



Sustainability In The Chemical Industry

**National Research Council, Division on
Earth and Life Studies, Board on
Chemical Sciences and
Technology, Committee on Grand
Challenges for Sustainability in the
Chemical Industry**

Sustainability In The Chemical Industry:

Sustainability in the Chemical Industry National Research Council, Division on Earth and Life Studies, Board on Chemical Sciences and Technology, Committee on Grand Challenges for Sustainability in the Chemical Industry, 2005-12-21 Through innovative design creation processing use and disposal of substances the chemical industry plays a major role in advancing applications to support sustainability in a way that will allow humanity to meet current environmental economic and societal needs without compromising the progress and success of future generations Based on a workshop held in February 2005 that brought together a broad cross section of disciplines and organizations in the chemical industry this report identifies a set of overarching Grand Challenges for Sustainability research in chemistry and chemical engineering to assist the chemical industry in defining a sustainability agenda These Grand Challenges include life cycle analysis renewable chemical feedstocks and education among others

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Transforming Sustainability Strategy into Action Beth Beloff, Marianne Lines, Dickson Tenzil, 2005-10-13 A highly informative and brilliant contribution to the growing sustainability literature Dr Brian and Mary Nattrass Managing Partners of Sustainability Partners and authors of The Natural Step for Business and Dancing with the Tiger The goal of sustainable development a recent focus in the corporate world is to ensure a better quality of life for everyone today and in generations to come The challenge facing industry leaders is how to reconcile economically competitive strategies with environmentally sound and socially responsible practices Transforming Sustainability Strategy into Action The Chemical Industry presents proven practical techniques to help managers in the chemical industry identify and assess options for improving the sustainability of their organizations with a pragmatic emphasis on operational aspects decision support and guidelines for measuring progress Employing a systematic approach and introducing globally proven problem solving and decision making tools designed to provoke questioning and creative thinking the authors address some of the most challenging issues for the industrial world today The authors combined expertise and extensive experience in translating sustainability strategies from theory into action make them uniquely qualified to deliver the kind of hands on responsive business solutions that will give

corporate leaders the competitive edge in preparing for tomorrow's socially and environmentally conscious marketplace

Sustainability in the Chemical Industry Committee on Grand Challenges for Sustainability in the Chemical Industry, National Research Council Staff, 2005-08-31 Based on a workshop that brought together a cross section of disciplines and organizations in the chemical industry this report identifies a set of overarching Grand Challenges for Sustainability research in chemistry and chemical engineering to assist the chemical industry in defining a sustainability agenda

Sustainability in the Chemical Industry Eric Johnson, 2012-04-17 It's the new rock and roll It's the new black Sustainability is trendy and not just among hipsters and pop stars The uncool chemical sector helped pioneer it and today companies inside and outside the sector have embraced it But what have they embraced Surely not the Brundtland definition of meeting the needs of the present without compromising the ability of future generations to meet their own needs Sustainability describes a change in the chemical industry's approach to the external world to regulators to greens to neighbors to investors and to the general public Displacing the adversarialism of the 1970s 80s sustainability is a new approach to social political conflict and an attempt to rebuild the industry's long suffering public image In practice it consists of A stakeholder approach to communications and external relations A rebranding of regulatory compliance and risk management with the emphasis on their benefits to stakeholders Recognition and even celebration of the opportunities not just the costs of environmental and social protection The core of this book is a survey of the world's 29 largest chemical companies how they put sustainability into action six of the 29 do not and the six sustainability brands they have created It begins with a history of stakeholders conflict before looking at various definitions of sustainability by academics by the public and by investors After the survey and analysis the book covers sustainability and greenwash plus the ROI of sustainability and it gives five recommendations

Management Principles of Sustainable Industrial Chemistry Genserik L. L. Reniers, Kenneth Sørensen, Karl Vrancken, 2013-03-20 Approaching sustainability from the perspectives of engineering and multiple scientific disciplines this book incorporates the concepts of intergenerational equity and ecological capabilities while promoting scientific rigor for the analysis of sustainability and the use of appropriate metrics to determine the comparative merits of alternatives The chapters are organized around the key non technological themes of sustainable industrial chemistry and provide an overview of the managerial principles to enhance sustainability in the chemicals sector The book strives to provide an intellectual forum and stimulus for defining the roles chemical engineers can play in achieving sustainable development Suitable for industry and graduate education this is the one stop guide to greener cleaner economically viable and more efficient chemical industries

Sustainable Value Creation in the Fine and Speciality Chemicals Industry R. Rajagopal, 2014-06-12 The global fine and speciality chemicals industry is a vital segment within the chemical value chain catering to a multitude of societal and industrial needs Regulatory sustainability and consumer forces have been constantly shaping the business fundamentals of this industry Developing value creation strategies which embed

economic environmental and social sustainability components will need a comprehensive assessment of business scientific and technological challenges facing the industry Sustainable Value Creation in the Fine and Speciality Chemicals Industry assesses sustainable value creation options against the backdrop of global mega trends that are defining the present and future course of the industry It discusses innovative strategies in feedstocks R D technology manufacturing resource management and the supply chain as well as the significance of the bio based chemical economy in enabling sustainable value creation in the fine and speciality chemicals industry Topics covered include Transformation in the fine and speciality chemicals business Sustainable management evolution transitions and tools Research and technology directions Resource optimization strategies Bio based chemicals specialties and polymers Sustainable practices in the fine and speciality chemicals industry Sustainable value creation strategies Sustainable Value Creation in the Fine and Speciality Chemicals Industry presents a comprehensive overview of strategic options for sustainability management in the global fine and speciality chemicals industry It will be a valuable resource for chemists and chemical engineers involved in the design and development of economically environmentally and socially sustainable practices for the future *Sustainability Engineering* Jeffery Perl, 2016-07-07 This book explores sustainability engineering through the lens of the manufacturing and chemical process industries to elucidate the safe and economic implementation of process designs used to transform raw materials into useful finished products The author applies the tenets of sustainability science to develop an engineering methodology that supports the perpetual availability of raw materials through recycling reuse repurposing incorporates inexhaustible supplies such as solar energy and municipal waste and encompasses the husbandry of these resources in a manner that minimizes negative environmental impacts Anyone involved in the design or manufacture of chemicals or the upgrade of existing manufacturing processes will benefit from this book's suggestions for identifying improvement options while adding the pivotal aspect of sustainability to the usual cost and safety equation optimization elements *Industry as a Partner for Sustainable Development* United Nations Environment Programme. Division of Technology, Industry, and Economics, 2002 In February 2001 UNEP in partnership with a variety of industry associations and organizations launched a reporting initiative to gauge progress by the private sector towards sustainable development This effort contributes to the wider review of progress with the implementation of Agenda 21 under the framework of the World Summit on Sustainable Development These volumes present sectoral reports on the progress towards sustainable development Efficiency and Sustainability in the Energy and Chemical Industries Krishnan Sankaranarayanan, Jakob de Swaan Arons, Hedzer J. van der Kooi, 2004-01-21 Translating fundamental principles of irreversible thermodynamics into day to day engineering concepts this reference provides the tools to accurately measure process efficiency and sustainability in the power and chemical industries helping engineers to recognize why losses occur and how they can be reduced utilizing familiar thermodynamic principles Compares the present industrial society with an emerging metabolic society in which mass production and consumption are in closer

harmony with the natural environment The first book to utilize classic thermodynamic principles for clear understanding analysis and optimization of work flows environmental resources and driving forces in the chemical and power industries

Chemicals without Harm Ken Geiser,2015-06-19 A proposal for a new chemicals strategy that we work to develop safer alternatives to hazardous chemicals rather than focusing exclusively on controlling them Today there are thousands of synthetic chemicals used to make our clothing cosmetics household products electronic devices even our children s toys Many of these chemicals help us live longer and more comfortable lives but some of these highly useful chemicals are also persistent toxic and dangerous to our health and the environment For fifty years the conventional approach to hazardous chemicals has focused on regulation barriers and protection In *Chemicals without Harm* Ken Geiser proposes a different strategy based on developing and adopting safer alternatives to hazardous chemicals rather than focusing exclusively on controlling them Geiser reviews past government policies focused on controlling chemicals describes government initiatives outside the United States that have begun to implement a more sustainable chemical policy and offers an overview of the chemicals industry and market He develops a safer chemicals policy framework that includes processes for characterizing classifying and prioritizing chemicals generating and using new chemical information and promoting transitions to safer chemicals The shift in strategy described by Geiser will require broad changes in science the chemicals economy and government policy Geiser shows that it is already beginning identifying an emerging movement of scientists corporate managers environmental activists and government leaders who are fashioning a new twenty first century approach to chemicals

Sustainable Development in Chemical Engineering Vincenzo Piemonte,Marcello De Falco,Angelo Basile,2013-05-28 Sustainable development is an area that has world wide appeal from developed industrialized countries to the developing world Development of innovative technologies to achieve sustainability is being addressed by many European countries the USA and also China and India The need for chemical processes to be safe compact flexible energy efficient and environmentally benign and conducive to the rapid commercialization of new products poses new challenges for chemical engineers This book examines the newest technologies for sustainable development in chemical engineering through careful analysis of the technical aspects and discussion of the possible fields of industrial development The book is broad in its coverage and is divided into four sections Energy Production covering renewable energies innovative solar technologies cogeneration plants and smart grids Process Intensification describing why it is important in the chemical and petrochemical industry the engineering approach and nanoparticles as a smart technology for bioremediation Bio based Platform Chemicals including the production of bioethanol and biodiesel bioplastics production and biodegradability and biosurfactants Soil and Water Remediation covering water management and re use and soil remediation technologies Throughout the book there are case studies and examples of industrial processes in practice

Efficiency and Sustainability in the Energy and Chemical Industries Krishnan Sankaranarayanan,2023-09-05 Using classic thermodynamic principles as the point of departure this

new edition of a popular resource supplies the understanding and tools required to measure process efficiency and sustainability with much improved accuracy Exploring the driving forces in the chemical and power industries Efficiency and Sustainability in the Energy and Chemical Industries Scientific Principles and Case Studies Third Edition investigates why losses occur and explains how to reduce them It focuses on the changing roles of refining and chemicals in industry and how the industry is transforming itself and considers economics as a key enabler to look at technology choices and whether shareholder returns will be there Includes new chapters on plastics recycling technologies and challenges low carbon energy sources the changing energy mix and project economics taxes and subsidies Illustrates techniques with wide ranging case studies related to energy conversion mining and the chemical industries as well as examples and problems Considers engineering layouts that reduce the environmental impact of chemical operations Explains how to use energy analysis to accurately assess the quality and performance of chemical processes Supplies quantitative tools for analyzing sustainability and efficiency Investigates the challenges of the hydrogen economy and CO₂ and low carbon Discusses plastics recycling economics and a changing energy mix Complete with the keys to quantification of process efficiency and sustainability this cutting edge book is the ideal guide for those engaged in the transition from fossil based fuels to renewable and sustainable energy sources using low waste procedures

Contributions of Chemical Engineering to Sustainability Juan Gabriel Segovia-Hernandez, Nelly Ramírez-Corona, Valentina Aristizábal-Marulanda, 2024-05-02 This book discusses the recent advancements in chemical engineering and their role in achieving the United Nations 2030 Agenda and Sustainable Development Goals SDGs Addressing these goals involves tackling intricate and interdisciplinary challenges Chemical engineers have been diligently addressing a diverse array of issues across academia society and industry with the aim of positively impacting these goals The book offers essential insights and detailed analyses for each SDG It explores the challenges encountered within various applications and proposes solutions based on foundational engineering principles The book's content is tailored to professionals students and researchers across diverse fields including engineering environmental science and biotechnology

The Ecological Modernization of the Chemical Industry Hendrik Hermann Eckart Ahrens, 2024-07-24 In this book key predictors of renewable feedstock adoption to achieve carbon neutrality in the European chemical industry are explored Systematic data collection for the analysis was conducted through semi structured expert interviews and document analysis validating existing theories including agent based models of innovation diffusion the multi level perspective of socio technical transition and technological innovation systems The research findings led to insights on the key predictors of renewable resource adoption and support practitioners to manage the transition to carbon neutrality

Fundamentals of Materials for Energy and Environmental Sustainability David S. Ginley, David Cahen, 2011-11-30 How will we meet rising energy demands What are our options Are there viable long term solutions for the future Learn the fundamental physical chemical and materials science at the heart of renewable non renewable energy

sources future transportation systems energy efficiency and energy storage Whether you are a student taking an energy course or a newcomer to the field this textbook will help you understand critical relationships between the environment energy and sustainability Leading experts provide comprehensive coverage of each topic bringing together diverse subject matter by integrating theory with engaging insights Each chapter includes helpful features to aid understanding including a historical overview to provide context suggested further reading and questions for discussion Every subject is beautifully illustrated and brought to life with full color images and color coded sections for easy browsing making this a complete educational package Fundamentals of Materials for Energy and Environmental Sustainability will enable today s scientists and educate future generations Sustainable Chemical Processes and Products Gijsbert Korevaar,2004 Sustainability, Innovation and Participatory Governance Hubert Heinelt,2019-06-04 Title first published in 2003 This book focuses on whether participatory governance can lead to sustainable and innovative outcomes Using an empirical analysis of the development implementation and review of an EU environmental management system the Eco Management and Audit Scheme EMAS it examines under which circumstances participatory governance might encourage sustainability and innovation Toxic Substances Control Act and the Chemicals Management Program at EPA United States. Congress. Senate. Committee on Environment and Public Works,2009 **Principles Of Environmental Issues In Chemical Industries** Mrs. Ch. V. Naga Sowjanya,Dr. Ch. V. R. L. Gayatri,2024-04-13 Principles of Environmental Issues in Chemical Industries is an exhaustive and pertinent examination of the complex interplay between the sustainable operation of chemical industries and environmental concerns With a strong dedication to connecting industry standards with environmental stewardship this book provides scholars researchers and professionals with invaluable insights The book undertakes an in depth analysis of critical principles and pragmatic implementations as it explores urgent environmental issues that the chemical industry presently confronts Each chapter meticulously examines approaches to reduce environmental impact and optimise industrial processes encompassing topics such as refuse management pollution prevention the implementation of green chemistry principles and the integration of renewable energy Principles of Environmental Issues in Chemical Industries presents a practical framework for addressing intricate regulatory environments and establishing environmentally friendly resolutions Through its emphasis on the significance of collaboration innovation and ethical stewardship the book motivates readers to adopt a comprehensive viewpoint regarding chemical production one that places environmental preservation and societal welfare at the forefront By virtue of its exceptional combination of academic rigour and pragmatic applicability this book is an essential asset for individuals striving to promote environmental sustainability in the chemical sector It guarantees a sustainable equilibrium between long term economic growth and environmental preservation

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