Life Cycle Assessment Thinkstep

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SANTOS KARLEE

Life-Cycle Greenhouse Gas Emissions of Commercial Buildings Springer Nature
The depletion of natural energy resources provides evidential adverse impacts on world economy functionality. The strong requirement of a sustainable energy supply has escalated intensive research and the discovery of cleaner energy sources, as well as efficient energy management practices. In the context of a circular economy, this research not only targets the optimisation of resources utilisation at different stages but also emphasises the eco-design of products to extend production life spans. Based on this concept, this book discusses the roles of process integration approaches, renewable energy sources utilisation and design modifications in addressing the process energy and exergy efficiency improvement. The primary focus is to enhance the economic and environmental performance through process analysis, modelling and optimisation. The articles mainly show the contribution of each aspect: (a) design and numerical study for innovative energy-efficient technologies, (b) process integration—heat and power, (c) process energy efficiency or emission analysis, and (d) optimisation of renewable energy resources' supply chain. The articles are based on the latest contribution of this journal's Special Issues in the 21st conference entitled "Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction (PRES)". This book is complemented with an editorial review to highlight the broader state-of-the-art development.
Chemicals and Fuels from Bio-Based Building Blocks Elsevier
Plastics & Sustainability clearly lays out the thorny and contentious issues that we encounter at the nexus of plastics and sustainability. The book serves as a practical guide for making sustainability decisions about how plastics are made and used, including current developments in the newest bio-based plastics. Designers, marketers, academics, and engineers will all find something of value in this balanced and thoughtful second edition. Increased public scrutiny of plastics materials and the plastics industry has led, paradoxically, to both a deeper understanding and growing confusion about polymers, their origins, their uses, their risks, and ultimately their disposal. The author makes objective comparisons among major polymer grades and bioplastics including their life cycle assessments and practical performance in commercial applications.
Ship Lifecycle John Wiley & Sons
Textiles and Clothing are key sectors and apparel is one of the necessities of human life. Environmental brunt of the textile sector and cradle to grave life cycle impacts of textiles and clothing products are a subject of constant investigation. There have been a lot of advancements in the textile sector in terms of materials such as textile fibres, yarns, fabrics, garments and also in terms of processes. All these innovations demand an environmental profile as well. Life Cycle Assessment is one of the widely used and popular scientific tools which has been utilized to measure the environmental footprints of various products and processes. This volume presents recent advances on LCA in the textiles and clothing sector.
Computing the Environment John Wiley & Sons
This Special Issue on "LCA of Energy Systems" contains inspiring contributions on assessing the sustainability of novel technologies destined to shape the future of our energy sector. These include battery-based and plug-in hybrid electric vehicles, geothermal energy, hydropower, biomass gasification, national electricity systems, and waste incineration. The analysis of trends and singularities will be invaluable to product designers, engineers, and policy makers. Furthermore, these exercises also contribute to refining the life cycle framework and harmonizing methodological decisions. Our hope is that this should be a step toward promoting the use of science and knowledge to shape a better world for everyone.
Life Cycle Management Springer Nature
In an effort to contribute to global efforts by addressing the marine pollution from various emission types, this Special Issue of Ship Lifecyle for Journal of Marine Science and Engineering was inspired to provide a comprehensive insight for naval architects, marine engineers, designers, shipyards, and ship-owners who strive to find optimal ways to survive in competitive markets by improving cycle time and the capacity to reduce design, production, and operation costs while pursuing zero emission. In this context, this Special Issue is devoted to providing insights into the latest research and technical developments on ship systems and operation with a life cycle point of view. The goal of this Special Issue is to bring together researchers from the whole marine and maritime community into a common forum to share cutting-edge research on cleaner shipping. It is strongly believed that such a joint effort will contribute to enhancing the sustainability of the marine and maritime activities. This Special Issue features six novel publications dedicated to this endeavor. First of all, as a proactive response to transitioning to cleaner marine fuel sources, numerous aspects of the excellence of fuel-cell based hybrid ships were demonstrated through four publications. In addition, two publications demonstrated the effectiveness of life cycle assessment (LCA) applicable to marine vessels.
Selected Papers from PRES 2018 Springer
Computing the Environment presents practical workflows and guidance for designers to get feedback on their design using digital design tools on environmental performance. Starting with an extensive state-of-the-art survey of what top international offices are currently using in their design projects, this book presents detailed descriptions of the tools, algorithms, and workflows used and discusses the theories that underlie these methods. Project examples from Transsolar Klimaengineering, Buro Happold´s SMART Group, Behnish Behnisch Architects, Thomas Herzog, Autodesk Research are contextualized with quotes and references to key thinkers in this field such as Eric Winsberg, Andrew Marsh, Michelle Addington and Ali Malkawi.
Workflows Routledge
Valorization of Microalgal Biomass and Wastewater Treatment provides tools, techniques, data and case studies to demonstrate the use of algal biomass in the production of valuable products like biofuels, food and fertilizers, etc. Valorization has several advantages over conventional bioremediation processes as it helps reduce the costs of bioprocesses. Examples of several successfully commercialized technologies are provided throughout the book, giving insights into developing potential processes for valorization of different biomasses. Wastewater treatment by microalgae generates the biomass, which could be utilized for developing various other products, such as fertilizers and biofuels. This book will equip researchers and policymakers in the energy sector with the scientific methodology and metrics needed to develop strategies for a viable transition in the energy sector. It will be a key resource for students, researchers and practitioners seeking to deepen their knowledge on energy planning, wastewater treatment and current and future trends. - Presents a detailed coverage of the tools and techniques for valarization of algal biomass - Includes detailed updates on the Life Cycle Assessment of microalgal wastewater treatment and biomass valorization, its challenges, prospectus, regulations and policies - Provides case studies of real-life examples for researchers to replicate and learn from
Advances in Sustainable Polymer Composites Springer
Bio-Economy and Agri-Production: Concepts and Evidence bridges the knowledge gap between sustainability and bio-economy aspects of agri-production. It complements traditional perspectives of agri-production with advanced engineering, information and communication technologies recently applied in agri-business. Including knowledgebased agriculture and reflecting sustainability and circular economy principles, the book presents a holistic view of sustainable bio-economy, contributing to the development of integrated agricultural systems. As technology advances, agricultural production management practices are now being called upon to address the need for

sustainability in the bio-economy. Bio-Economy and Agri-Production: Concepts and Evidence presents information to broaden the awareness and promotion of practices and technology to reduce the use of inputs, protect health and environment and improve resource-use efficiency. Topics that are addressed include circular economy in agri-business, lifecycle thinking, lean management, agri-chains, green production, and waste management. Bio-Economy and Agri-Production: Concepts and Evidence is a valuable reference for professionals, consultants, and policy making stakeholders in biosystems engineering and agricultural industries - Focuses on responsible management practices to protect the environment while producing needed resources - Application based for those in agricultural sectors seeking to integrate bioeconomic strategies - Provides real-world insights into transitioning practices

Pavement Life-Cycle Assessment Taylor & Francis

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.

Sustainable Engineering Academic Press

This book is a uniquely pedagogical while still comprehensive state-of-the-art description of LCA-methodology and its broad range of applications. The five parts of the book conveniently provide: I) the history and context of Life Cycle Assessment (LCA) with its central role as quantitative and scientifically-based tool supporting society’s transitioning towards a sustainable economy; II) all there is to know about LCA methodology illustrated by a red-thread example which evolves as the reader advances; III) a wealth of information on a broad range of LCA applications with dedicated chapters on policy development, prospective LCA, life cycle management, waste, energy, construction and building, nanotechnology, agrifood, transport, and LCA-related concepts such as footprinting, ecolabelling,design for environment, and cradle to cradle. IV) A cookbook giving the reader recipes for all the concrete actions needed to perform an LCA. V) An appendix with an LCA report template, a full example LCA report serving as inspiration for students who write their first LCA report, and a more detailed overview of existing LCIA methods and their similarities and differences.

Sustainable Construction Technologies Frontiers Media SA

Life-Cycle Assessment of Semiconductors presents the first and thus far only available transparent and complete life cycle assessment of semiconductor devices. A lack of reliable semiconductor LCA data has been a major challenge to evaluation of the potential environmental benefits of information technologies (IT). The analysis and results presented in this book will allow a higher degree of confidence and certainty in decisions concerning the use of IT in efforts to reduce climate change and other environmental effects. Coverage includes but is not limited to semiconductor manufacturing trends by product type and geography, unique coverage of life-cycle assessment, with a focus on uncertainty and sensitivity analysis of energy and global warming missions for CMOS logic devices, life cycle assessment of flash memory and life cycle assessment of DRAM. The information and conclusions discussed here will be highly relevant and useful to individuals and institutions.

Handbook on Life Cycle Assessment MDPI

The goals of the Circular Economy clearly point towards the cascading approach. Reuse and recycling of materials and products keeps secondary resources circulating and thus protects primary resources from being exploited. Cascade Use in Technologies is dedicated to cascading approaches of materials and products and fits perfectly to the Circular Economy discussion within Europe and the rest of the world. Most methods used in this context can be more or less allocated to life cycle management approaches with a rather technical perspective, as most of the articles presented in this book are engineering-driven. Therefore, it is a novel forum for reporting technological breakthroughs regarding cascading use of materials and products in the domains of automotive, electronics, and computing, and regarding resource criticality in general. Content · Material and Energy Flow Assessment · Sustainable Mobility · Industrial Ecology with a focus on renewable energy sources or WEEE · (Re-) Manufacturing · Cascade Use and Waste Management 4.0 Audience · Researchers · Scientists and technologists from industry, universities, research firms · Employees of government agencies Editors Dr.-Ing. Alexandra Pehlken studied Mining Engineering at RWTH Aachen University, specializing in mineral processing. She received the Lise-Meitner Scholarship from the State of North Rhine-Westfalia and spent two years in Canada. She has headed the BMBF-funded "Cascade Use" research group at the Carl von Ossietzky University of Oldenburg and is now working for OFFIS. Dr. Matthias Kalverkamp is a Post-Doc researcher in the "Cascade Use" research group and focuses on remanufacturing supply chains in the context of the circular economy. During his PhD studies, he conducted research in Europe, North America and Chile. Prior to that, he worked in project management at the BIBA - Bremer Institut für Produktion und Logistik GmbH. Rikka Wittstock studied Sustainability Economics and Management at the Carl von Ossietzky University of Oldenburg and completed her master thesis within the framework of the "Cascade Use" project, focusing on fuel cell vehicles and their impact on platinum demand. She is currently a PhD student at the University of Osnabrueck.

Microalgal Biotechnology John Wiley & Sons

An increasing number of agencies, academic institutes, and governmental and industrial bodies are embracing the principles of sustainability in managing their activities and conducting business. Pavement Life-Cycle Assessment contains contributions to the Pavement Life-Cycle Assessment Symposium 2017 (Champaign, IL, USA, 12-13 April 2017) and discusses the current status of as well as future developments for LCA implementation in project- and network-level applications. The papers cover a wide variety of topics: - Recent developments for the regional inventory databases for materials, construction, and maintenance and rehabilitation life-cycle stages and critical challenges - Review of methodological choices and impact on LCA results - Use of LCA in decision making for project selection - Implementation of case studies and lessons learned: agency perspectives - Integration of LCA into pavement management systems (PMS) - Project-level LCA implementation case studies - Network-level LCA applications and critical challenges - Use-phase rolling resistance models and field validation - Uncertainty assessment in all life-cycle stages - Role of PCR and EPDs in the implementation of LCA Pavement Life-Cycle Assessment will be of interest to academics, professionals, and policymakers involved or interested in Highway and Airport Pavements.

Strategic Management and the Circular Economy John Wiley & Sons

This book presents a novel way to enable people, regardless of their scale of influence, to take responsibility for global environmental problems including climate change. It introduces a new framework called Planetary Accounting, which allows the Planetary Boundaries, non-negotiable limits for the environment, to be translated into limits for human activity. It shows how such limits can be broken down into chunks that can be managed at different levels (from individual and community, to business and sector levels, to cities and regions), and at any level of government. The book begins by summarising the science of climate change and introducing the notion of the Anthropocene – the “human age”. It highlights the importance of returning to and remaining within the Planetary Boundaries but shows that we can’t realistically do so unless we have a new approach to environmental accounting. The book then outlines how Planetary Accounting furnishes this new approach by combining sustainability science, change theory, and environmental accounting to create a scalable framework for environmental management that encourages systemic and individual change. The details of the science of and our human contribution to ten critical human pressures are then presented, and the book concludes with a guide for those seeking to apply Planetary Accounting in practice. Planetary Accounting could form the scientific underpinning of behaviour change programs, guide the development of policy and regulations, and provide both the basis for environmental laws, and the foundation of future global environmental agreements. It has been 50 years since the first views from space showed a blue planet alone in our solar system. This book is an historic opportunity to provide humanity for the first time with sufficient information to begin implementing Planetary Accounting.

Progress on Life Cycle Assessment in Textiles and Clothing Frontiers Media SA

Microalgae are a group of single-celled, photosynthetic microorganisms. They are of great commercial interest as they are capable of producing biomass (with a vast array of biochemical) using sunlight, CO2 and various other naturally occurring nutrients. Correctly utilised, they have the potential to provide sustainable supply of commercially relevant biochemicals, biofuels, nutraceuticals, food and feed supplements. The field of microalgal biotechnology is a fast-paced area of research, with technologies coming ever closer to commercial viability. Microalgal Biotechnology consolidates the latest research in the field together with a look at market potential and policy considerations. Highlighting the huge potential of microalgae as commercial commodities, it covers progress on various fronts including; bio-refinery and its technological challenges, genetic engineering, biosafety and regulatory issues, open and closed photo-bioreactors for biomass production, market space and sustainability for algal products. This book is a useful resource for researchers, academicians, postgraduate students, industries, policy makers and anyone interested in the status and future possibilities of microalgae commercialisation.

Cascade Use in Technologies 2018 Elsevier

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 contexts. The book critically 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 interdependency between critical 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 mining. The book is 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 energy and critical raw materials - Explores interdisciplinary perspectives from the natural sciences, engineering, and social sciences - Discusses critical strategies to address the nexus from a practitioner's perspective

Life Cycle Assessment of Wastewater Treatment MDPI

Sustainable Construction Technologies: Life-Cycle Assessment provides practitioners with a tool to help them select technologies that are financially advantageous even though they have a higher initial cost. Chapters provide an overview of LCA and how it can be used in conjunction with other indicators to manage construction. Topics covered include indoor environment quality, energy efficiency, transport, water reuse, materials, land use and ecology, and more. The book presents a valuable tool for construction professionals and researchers that want to apply sustainable construction techniques to their projects. Practitioners will find the international case studies and discussions of worldwide regulation and standards particularly useful. - Provides a framework for analyzing sustainable construction technologies and economic viability - Introduces key credit criteria for different sustainable construction technologies - Covers the most relevant construction areas - Includes technologies that can be employed during the process of construction, or to the product of the construction process, i.e. buildings - Analyzes international rating systems and provides supporting case studies

Planetary Accounting Academic Press

Encyclopedia of Renewable and Sustainable Materials, Five Volume Set provides a comprehensive overview, covering research and development on all aspects of renewable, recyclable and sustainable materials. The use of renewable and sustainable materials in building construction, the automotive sector, energy, textiles and others can create markets for agricultural products and additional revenue streams for farmers, as well as significantly reduce carbon dioxide (CO2) emissions, manufacturing energy requirements, manufacturing costs and waste. This book provides researchers, students and professionals in materials science and engineering with tactics and information as they face increasingly complex challenges around the development, selection and use of construction and manufacturing materials. Covers a broad range of topics not available elsewhere in one resource Arranged thematically for ease of navigation Discusses key features on processing, use, application and the environmental benefits of renewable and sustainable materials Contains a special focus on sustainability that will lead to the reduction of carbon emissions and enhance protection of the natural environment with regard to sustainable materials

Pavement, Roadway, and Bridge Life Cycle Assessment 2020 John Wiley & Sons

An increasing number of agencies, academic institutes, and governmental and industrial bodies are embracing the principles of sustainability in managing their activities. Life Cycle Assessment (LCA) is an approach developed to provide decision support regarding the environmental impact of industrial processes and products. LCA is a field with ongoing research, development and improvement and is being implemented world-wide, particularly in the areas of pavement, roadways and bridges. Pavement, Roadway, and Bridge Life Cycle Assessment 2020 contains the contributions to the International Symposium on Pavement, Roadway, and Bridge Life Cycle Assessment 2020 (Davis, CA, USA, June 3-6, 2020) covering research and practical issues related to pavement, roadway and bridge LCA, including data and tools, asset management, environmental product declarations, procurement, planning, vehicle interaction, and impact of materials, structure, and construction. Pavement, Roadway, and Bridge Life Cycle Assessment 2020 will be of interest to researchers, professionals, and policymakers in academia, industry, and government who are interested in the sustainability of pavements, roadways and bridges.

Life Cycle Assessment Student Handbook John Wiley & Sons This student version of the popular bestseller, Life Cycle Assessment Handbook, is not a watered-down version of the original, but retains all of the important information and valuable lessons provided in the first book, along with helpful problems and solutions for the student learning about Life Cycle Assessment (LCA). As the last several decades have seen a dramatic rise in the application of LCA in decision making, the interest in the life cycle concept as an environmental management and sustainability tool continues to grow. The LCA Student Handbook offers a look at the role that life cycle information, in the hands of companies, governments and consumers, may have in improving the environmental performance of products and technologies. It concisely and clearly presents the various aspects of LCA in order to help the reader better understand the subject. The international success of the sustainability paradigm needs the participation of many stakeholders, including citizens, corporations, academia, and NGOs. The handbook links LCA and responsible decision making and how the life cycle concept is a critical element in environmental sustainability. It covers issues such as building capacity in developing countries and emerging economies so that they are more capable of harnessing the potential in LCA for sustainable development. Governments play a very important role with the leverage they have through procurement, regulation, international treaties, tax incentives, public outreach, and other policy tools. This compilation of points to the clear trend for incorporating life cycle information into the design and development processes for products and policies, just as quality and safety concerns are now addressed throughout product design and development. The Life Cycle Assessment Student Handbook is not just for students. It is also a valuable resource for practitioners looking for a desktop reference on LCA or for any engineer, manager, or policy-maker wishing to learn about LCA.

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