

## Energy Modelling In Gabi

*This edited volume presents the proceedings of the 20th CIRP LCE Conference, which cover various areas in life cycle engineering such as life cycle design, end-of-life management, manufacturing processes, manufacturing systems, methods and tools for sustainability, social sustainability, supply chain management, remanufacturing, etc. In this Special Issue, we have several papers related to fuel-cell-based cogeneration systems; the management and control of fuel cell systems; the analysis, simulation, and operation of different types of fuel cells; modelling and online experimental validation; and the environment assessment of cathode materials in lithium-ion battery energy generation systems. A paper which gives a comprehensive review with technical guidelines for the design and operation of fuel cells, especially in a cogeneration system setup, which can be an important source of references for the optimal design and operation of various types of fuel cells in cogeneration systems, can also be found in this Special Issue.*

*Sustainability enables the development of products with minimal environment impact coupled with economical and societal benefits. This book provides an understanding of theoretical and practical perspectives pertaining to Sustainable manufacturing. This book focuses on fundamentals, providing insights, concepts, tools, methods, case studies, and practical perspectives taken from research. The book will be of interest to students, researchers and industry practitioners.*

**Energy Technology 2017**Carbon Dioxide Management and Other TechnologiesSpringer

**Goal and Scope Definition in Life Cycle Assessment**

**Energy Technology 2011**

**Management of Natural Resources, Sustainable Development and Ecological Hazards II**

**Carbon Dioxide and Other Greenhouse Gas Reduction Metallurgy and Waste Heat Recovery**

**Gaining Benefits from Discarded Textiles**

**Cost-Effective Energy Efficient Building Retrofitting**

Provides aspiring engineers with pertinent information and technological methodologies on how best to manage industry's modern-day environment concerns This book explains why industrial environmental management is important to human environmental interactions and describes what the physical, economic, social, and technological goal of a sustainable environment are. It emphasizes recent progress in life-cycle sustainable design, applying green engineering principles and the concept of Zero Effect Zero Defect to minimize wastes and discharges from various manufacturing facilities. Its goal is to educate engineers on how to obtain an optimum balance between environmental protection and economic goals, while allowing humans to maintain an acceptable quality of life. Industrial Environmental Management: Engineering, Science, and Policy covers topics such as industrial wastes, life cycle sustainable design, lean manufacturing, international environmental regulations, and the assessment and management of health and environmental risks. The book also discusses the economics of manufacturing pollution prevention: how eco-industrial parks and process intensification will help minimize waste; and the application of green manufacturing principles in order to minimize wastes and discharges from manufacturing facilities. Provides end-of-chapter questions along with a solutions manual for adopting profes

Interdisciplinary areas that makes it suitable for different branches of engineering such as wastewater management and treatment; pollutant sampling; health risk assessment; waste minimization; lean manufacturing; and regulatory information Shows how industrial environmental management is connected to areas like sustainable engineering, petroleum engineering. It will appeal to practicing engineers seeking information about sustainable design principles and methodology.

Modelling, Assessment, and Optimization of Energy Systems provides comprehensive methodologies for the thermal modelling of energy systems based on thermodynamic, exergoeconomic and exergoenvironmental approaches. It provides advanced analytical approaches, assessment criteria and the methodologies to obtain analytical expressions for the modelling, assessment, and optimization of energy systems. It also includes experimental data. The concept of single-objective and multi-objective optimization with application to energy systems is provided, along with decision-making tools for multi-objective problems, multi-criteria problems, for simplifying the optimization of large energy systems, and for exergoeconomic improvement integrated with a simulator.

A comprehensive methodology for modelling, assessment, improvement of any energy system with guidance, and practical examples that provide detailed insights for energy engineering, mechanical engineering, chemical engineering and researchers in the field of analysis and optimization of energy systems. Offers comprehensive analytical tools and simulation of energy systems with applications for decision-making tools Provides methodologies to obtain analytical models of energy systems for experimental data Covers decision-making tools in multi-objective problems The Material Basis of Energy Transitions explores the intersection between critical raw material provision and the energy system. Chapters draw on examples and case studies involving energy technologies (e.g. electric power, transport) and raw material provision (e.g. mining, recycling), and consider these in their regional and global context. It discusses issues such as the notion of criticality in the context of a circular economy, approaches for estimating the need for raw materials, certification schemes for raw materials, the role of consumers, and the impact of renewable energy development on resource conflicts. Each chapter deals with a specific issue that characterizes the raw materials and renewable energies by examining case studies from a particular conceptual perspective. The book is a resource for students and researchers from the social sciences, natural sciences, and engineering, as well as interdisciplinary scholars interested in the field of renewable energies, the circular economy, recycling, transport and energy systems, and also of interest to policymakers in the fields of renewable energy, recycling, and mining, professionals from the energy and resource industries, as well as energy experts and consultants looking for an interdisciplinary assessment of critical materials. Provides a comprehensive overview of key issues related to the nexus between renewable resources and energy systems.

Materials Explores interdisciplinary perspectives from the natural sciences, engineering, and social sciences Discusses critical strategies to address the nexus from a practitioner's perspective

The 5th International Conference on Civil Engineering and Urban Planning (CEUP2016) was held in Xi'an, China on August 23 – 26, 2016. CEUP2016 gathered outstanding scientists and researchers worldwide to exchange and discuss new findings in civil engineering and urban planning associated with transportation and environmental topics.

The committee is also greatly honored to have four renowned experts for taking time off to present their keynotes to the conference. The conference had received a total of 410 submissions, which after peer review by the Technical Program Committee, only 108 were selected to be included in this conference proceedings, which covers Arch

**Engineering and Transportation Engineering.**

**LCA of Different Treatment Pathways**

**Conventional and Future Energy for Automobiles**

**The Role of Exergy in Energy and the Environment**

**Energy and Environmental Security in Developing Countries**

**A Systems Engineering Approach**

**Modelling and Process Control of Fuel Cell Systems**

This book introduces the 3R concept applied to wastewater treatment and resource recovery under a double perspective. Firstly, it deals with innovative technologies leading to: Reducing energy requirements, space and impacts; Reusing water and sludge of sufficient quality; and Recovering resources such as energy, nutrients, metals and chemicals, including biopolymers. Besides targeting effective C,N&P removal, other issues such as organic micropollutants, gases and odours emissions are considered. Most of the technologies analysed have been tested at pilot or at full-scale. Tools and methods for their Economic, Environmental, Legal and Social impact assessment are described. The 3R concept is also applied to Innovative Processes design, considering different levels of innovation. Retrofitting, where novel units are included in more conventional processes, and complete process redesign, where novel concepts, tools are presented for Modelling, Optimising and Selecting the most suitable plant layout for each particular scenario from a holistic technical, economic and environmental point of view.

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.

The conference addresses general topics on how products and materials can be recycled and looks for application examples. The focus is on the areas: · Material and Energy Flow Assessment · Sustainable Mobility · Industrial Ecology with a focus on renewable energy sources of WEEE · (Re-) Manufacturing · Cascade Use and Waste Management 4.0 This book presents a comprehensive account of the energy and environmental security perspectives of the developing countries. To address the subject comprehensively, it covers four geographically diverse clusters of developing countries from across the world. The regions particularly focused on are: South Asia, South East Asia, Sub Sahara Africa, and Latin America. It is a valuable contribution to the debate, and policy and research activities around the subjects of energy and environmental security in the developing countries and beyond. The book covers the interwoven subjects of energy security and environmental security in the context of developing countries for the first time. It discusses the latest dimensions, challenges, and solutions around taking into account technical, economic, social, and policy perspectives. It incorporates up-to-date data, case studies, and complete assessment. This edited book has contributions from established as well as emerging scholars from around the world. It benefits a wide range of stakeholders from the fields of energy, environment, and sustainable development. It is of help to academics, researchers, and analysts in these fields besides having appeal for policymakers, and national and international developmental organizations. It also helps developing countries to learn from each other's experiences.

Modeling, Assessment, and Optimization of Energy Systems

Innovative Wastewater Treatment & Resource Recovery Technologies: Impacts on Energy, Economy and Environment

Industrial Environmental Management

Concepts, Tools, Methods and Case Studies

Materials, Technologies, Optimization and Case Studies

Handbook of Optoelectronic Device Modeling and Simulation

The combined challenges of health, comfort, climate change and energy security cross the boundaries of traditional building disciplines. This authoritative collection, focusing mostly on energy and ventilation, provides the current and next generation of building engineering professionals with what they need to work closely with many disciplines to meet these challenges. A Handbook of Sustainable Building Engineering covers: how to design, engineer and monitor a building in a manner that minimises the emissions of greenhouse gases; how to adapt the environment, fabric and services of existing and new buildings to climate change; how to improve the environment in and around buildings to provide better health, comfort, security and productivity; and provides crucial expertise on monitoring the performance of buildings once they are occupied. The authors explain the principles behind built environment engineering, and offer practical guidance through international case studies.

The rise of manufacturing intelligence is fuelling innovation in processes and products concerning a low environmental impact over the product's lifecycle. Sustainable intelligent manufacturing is regarded as a manufacturing paradigm for the 21st century, in the move towards the next generation of manufacturing and processing technologies. The manufacturing industry has reached a turning point in its evolution and new business opportunities are emerging. With sustainable development arises the immense challenge of combining innovative ideas regarding design, materials and products with non-polluting processes and technologies, conserving energy and other natural resources. On the other hand, sustainability has become a key concern for government policies, businesses and the general public. Model cities are embracing novel ecosystems, combining environmental, social and economic issues in more inclusive and integrated frameworks. Green Design, Materials and Manufacturing Processes includes essential research in the field of sustainable intelligent manufacturing and related topics, making a significant contribution to further development of these fields. The volume contains reviewed papers presented at the 2nd International Conference on Sustainable Intelligent Manufacturing, conjointly organized by the Centre for Rapid and Sustainable Product Development, Polytechnic Institute of Leiria, and the Faculty of Architecture, Technical University of Lisbon, both in Portugal. This event was held at the facilities of the Faculty of Architecture, Lisbon, from June 26 to June 29, 2013. A wide range of topics is covered, such as Eco Design and Innovation, Energy Efficiency, Green and Smart Manufacturing, Green Transportation, Life-Cycle Engineering, Renewable Energy Technologies, Reuse and Recycling Techniques, Smart Design, Smart Materials, Sustainable Business Models and Sustainable Construction. Green Design, Materials and Manufacturing Processes is intended for engineers, architects, designers, economists and manufacturers who are actively engaged in the advancement of science and technology regarding key sustainability issues, leading to more suitable, efficient and sustainable products, materials and processes.

With the signing of the Paris Agreement in December 2015 the United Nations explained their willingness to limit the GHG Emissions and contribute to the measures against the global warming effect. In 2019 the European Commission proposed the Green Deal and as a consequence the target to be climate neutral in 2050. In consequence fossil based energy system has to transform into a climate-neutral energy system with renewable and sustainable energy carriers. Research on and development of alternative fuels and new production processes are ongoing to provide the technical solution. Political actions are needed to provide the economic framework for the introduction of such alternative fuel solutions. The fulfillment of the European CO2 reduction targets until 2050 needs realistic technical solutions including backwards compatible approaches for existing vehicle fleets. An economic and sustainable development towards climate neutral mobility requires a holistic view based on life cycle assessments for different mobility approaches including the economic impacts as well as financing options. A synergetic discussion of solutions for future fuels and powertrain technologies is needed to develop an economic pathway to a sustainable and affordable mobility of tomorrow. The challenging goal for mobility can only be achieved through an international cooperation of universities, the automobile industry, energy producers, the oil industry and the legislative bodies of the member states. The international colloquium aims to contribute to the development of a climate-neutral mobility by exchanging views on and discussing all aspects connected with the "powertrain/fuel/environment" system, including the necessary political regulations.

This collection focuses on energy efficient technologies including innovative ore beneficiation, smelting technologies, recycling and waste heat recovery. The volume also covers various technological aspects of sustainable energy ecosystems, processes that improve energy efficiency, reduce thermal emissions, and reduce carbon dioxide and other greenhouse emissions. Papers addressing renewable energy resources for metals and materials production, waste heat recovery and other industrial energy efficient technologies, new concepts or devices for energy generation and conversion, energy efficiency improvement in process engineering, sustainability and life cycle assessment, and energy systems for the thermodynamics and modeling for sustainable metallurgical processes are included. This volume also offers topics on CO2 sequestration and reduction in greenhouse gas emissions from process engineering, sustainable technologies in extractive metallurgy, as well as the materials processing and manufacturing industries with reduced energy consumption and CO2 emission. Contributions from all areas of non-nuclear and non-traditional energy sources, such as solar, wind, and biomass are also included in this volume.Papers from the following symposia are presented in the book:Energy TechnologiesAdvances in Environmental Technologies: Recycling and Sustainability Joint SessionDeriving Value from Challenging Waste Materials: Recycling and Sustainability Joint SessionSolar Cell Silicon

"An Integrated Approach to Energy, Health and Operational Performance"

International Economics of Resource Efficiency

Options for a Greener Future

Sustainable Design and Manufacturing 2019

Locally Available Energy Sources and Sustainability

Internationale Konferenz zur Kaskadennutzung und Kreislaufwirtschaft – Oldenburg 2018

This book contains papers presented at the Second International Conference on the Management of Natural Resources, Sustainable Development and Ecological Hazards, held in South Africa, December 15-17, 2009. The Conference goes by the shortened name *Stages of the Planet* to emphasize the urgency of the problems under discussion. Like the first conference held in Patagonia, Argentina, this meeting was prompted by the need to take stock of the continuous deterioration of our planet and to formulate constructive policies for the immediate future. The success of the first Conference led to the decision to reconvene the meeting in Africa. That continents engagement in global change trends became more pronounced with the World Summit on Sustainable Development that took place in Johannesburg in 2002 and addressed Millenium Development Goals. South Africa actively held its first National Conference on Environment and Development in 1991. It is well known that in the effort to achieve sustainable development, Africa faces challenges with water and energy supply, sanitation access; renewable technologies transfer, food security, health issues (especially childrens health), rapid urbanization, housing, biodiversity threats, and climate change vulnerability. Because of its geographic position, spanning two hemispheres and nearly all climatic zones, as well as its still low carbon emissions, pristine ecosystems and endemic biodiversity regions, Africa provides excellent opportunities for environmental research and earth and space observations, as well as studies of the socio-economic aspects of sustainability issues. AUDIENCE: Researchers and professionals involved in ecosystems and environmental problems, as well as policy makers, social and political scientists

Approaches on carbon dioxide (CO2) emission reduction in metal production by improved energy efficiency in life cycle fuel use, reductions in carbonate-based flux/raw material usage, as well as finding thermodynamically feasible reactions leading to lower emissions. Energy saving techniques for extraction and processing of ferrous and nonferrous metals and other materials Capture, conservation, and use of heat generated from processing

This book develops a model to evaluate and assess life-cycle greenhouse gas emissions based on typical Australian commercial building design options. It also draws comparisons between some of the many green building rating tools that have been developed worldwide to support sustainable development. These include: Leadership in Energy and Environmental Design (LEED) by the United States Green Building Council (USGBC), Building Research Establishment Environmental Assessment Method (BREEAM) by the Building Research Establishment, Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) by the Japanese Sustainable Building Consortium, and Green Star Environmental Rating System by the Green Building Council of Australia. Life-cycle assessment (LCA), life-cycle energy consumption, and life-cycle greenhouse gas emissions form the three pillars of life-cycle studies, which have been used to evaluate environmental impacts of building construction. Assessment of the life-cycle greenhouse gas emissions of buildings is one of the significant obstacles in evaluating green building performance. This book explains the methodology for achieving points for the categories associated with reduction of greenhouse gas emissions in the Australian Green Star rating system. The model for the assessment uses Gabi 8.7 platform along with Visual Basic in Microsoft Excel and shows the relationship between the building ' s energy consumption and greenhouse gas emissions released during the lifetime of the building. The data gathered in the book also illustrates that the green building design and specifications are becoming more popular and are being increasingly utilized in Australia. This book is important reading for anyone interested in sustainable construction, green design and buildings and LCA tools.

This volume contains the proceedings of the Fourth International Conference on Sustainability in Energy and Buildings, SEB12, held in Stockholm, Sweden, and is organized by KTH Royal Institute of Technology, Stockholm, Sweden in partnership with KES International. The International Conference on Sustainability in Energy and Buildings focuses on a broad range of topics relating to sustainability in buildings but also encompassing energy sustainability more widely. Following the success of earlier events in the series, the 2012 conference includes the themes Sustainability, Energy, and Buildings and Information and Communication Technology, ICT. The SEB ' 12 proceedings include invited participation and paper submissions across a broad range of renewable energy and sustainability-related topics relevant to the main theme of Sustainability in Energy and Buildings. Applicable areas include technology for renewable energy and sustainability in the built environment, optimization and modeling techniques, information and communication technology usage, behavior and practice, including applications.

Handbook of Biofuels Production

The Material Basis of Energy Transitions

Information Modelling and Knowledge Bases XXXI

Civil Engineering And Urban Planning - Proceedings Of The 5th International Conference On Civil Engineering And Urban Planning (Ceup2016)

Energy and Resource Efficiency in Aluminium Die Casting

Sustainable Solid Waste Management

The interactions between human activities and the environment are complicated and often difficult to quantify. In many occasions, judging where the optimal balance should lie among environmental protection, social well-being, economic growth, and technological progress is complex. The use of a systems engineering approach will fill in the gap contributing to how we understand the intricacy by a holistic way and how we generate better sustainable soli waste management practices. This book also aims to advance interdisciplinary understanding of intertwined facets between policy and technology relevant to solid waste management issues interrelated to climate change, land use, economic growth, environmental pollution, industrial ecology, and population dynamics.

This book is devoted to the analysis and applications of energy, exergy, and environmental issues in all sectors of the economy, including industrial processes, transportation, buildings, and services. Energy sources and technologies considered are hydrocarbons, wind and solar energy, fuel cells, as well as thermal and electrical storage.

This book provides theoretical insights, along with state-of-the-art case studies and examples and will appeal to the academic community, but also to energy and environmental professionals and decision makers.

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.

Cost-Effective Energy Efficient Building Retrofitting:Materials, Technologies, Optimization and Case Studies provides essential knowledge for civil engineers, architects, and other professionals working in the field of cost-effective energy efficient building retrofitting. The building sector is responsible for high energy consumption and its global demand is expected to grow as each day there are approximately 200,000 new inhabitants on planet Earth. The majority of electric energy will continue to be generated from the combustion of fossil fuels releasing not only carbon dioxide, but also methane and nitrous oxide. Energy efficiency measures are therefore crucial to reduce greenhouse gas emissions of the building sector. Energy efficient building retrofitting needs to not only be technically feasible, but also economically viable. New building materials and advanced technologies already exist, but the knowledge to integrate all active components is still scarce and far from being widespread among building industry stakeholders. Emphasizes cost-effective methods for the refurbishment of existing buildings, presenting state-of-the-art technologies Includes detailed case studies that explain various methods and Net Zero Energy Explains optimal analysis and prioritization of cost effective strategies

Environmental Life Cycle Assessment of Goods and Services

Life-Cycle Greenhouse Gas Emissions of Commercial Buildings

Molecular Beam Epitaxy

Engineering, Science, and Policy

An Input-Output Approach

*Optoelectronic devices are now ubiquitous in our daily lives, from light emitting diodes (LEDs) in many household appliances to solar cells for energy. This handbook shows how we can probe the underlying and highly complex physical processes using modern mathematical models and numerical simulation for optoelectronic device design, analysis, and performance optimization. It reflects the wide availability of powerful computers and advanced commercial software, which have opened the door for non-specialists to perform sophisticated modeling and simulation tasks. The chapters comprise the know-how of more than a hundred experts from all over the world. The handbook is an ideal starting point for beginners but also gives experienced researchers the opportunity to renew and broaden their knowledge in this expanding field.*

*This multi-contributor handbook discusses Molecular Beam Epitaxy (MBE), an epitaxial deposition technique which involves laying down layers of materials with atomic thicknesses on to substrates. It summarizes MBE research and application in epitaxial growth with close discussion and a 'how to' on processing molecular or atomic beams that occur on a surface of a heated crystalline substrate in a vacuum. MBE has expanded in importance over the past thirty years (in terms of unique authors, papers and conferences) from a pure research domain into commercial applications (prototype device structures and more at the advanced research stage). MBE is important because it enables new device phenomena and facilitates the production of multiple layered structures with extremely fine dimensional and compositional control. The techniques can be deployed wherever precise thin-film devices with enhanced and unique properties for computing, optics or photonics are required. This book covers the advances made by MBE both in research and mass production of electronic and optoelectronic devices. It includes new semiconductor materials, new device structures which are commercially available, and many more which are at the advanced research stage. Condenses fundamental science of MBE into a modern reference, speeding up literature review*

*Discusses new materials, novel applications and new device structures, grounding current commercial applications with modern understanding in industry and research Coverage of MBE as mass production epitaxial technology enhances processing efficiency and throughput for semiconductor industry and nanostructured semiconductor materials research, especially*

*This book presents the proceedings of CRIOCM2018, 23rd International Symposium on Advancement of Construction Management and Real Estate, sharing the latest developments in real estate and construction management around the globe. The conference was organized by the Chinese Research Institute of Construction Management (CRIOCM) working in close collaboration with Guizhou Institute of Technology (GIT). Written by international academics and professionals, the proceedings discuss the latest achievements, research findings and advances in frontier disciplines in the field of construction management and real estate. Covering a wide range of topics, including New-type urbanization, land development and land use, urban planning and infrastructure construction, housing market and housing policy, real estate finance and investment, new theories and practices on construction project management, smart city, BIM technologies and applications, construction management in big data era, green architecture and eco-city, rural rejuvenation and eco-civilization, other topics related to construction management and real estate, the discussions provide valuable insights into the advancement of construction management and real estate in the new era. The book is an outstanding reference resource for academics and professionals alike. This book develops a model to evaluate and assess life-cycle greenhouse gas emissions based on typical Australian commercial building design options. It also draws comparisons between some of the many green building rating tools that have been developed worldwide to support sustainable development. These include: the Leadership in Energy and Environmental Design (LEED(R)) by the United States Green Building Council (USGBC), Building Research Establishment Environmental Assessment Method (BREEAM) by the Building Research Establishment, Comprehensive Assessment System for Building Environmental Efficiency (CASBEE) by the Japanese Sustainable Building Consortium, and Green Star Environmental Rating System by the Green Building Council of Australia. Life-cycle assessment (LCA), life-cycle energy consumption (LCE), and life-cycle greenhouse gas emissions (LGE) form the three pillars of life-cycle studies, which have been used to evaluate environmental impacts of building construction. Assessment of the life-cycle greenhouse gas emissions of buildings is one of the significant obstacles in evaluating green building performance. This book explains the methodology for achieving points for the categories associated with reduction of greenhouse gas emissions in the Australian Green Star rating system. The model for the assessment uses Gabi 8.7 platform along with Visual Basic in Microsoft Excel and shows the relationship between the building's energy consumption and greenhouse gas emissions released during the lifetime of the building. The data gathered in the book also illustrates that the green building design and specifications are becoming more popular and are being increasingly utilised in Australia. This book is important reading for anyone interested in sustainable construction, green design and buildings and life cycle assessment tools.*

13th International Colloquium Fuels

Energy Technology 2012

Proceedings of the 23rd International Symposium on Advancement of Construction Management and Real Estate

Carbon Dioxide Management and Other Technologies

Cascade Use in Technologies 2018

A Handbook of Sustainable Building Design and Engineering

Environmental life cycle assessment is often thought of as cradle to grave and therefore as the most complete accounting of the environmental costs and benefits of a product or service. However, as anyone who has done an environmental life cycle assessment knows, existing tools have many problems: data is difficult to assemble and life cycle studies take months of effort. A truly comprehensive analysis is prohibitive, so analysts are often forced to simply ignore many facets of life cycle impacts. But the focus on one aspect of a product or service can result in misleading indications if that aspect is benign while other aspects pollute or are otherwise unsustainable. This book summarizes the EIO-LCA method, explains its use in relation to other life cycle assessment models, and provides sample applications and extensions of the model into novel areas. A final chapter explains the free, easy-to-use software tool available on a companion website. (www.eiolca.net) The software tool provides a wealth of data, summarizing the current U.S. economy in 500 sectors with information on energy and materials use, pollution and greenhouse gas discharges, and other attributes like associated occupational deaths and injuries. The eiolca project of twelve faculty members and over 20 students working together over the past ten years at the Green Design Institute of Carnegie Mellon University, the EIO-LCA has been applied to a wide range of products and services. It will prove useful for research, industry, and in economics, engineering, or interdisciplinary classes in green design.

This volume consists of 52 peer-reviewed papers, presented at the International Conference on Sustainable Design and Manufacturing (SDM-19) held in Budapest, Hungary in July 2019. Leading-edge research into sustainable design and manufacturing aims to enable the manufacturing industry to grow by adopting more advanced technologies, and at the same time improve its sustainability by reducing its environmental impact. The topic includes the sustainable design of products and services; the sustainable manufacturing of all products; energy efficiency in manufacturing; innovation for eco-design; circular economy; industry 4.0; industrial metabolism; automotive and transportation systems. Application areas are wide and varied. The book will provide an excellent overview of the latest developments in the Sustainable Design and Manufacturing Area.

This monograph provides a field-proven approach to analyze industrial production with a cross-company scope as well as regarding all hierarchical system levels of manufacturing enterprises. The book exemplifies this approach in the context of aluminum die casting, and presents a set of measures which allow a 30 percent energy reduction along the value chain. The target audience primarily comprises researchers and experts in the field but the book may also be beneficial for graduate students.

Proceedings of the symposia sponsored by the Energy Committee of the Extraction and Processing Division and the Light Metals Division of TMS (The Minerals, Metals & Materials Society) Held during the TMS 2012 Annual Meeting & Exhibition Orlando, Florida, USA, March 11-15, 2012

From Research to Mass Production

Climate Change, Energy, Sustainability and Pavements

Renewable Energy and Sustainable Technologies for Building and Environmental Applications

Energy Technology 2017

Sustainable Manufacturing

Eco-informed Material Choice

Handbook of Biofuels Production, Second Edition, discusses advanced chemical, biochemical, and thermochemical biofuels production routes that are fast being developed to address the global increase in energy usage. Research and development in this field is aimed at improving the quality and environmental impact of biofuels production, as well as the overall efficiency and output of biofuels production plants. The book provides a comprehensive and systematic reference on the range of biomass conversion processes and technology. Key changes for this second edition include increased coverage of emerging feedstocks, including microalgae, more emphasis on by-product valorization for biofuels' production, additional chapters on emerging biofuel production methods, and discussion of the emissions associated with biofuel use in engines. The editorial team is strengthened by the addition of two extra members, and a number of new contributors have been invited to work with authors from the first edition to revise existing chapters, thus offering fresh perspectives. Provides systematic and detailed coverage of the processes and technologies being used for biofuel production Discusses advanced chemical, biochemical, and thermochemical biofuels production routes that are fast being developed to address the global increase in energy usage Reviews the production of both first and second generation biofuels Addresses integrated biofuel production in biorefineries and the use of waste materials as feedstocks

Waste management can be problematic. Especially with the emphasis in many countries now being on sustainability, there is a great need for more research on disposal methods. While we have found ways to reduce the volume of waste that needs to be disposed, questions remain about the environmental and safety aspects of waste of waste materials as feedstocks

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activities, current technology improvements, and regulatory and monitoring problems. Featuring papers published at the Sixth International Conference on Waste Management and the Environment, this book contains contributions on the topics such as: Advanced Waste Treatment Technology, Wastewater Treatment; Resources Recovery; Waste Incineration and Gasification; Waste Pre-Treatment; Separation and Transformation; Landfills; Soil and Groundwater Clean-up; Public Awareness; Air Pollution Control; Hazardous Waste, Waste Management; Construction and Demolition Waste Costs; Waste Reduction; Reuse and Recycling, Energy from Waste; Electrical Waste; Rare Metals; Computer Modelling; Methodologies and Practices; Risk Assessment; Nuclear Waste;

Environmental Economics Assessment: Laws and Regulations; Biological Treatments; Agricultural Wastes. Information modeling and knowledge bases have become an important area of academic and industry research in the 21st century, addressing complexities of modeling that reach beyond the traditional borders of information systems and academic computer science research. This book presents 32 reviewed, selected and updated papers delivered at the 29th International Conference on Information Modeling and Knowledge Bases (IC2019), held in Lappeenanta, Finland, from 3 to 7 June 2019. In addition, two papers based on the keynote presentations and one paper edited from the discussion of the panel session are included in the book. The conference provided a forum to exchange scientific results and experience, and attracted academics and practitioners working with information and knowledge. The papers cover a wide range of topics, ranging from knowledge discovery through conceptual and linguistic modeling, knowledge and information modeling and discovery, cross-cultural communication and social computing, environmental modeling and engineering, and multimedia data modeling and systems to complex scientific problem-solving. The conference presentation sessions: Learning and Linguistics; Systems and Processes; Data and Knowledge Representation; Models and Interface; Formalizations and Reasoning; Models and Modeling; Machine Learning; Models and Programming; Environment and Predictions; and Emotion Modeling and Social Networks reflect the main themes of the conference. The book also includes 2 extended publications of keynote addresses: 'Philosophical Foundations of Conceptual Modeling' and 'Sustainable Solid Waste Management using Life Cycle Modeling for Environmental Impact Assessment', as well as additional material covering the discussion and findings of the panel session. Providing an overview of current research in the field, the book will be of interest to all those working with information systems, information modeling and knowledge bases.

Renewable energy is electrically generated by fuel sources that restore themselves over a short period of time and do not diminish. Although some renewable energy technologies impact the environment, renewables are considered environmentally preferable to conventional sources and, when replacing fossil fuels, have significant potential to reduce greenhouse gas emissions. This book focuses on the environmental and economic benefits of using renewable energy, which include: (i) generating energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution, (ii) diversifying energy supply and reducing dependence on imported fuels, and (iii) creating economic development and jobs in manufacturing, installation, and more. Local governments can dramatically reduce their carbon footprint by purchasing or directly generating electricity from clean and renewable sources. The most common renewable power technologies include: solar (photovoltaic (PV), solar thermal), wind, biogas (e.g., landfill gas, wastewater treatment digester gas), geothermal, biomass, low-impact hydroelectricity, and emerging technologies such as wave and tidal energy.

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Proceedings of the 4th International Conference in Energy and Buildings (SEB 712)

Waste Management and the Environment VI

Green Design, Materials and Manufacturing Processes

Proceedings of the 20th CIRP International Conference on Life Cycle Engineering, Singapore 17-19 April, 2013

Fundamentals, Materials, Nanostructures, LEDs, and Amplifiers, Vol. 1

Eco-Innovation Policies for a Green Economy

*This diverse resource on renewable energy and sustainable technologies highlights the status, state of the art, challenges, advancements and options in areas such as energy recovery systems, turbine ventilators, green composites, biofuels and bio-resources for energy production, wind energy, integrated energy-efficient systems, thermal energy storage, natural ventilation & day-lighting systems, and low carbon technologies for building and environmental applications. It is designed to serve as a reference book for students, researchers, manufacturers and professionals working in these fields. The editors have gathered articles from world-leading experts that clearly illustrate key areas in renewable energy and sustainability. The distinct role of these technologies in future endeavors is stressed by taking into account the opportunities to contribute with new approaches, methods and directions for building and environmental applications. The in-depth discussion presented in this book will give readers a clear understanding of every important aspect of each technology's applications, optimum configuration, modifications, limitations and their possible improvements.*

*Climate change, energy production and consumption, and the need to improve the sustainability of all aspects of human activity are key inter-related issues for which solutions must be found and implemented quickly and efficiently. To be successfully implemented, solutions must recognize the rapidly changing socio-techno-political environment and multi-dimensional constraints presented by today's interconnected world. As part of this global effort, considerations of climate change impacts, energy demands, and incorporation of sustainability concepts have increasing importance in the design, construction, and maintenance of highway and airport pavement systems. To prepare the human capacity to develop and implement these solutions, many educators, policy-makers and practitioners have stressed the paramount importance of formally incorporating sustainability concepts in the civil engineering curriculum to educate and train future civil engineers well-equipped to address our current and future sustainability challenges. This book will prove a valuable resource in the hands of researchers, educators and future engineering leaders, most of whom will be working in multidisciplinary environments to address a host of next-generation sustainable transportation infrastructure challenges. "This book proposes a broad detailed overview of the actual scientific knowledge about pavements linked to climate change, energy and sustainability at the international level in an original multidimensional/multi-effects way. By the end, the reader will be aware of the whole global issues to care about for various pavement technical features around the world, among which the implications of modelling including data collection, challenging resources saving and infrastructures services optimisation. This is a complete and varied work, rare in the domain." Dr. Agnes Jullien Research Director Director of Environmental, Development, Safety and Eco-Design Laboratory (EASE) Department of Development, Mobility and Environment Ifsttar Centre de Nantes Cedex- France "An excellent compilation of latest developments in the field of sustainable pavements. The chapter topics have been carefully chosen and are very well-organized with the intention of equipping the reader with the state-of-the-art knowledge on all aspects of pavement sustainability. Topics covered include pavement Life Cycle Analysis (LCA), pervious pavements, cool pavements, photocatalytic pavements, energy harvesting pavements, etc. which will all be of significant interest to students, researchers, and practitioners of pavement engineering. This book will no doubt serve as an excellent reference on the topic of sustainable pavements." Dr. Wei-Hsing Huang Editor-in-Chief of International Journal of Pavement Research and Technology (IJPRT) and Professor of Civil Engineering National Central University Taiwan*

*Addressing the growing global concern for sustainable engineering, Materials and the Environment, 2e is the only book devoted exclusively to the environmental aspects of materials. It explains the ways in which we depend on and use materials and the consequences these have, and it introduces methods for thinking about and designing with materials within the context of minimizing environmental impact. Along with its noted in-depth coverage of material consumption, the material life-cycle, selection strategies, and legislative aspects, the second edition includes new case studies, important new chapters on Materials for Low Carbon Power and Material Efficiency, all illustrated by in-text examples and expanded exercises. This book is intended for instructors and students as well as materials engineers and product designers who need to consider the environmental implications of materials in their designs. Introduces methods and tools for thinking about and designing with materials within the context of their role in products and the environmental consequences Contains numerous case studies showing how the methods discussed in the book can be applied to real-world situations Includes full-color data sheets for 40 of the most widely used materials, featuring such environmentally relevant information as their annual production and reserves, embodied energy and process energies, carbon footprints, and recycling data New to this edition: New chapter of Case Studies of Eco-audits illustrating the rapid audit method New chapter on Materials for Low Carbon Power examines the consequences for materials supply of a major shift from fossil-fuel based power to power from renewables New chapter exploring Material Efficiency, or design and management for manufacture to provide the services we need with the least production of materials Recent news-clips from the world press that help place materials issues into a broader context. are incorporated into all chapters End-of-chapter exercises have been greatly expanded The datasheets of Chapter 15 have been updated and expanded to include natural and man-made fibers*

*Re-engineering Manufacturing for Sustainability*

*Sustainability in Energy and Buildings*

*Proceedings of the 6th International Conference on Sustainable Design and Manufacturing (KES-SDM 19)*

*Materials and the Environment*

*An Analysis for Green-Building Implementation Using A Green Star Rating System*