

Overview Of Biogas Technology And Legislative Framework

Value-Chain of Biofuels: Fundamentals, Technology, and Standardization presents the fundamental aspects of biofuel production, from biomass conversion technologies and biofuels' end products to related policy regulation and standardization. Sections explore the current biofuels industry, addressing pretreatment, feedstocks, and conversion processes, review different pathways to produce biofuels, including bioethanol, biochar, biogas/bio-hydrogen, bio-oil, biodiesel, and many others, and finally, present policy regulation and standardization on biofuel production, with a focus on applications. Case studies are provided alongside reviews from academic and industry perspectives, discussing economics and lifecycle assessments (LCA) of biofuel production, as well as analyses of supply chains. Offering a comprehensive and timely overview, this book provides an ideal reference for researchers and practitioners working in bioenergy and renewable energy, but it will also be of interest to chemists, bioengineers, chemical engineers, and the

Access Free Overview Of Biogas Technology And Legislative Framework

agricultural and petrochemical industries. Helps readers gain academic and industry perspectives on biofuel production with the inclusion of lab-based experimentation and informative case studies Contains an exhaustive analysis of biomass conversion technologies for biofuels and biochemicals Provides a clear and concise text that avoids the overuse of jargon and technical language The global demand for energy is met mainly by fossil fuels. Their excessive and indiscriminate use, coupled with increasing demand for energy, will soon deplete their existing reserves. Therefore, it is extremely important to find alternative, environment-friendly, and ecologically sound sources of energy for meeting the present and future energy requirements. Biogas Technology: Towards Sustainable Development makes an attempt to explore the potential of utilizing biodegradable biomass as fuel and manure. The International Conference on the State of the Art on Biogas Technology, Transfer and Diffusion was held in Cairo, Egypt, from 17 to 24 November 1984. The Conference was organized by the Egyptian Academy of Scientific Research and Technology (ASR T), the Egyptian National Research Centre (NRC), the Bioenergy Systems and Technology

Access Free Overview Of Biogas Technology And Legislative Framework

project (BST) of the US Agency for International Development (US/AID) Office of Energy, and the National Academy of Sciences (NAS). A number of international organizations and agencies co-sponsored the Conference. More than 100 participants from 40 countries attended. The purpose of the Conference was to assess the viability of biogas technology (BGT) and propose future courses of action for exploiting BGT prospects to the fullest extent. The Conference emphasized a balanced coverage of technical, environmental, social, economic and organizational aspects relevant to biogas systems design, operation and diffusion. It was organized to incorporate experiences that are pertinent, for the most part, to developing countries. In addition to the wide spectrum of presentations and country programs, structured and non-structured discussions among the participants were strongly encouraged in thematic sessions at round-table discussions, and through personal contacts during poster sessions and field trips. It was clear from the enthusiastic response of most participants that the Conference, in large measure, succeeded in fulfilling its mission. Although draft papers were distributed to all participants, it was felt that the results

Access Free Overview Of Biogas Technology And Legislative Framework

obtained were worthy of organized and refined documentation. And this is precisely what this book intends to do.

Reviews the latest advances in biofuel manufacturing technologies and discusses the deployment of other renewable energy for transportation. Aimed at providing an interface useful to business and scientific managers, this book focuses on the key challenges that still impede the realization of the billion-ton renewable fuels vision. It places great emphasis on a global view of the topic, reviewing deployment and green energy technology in different countries across Africa, Asia, South America, the EU, and the USA. It also integrates scientific, technological, and business development perspectives to highlight the key developments that are necessary for the global replacement of fossil fuels with green energy solutions. *Green Energy to Sustainability: Strategies for Global Industries* examines the most recent developments in biofuel manufacturing technologies in light of business, financial, value chain, and supply chain concerns. It also covers the use of other renewable energy sources like solar energy for transportation and proposes a view of the challenges over the next two to five decades, and how these

Access Free Overview Of Biogas Technology And Legislative Framework

will deeply modify the industrial world in the third millennium. The coming of age of electric vehicles is also looked at, as is the impact of their deployment on the biomass to biofuels value chain. Offers extensive updates on the field of green energy for global industries Covers the structure of the energy business; chemicals and diesel from biomass; ethanol and butanol; hydrogen and methane; and more Provides an expanded focus on the next generation of energy technologies Reviews the latest advances in biofuel manufacturing technologies Integrates scientific, technological and business perspectives Highlights important developments needed for replacing fossil fuels with green energy Green Energy to Sustainability: Strategies for Global Industries will appeal to academic researchers working on the production of fuels from renewable feedstocks and those working in green and sustainable chemistry, and chemical/process engineering. It is also an excellent textbook for courses in bioprocessing technology, renewable resources, green energy, and sustainable chemistry.

Biogas Energy

Biomethane through Resource Circularity

Bioelectrosynthesis

Access Free Overview Of Biogas Technology And Legislative Framework

Biogas

Status and Research Needs

Emerging Technologies and Biological Systems for Biogas Upgrading

This book focuses on agricultural waste treatment and renewable energy production from the perspective of anaerobic digestion. It covers topics on anaerobic digestion processes and practices in various types of biogas plant construction and management and systematically addresses the principle and main features of three kinds of anaerobic digestion systems: household digesters, biogas septic tanks, and biogas plants. Instructive, informative and easy to understand, the book offers a valuable asset for researchers, technicians, graduate students and managerial personnel working in the areas of renewable energy, agricultural ecological engineering and the treatment and utilization of agricultural wastes.

Biogas is a renewable energy resource that can be an alternative solution for the world's insatiable energy demands while helping in managing waste and reducing the greenhouse gas (GHG) emissions. It is also regarded as carbon neutral as the carbon in biogas comes from organic matter (feedstock) that captured this carbon from atmospheric CO₂ over a relatively short timescale. This book has been written and compiled to collate latest information on biogas technology to help readers, researchers

Access Free Overview Of Biogas Technology And Legislative Framework

and extension workers alike to understand the fruitful exploitation of the process. It has fourteen chapters, primarily in three major categories: 01. the first category dealing with the basic biomethanation process including its ecology, microbiology, biochemistry and molecular biology. 02. the second category dealing with the evolution of the technology in Indian/global scenario from the lab to the land 03. the last category is dealing with the economics of the technology. All the various known and active names in this field of research and development have put their hearts and minds into their contributed chapters. The additional details provided in the Annexures (viz., Model bankable scheme for biogas commercialisation venture; Frequently asked questions in adopting biogas technology; Common terminologies in biogas research; Glossary of abbreviations and symbols frequently used in biogas research; and Prominent global entities in biogas R&D and commercialisation) double the usefulness of the compilation.

The Distinguishing Feature Of The Book Is Its Exhaustive Coverage Encompassing Theory And Practical Aspects On Items Like The Status Of Biogas Technology, Different Types Of Biogas Plants And Their Suitability For A Given Situation, Their Design Aspects, Sizing And Scaling Of Biogas Plants Which Are Illustrated With Calculations And

Access Free Overview Of Biogas Technology And Legislative Framework

Working Drawings. In Addition, Constructional Aspects, Cost Aspects, Diagnosis And Cure Of Faults During Operation And Details Of Utilisation Devices Are Detailed.

In recent years, the importance of biogas energy has risen manifold and has become universal. This is due to the realization that biogas capture and utilization has great potential in controlling global warming. By capturing biogas wherever it is formed, we not only tap a source of clean energy, but we also prevent the escape of methane to the atmosphere. Given that methane has 25 times greater global warming potential than CO₂, methane capture through biogas energy in this manner can contribute substantially towards global warming control.

Design and Optimization of Biogas Energy Systems
Advances in Eco-Fuels for a Sustainable Environment

Advances in Silage Production and Utilization
Principles and Technologies for Value-Added Products

Biogas Technology in the Third World

Biogas Technology in Developing Countries

Introduces basic principles and mechanisms, covers new developments, and provides a different view of the main facets of bioelectrosynthesis Bioelectrosynthesis represents a promising approach for storing renewable energy or producing target chemicals in an energy-sustainable and low-cost way.

Access Free Overview Of Biogas Technology And Legislative Framework

This timely and important book systemically introduces the hot issues surrounding bioelectrosynthesis, including potential value-added products via bioelectrochemical system, reactor development of bioelectrosynthesis, and microbial biology on biofilm communities and metabolism pathways. It presents readers with unique viewpoints on basic principles and mechanisms along with new developments on reactor and microbial ecology. Beginning with a principle and products overview of bioelectrosynthesis, *Bioelectrosynthesis: Principles and Technologies for Value-Added Products* goes on to offer in-depth sections on: biogas production and upgrading technology via bioelectrolysis; organic synthesis on cathodes; chemical products and nitrogen recovery; external electron transfer and electrode material promotion; and the microbiology of bioelectrosynthesis. Topics covered include: hydrogen production from waste stream with microbial electrolysis cell; microbial electrolysis cell; inorganic compound synthesis in bioelectrochemical system; microbial growth, ecological, and metabolic characteristics in bioelectrosynthesis systems; microbial metabolism kinetics and interactions in bioelectrosynthesis system; and more. * Comprehensively covers all of the key issues of bioelectrosynthesis * Features contributions from top experts in the field * Examines the conversion of organic wastes to methane via electromethanogenesis; methane production at biocathodes; extracellular electron transport of electroactive biofilm; and more *Bioelectrosynthesis: Principles and Technologies for Value-Added Products* will appeal to chemists, electrochemists, environmental chemists, water chemists, microbiologists, biochemists, and graduate students involved in the field.

Access Free Overview Of Biogas Technology And Legislative Framework

The leading book on the market just got better: With its unique approach covering all aspects of setting up and running a biogas plant, this new edition has been expanded to include recent advances in biomass processing. The author is a key player in the field, who has designed numerous small- and industrial-scale biogas plants, and who is also a long-time lecturer on biogas production, thus combining didactical skill with real-life expertise. As such, he covers both the biological and technical aspects of biogas generation. The full range of biogas substrates and processing modes is explained, from agricultural and industrial waste to marine algae and sediment. On-site use of biogas for conversion into electricity, fuel and heat is also discussed, as are safety and regulatory issues. Many real-life examples of European biogas plants already in operation illustrate the contents, as do numerous schemes, diagrams and summary tables. For this new edition, biogas analytics and quality control required for feeding biogas into natural gas networks are included, as is a completely new chapter on the microbiology of biogas-producing bacterial communities.

This Book Is Written With Special Focus On Issues Relating To Policies And Strategies For Planning And Implementation Of Biogas Programme. The Book Provides A Detailed Overview Of Biogas Technology Covering All The Facets. It Provides Comprehensive History And Progress Of Biomethanation In Select Countries And Regions Where It Has Made Special Mark. It Provides A Detailed Overview Of Developments In India Covering Historical Perspectives, Biogas Potential, Chronological Progress Of Biomethanation, And Enumerates References Made To Biogas At Important Seminars And Conferences By Eminent Personalities From

Access Free Overview Of Biogas Technology And Legislative Framework

India And Abroad. It Comprehensively Spells Out Various Implementation Strategies Particularly The Turnkey Approach Which Is Largely Responsible For Bringing Biogas Revolution In India Judging By The Unprecedented Spurt In The Number Of Biogas Plants Installed In Recent Years.It Consolidates The Findings And Recommendations Of Several Socio-Economic Surveys On Biomethanation Undertaken In Past In India From Time To Time. It Presents Case-Studies Of Several Community Biogas Plants Which Have Greatly Helped In Improving The Rural Economy. It Also Provides An Overview Of Energy Needs Of Developing Countries, Reviews Integrated Rural Energy Programme (Irep) And The Urjagram Programmes Of The Union Government As Supportive Programmes For Biomethanation, And Views Biogas Programme As An Instrument Of Sustainable Development. It Discusses At Length The Economics And Cost- Effectiveness Of Biogas Systems.The Book Also Identifies Areas For Further Studies And Looks Forward That Biomethanation Will Scale New Heights Even When The Subsidies Are Completely Withdrawn And Market-Driven Approach Under The New Economic Policy Governs The Biogas Programme. In Short, The Book Covers All Related Aspects Involving Policies, Progress And Prospects Of Biomethanation In India And Abroad.

This book offers the current state of knowledge in the field of biofuels, presented by selected research centers from around the world. Biogas from waste production process and areas of application of biomethane were characterized. Also, possibilities of applications of wastes from fruit bunch of oil palm tree and high biomass/bagasse from sorghum and Bermuda grass for second-generation bioethanol were

Access Free Overview Of Biogas Technology And Legislative Framework

presented. Processes and mechanisms of biodiesel production, including the review of catalytic transesterification process, and careful analysis of kinetics, including bioreactor system for algae breeding, were widely analyzed. Problem of emissivity of NO_x from engines fueled by B20 fuel was characterized. The closing chapters deal with the assessment of the potential of biofuels in Turkey, the components of refinery systems for production of biodegradable plastics from biomass. Also, a chapter concerning the environmental conditions of synthesis gas production as a universal raw material for the production of alternative fuels was also added.

Biogas Technology

comparisons and performance

towards sustainable development

Research, Technology and Practices

Biogas Systems

From Anaerobic Digestion to a Sustainable Bioenergy Industry

This book gives an overview on techniques and future perspectives of various aspects of waste biomass management. It also presents the economic and environmental evaluation, and also the monetary value-benefits and sustainability of the different processes. Recycling processes of lignocellulosic biomass from palm oil mill waste are covered, as well as from sugar industry waste and agriculture waste. It also includes thermal and non-

Access Free Overview Of Biogas Technology And Legislative Framework

thermal technologies for resource recovery from waste biomass. Challenges in the reuse and recycling of waste biomass are discussed, i.e., the hygienic safety in biomass management and bioremediation technologies for conversion into valuable products. The book is aiming at scientists, researchers and students alike, who are working in the research areas pertaining to waste management. The Biogas Handbook Science, Production and Applications Elsevier

Biogas is a renewable energy resource that can be an alternative solution for the world's insatiable energy demands while helping in managing waste and reducing the greenhouse gas (GHG) emissions. It is also regarded as carbon neutral as the carbon in biogas comes from organic matter (feedstock) that captured this carbon from atmospheric CO₂ over a relatively short timescale. This book has been written and compiled to collate latest information on biogas technology to help readers to understand the fruitful exploitation of the process. Note: T&F does not sell or distribute the

Access Free Overview Of Biogas Technology And Legislative Framework

Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka. This title is co-published with New India Publishing Agency.

This book provides comprehensive and simplified coverage of fundamentals of biogas such as production, purification, storage, methods of improving yield and utilization, types, construction, design and operation of biogas plants. It covers stepwise design and a manual for construction of biogas plants including a planning guide, profitability analysis and evaluation of biogas plants. The biogas energy profile in Nigeria is exclusively covered. Features: Explores planning for biogas plants as a pre-requisite to develop a functional plant balancing energy production and consumption. Gives out detailed provision of the types of substances that are and can be used for biogas production covering animal, municipal, and industrial wastes. Provides knowledge for aspiring biogas producers as well as decision makers, specifically in the context of Nigeria. Covers use of digestrate for anaerobic

Access Free Overview Of Biogas Technology And Legislative Framework

digestion as a waste treatment method and on the input (feedstock) to the biogas plant. Compares carbon dioxide emissions from biogas plants with fossil fuel plants. This book aims at Graduate Students and Researchers in Agricultural, Environmental, Chemical, Civil and Energy engineering and related professional audience.

State of Development

Emerging Waste Management Techniques

Recent Advances and Integrated

Approaches

Microorganisms, Products, and Processes

Biofuels

Integrated Rural Energy Planning

Recent advances in technology to recover bioenergy from various feedstocks make them suitable alternatives to fossil fuel. This book contains several scientific discussions regarding microbes involved in biogas production, the anaerobic digestion process, their operation, and application for sustainable development. The book provides in-depth information about anaerobic digestion for researchers and graduate students. The editor sincerely thanks all the contributors, whose efforts have brought this book to fruition.

Design and Optimization of Biogas Energy Systems presents an overview on planning, implementing, assessing and optimizing biogas systems, from fuel conversion to power generation. The book introduces the fundamental elements of bioenergy systems, highlighting the specificities of biogas

Access Free Overview Of Biogas Technology And Legislative Framework

systems. It discusses the current state of their adoption at a global level and the challenges faced by designers and operators. Methods for sizing, simulating and modeling are discussed, including prefeasibility analysis, available production processes, integration into hybrid energy systems, and the application of Big Data analysis and game theory concepts. All chapters include real-life examples and exercises to illustrate the topics being covered. The book goes beyond theory to offer practical knowledge of methods to reach solutions to key challenges in the field. This is a valuable resource for researchers, practitioners and graduate students interested in developing smart, reliable and sustainable biogas technologies. Provides an applied approach to biogas systems, from technology fundamentals, to economic and environmental assessment Explores control methods and reliability prediction of each system component, including modeling and simulation with HOMER and MATLAB Discusses the use of Big Data analysis, numerical methods, and Game Theory for plant assessment Handbook of Biofuels looks at the many new developments in various type of bioenergy, along with the significant constraints in their production and/or applications. Beyond introducing current approaches and possible future directions of research, this title covers sources and processing of raw materials to downstream processing, constraints involved and research approaches to address and overcome these needs. Different combinations of products from the biorefinery are included, along with the material to answer questions surrounding the optimum process conditions for conversion of different feedstocks to bioenergy, the basis for choosing conversion technology, and what bioenergy products make economic sense. With chapters on the techno-economic analysis of biofuel production and concepts and step-by-step approaches in

Access Free Overview Of Biogas Technology And Legislative Framework

bioenergy processing, the objective of this book is to present a comprehensive and all-encompassing reference about bioenergy to students, teachers, researchers and professionals. Reviews all existing and emerging technologies surrounding the production of advanced biofuels, including biodiesel and bioethanol Includes biofuel applications with compatible global application case studies Offers new pathways for converting biomass

The world has shifted towards sustainable development for the generation of energy and industrially valuable chemicals. Biorefinery plays an important role in the integration of conversion process with high-end equipment facilities for the generation of energy, fuels and chemicals. The first part of the book presents the fundamentals of the biorefinery concept. The second part describes the biorefinery approach for production of several industrially important chemicals from waste biomass and agro residues. These chemicals include industrially important C4, C5 and C6 chemicals, propylene glycol, glycerol byproducts, dyes and inks etc. Each and every chemical has its own industrial value and the book describes the production processes and strategies at the industrial level. The final part of the book describes the various biorefinery approaches and economic analysis for the different types of biofuel production.

Green Energy to Sustainability: Strategies for Global Industries

Policies, Progress and Prospects

Anaerobic Digestion of Biomass

Gaseous Carbon Waste Streams Utilization

Biotechnology for Zero Waste

Waste Biomass Management – A Holistic Approach

Ensiling is a technique that is used to store food, mainly vegetable crops, to

feed the herd when the forage supply from the pastures is not enough to maintain the productive performance of the ruminant animals. However, silage can also be used as substrate for biogas production and other different purposes. In the past years, we have seen many advances in the knowledge about silage production utilization, and this book is a compilation and discussion of the outstanding scientific research activities concerning actually the most recent advances and technologies that have been studied about silage and future demands. It is directed to a broad public of readers - farmers, academics, students, or anyone just curious or interested in the subject.

Biomethane through resource circularity: Research, Technology and Practices is an invaluable resource for researchers, policy makers, implementers and PhD and Marsters level students in universities analyzing the present status, waste biomass including agro wastes, success in experimentation & commercial production, future needs and other relevant areas. While huge

Access Free Overview Of Biogas Technology And Legislative Framework

biomass is wasted by open burning, there is potential of energy generation that can be extracted from the biomass preventing GHG emission and creating business opportunities. Abundance and renewable bioenergy can contribute to a more secure, sustainable, and economically sound future through biomethanation process by selecting followings: Supply chain sustainability of clean energy sources Appropriate Anaerobic Digestion technology with different feedstock Processes Parameter Optimization and best fit conditions, Productivity, Purification of biogas and end use Economic feasibility as business case, Commercialization, generating employment and Revitalizing rural economies This book addresses most of the above issues in lucid manner by experts in the field from different countries which are helpful for the related stakeholders edited by experts in the field.

With pressure increasing to utilise wastes and residues effectively and sustainably, the production of biogas represents one of the most important routes towards reaching national and

international renewable energy targets. The biogas handbook: Science, production and applications provides a comprehensive and systematic guide to the development and deployment of biogas supply chains and technology. Following a concise overview of biogas as an energy option, part one explores biomass resources and fundamental science and engineering of biogas production, including feedstock characterisation, storage and pre-treatment, and yield optimisation. Plant design, engineering, process optimisation and digestate utilisation are the focus of part two. Topics considered include the engineering and process control of biogas plants, methane emissions in biogas production, and biogas digestate quality, utilisation and land application. Finally, part three discusses international experience and best practice in biogas utilisation. Biogas cleaning and upgrading to biomethane, biomethane use as transport fuel and the generation of heat and power from biogas for stationery applications are all discussed. The book concludes with

Access Free Overview Of Biogas Technology And Legislative Framework

a review of market development and biomethane certification schemes. With its distinguished editors and international team of expert contributors, The biogas handbook: Science, production and applications is a practical reference to biogas technology for process engineers, manufacturers, industrial chemists and biochemists, scientists, researchers and academics working in this field. Provides a concise overview of biogas as an energy option Explores biomass resources for production Examines plant design and engineering and process optimisation

Current Developments in Biotechnology and Bioengineering: Waste Treatment Processes for Energy Generation provides extensive research on the role of waste management processes/technologies for energy generation. The enormous increase of waste materials generated by human activity and its potentially harmful effects on the environment and public health have led to an increasing awareness of an urgent need to adopt scientific methods for the safe

***disposal of wastes. This book outlines the basic knowledge, processes and technologies for the generation of energy from waste and functions as an important reference for academics and practitioners at varying levels of interest and knowledge. The book's content encompasses all issues for energy recovery from waste in a very clear and simple manner, acting as a comprehensive resource for anyone seeking an understanding on the topic. Outlines the latest technologies used for waste conversion into energy and facilitates project evaluation based on these technologies Summarizes the pros and cons of various processes Includes case studies and economic analysis
Biogas Production
Biogas Plant
Handbook of Biofuels***

***Fundamentals, Process, and Operation
Biogas Technology, Transfer and
Diffusion***

Advances in Eco-fuels for Sustainable Environment presents the most recent developments in the field of environmentally friendly eco-fuels. Dr. Kalad Azad and his team of contributors analyze the latest bio-

Access Free Overview Of Biogas Technology And Legislative Framework

energy technologies and emission control strategies, while also considering other important factors, such as environmental sustainability and energy efficiency improvement. Coverage includes biofuel extraction and conversion technologies, the implementation of biotechnologies and system improvement methods in the process industries. This book will help readers develop a deeper understanding of the relevant concepts and solutions to global sustainability issues with the goal of achieving cleaner, more efficient energy. Energy industry practitioners, energy policymakers and government organizations, renewables researchers and academics will find this book extremely useful. Focuses on recent developments in the field of eco-fuels, applying concepts to various medium-large scale industries Considers the societal and environmental benefits, along with an analysis of technologies and research Includes contributions from industry experts and global case studies to demonstrate the application of the research and technologies discussed

Biotechnology for Zero Waste The use of biotechnology to minimize waste and maximize resource valorization In Biotechnology for Zero Waste: Emerging Waste Management Techniques, accomplished environmental researchers Drs. Chaudhery Mustansar Hussain and Ravi Kumar Kadeppagari deliver a robust exploration of the role of biotechnology in reducing waste and creating a zero-waste environment. The editors provide

Access Free Overview Of Biogas Technology And Legislative Framework

resources covering perspectives in waste management like anaerobic co-digestion, integrated biosystems, immobilized enzymes, zero waste biorefineries, microbial fuel cell technology, membrane bioreactors, nano biomaterials, and more. Ideal for sustainability professionals, this book comprehensively sums up the state-of-the-art biotechnologies powering the latest advances in zero-waste strategies. The renowned contributors address topics like bioconversion and biotransformation and detail the concept of the circular economy. *Biotechnology for Zero Waste* effectively guides readers on the path to creating sustainable products from waste. The book also includes: A thorough introduction to modern perspectives on zero waste drives, including anaerobic co-digestion as a smart approach for enhancing biogas production Comprehensive explorations of bioremediation for zero waste, biological degradation systems, and bioleaching and biosorption of waste Practical discussions of bioreactors for zero waste and waste2energy with biotechnology An in-depth examination of emerging technologies, including nanobiotechnology for zero waste and the economics and commercialization of zero waste biotechnologies Perfect for process engineers, natural products, environmental, soil, and inorganic chemists, *Biotechnology for Zero Waste: Emerging Waste Management Techniques* will also earn a place in the libraries of food technologists, biotechnologists, agricultural scientists, and

Access Free Overview Of Biogas Technology And Legislative Framework

microbiologists.

Introduction to biogas, including its technology as well as principles, has been provided in this well-structured and descriptive book. It encompasses numerous research reports demonstrating sequential production of biogas and also discusses the principles and mechanisms involved in its operation. The efficacy of technologies adopted for the production of biogas, specifically anaerobic digestion of waste and gas production systems, its structure, mechanism and other aspects of the process, applications and purification of biogas, architecture of pipes and plants, evaluation of environmental facets, economic issues and a few other topics which hold importance in any aspect of biogas generation have been examined in the book. Biogas being a renewable, sustainable and alternative source of energy obtained from the anaerobic digestion of Cow dung or other animal/plant wastes under appropriate conditions can be burnt and used as a cooking fuel after it has been properly purified or scrubbed. Biogas technology involves the construction of digester/ biogas plant in which the organic materials are charged into, and allowed to digest for production of the gas (a mixture of methane, carbondioxide, hydrogen sulphide, water vapor etc) and a set of purifying chambers for cleaning or scrubbing the gas, before compressing it into the combustion chamber for domestic use. These are what you will learn: *Introduction to Biogas Technology

Access Free Overview Of Biogas Technology And Legislative Framework

*Properties of Biogas *Operating Parameters Affecting Biogas Production. *Biochemical Processes of Biogas Production. *Gas Flow Mechanism *Design of Digester and Purifying Chambers. *Gas Production *Gas Purification *Testing *Maintenance of a Biogas Plant *Safety of Biogas

Value-Chain of Biofuels

Biorefinery Production Technologies for Chemicals and Energy

An Overview of Biogas Technology
Technology and Principles

Biogas Digester Design, Gas Production and Purification

System studies of biogas production

This book presents the state of the art in biogas production using anaerobic digestion technology, with an emphasis on waste utilization/valorization.

Offering a comprehensive reference guide to biogas production from different waste streams, it covers various aspects of anaerobic digestion technology from the basics, i.e., microbiological aspects to prominent parameters governing biogas production systems, as well as major principles of their operation, analysis, process control, and troubleshooting. Written and edited by internationally

Access Free Overview Of Biogas Technology And Legislative Framework

recognized experts in the field of biogas production from both academia and industry, it provides in-depth and cutting-edge information on central developments in the field. In addition, it discusses and reviews major issues affecting biogas production, including the type of feedstock, pretreatment techniques, production systems, design and fabrication of biogas plants, as well as biogas purification and upgrading technologies. 'Biogas: Fundamentals, Process, and Operation' also addresses the application of advanced environmental and energy evaluation tools including life cycle assessment (LCA), exergy, techno-economics, and modeling techniques. This book is intended for all researchers, practitioners and students who are interested in the current trends and future prospects of biogas production technologies. Anaerobic digestion (AD) is by far the most important technology for providing clean renewable energy to millions in rural areas of many developing countries. AD of biowastes produces both biomethane and anaerobic digestate

Access Free Overview Of Biogas Technology And Legislative Framework

as a byproduct that can be used further as a biofertilizer. Biowastes including sewage, food processing wastes, animal wastes, and lignocellulosic wastes typically produce biogas containing 55%–70% biomethane. In the context of energy consumption, more than 85% of the total energy consumed currently comes from non-renewable fossil resources. Biogas technology can provide sustainable, affordable, and eco-friendly energy through waste recycling. This book provides basic knowledge and recent research on biogas production, focusing on the enhancement of biomethane and production routes integrated with microalgae cultivation or agriculture.

Emerging Technologies and Biological Systems for Biogas Upgrading systematically summarizes the fundamental principles and the state-of-the-art of biogas cleaning and upgrading technologies, with special emphasis on biological processes for carbon dioxide (CO₂), hydrogen sulfide (H₂S), siloxane, and hydrocarbon removal. After analyzing the global scenario of biogas production,

Access Free Overview Of Biogas Technology And Legislative Framework

upgrading and utilization, this book discusses the integration of methanation processes to power-to-gas systems for methane (CH₄) production and physiochemical upgrading technologies, such as chemical absorption, water scrubbing, pressure swing adsorption and the use of membranes. It then explores more recent and sustainable upgrading technologies, such as photosynthetic processes using algae, hydrogen-mediated microbial techniques, electrochemical, bioelectrochemical, and cryogenic approaches. H₂S removal with biofilters is also covered, as well as removal of siloxanes through polymerization, peroxidation, biological degradation and gas-liquid absorption. The authors also thoroughly consider issues of mass transfer limitation in biomethanation from waste gas, biogas upgrading and life cycle assessment of upgrading technologies, techno-economic aspects, challenges for upscaling, and future trends. Providing specific information on biogas upgrading technology, and focusing on the most recent developments, Emerging Technologies and

Access Free Overview Of Biogas Technology And Legislative Framework

Biological Systems for Biogas Upgrading is a unique resource for researchers, engineers, and graduate students in the field of biogas production and utilization, including waste-to-energy and power-to-gas. It is also useful for entrepreneurs, consultants, and decision-makers in governmental agencies in the fields of sustainable energy, environmental protection, greenhouse gas emissions and climate change, and strategic planning. Explores all major technologies for biogas upgrading through physiochemical, biological, and electrochemical processes Discusses CO₂, H₂S, and siloxane removal techniques Provides a systematical approach to discuss technologies, including challenges to gas-liquid mass transfer, life cycle assessment, techno-economic implications, upscaling and systems integration Written as a practical introduction to biogas plant design and operation, this book fills a huge gap by presenting a systematic guide to this emerging technology -- information otherwise only available in poorly intelligible

Access Free Overview Of Biogas Technology And Legislative Framework

reports by US governmental and other official agencies. The author draws on teaching material from a university course as well as a wide variety of industrial biogas projects he has been involved with, thus combining didactical skill with real-life examples. Alongside biological and technical aspects of biogas generation, this timely work also looks at safety and legal aspects as well as environmental considerations.

Biogas from Waste and Renewable Resources

Biogas Technology in Nigeria

Current Developments in Biotechnology and Bioengineering

The Biogas Handbook

Anaerobic Digestion

Fundamentals, Technology, and Standardization

This book focuses on biogas production by anaerobic digestion, which is the most popular bioenergy technology of today. Using anaerobic digestion for the production of biogas is a sustainable approach that simultaneously also allows the treatment of organic waste. The energy contained in the substrate is released in the form of biogas, which can be employed as a renewable fuel in diverse industrial sectors. Although biogas generation is considered an established process,

Access Free Overview Of Biogas Technology And Legislative Framework

it continues to evolve, e.g. by incorporating modifications and improvements to increase its efficiency and its downstream applications. The chapters of this book review the progress made related to feedstock, system configuration and operational conditions. It also addresses microbial pathways utilized, as well as storage, transportation and usage of biogas. This book is an up-to-date resource for scientists and students working on improving biogas production. Biogas has the potential to be part of the transition towards a more sustainable energy system. Biogas is a renewable energy source and can play an important role in modern waste management systems. Biogas production can also help recirculate nutrients back to farmland. Besides all this, biogas is a locally produced energy source with the potential to increase global resource efficiency, since it can lead to more value and less waste, as well as decreased negative environmental effects. However, biogas production systems are complex, including different substrates, different applications for biogas and digestate, and different technology solutions for digestion, pre-treatment and for upgrading the raw gas. To increase the development of biogas production systems, knowledge sharing is a key factor. To increase this knowledge sharing, comprehensible analysis and comparisons of biogas production systems are necessary. Thus, studies are needed to verify the resource efficiency of biogas production systems from different perspectives. The aim of this thesis is to perform a systems analysis of biogas production systems and to explore how to analyse and compare biogas production systems. An additional aim is to study biogas production systems from a systems perspective, with a focus on environment, energy and

Access Free Overview Of Biogas Technology And Legislative Framework

economy. Studying biogas production systems from different system levels, as well as from different approaches, is beneficial because it results in deeper knowledge of biogas systems and greater opportunities to identify synergies. Systems studies of biogas are important, since biogas systems are often complex and integrated with other systems. In this thesis, biogas systems analyses are performed at different levels. In the widest system study, classifications of different biogas plants are analysed and classifications in different European countries are compared, with the prospect of paving the way for a new common classification for biogas plants in Europe. Today, classifications vary between countries, and hence comparisons of plants in different countries are difficult. In the narrowest system study, a new methodology for analysing energy demand at different biogas production plants has been developed. The aim was to develop a methodology that is applicable for all kinds of biogas plants with energy inputs. The methodology describes the process of analysing energy demand and allocating energy to sub-processes and unit processes. Further, an approach for assessing the resource efficiency of different treatment options for organic waste was designed. The approach includes environmental, economic and energy perspectives, and was applied to five different regions with several food manufacturing companies. A study of treatment options for organic waste from a single food company was also conducted. The results showed that biogas production is a resource-efficient way to treat waste from the food industry. The approach enables a wider analysis of biogas systems, and the results from the applications show the complexity of assessing resource efficiency. It is also shown that it is important to

Access Free Overview Of Biogas Technology And Legislative Framework

understand that the resource efficiency of a system is always in relation to the substituted system. In this thesis, three different approaches to analysing biogas production systems are presented: categorization, resource efficiency analysis and energy demand analysis. These approaches all contribute to the understanding of biogas systems and can help, in different ways, to increase knowledge about biogas systems in the world. If knowledge about different biogas systems can be easily disseminated, more of the unused potential of biogas production may be realized, and hence more fossil fuels can be replaced within the energy system. Biogas har potentialen att vara en del av övergången till ett mer hållbart energisystem. Biogas är en förnybar energikälla som kan spela en viktig roll i moderna avfallshanteringssystem. Produktion av biogas kan även hjälpa till att återcirkulera näringsämnen tillbaka till jordbruksmark. Förutom allt detta är biogas en lokalt producerad energikälla med potential att öka resurseffektiviteten i världen, eftersom det kan leda till ökat värde och mindre avfall samt minskade negativa miljöeffekter. Dock är biogasproduktionssystem komplexa, inklusive exempelvis olika substrat, användning för biogasen och rötresterna, olika tekniska lösningar för rötresterna såväl som förbehandling av substrat och uppgradering av rågas. För att öka utvecklingen av biogasproduktionssystem är kunskapsdelning en nyckelfaktor. För att öka kunskapsdelningen är tydliga analyser och jämförelser av biogasproduktionssystem nödvändiga. Därför behövs studier för att verifiera resurseffektiviteten för biogasproduktionssystem från olika perspektiv. Syftet med denna avhandling är att utföra systemanalyser av biogasproduktionssystem och att undersöka hur man

Access Free Overview Of Biogas Technology And Legislative Framework

analyserar och jämför biogasproduktionssystem. Vidare är syftet också att studera biogasproduktionssystem ur ett systemperspektiv med fokus på miljö, energi och ekonomi. Det är fördelaktigt att studera biogasproduktionssystem på olika systemnivåer och utifrån olika tillvägagångssätt, eftersom kunskapen om biogassystem fördjupas och möjligheterna att hitta synergier ökar. Systemstudier av biogas är viktigt eftersom biogassystem ofta är komplexa och integrerade i andra system. I denna avhandling utförs analyser på olika nivåer av biogassystemen. På den högsta systemnivån analyseras klassificeringar av olika biogasanläggningar. Klassificeringar i olika europeiska länder jämförs, med förhoppningen att bana väg mot en ny, gemensam klassificering för biogasanläggningar i Europa. Idag varierar klassificeringarna mellan länder och därför är jämförelser av anläggningar mellan länder svåra. På den lägsta systemnivån utvecklades en ny metod för analys av energibehov vid olika biogasproduktionsanläggningar. Syftet var att utveckla en metod för alla typer av biogasanläggningar. Metodiken beskriver processen för att analysera energibehov och fördela energin till delprocesser och enhetsprocesser. Vidare utformades en metod för att bedöma resurseffektiviteten hos olika behandlingsalternativ för organiskt avfall. Metoden inkluderar miljö, ekonomi och energi och tillämpades i fem olika regioner med flera livsmedelsindustriföretag. En studie av behandlingsalternativ för organiskt avfall från ett enda livsmedelsföretag genomfördes också. Resultaten visade att biogasproduktion är ett resurseffektivt sätt att behandla avfall från livsmedelsindustrin. Metoden möjliggör en bredare analys av biogassystem och resultaten från tillämpningarna visar komplexiteten i att

Access Free Overview Of Biogas Technology And Legislative Framework

utvärdera resurseffektiviteten. Det visas också att det är viktigt att förstå att ett systems resurseffektivitet alltid är i förhållande till det substituerade systemet. I denna avhandling presenteras tre olika metoder för analys av biogasproduktionssystem: kategorisering, resurseffektivitetsanalys och energibehovsanalys. Dessa tillvägagångssätt bidrar alla till att förstå biogassystem och kan på olika sätt bidra till att öka kunskapen för biogassystem i världen. Med bra system för att sprida kunskap om olika biogassystem kan mer av den outnyttjade potentialen för biogasproduktion realiseras och därmed kan fler fossila bränslen i energisystemet ersättas, samtidigt som de övriga fördelarna med biogas också kommer samhället till nytta.

In the quest to mitigate the buildup of greenhouse gases in Earth's atmosphere, researchers and policymakers have increasingly turned their attention to techniques for capturing greenhouse gases such as carbon dioxide and methane, either from the locations where they are emitted or directly from the atmosphere. Once captured, these gases can be stored or put to use. While both carbon storage and carbon utilization have costs, utilization offers the opportunity to recover some of the cost and even generate economic value. While current carbon utilization projects operate at a relatively small scale, some estimates suggest the market for waste carbon-derived products could grow to hundreds of billions of dollars within a few decades, utilizing several thousand teragrams of waste carbon gases per year. Gaseous Carbon Waste Streams Utilization: Status and Research Needs assesses research and development needs relevant to understanding and improving the commercial viability of waste carbon utilization technologies and defines a research agenda to address

Access Free Overview Of Biogas Technology And Legislative Framework

key challenges. The report is intended to help inform decision making surrounding the development and deployment of waste carbon utilization technologies under a variety of circumstances, whether motivated by a goal to improve processes for making carbon-based products, to generate revenue, or to achieve environmental goals.

Discover biomolecular engineering technologies for the production of biofuels, pharmaceuticals, organic and amino acids, vitamins, biopolymers, surfactants, detergents, and enzymes In *Biomolecular Engineering Solutions for Renewable Specialty Chemicals*, distinguished researchers and editors Drs. R. Navanietha Krishnaraj and Rajesh K. Sani deliver a collection of insightful resources on advanced technologies in the synthesis and purification of value-added compounds. Readers will discover new technologies that assist in the commercialization of the production of value-added products. The editors also include resources that offer strategies for overcoming current limitations in biochemical synthesis, including purification. The articles within cover topics like the rewiring of anaerobic microbial processes for methane and hythane production, the extremophilic bioprocessing of wastes to biofuels, reverse methanogenesis of methane to biopolymers and value-added products, and more. The book presents advanced concepts and biomolecular engineering technologies for the production of high-value, low-volume products, like therapeutic molecules, and describes methods for improving microbes and enzymes using protein engineering, metabolic engineering, and systems biology approaches for converting wastes. Readers will also discover: A thorough introduction to engineered microorganisms for

Access Free Overview Of Biogas Technology And Legislative Framework

the production of biocommodities and microbial production of vanillin from ferulic acid Explorations of antibiotic trends in microbial therapy, including current approaches and future prospects, as well as fermentation strategies in the food and beverage industry Practical discussions of bioactive oligosaccharides, including their production, characterization, and applications In-depth treatments of biopolymers, including a retrospective analysis in the facets of biomedical engineering Perfect for researchers and practicing professionals in the areas of environmental and industrial biotechnology, biomedicine, and the biological sciences, Biomolecular Engineering Solutions for Renewable Specialty Chemicals is also an invaluable resource for students taking courses involving biorefineries, biovalorization, industrial biotechnology, and environmental biotechnology.

Waste Treatment Processes for Energy Generation
An Introduction

Science, Production and Applications
A Multidisciplinary Review

An Overview of Perspectives

Biomolecular Engineering Solutions for Renewable
Specialty Chemicals