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E08 - LESTER HARDY

Quantifying exergy losses in the energy supply system of buildings reveals the potential for energy improvement, which cannot be discovered using conventional energy analysis. Thermoconomics combines economic and thermodynamic analysis by applying the concept of cost (an economic concept) to exergy, as exergy is a thermodynamic property fit for this purpose, in that it combines the quantity of energy with its quality factor. Exergy Analysis and Thermoconomics of Buildings applies exergy analysis methods and thermoconomics to the built environment. The mechanisms of heat transfer throughout the envelope of buildings are analyzed from an exergy perspective and then to the building thermal installations, analyzing the different components, such as condensing boilers, absorption refrigerators, microcogeneration plants, etc., including solar installations and finally the thermal facilities as a whole. A detailed analysis of the cost formation process is presented, which has its physical roots firmly planted in the second law of thermodynamics. The basic principles and the rules of cost allocation, in energy units (exergy cost), in monetary units (exergoeconomic cost), and in CO₂ emissions (exergoenvironmental cost), based on the so-called Exergy Cost Theory are presented and applied to thermal installations of buildings. Clear and rigorous in its exposition, Exergy Analysis and Thermoconomics of Buildings discusses exergy analysis and thermoconomics and the role they could play in the analysis and design of building components, either the envelope or the thermal facilities, as well as the diagnosis of thermal installations. This book moves progressively from introducing the basic concepts to applying them. Exergy Analysis and Thermoconomics of Buildings provides examples of specific cases throughout this book. These cases include real data, so that the results obtained are useful to interpret the inefficiencies and losses that truly occur in actual installations; hence, the assessment of their effects encourages the manner to improve efficiency. Applies exergy analysis methods for the installation of building thermal facilities equipment components, including pipes, valves, heat exchangers, boilers and heat pumps Helps readers determine the operational costs of heating and cooling building systems Includes exergy analysis methods that are devoted to absorption refrigerators, adsorption cooling systems, basic air conditioning processes, ventilation systems and solar systems, either thermal and PV Discusses the direct application of exergy analysis concepts, including examples of buildings with typical heating, DHW and air conditioning installations

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: Design and Operation deals with various aspects of a thermal power plant, providing a new dimension to the subject, with focus on operating practices and troubleshooting, as well as technology and design. Its author has a 40-long association with thermal power plants in design as well as field engineering, sharing his experience with professional engineers under various training capacities, such as training programs for graduate engineers and operating personnel. Thermal Power Plant presents practical content on coal-, gas-, oil-, peat- and biomass-fueled thermal power plants, with chapters in steam power plant systems, start up and shut down, and interlock and protection. Its practical approach is ideal for engineering professionals. Focuses exclusively on thermal power, addressing some new frontiers specific to thermal plants Presents both technology and design aspects of thermal power plants, with special treatment on plant operating practices and troubleshooting Features a practical approach ideal for professionals, but can also be used to complement undergraduate and graduate studies

Thermal Power Plants theme is a component of Encyclopedia of Energy Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. The Theme on Thermal Power Plants presents three main topics which are then expanded into multiple subtopics, each as a chapter. The first topic covers the basic theory including fossil fuel combustion, nuclear fission, thermal fluids and thermodynamic cycles. It then deals with those aspects important to the maintenance of high efficiency and good reliability such as exergy analysis, material characteristics and life extension. The second topic deals with the production of steam. Although this is only the heat receiving part of the steam cycle it is consistent with the general layout of the power plant where the fossil fuel fired boiler or nuclear fission reactor is a separate and distinct part with its own ancillary equipment. Fossil boilers and nuclear reactors both produce steam but are so different that each is covered separately in its respective series of chapters. The third topic deals with the generation of power utilizing the steam produced in the boiler or reactor. Several chapters cover steam turbine design and operation. Since power must be produced to exactly match the demand, consideration is given to operational constraints and protective devices. Heat rejection in cooling towers is important where no large body of water exists and is addressed in one chapter. Gas turbines are used for peak power generation and, with steam turbines, for combined cycle plants so are dealt with in two chapters. Conversion of mechanical power from the turbine to electrical power for distribution to the consumer is an important aspect and is covered by the last chapter. 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, NGOs and GOs.

This Encyclopedia of Control Systems, Robotics, and Automation is a component of the global Encyclopedia of Life Support Systems EOLSS, which is an integrated compendium of twenty one Encyclopedias. This 22-volume set contains 240 chapters, each of size 5000-30000 words, with perspec-

tives, applications and extensive illustrations. It is the only publication of its kind carrying state-of-the-art knowledge in the fields of Control Systems, Robotics, and Automation and is aimed, by virtue of the several applications, 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.

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

Thermal to Mechanical Energy Conversion: Engines and Requirements is a component of Encyclopedia of Energy 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 Thermal to Mechanical Energy Conversion: Engines and Requirements with contributions from distinguished experts in the field discusses energy. 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.

Future Energy will allow us to make reasonable, logical and correct decisions on our future energy as a result of two of the most serious problems that the civilized world has to face; the looming shortage of oil (which supplies most of our transport fuel) and the alarming rise in atmospheric carbon dioxide over the past 50 years (resulting from the burning of oil, gas and coal and the loss of forests) that threatens to change the world's climate through global warming. Future Energy focuses on all the types of energy available to us, taking into account a future involving a reduction in oil and gas production and the rapidly increasing amount of carbon dioxide in our atmosphere. It is unique in the genre of books of similar title in that each chapter has been written by a scientist or engineer who is an expert in his or her field. The book is divided into four sections: • Traditional Fossil Fuel and Nuclear Energy • Renewable Energy • Potentially Important New Types of Energy • New Aspects to Future Energy Usage Each chapter highlights the basic theory and implementation, scope, problems and costs associated with a particular type of energy. The traditional fuels are included because they will be with us for decades to come - but, we hope, in a cleaner form. The renewable energy types includes wind power, wave power, tidal energy, two forms of solar energy, bio-mass, hydroelectricity, geothermal and the hydrogen economy. Potentially important new types of energy include: pebble bed nuclear reactors, nuclear fusion, methane hydrates and recent developments in fuel cells and batteries. - Written by experts in the key future energy disciplines from around the globe - Details of all possible forms of energy that are and will be available globally in the next two decades - Puts each type of available energy into perspective with realistic, future options

Pollution Control Technologies is a component of Encyclopedia of Environmental and Ecological 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 Pollution Control Technologies focuses largely concerned with strategies for pollution reduction, and pollution prevention if at all possible, using scientific and technological methods. Focusing primarily but not exclusively on air pollution, the Theme is written in simple English, avoiding both mathematical and chemical equations as far as possible to facilitate effective and widest possible dissemination. The content of the Theme provides the essential aspects and a myriad of issues of great relevance to our world such as: Control of Particulate Matter in Gaseous Emissions; Control of Gaseous Emissions; Pollution Control through Efficient Combustion Technology; Pollution Control in Industrial Processes; Pollution Control in Transportation, which are then expanded into multiple subtopics, each as a chapter. 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

This book presents nine chapters based on fundamental and applied research of alternative energies. At the present time, the challenge is that technology has to come up with solutions that can provide environmentally friendly energy supply options that are able to cover the current world energy demand. Experts around the world are working on these issues for providing new solutions that will break the existing technological barriers. This book aims to address key pillars in the alternative energy field, such as: biomass energy, hydrogen energy, solar energy, wind energy, hydroelectric power, geothermal energy and their environmental implications, with the most updated progress for each pillar. It also includes the life cycle assessment (LCA) and thermo-economic analysis (TA) as tools for evaluating and optimising environmental and cost subjects. Chapters are organized into fundamental research, applied research and future trends; and written for engineers, academic researches and scientists.

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, Pro-

Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers and NGOs.

This work presents a comprehensive investigation of the most significant renewable hydrogen production processes. Technical, economic and ecological studies are described for the processes of steam reforming of ethanol, natural gas and biogas; water electrolysis with energy from renewable sources (wind power, photovoltaic and hydroelectric), and hydrogen production using algae. Aimed at mechanical and chemical engineering graduate students and researchers involved in environmental sciences, sustainable energy and bioenergy research, this book introduces readers to the latest developments in the field and provides essential reference material for future research. The book first presents a comprehensive literature review of the processes studied. Subsequently, it provides a technical report on assessing the energetic efficiency for each hydrogen production process, as well as an economic study of the respective hydrogen production costs. Lastly, the ecological efficiency of each process is addressed. Over the past few decades, the UNESP's Group of Optimization of Energetic Systems, headed by Professor José Luz Silveira, has been pursuing research in the field of renewable energy generation. A major part of the group's research focuses on the production of hydrogen as a fuel and its important contribution to mitigating the environmental impacts caused by pollutant emissions.

Thermal Power Plants (Volume III) has been derived from the work of several professors in the nuclear and power industry all of whom have been directly involved with the industry as managers or consultants. The text has been written as educational material and many of the individual chapters have been written as course material for advanced university courses. Also several chapters include material related to plant operation which is prescribed for operator training. Hence it bridges the gap between academic study and practical training. While it is not intended to be comprehensive in all respects it does provide an overview of the topic with sufficient technical depth for a general understanding of power plant technology and a basis for further study in a particular area. When used as a reference in this way each chapter can stand alone and be read independently of the others. Overall it meets the general philosophy of EOLSS in providing a source of knowledge for sustainable development and technological progress for educators and decision makers

In this ready reference, top academic researchers, industry players and government officers join forces to develop commercial concepts for the transition from current nuclear or fossil fuel-based energy to renewable energy systems within a limited time span. They take into account the latest science and technology, including an analysis of the feasibility and impact on the environment, economy and society. In so doing, they discuss such complex topics as electrical and gas grids, fossil power plants and energy storage technologies. The contributions also include robust, conceivable and breakthrough technologies that will be viable and implementable by 2020.

Solar Energy Conversion and Photoenergy Systems: Thermal Systems and Desalination Plants theme in five volumes is a component of Encyclopedia of Energy 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 Solar Energy Conversion and Photoenergy Systems: Thermal Systems and Desalination Plants with contributions from distinguished experts in the field, discusses solar energy, renewable energy, thermal systems, and desalination systems, some of which are already in commercial and practical applications and others are under research and testing level. The volumes provide an analysis and discussion about the reasons behind the current efforts of our society, considering both developed and developing countries, to accelerate the exploitation of the huge solar energy potential in our normal daily lives. The five volumes also provide some basic information about the solar energy potential, history and the amazing trip of a photon from its creation in the Sun until its arrival to the Earth. 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.

Ancillary Equipment and Electrical Equipment is 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. The volume presents state-of-the-art subject matter of various aspects of Ancillary Equipment And Electrical Equipment such as: Seawater Supply Pump; Cooling Water Recirculation Pump; Brine Recirculation Pump; Brine Blowdown Pump; Brine Heater Condensate Pump; Minor Pumps For Desalination Plants; The Installation Criteria And The Layout; Hydraulic Aspects In Design And Operation Of Axial-Flow Pumps; Description Of Surface Vortices With Regard To Common Design Criteria Of Intake Chambers; Vacuum Creating Equipment; Filtering Equipment; Chemical Dosing Stations; On-Load Sponge Ball Cleaning System; Power Supply Systems And Electrical Equipment For Desalination Plants; Composite Materials For Pressure Vessels And Pipes; Thermal Stresses In Vessels, Piping, And Components; Pressure Vessels And Piping Systems: Reliability, Risk And Safety Assessment; Pressure Vessels And Shell Structures; Pipeline Operations; Steel And Pipe Mill Technology; Pipeline Structural Integrity; Pipeline System Automation And Control; Pump And Compressor Operation; Environmental Conservation Practices For Pipelines. This volume is aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy and Decision Makers

Energy Carriers and Conversion Systems is a component of Encyclopedia of Energy Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. The Theme on Energy Carriers and Conversion Systems with contributions from distinguished experts in the field discusses energy matters of great relevance to our world such as: Historical Background, Systematic Concept, General Sketch, and Key Technologies; Water Splitting Science and Technology; Hydrogen Storage and Transportation; Fuels Cells and Other Applications. These 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.

Transportation Engineering and Planning 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 Transportation Engineering and Planning presents the readers with diverse sources of information and knowledge about transportation engineering and planning, to help ensure that informed actions are compatible with sustainable world development. It begins with a historical analysis of transportation development, since an understanding of how transportation technologies developed is a prerequisite for understanding issues involved in transportation systems, and for developing sound policy analysis. Next, the various chapters analyze transportation problems, discusses the state of public policy addressing

those problems, considers the causes and effects of changes in demand for mobility as the socio-economic environment changes, and then deals with the fundamental questions related to transportation. These two volumes are aimed at the following a wide spectrum of audiences from the merely curious to those seeking in-depth knowledge: 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 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

Fossil fuel prices continue to rise and, at the same time, environmental policies are demanding a reduction in greenhouse gases and toxic emissions. A coherent energy strategy is needed: one that addresses both energy supply and demand and takes into account the whole energy lifecycle, from fuel production to the end-users of energy systems. This book examines hydrogen energy technologies and infrastructure development.

There has been a strong need to enhance the utilization of renewable energy systems (RESs) from onshore to offshore applications where oil and gas companies are pivoting to integrate such renewable energy options into their offshore operations to lower their carbon footprint, extend the lifetime of their assets, and expand their market. In this regard, innovative hybrid energy systems, such as "Power to Gas (P2G) and "Power to Liquid (P2L) options, as well as novel integration strategies for "Gas to Power (G2P) systems, offer the opportunity to implement solutions energy transition, paving the way to offshore RES deployment. Hybrid Energy Systems for Offshore Applications delivers a comprehensive presentation of state of the art and perspective developments of offshore RES exploitation strategies and technologies, and provides a unique portfolio of decision-making methodologies supporting the selection of the most suitable options for offshore renewable energy production at a specific site. System modeling and analysis along with the definitions of multicriteria methodologies and strategies based on sustainability, environmental impact, and safety performance indicators are addressed in an integrated fashion. Rounding out with both research and practical applications explained, this book gives academicians and industrial professionals fundamentals and methods for integrated performance analysis of innovative systems addressing offshore RES exploitation, sustainable chemical and power production, better efficiency, lower costs, lower environmental impact, and higher inherent safety. Harmonized presentation of RESs Unique coverage on hybrid energy systems and their offshore applications Comprehensive thermodynamic analysis and evaluation of the developed systems Process and system modeling, analysis, and decision-making methodologies for offshore P2G, P2L, and G2P solutions Sustainability modeling and assessment studies for various offshore applications Distinct parametric studies, illustrations, and case studies Specific sustainability and safety performance indicators for comparative evaluations

Renewable Energy Powered Desalination Handbook: Applications and Thermodynamics offers a practical handbook on the use of renewable technologies to produce freshwater using sustainable methods. Sections cover the different renewable technologies currently used in the field, including solar, wind, geothermal and nuclear desalination. This coverage is followed by an equally important clear and rigorous discussion of energy recovery and the thermodynamics of desalination processes. While seawater desalination can provide a climate-independent source of drinking water, the process is energy-intensive and environmentally damaging. This book provides readers with the latest methods, processes, and technologies available for utilizing renewable energy applications as a valuable technology. Desalination based on the use of renewable energy sources can provide a sustainable way to produce fresh water. It is expected to become economically attractive as the costs of renewable technologies continue to decline and the prices of fossil fuels continue to increase. Covers renewable energy sources, such as nuclear, geothermal, solar and wind powered desalination and energy storage and optimization Includes energy recovery schemes, optimization and process controls Elaborates on the principles of thermodynamics and second law efficiencies to improve process performance, including solar desalination Explains global applicability of solar, wind, geothermal and nuclear energy sources with case studies Discusses renewable energy-desalinated water optimization schemes for island communities

This book has been derived from the work of several professors in the nuclear and power industry all of whom have been directly involved with the industry as managers or consultants. The text has been written as educational material and many of the individual chapters have been written as course material for advanced university courses. Also several chapters include material related to plant operation which is prescribed for operator training. Hence it bridges the gap between academic study and practical training. While it is not intended to be comprehensive in all respects it does provide an overview of the topic with sufficient technical depth for a general understanding of power plant technology and a basis for further study in a particular area. When used as a reference in this way each chapter can stand alone and be read independently of the others. Overall it meets the general philosophy of EOLSS in providing a source of knowledge for sustainable development and technological progress for educators and decision makers

Air Conditioning - Energy Consumption and Environmental Quality theme is the component of Encyclopedia of Energy Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The book on Air Conditioning - Energy Consumption and Environmental Quality in the Encyclopedia of Energy Sciences, Engineering and Technology Resources considers the following topics on Systems and Equipment for Space Heating, Ventilation Systems, Air conditioning and Refrigeration and Cryogenic Systems. This volume is 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.

Electric Power Systems: Advanced Forecasting Techniques and Optimal Generation Scheduling helps readers develop their skills in modeling, simulating, and optimizing electric power systems. Carefully balancing theory and practice, it presents novel, cutting-edge developments in forecasting and scheduling. The focus is on understanding and solving pivotal problems in the management of electric power generation systems. Methods for Coping with Uncertainty and Risk in Electric Power Generation Outlining real-world problems, the book begins with an overview of electric power generation

systems. Since the ability to cope with uncertainty and risk is crucial for power generating companies, the second part of the book examines the latest methods and models for self-scheduling, load forecasting, short-term electricity price forecasting, and wind power forecasting. Toward Optimal Coordination between Hydro, Thermal, and Wind Power Using case studies, the third part of the book investigates how to achieve the most favorable use of available energy sources. Chapters in this section discuss price-based scheduling for generating companies, optimal scheduling of a hydro producer, hydro-thermal coordination, unit commitment with wind generators, and optimal optimization of multigeneration systems. Written in a pedagogical style that will appeal to graduate students, the book also expands on research results that are useful for engineers and researchers. It presents the latest techniques in increasingly important areas of power system operations and planning.

Brought to you by the creator of numerous bestselling handbooks, the Handbook of Energy Efficiency and Renewable Energy provides a thorough grounding in the analytic techniques and technological developments that underpin renewable energy use and environmental protection. The handbook emphasizes the engineering aspects of energy conservation and renewable energy. Taking a world view, the editors discuss key topics underpinning energy efficiency and renewable energy systems. They provide content at the forefront of the contemporary debate about energy and environmental futures. This is vital information for planning a secure energy future. Practical in approach, the book covers technologies currently available or expected to be ready for implementation in the near future. It sets the stage with a survey of current and future world-wide energy issues, then explores energy policies and incentives for conservation and renewable energy, covers economic assessment methods for conservation and generation technologies, and discusses the environmental costs of various energy generation technologies. The book goes on to examine distributed generation and demand side management procedures and gives a perspective on the efficiencies, economics, and environmental costs of fossil and nuclear technologies. Highlighting energy conservation as the cornerstone of a successful national energy strategy, the book covers energy management strategies for industry and buildings, HVAC controls, co-generation, and advances in specific technologies such as motors, lighting, appliances, and heat pumps. It explores energy storage and generation from renewable sources and underlines the role of infrastructure security and risk analysis in planning future energy transmission and storage systems. These features and more make the Handbook of Energy Efficiency and Renewable Energy the tool for designing the energy sources of the future.

Application of advanced computer-oriented techniques are necessary in the synthesis, design analysis and operation of a complex integrated plant to produce power and freshwater, by desalting seawater or brackish water, at higher efficiency and lower cost. These are the two vital commodities to maintain sustainability of life, particularly in the arid regions where natural freshwater supply is either totally lacking or has become scarce. Even in the regions with polluted water resources, such a system is required to support life. At the same time, the available energy should be put to maximum use and life-cycle analysis is essential to ensure sustainability of the systems. The contributors of this book, experts in their own respective fields, outline the various techniques enriched by their experience. The contents of the book would, therefore, be of great interest not only to designers and operators of dual-purpose power-desalination plants but also to educators and researchers as well serve as a valuable source of information to those engaged in other areas of processing industry. The book is motivated by the growing importance of integrated power and desalination plants in general and in their respective regions in particular, and the long felt need for an authoritative book on the subject. After a long gap of more than two decades following the publication of "Principles of Desalination" Spiegler and Laird in 1980, this book would be a welcome addition to the literature in the field to serve as a valuable guide and reference to all those who are concerned with the integration of power and desalination plants. It will also serve as a valuable source of information to those in the processing industry in general.

Renewable Energy Sources Charged with Energy from the Sun and Originated from Earth-Moon Interaction theme is a component of Encyclopedia of Energy Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The volume on Renewable Energy Sources Charged with Energy from the Sun and Originated from Earth-Moon Inter-

action, considers energy sources that are renewable in the sense that they are continually renewed, charged mainly by solar radiation, regardless of their utilization. In addition to energy sources charged by the sun, the subject of tidal energy, which originates from the gravitational interaction of the earth, moon, and sun, is also provided. This theme is structured in five main topics: Renewable Energy Sources Charged with Energy from the Sun ; Energy from Biomass; Wind Energy, Natural Temperature Differences as an Energy Source; Wave Energy; Tidal Energy, which are then expanded into multiple subtopics, each as a chapter. These two 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.

Desalination Update illustrates the growing research and development activities in the field of desalination of water. The chapters in this book also show the close link in the supply of water and supply of power. Power is needed to desalinate water, and water is needed to produce power via steam and cooling water. As the world is becoming increasingly in need of water and power, the education of generations of new workers in these technologies makes the publications of these books of rising importance. Students and specialists alike will find branching strands in this field of development worthy of dedication of careers. Never has shrinking essential resources and exploding needs confront mankind as much as water. Excellent reviews in this book provide keywords, concepts, and current knowledge and status of practice useful for teaching and continued evolution.

The 8-volume set contains the Proceedings of the 25th ECOS 2012 International Conference, Perugia, Italy, June 26th to June 29th, 2012. ECOS is an acronym for Efficiency, Cost, Optimization and Simulation (of energy conversion systems and processes), summarizing the topics covered in ECOS: Thermodynamics, Heat and Mass Transfer, Exergy and Second Law Analysis, Process Integration and Heat Exchanger Networks, Fluid Dynamics and Power Plant Components, Fuel Cells, Simulation of Energy Conversion Systems, Renewable Energies, Thermo-Economic Analysis and Optimisation, Combustion, Chemical Reactors, Carbon Capture and Sequestration, Building/Urban/Complex Energy Systems, Water Desalination and Use of Water Resources, Energy Systems- Environmental and Sustainability Issues, System Operation/ Control/Diagnosis and Prognosis, Industrial Ecology.

In light of recent alarming environmental trends combined with increasing commercial viability of fuel cells, the time is propitious for a book focusing on the systematic aspects of cell plant technology. This multidisciplinary text covers the main types of fuel cells, R&D issues, plant design and construction, and economic factors to provide industrial and academic researchers working in electrical systems design, electrochemistry, and engineering with a unique and comprehensive resource.

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.

Compendium of Hydrogen Energy, Volume 2: Hydrogen Storage, Distribution and Infrastructure focuses on the storage and transmission of hydrogen. As many experts believe the hydrogen economy will, at some point, replace the fossil fuel economy as the primary source of the world's energy, this book details hydrogen storage in pure form, including chapters on hydrogen liquefaction, slush production, as well as underground and pipeline storage. Other sections in the book explore physical and chemical storage, including environmentally sustainable methods of hydrogen production from water, with final chapters dedicated to hydrogen distribution and infrastructure. Covers a wide array of methods for storing hydrogen, detailing hydrogen transport and the infrastructure required for transition to the hydrogen economy Written by leading academics in the fields of sustainable energy and experts from the world of industry Part of a very comprehensive compendium which looks at the entirety of the hydrogen energy economy