Life Cycle Assessment Thinkstep

WorkflowsSustainable Technologies for Value Addition to Biomass WasteSelected Papers from PRES 2018Ship LifecycleEncyclopedia of Renewable and Sustainable MaterialsCascade Use in Technologies 2018Anaerobic DigestionBiosurfactants: New Insights in their Biosynthesis, Production and ApplicationsDevelopment of Metrics for Streamlined Life Cycle AssessmentsOrganizational water footprint – analyzing water use and mitigating water scarcity along global supply chainsLife Cycle Assessment Richard Garber Ashok Pandey Jiří Jaromír Klemeš Peilin Zhou Alexandra Pehlken Gavin Collins Gloria Soberón-Chávez Maria de Lourdes Alcaraz Ochoa Forin, Silvia Christine Hemming

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workflows are being rethought and remodelled across the architecture engineering and construction aec spectrum the synthesis of building information modelling bim platforms with digital simulation techniques and increasing access to data charting building performance is allowing architects to engage in the generation of new workflows across multidisciplinary teams by merging digital design operations with construction activities project delivery and post occupation scenarios architects are becoming instrumental in the shaping of buildings as well as the design process workflows expand the territory of architectural practice by extending designers remit beyond the confines of the design stage the implications for the aec industry and architecture as a profession could not be greater these new collaborative models are becoming as important as the novel buildings they allow us to produce contributors

include shajay bhooshan john cays randy deutsch sean gallagher ian keough peter kis jonathan mallie adam modesitt rhett russo dale sinclair and stacie wong featured architects arup diller scofidio renfro gluck gro architects plant populous young ayata and zaha hadid architects

sustainable technologies for value addition to biomass waste introduces readers to revolutionary approaches for converting waste biomass into commercially viable products such as biofuels materials and microbial derivatives this book explores detailed methodologies for transforming biomass waste highlighting advanced techniques reactor designs and sustainable strategies it provides critical insights into the feasibility limitations and applications of these technologies making it a vital resource for professionals seeking to understand the intersection of sustainability and innovation in waste management beyond production technologies the book delves into the physicochemical composition of biomass waste explores marine biomass recycling and examines the integration of artificial intelligence for efficient waste management it offers a life cycle assessment framework to evaluate waste generation and conversion emphasizing its role in advancing a circular economy while addressing environmental challenges readers will also benefit from discussions on commercial scalability and the broader impacts of these technologies on resource conservation and pollution reduction sustainable technologies for value addition to biomass waste introduces readers to revolutionary approaches for converting waste biomass into commercially viable products such as biofuels materials and microbial derivatives this book explores detailed methodologies for transforming biomass waste highlighting advanced techniques reactor designs and sustainable strategies it provides critical insights into the feasibility limitations and applications of these technologies making it a vital resource for professionals seeking to understand the intersection of sustainability and innovation in waste management actively contributes to a greener and more sustainable future by recognizing the vast potential of waste biomass as a valuable resource offers detailed production process flowsheets for various value added products to gain a deeper understanding of the challenges and opportunities involved provides insights in commercially viable production processes for value added products to embark on entrepreneurial ventures in the field inspires and enables harnessing the potential of waste biomass for positive environmental and economic impact

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

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

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

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 or weee re manufacturing cascade use and waste management 4 0

anaerobic digestion ad is a naturally occurring biological process in soils sediments ruminants and several other anoxic environments that cycles carbon and other nutrients and converts organic matter into a methane rich gas as a biotechnology ad is now well established for the treatment of the organic fraction of various waste materials including wastewaters but is also increasingly applied for an expanding range of organic feedstocks suitable for biological conversion to biogas ad applications are classified in various ways including on the basis of bioreactor design and operating parameters such as retention time temperature ph total solids ts and volatile solids vs contents and biodegradability of substrates ad is an attractive bioenergy and waste wastewater treatment technology the advantages of ad for waste treatment include production of a useable fuel biogas methane possibility of high organic loading reduced carbon footprint and suitability for integration into a wide variety of process configurations and scales specifically two important and developing applications exemplify the potential of ad technologies 1 the integration of ad as the basis of the core technologies underpinning municipal wastewater and sewage treatment to displace less sustainable and more energy intensive aerobic biological treatment systems in urban water infrastructures and 2 technical innovations for higher rate conversions of high solids wastestreams and feedstocks for the production of energy carriers i e methane biogas but possibly also biohydrogen and other industrially relevant intermediates such as organic acids internationally the research effort to maximize ad biogas yield has increased ten fold over the past decade depending on the feedstocks bioreactor design and process parameters fundamental and applied knowledge are still required to improve conversion rates and biogas yields this research topic cover aspects related to ad processes

such as the effect of feedstock composition as well as the effect of feedstock pre treatment bioreactor design and operating modes on process efficiency microbial community dynamics and systems biology influence of macro and micro nutrient concentrations and availability process control upgrading and calibration of anaerobic digestion models e g adm1 considering the biochemical routes as well as the hydrodynamics in such ecosystems and novel approaches to process monitoring such as the development and application of novel and rapid diagnostic assays including those based on molecular microbiology detailed full scale application studies were also particularly welcomed

growing concern about climate change and human impact on the environment have resulted in an increase in interest for evaluating the environmental impact of products and services we consume life cycle assessment lca has become the most prominent method for environmental evaluation life cycle assessment is the quantification of the environmental impacts of a product or service through its whole life cycle from the extraction of materials to manufacturing and end of life a carbon footprint is a subset of an lca lcas are required as part of government regulations used by companies to identify high resource use in their supply chain or to choose between product designs and by consumers to choose between alternative product choices lcas provide valuable information however they are resource intensive time consuming and uncertain therefore a methodology that addresses all these issues is needed this study addresses the following question can lcas be streamlined while still providing useful information to answer this an under specification probabilistic screening methodology is employed the screening methodology uses a high level assessment of the footprint incorporates uncertainty in the inputs and refines data around the primary drivers of impact the streamlined lca procedure is extended to include a sobol based sensitivity analysis methodology for identifying high impact activities the effects of partial perfect information in subsequent data acquisition activities on the streamlining methodology are examined metrics to determine sufficiency in the data gathering procedure and to determine whether decision makers can sufficiently distinguish between two products or design alternatives are developed a procedure to quantify the cost of additional information is developed finally an exploration of the scenario space of the impacts is analyzed the extended streamlined methodology is applied to a case study on tablets with a focus on integrated circuits this thesis finds that the streamlined probabilistic methodology can be used to cost effectively evaluate the environmental impact of products while still taking uncertainty into account metrics to determine sufficiency can be effectively used and the presence of partial information does not limit the usefulness of the metrics furthermore quantifying the cost of additional information can help determine sufficiency in data collection efforts and can help understand the challenges that companies face

when performing an lca

freshwater is a vital resource for humans and ecosystems but is scarce in many regions around the world organizations measure and manage direct water use at their premises but usually neglect the indirect water use associated with global supply chains even though the latter can be higher by several orders of magnitude as of 2015 there was no standardized life cycle based approach for analysing the water consumption of an organization against this background the bmbf funded research project water footprint for organizations local measures in global supply chains welle has been launched by tu berlin evonik german copper institute neoperl thinkstep and volkswagen the project aims to support organizations in determining their complete organizational water footprint identifying local hotspots in global supply chains and taking action to reduce their water use and mitigate water stress at critical basins within the welle project a method for analysing an organizational water footprint has been developed which analyses an organization s water use and resulting local impacts throughout its entire value chain in other words the organizational water footprint considers not only the direct water use at production facilities but also the water used indirectly for energy generation and raw material production upstream in the supply chain as well as water use during the use and end of life phases of products downstream the organizational water footprint method builds on two environmental assessment frameworks which have been identified as suitable for the purpose of this project water footprint iso 14046 2014 and organizational life cycle assessment unep 2015 to support stakeholders in conducting organizational water footprint studies this guidance document was developed which presents the method in a clear and concise way by illustrating each step with a practical example by analysing their water footprints organizations can determine water use and resulting local impacts at premises and beyond the fence along global supply chains in this way they can reduce water risks and contribute to a more sustainable use of the world s limited freshwater resources süßwasser ist eine lebenswichtige ressource für menschen und Ökosysteme ist aber in vielen regionen der welt knapp organisationen messen und managen den direkten wasserverbrauch an ihrem standort vernachlässigen aber in der regel den indirekten wasserverbrauch der mit globalen lieferketten verbunden ist obwohl letzterer um mehrere größenordnungen höher sein kann bis 2015 gab es keinen standardisierten lebenszyklusbasierten ansatz um den wasserverbrauch einer organisation zu analysieren vor diesem hintergrund wurde das vom bmbf geförderte forschungsprojekt water footprint for organizations local measures in global supply chains welle von der tu berlin evonik dem deutschen kupferinstitut neoperl thinkstep und volkswagen gestartet das projekt zielt darauf ab unternehmen dabei zu unterstützen ihren kompletten organisatorischen wasserfußabdruck zu bestimmen lokale hotspots in globalen

lieferketten zu identifizieren und maßnahmen zu ergreifen um ihren wasserverbrauch zu reduzieren und den wasserstress in wasserknappen einzugsgebieten zu mindern im rahmen des welle projekts wurde eine methode zur analyse eines organisationsbezogenen wasser fußabdrucks entwickelt die den wasserverbrauch einer organisation und die daraus resultierenden lokalen auswirkungen entlang der gesamten wertschöpfungskette analysiert das heißt der organisationsbezogene wasser fußabdruck berücksichtigt nicht nur den direkten wasserverbrauch in den produktionsstätten sondern auch den indirekten wasserverbrauch für die energieerzeugung und die rohstoffproduktion vorgelagert in der lieferkette sowie den wasserverbrauch während der nutzungs und end of life phase der produktion nachgelagert die methode des organisationsbezogenen wasser fußabdrucks baut auf zwei umweltbewertungsrichtlinien auf die für den zweck dieses projekts als geeignet identifiziert wurden wasser fußabdruck iso 14046 2014 und organisationsbezogene Ökobilanzierung unep 2015 um akteure bei der durchführung von organisationsbezogenen wasser fußabdruck studien zu unterstützen wurde dieser leitfaden entwickelt der die methode klar und übersichtlich darstellt und indem jeder schritt mit einem praktischen beispiel illustriert wird durch die analyse ihres wasser fußabdrucks können organisationen den wasserverbrauch und die daraus resultierenden lokalen auswirkungen am standort und entlang globaler lieferketten ermitteln auf diese weise können sie wasserrisiken reduzieren und zu einem nachhaltigeren umgang mit den begrenzten süßwasserressourcen der welt beitragen

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