABLE DEVELOPMENT -Volume IV

EOLSS Publications Mechanical Engineering, Energy Systems and Sustainable Development theme is a component of Encyclopedia of Physical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Mechanical Engineering, Energy Systems and Sustainable Development with contributions from distinguished experts in the field discusses mechanical engineering - the generation and application of heat and mechanical power and the design, production, and use of machines and tools. These five volumes are aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers, NGOs and GOs.

Exergy, Energy System Analysis and Optimization - Volume II

Thermoeconomic Analysis Modeling, Simulation and Optimization in Energy Systems

EOLSS Publications Exergy, Energy System Analysis, and Optimization theme is a component of the Encyclopedia of Energy Sciences, Engineering and Technology Resources which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. These three volumes are organized into five different topics which represent the main scientific areas of the theme: 1. Exergy and Thermodynamic Analysis; 2. Thermoeconomic Analysis; 3. Modeling, Simulation and Optimization in Energy Systems; 4. Artificial Intelligence and Expert Systems in Energy Systems Analysis; 5. Sustainability Considerations in the Modeling of Energy Systems. Fundamentals and applications of characteristic methods are presented in these volumes. These three volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

Modelling and simulation of low-temperature district heating systems for the development of an exergy-based assessment method.

BoD - Books on Demand Low temperature district heating (LTDH) offers possibilities for efficient heat supply based on renewable energies. For the analysis of LTDH, the exergetic assessment is a suitable method. Hence, an exergy-based assessment method was developed in which energy as well as economic and sustainability aspects are combined. As part of a technology comparison, the method is applied to case studies to verify the applicability of the assessment approach. The approach highlights innovative supply solutions by identifying the advantages and disadvantages of different supply strategies.

Progress in Exergy, Energy, and the Environment

Springer This thorough and highly relevant volume examines exergy, energy and the environment in the context of energy systems and applications and as a potential tool for design, analysis, optimization. It further considers their role in minimizing and/or eliminating environmental impacts and providing for sustainable development. In this regard, several key topics ranging from the basics of the thermodynamic concepts to advanced exergy analysis techniques in a wide range of applications are covered.

Exergy, Energy System Analysis and Optimization - Volume III

Artificial Intelligence and Expert Systems in Energy Systems Analysis Sustainability Considerations in the Modeling of Energy Systems

EOLSS Publications Exergy, Energy System Analysis, and Optimization theme is a component of the Encyclopedia of Energy Sciences, Engineering and Technology Resources which is part of the global Encyclopedia of Life Support Systems (EOLSS), an integrated compendium of twenty one Encyclopedias. These three volumes are organized into five different topics which represent the main scientific areas of the theme: 1. Exergy and Thermodynamic Analysis; 2. Thermo-economic Analysis; 3. Modeling, Simulation and Optimization in Energy Systems; 4. Artificial Intelligence and Expert Systems in Energy Systems Analysis; 5. Sustainability Considerations in the Modeling of Energy Systems. Fundamentals and applications of characteristic methods are presented in these volumes. These three volumes are aimed at the following five major target audiences: University and College Students, Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

Comprehensive Energy Systems

Elsevier Comprehensive Energy Systems provides a unified source of information covering the entire spectrum of energy, one of the most significant issues humanity has to face. This comprehensive book describes traditional and novel energy systems, from single generation to multi-generation, also covering theory and applications. In addition, it also presents high-level coverage on energy policies, strategies, environmental impacts and sustainable development. No other published work covers such breadth of topics in similar depth. High-level sections include Energy Fundamentals, Energy Materials, Energy Production, Energy Conversion, and Energy Management. Offers the most comprehensive resource available on the topic of energy systems Presents an authoritative resource authored and edited by leading experts in the field Consolidates information currently scattered in publications from different research fields (engineering as well as physics, chemistry, environmental sciences and economics), thus ensuring a common standard and language

Engineering Thermodynamics of Thermal Radiation: for Solar Power Utilization

McGraw Hill Professional Complete coverage of the thermodynamics of radiation matter for solar energy utilization This comprehensive guide reviews the fundamentals of the thermodynamics of radiation matter--photon gas. The book introduces the exergy of radiation through the most advanced thermodynamic analysis of the solar power processes involving radiation. Engineering Thermodynamics of Thermal Radiation: For Solar Power Utilization provides, for the first time, an exhaustive discussion on energy and exergy analysis of radiation processes. Extensive details on the exergy of radiation are developed for evaluation of the practical uses of radiation. This volume contains quantitative calculation examples for solar heating, a solar chimney power plant, photosynthesis, and photovoltaic technology. Addressed to researchers, designers, and users of different solar installations, the book also has the potential to inspire the development of new applications of radiation exergy. Coverage includes: Definitions and laws of substance and radiation Laws of thermodynamic analysis, including energy and exergy analysis Thermodynamic properties of photon gas Exergy of emission and arbitrary radiation flux Energy, entropy, and exergy radiation spectra of surfaces Thermodynamic analysis of heat from the sun, a solar chimney power plant, photosynthesis, and the photovoltaic

Exergy

Energy, Environment and Sustainable Development

Newnes This book deals with exergy and its applications to various energy systems and applications as a potential tool for design, analysis and optimization, and its role in minimizing and/or eliminating environmental impacts and providing sustainable development. In this regard, several key topics ranging from the basics of the thermodynamic concepts to advanced exergy analysis techniques in a wide range of applications are covered as outlined in the contents. Offers comprehensive coverage of exergy and its applications, along with the most up-to-date information in the area with recent developments Connects exergy with three essential areas in terms of energy, environment and sustainable development Provides a number of illustrative examples, practical applications, and case studies Written in an easy-to-follow style, starting from the basics to advanced systems

Sustainability Assessment of Renewables-Based Products

Methods and Case Studies

John Wiley & Sons An extensive update and sequel to the successful title Renewables-Based Technology: Sustainability Assessment. Over the past decade, the field of renewable resources has grown tremendously and sustainability assessment methods have undergone significant changes and improvements. This book brings together the wide range of sustainability assessment methods in current use, together with case studies to demonstrate their applications. The book is divided into four sections as follows: Part 1 - Introduction: Discusses the growing role of renewables as resources and their applications, together with an introduction to the principles of sustainability assessment Part 2 - Assessment Methods: Presents a wide variety of sustainability assessment methods and tools that are currently used. This includes land, water-and material use analysis, energy and exergy use, carbon footprints, life cycle analysis, ecological footprints, life cycle costing, social sustainability analysis, Prosuite methodology and Seebalance (the SocioEcoEfficiency Analysis developed by BASF. Part 3 - Case Studies: Provides context by demonstrating the application of these methods within the major industries benefiting from renewables. The case studies apply sustainability assessment methods to the production of renewable energy (wind energy, solar energy and biofuels), bio-based chemicals and bio-based materials. Part 4 - Conclusions

Adsorption Processes for Water Treatment and Purification

Springer This book provides researchers and graduate students with an overview of the latest developments in and applications of adsorption processes for water treatment and purification. In particular, it covers current topics in connection with the modeling and design of adsorption processes, and the synthesis and application of cost-effective adsorbents for the removal of relevant aquatic pollutants. The book describes recent advances and alternatives to improve the performance and efficacy of this water purification technique. In addition, selected chapters are devoted to discussing the reliable modeling and analysis of adsorption data, which are relevant for real-life applications to industrial effluents and groundwater. Overall, the book equips readers with a general perspective of the potential that adsorption processes hold for the removal of emerging water pollutants. It can readily be adopted as part of special courses on environmental engineering, adsorption and water treatment for upper undergraduate and graduate students. Furthermore, the book offers a valuable resource for researchers in water production control, as well as for practitioners interested in applying adsorption processes to real-world problems in water treatment and related areas.

Thermal Design and Optimization

John Wiley & Sons A comprehensive and rigorous introduction to thermal system design from a contemporary perspective Thermal Design and Optimization offers readers a lucid introduction to the latest methodologies for the design of thermal systems and emphasizes engineering economics, system simulation, and optimization methods. The methods of exergy analysis, entropy generation minimization, and thermoeconomics are incorporated in an evolutionary manner. This book is one of the few sources available that addresses the recommendations of the Accreditation Board for Engineering and Technology for new courses in design engineering. Intended for classroom use as well as self-study, the text provides a review of fundamental concepts, extensive reference lists, end-of-chapter problem sets, helpful appendices, and a comprehensive case study that is followed throughout the text. Contents include: * Introduction to Thermal System Design * Thermodynamics, Modeling, and Design Analysis * Exergy Analysis * Heat Transfer, Modeling, and Design Analysis * Applications with Heat and Fluid Flow * Applications with Thermodynamics and Heat and Fluid Flow * Economic Analysis * Thermoeconomic Analysis and Evaluation * Thermoeconomic Optimization Thermal Design and Optimization offers engineering students, practicing engineers, and technical managers a comprehensive and rigorous introduction to thermal system design and optimization from a distinctly contemporary

perspective. Unlike traditional books that are largely oriented toward design analysis and components, this forward-thinking book aligns itself with an increasing number of active designers who believe that more effective, system-oriented design methods are needed. Thermal Design and Optimization offers a lucid presentation of thermodynamics, heat transfer, and fluid mechanics as they are applied to the design of thermal systems. This book broadens the scope of engineering design by placing a strong emphasis on engineering economics, system simulation, and optimization techniques. Opening with a concise review of fundamentals, it develops design methods within a framework of industrial applications that gradually increase in complexity. These applications include, among others, power generation by large and small systems, and cryogenic systems for the manufacturing, chemical, and food processing industries. This unique book draws on the best contemporary thinking about design and design methodology, including discussions of concurrent design and quality function deployment. Recent developments based on the second law of thermodynamics are also included, especially the use of exergy analysis, entropy generation minimization, and thermo-economics. To demonstrate the application of important design principles introduced, a single case study involving the design of a cogeneration system is followed throughout the book. In addition, Thermal Design and Optimization is one of the best newsources available for meeting the recommendations of the Accreditation Board for Engineering and Technology for more design emphasis in engineering curricula. Supported by extensive reference lists, end-of-chapter problem sets, and helpful appendices, this is a superb text for both the classroom and self-study, and for use in industrial design, development, and research. A detailed solutions manual is available from the publisher.

Bioenergy and Renewable Power Methane in Integrated 100% Renewable Energy Systems. Limiting Global Warming by Transforming Energy Systems

Limiting Global Warming By Transforming Energy Systems

Kassel University Press GmbH

Sustaining Prosperity, Nature and Wellbeing

What do the Indicators Tell Us?

Routledge This book explores what is needed for an overall evaluation of the prosperity and wellbeing of people within a framework of sustaining the economy, environment and development. The book begins by assessing the validity of available data, indicators and indices in decision and policy making. It describes what the data tell us about the effects of economic activity on the quality of life and prosperity of people and nations, now and in the future, and highlights how a reliance on partial and distorted information can thwart rational policies. It also examines whether less tangible notions of wellbeing and happiness lend themselves to quantification and prediction. Overall, Bartelmus demonstrates the need for integrated accounting and analysis to revise policy priorities around environmental, social, economic and sustainability concerns. Confronting the persisting polarization of environmentalists and economists, this book will be of great relevance to students, scholars and professionals with an interest in environmental and ecological economics, sustainability indicators and their use in integrative policy.

ECOS 2012 The 25th International Conference on Efficiency, Cost, Optimization and Simulation of Energy Conversion Systems and Processes (Perugia, June 26th-June 29th, 2012)

Firenze University Press

Handbook of Environmental Materials Management

Springer This reference work analyzes and assesses global environmental management techniques for environmental materials with a focus on their performance and economic benefits, proposing eco-friendly solutions and designating policies that will sustain the environment for future generations. It addresses management of environmental materials as not only a complex anthropogenic problem, but also as an expensive problem that needs to be managed sustainably. Simultaneously, it considers the environmental and economic benefits involved in the high levels of investment and operation costs required to develop effective materials collection and management systems in modern society.

OUR FRAGILE WORLD: Challenges and Opportunities for Sustainable Development - Volume I

EOLSS Publications This publication, Our Fragile World: Challenges and Opportunities for Sustainable Development, presents perspectives of several important subjects that are covered in greater detail and depth in the Encyclopedia of Life Support Systems (EOLSS). The contributions to the two volumes provide an integrated presentation of knowledge and worldviews related to the state of: Earth's natural resources, social resources, institutional resources, and economic and financial resources. They present the vision and thinking of over 200 authors in support of efforts to solve the complex problems connected with sustainable development, and to secure perennial life support on "The Blue Planet". These contributions are holistic, informative, forward looking, and will be of interest to a broad readership. This volume presents contributions with focus on the Natural and Social Dimensions of sustainable Development in two sections: NATURAL SYSTEMS AND RESOURCES (Natural Systems and Climate Change ; - Natural Resources Management). - SOCIO-CULTURAL ISSUES (Human Security, Peace, and Socio-Cultural issues; Equity and Ethical issues).

Petroleum and Gas Field Processing

CRC Press Many oil production processes present a significant challenge to the oil and gas field processing facilities and equipment design. The optimization of the sequential operations of handling the oil-gas mixture can be a major factor in increasing oil and gas production rates and reducing operating costs. Petroleum and Gas Field Processing provides an all-inclusive guide to surface petroleum operations and solves these and other problems encountered in the field processing of oil and gas. Fully revised and updated to reflect major changes over the past decade or so, this second edition builds on the success attained in the first edition. It delivers an expanded and updated treatment that covers the principles and procedures related to the processing of reservoir fluids for the separation, handling, treatment, and production of quality petroleum oil and gas products. With five new chapters, this second edition covers additional subjects, in particular natural gas, economics and profitability, oil field chemicals, and piping and pumps. The book also contains worked-out examples and case studies from a variety of oil field operations.

Thermodynamics for Sustainable Management of Natural Resources

Springer This book examines ways of assessing the rational management of nonrenewable resources. Integrating numerous methods, it systematically exposes the strengths of exergy analysis in resources management. Divided into two parts, the first section provides the theoretical background to assessment methods, while the second section provides practical application examples. The topics covered in detail include the theory of exergy cost and thermo-ecological cost, cumulative calculus and life cycle evaluation. This book serves as a valuable resource for researchers looking to investigate a range of advanced thermodynamic assessments of the influence of production processes on the depletion of nonrenewable resources.

THERMAL POWER PLANT AND CO-GENERATION PLANNING - VoLUME III

These volumes are a component of Encyclopedia of Water Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. These volumes discuss on Large-scale power production which requires the use of heat in a thermodynamic cycle to produce mechanical work, which in turn can generate electrical energy. Substantial quantities of fuel are hence required to sustain the production of heat. Fuel may be combustible, as in the case of fossil fuels such as coal and oil, or fissionable, as in the case of nuclear fuels such as uranium. All fuels produce waste products, which must be discharged, dumped, or stored. Such products range from innocuous water vapor to hazardous nuclear waste. These volumes are aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy and Decision Makers

Energy Efficiency and Management in Food Processing Facilities

CRC Press Energy efficiency, environmental protection, and processing waste management continue to attract increased attention in the food processing industry. As with other industrial sectors, reducing costs while also reducing environmental impact and improving overall sustainability is becoming an important part of the business process. Providing practical guidance, *Energy Efficiency and Management in Food Processing Facilities* explores energy efficiency technologies, emerging energy efficient processes, and methods for converting food processing wastes into energy. Organized around five central themes, the book explores: Fundamentals of energy conservation, analysis, and management Energy conservation technologies as applied to the food processing industry Energy efficiency and conservations in current food processing systems Emerging systems Energy conversion technologies for utilization of food processing wastes Conservation Techniques that Improve the Bottom Line The lack of information on energy conservation and conversion technologies has been a major barrier to energy efficiency improvement and the utilization of processing wastes in the food processing industry. With coverage ranging from basic theory to traditional and alternative energy, this book provides the required skill set for the increased energy conservation and reduced consumption that will positively impact the bottom line in food processing facilities.

The Exergy Method of Thermal Plant Analysis

Elsevier The Exergy Method of Thermal Plant Analysis aims to discuss the history, related concepts, applications, and development of the Exergy Method - analysis technique that uses the Second Law of Thermodynamics as the basis of evaluation of thermodynamic loss. The book, after an introduction to thermodynamics and its related concepts, covers concepts related to exergy, such as physical and chemical exergy, exergy concepts for a control method and a closed-system analysis, the exergy analysis of simple processes, and the thermocentric applications of exergy. A seven-part appendix is also included. Appendices A-D covers miscellaneous information on exergy, and Appendix E features charts of thermodynamic properties. Appendix F is a glossary of terms, and Appendix G contains the list of references. The text is recommended for physicists who would like to know more about the Exergy Method, its underlying principles, and its applications not only in thermal plant analysis but also in certain areas.

Thermodynamic Optimization of Complex Energy Systems

Springer Science & Business Media A comprehensive assessment of the methodologies of thermodynamic optimization, exergy analysis and thermoeconomics, and their application to the design of efficient and environmentally sound energy systems. The chapters are organized in a sequence that begins with pure thermodynamics and progresses towards the blending of thermodynamics with other disciplines, such as heat transfer and cost accounting. Three methods of analysis stand out: entropy generation minimization, exergy (or availability) analysis, and thermoeconomics. The book reviews current directions in a field that is both extremely important and intellectually alive. Additionally, new directions for research on thermodynamics and optimization are revealed.

Biorefineries and Chemical Processes

Design, Integration and Sustainability Analysis

John Wiley & Sons As the range of feedstocks, process technologies and products expand, biorefineries will become increasingly complex manufacturing systems. *Biorefineries and Chemical Processes: Design, Integration and Sustainability Analysis* presents process modelling and integration, and whole system life cycle analysis tools for the synthesis, design, operation and sustainable development of biorefinery and chemical processes. Topics covered include: Introduction: An introduction to the concept and development of biorefineries. Tools: Included here are the methods for detailed economic and environmental impact analyses; combined economic value and environmental impact analysis; life cycle assessment (LCA); multi-criteria analysis; heat integration and utility system design; mathematical programming based optimization and genetic algorithms. Process synthesis and design: Focuses on modern unit operations and innovative process flowsheets. Discusses thermochemical and biochemical processing of biomass, production of chemicals and polymers from biomass, and processes for carbon dioxide capture. Biorefinery systems: Presents biorefinery process synthesis using whole system analysis. Discusses bio-oil and algae biorefineries, integrated fuel cells and renewables, and heterogeneous catalytic reactors. Companion website: Four case studies, additional exercises and examples are available online, together with three supplementary chapters which address waste and emission minimization, energy storage and control systems, and the optimization and reuse of water. This textbook is designed to bridge a gap between engineering design and sustainability assessment, for advanced students and practicing process designers and engineers.

Advances in Heat Pump-Assisted Drying Technology

CRC Press Drying of solids is one of the most common, complex, and energy-intensive industrial processes. Conventional dryers offer limited opportunities to increase energy efficiency. Heat pump dryers are more energy and cost effective, as they can recycle drying thermal energy and reduce CO₂, particulate, and VOC emissions due to drying. This book provides an introduction to the technology and current best practices and aims to increase the successful industrial implementation of heat pump-assisted dryers. It enables the reader to engage confidently with the technology and provides a wealth of information on theories, current practices, and future directions of the technology. It emphasizes several new design concepts and operating and control strategies, which can be applied to improve the economic and environmental efficiency of the drying process. It answers questions about risks, advantages vs. disadvantages, and impediments and offers solutions to current problems. Discusses heat pump technology in general and its present and future challenges. Describes interesting and promising innovations in drying food, agricultural, and wood products with various heat pump technologies. Treats several technical aspects, from modeling and simulation of drying processes to industrial applications. Emphasizes new design concepts and operating and control strategies to improve the efficiency of the drying process.

A User Guide on Process Integration for the Efficient Use of Energy

Advanced Communication and Control Methods for Future Smartgrids

Perspectives for Biodiversity and Ecosystems

Springer Nature The novelty of the book is a strong focus on perception, perspectives and prediction by scientists with profound insight into the ecology of ecosystems or into human demands and activity. The challenge is to bridge from empirical data and the knowledge of the past to the possibilities of the performance in the future. We assume that there is scope for more cooperation between the fields of ecology and practical philosophy or other social sciences in organising ecosystems and shaping the cultural future of humankind, and that such collaboration should be accorded considerably more priority. This book deals with environmental processes seen within a framework of the nature of ecosystems and human cultures. The future of the environment, the development of ecosystems and effective nature conservation management are the essentials of this book. Human nature and culture,

and in particular their interactions, are interpreted as a set of rules and as given. The aim is not only to assess the significance of human influence on species composition and biodiversity but also to weigh up the subsequent potentials for action. In this book we will analyze the problems independently of one another, even if they are interconnected. This book focuses on perspectives and prognoses for the impacts of anthropogenic activity on ecosystems and thus on species conservation. Its goal is to improve assessments of the impacts of human activity on the environment. We are aware that prognoses have very often proven to be false. It is difficult to impossible to be able to predict with precision how evolution and ecosystems will change in future under anthropogenic influence. This strengthens our resolve to attempt to retain the highest possible degree of scientific integrity and professionalism and not to shy away from expressing the uncertainty of our own ideas and prognoses. We venture prognoses in this book and we will fail. However, we hope that we will be wrong on the right side.

LowEx Communities - Optimised Performance of Energy Supply Systems with Exergy Principles.

The Jevons Paradox and the Myth of Resource Efficiency Improvements

Taylor & Francis 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.

Energy Storage Systems

Empirical Studies on Economics of Innovation, Public Economics and Management

Proceedings of the 18th Eurasia Business and Economics Society Conference

Springer This volume presents selected papers from the 18th Eurasia Business and Economics Society (EBES) Conference, with major emphasis placed on highlighting the latest research developments in the economics of innovation, public economics, and management. The articles in the volume also address more specialized topics such as luxury fashion, weather derivatives, health management, Islamic bonds, and life satisfaction, among others. The majority of the articles focus on phenomena observed in the Middle East and North Africa (MENA) region and South Asia, representing a unique contribution to understanding contemporary research challenges from a different perspective.

Sustainability

A Way to Abundance

CRC Press The book describes mechanisms whereby the Earth naturally thrives towards energy and resources abundance and how unsustainable industrial practices alter this trend. Introduces the concept of earth energy and associates this to the conditions of the biosphere and emphasizes the possibilities with inexpensive wind and solar energy. Provides a good quantification of the concepts of sustainability and its effects on the environment and critical analysis and updates to the relationships between the environmental impact, affluence and technology.

Living Rivers: Trends and Challenges in Science and Management

Springer Science & Business Media This book demonstrates an integrated perspective of trends and challenges in sustainable river science and management, as presented by experts in the fields that form its foundations - ecology, economy and sociology. Their contributions integrate current knowledge of the structure, functioning and management of 'living rivers'. Also included are data and experiences concerning the rivers Allier, Meuse, Rhine, Sava and Tagliamento in Europe and the Illinois River in the USA.

Sustainable Development in Practice

Case Studies for Engineers and Scientists

John Wiley & Sons This groundbreaking text provides background theory on the concept of sustainable development (environmental, social and economic aspects) and presents a series of practical case studies on such topics as waste water management, air quality, solid waste management and renewable energy.

Goal and Scope Definition in Life Cycle Assessment

Springer This book describes the importance of the goal and scope phase for the entire LCA study. In this first phase of the LCA framework (ISO standardized), the purpose of the assessment is defined and decisions are made about the details of the industrial system being studied and how the study will be conducted. Selecting impact categories, category indicators, characterization models, and peer review is decided during goal and scope definition. The book provides practical guidance and an overview of LCIA methods available in LCA software. Although not specified in the ISO standards, Attributional LCA and Consequential LCA are presented in order to appropriately determine the goal and scope of an assessment. The book closes with the interconnection between goal and scope definition and the interpretation phase. Example goal and scope documents for attributional and consequential LCAs are provided in the annexes.

Our Fragile World

Challenges and Opportunities for Sustainable Development

Modeling, Simulation, and Optimization

Springer This book features selected contributions in the areas of modeling, simulation, and optimization. The contributors discuss requirements in problem solving for modeling, simulation, and optimization. Modeling, simulation, and optimization have increased in demand in exponential ways and how potential solutions might be reached. They describe how new technologies in computing and engineering have reduced the dimension of data coverage worldwide, and how recent inventions in information and communication technology (ICT) have inched towards reducing the gaps and coverage of domains globally. The chapters cover how the digging of information in a large data and soft-computing techniques have contributed to a strength in prediction and analysis, for decision making in computer science, technology, management, social computing, green computing, and telecom. The book provides an insightful reference to the researchers in the fields of engineering and computer science. Researchers, academics, and professionals will benefit from this volume. Features selected expanded papers in modeling, simulation, and optimization from COMPSE 2016; Includes research into soft computing and its application in engineering and technology; Presents contributions from global experts in academia and industry in modeling, simulation, and optimization.

The Second Law of Economics

Energy, Entropy, and the Origins of Wealth

Springer Science & Business Media Nothing happens in the world without energy conversion and entropy production. These fundamental natural laws are familiar to most of us when applied to the evolution of stars, biological processes, or the working of an internal combustion engine, but what about industrial economies and wealth production, or their constant companion, pollution? Does economics conform to the First and the Second Law of Thermodynamics? In this important book, Reiner Kümmel takes us on a fascinating tour of these laws and their influence on natural, technological, and social evolution. Analyzing economic growth in Germany, Japan, and the United States in light of technological constraints on capital, labor, and energy, Professor Kümmel upends conventional economic wisdom by showing that the productive power of energy far outweighs its small share of costs, while for labor just the opposite is true. Wealth creation by energy conversion is accompanied and limited by polluting emissions that are coupled to entropy production. These facts constitute the Second Law of Economics. They take on unprecedented importance in a world that is facing peak oil, debt-driven economic turmoil, and threats from pollution and climate change. They complement the First Law of Economics: Wealth is allocated on markets, and the legal framework determines the outcome. By applying the First and Second Law we understand the true origins of wealth production, the issues that imperil the goal of sustainable development, and the technological options that are compatible both with this goal and with natural laws. The critical role of energy and entropy in the productive sectors of the economy must be realized if we are to create a road map that avoids a Dark Age of shrinking natural resources, environmental degradation, and increasing social tensions.