Centralized And Distributed Generated Power Systems A

' Supernormal Growth confirms the supernormal achievements of China by providing founding statistics that China, during the past 35 years, experienced a synchronous high-speed growth of investment, consumption, labor productivity with low volatility. First of its kind, Jeffrey Shi analyzes the unique structure and operating mechanism of China''s existing market economy from a theoretic perspective, and attributes China''s supernormal growth to supernormal investment aroused by China''s three dimensional (3-D) market system which consists of competitive enterprises, competitive local governments and central government and to supernormal purchasing power created by American''s finance-driving strategy. In examining multiple challenges of China one by one, the Shi proposes a whole conception of national strategic asset investment system which does not interfere with the operation of normal market, but provides sustainable extra force to extend China''s supernormal growth, and also an innovative idea of relieving polarization of the poor and the rich through a ''1.5th income distribution'' system, so as to provide a panoramic view of China''s supernormal growth strategy in the next 30 years. Shi is not only a respected scholar, but also a successful businessman, giving Supernormal Growth a more valuable reference in answering many questions about China''s development no matter in the past or future. Contents:China''s Unconventional Economic GrowthChina''s Special Market Economy and Supernormal InvestmentThe US Federal Reserve and International Supernormal Purchasing PowerA New Historical Phase for China''s Economic GrowthA New Phase for Supernormal Growth Readership: Undergraduates and policy makers interested in economic development and want to refer to China''s economic history and future from 1949 to 2049. Keywords:China Studies;China Model;Growth Theory'

"This book compiles numerous ongoing projects and research efforts in the design of agents in light of recent development in neurocognitive science and quantum physics, providing readers with interdisciplinary applications of multi-agents systems, ranging from economics to engineering"--Provided by publisher.

Distributed GenerationThe Power Paradigm for the New MillenniumCRC Press

This book constitutes the refereed proceedings of the 6th International Conference on Industrial Applications of Holonic and Multi-Agent Systems, HoloMAS 2013, held in Prague, Czech Republic, in August 2013, in conjunction with DEXA 2013. The 25 revised full papers presented together with two invited talks were carefully reviewed and selected from 37 submissions. The papers are organized in the following topical sections: MAS in automation and manufacturing; design, simulation and validation; MAS in transportation systems; industrial applications; and new trends.

Embedded Generation

Department of the Interior and Related Agencies Appropriations for 2001

Handbook Utility Management

Distributed Power Generation
Intelligent Infrastructures
'China''s Economy 1979â??2049'

As the electrical industry continues to develop, one sector that still faces a range of concerns is the electrical distribution system. Excessive industrialization and inadequate billing are just a few issues that have plagued this electrical sector as it advances into the smart grid environment. Research is necessary to explore the possible solutions in fixing these problems and developing the distribution sector into an active and smart system. The Handbook of Research on New Solutions and Technologies in Electrical Distribution Networks is a collection of innovative research on the methods and applications of solving major issues within the electrical distribution system. Some issues covered within the publication include distribution losses, improper monitoring of system, renewable energy integration with micro-grid and distributed energy sources, and smart home energy management system modelling. This book is ideally designed for power engineers, electrical engineers, energy professionals, developers, technologists, policymakers, researchers, academicians, industry professionals, and students seeking current research on improving this key sector of the electrical industry.

As a result of deregulation, the US electric utility industry is undergoing a dramatic transformation with far-reaching technical and social consequences. At the heart of this transformation lies Distributed Generation (DG)-the substitution of centralized electricity production with smaller-scale technologies located in or near facilities and powered by natural gas or renewable resources. The Electric Power Research Institute estimates that 20 percent of all new power generation will use distributed, not centralized technologies. Distributed Generation: The Power Paradigm for the New Millennium is the first step to understanding the myriad issues that surround the newest, most significant trend in power production since the steam turbine. Chapters contributed by the top experts in their fields address virtually every aspect of this energy "revolution," from its associated technologies to the regulatory environment and from choosing the right DG system for a given purpose to the novel financial and economic opportunities this paradigm shift presents. This book gives engineers and energy business developers their first opportunity to explore and gain a broad understanding of the new energy landscape. With its detailed discussion of the near-term technologies that will see application in the next few years, Distributed Generation: The Power Paradigm for the New Millennium will undoubtedly become the industry's standard reference.

The world is currently undergoing an historic energy transition, driven by increasingly stringent decarbonisation policies and rapid advances in low-carbon technologies. The large-scale shift to low-carbon energy is disrupting the global energy system, impacting whole economies, and changing the political dynamics within and between countries. This open access book, written by leading energy scholars, examines the economic and geopolitical implications of the global energy

transition, from both regional and thematic perspectives. The first part of the book addresses the geopolitical implications in the world's main energy-producing and energy-consuming regions, while the second presents in-depth case studies on selected issues, ranging from the geopolitics of renewable energy, to the mineral foundations of the global energy transformation, to governance issues in connection with the changing global energy order. Given its scope, the book will appeal to researchers in energy, climate change and international relations, as well as to professionals working in the energy industry.

Demand for on-site and alternative power generation is growing, fueled by government and public pressure to increase generation from renewable sources and energy efficient plant, and by the potential economic benefits resulting from privatization and deregulation of the supply sector. This book is a practical, course-derived guide that covers all aspects of embedded (or dispersed) generation, from prime mover characteristics to network reliability modelling. Topics include power quality, protection, reliability and economics. It is essential reading for practicing engineers responsible for planning, designing or specifying embedded generation solutions.

Electricity Generation

Multi-Agent Applications with Evolutionary Computation and Biologically Inspired Technologies: Intelligent Techniques for Ubiquity and Optimization

SES 2020

Sustainable Energy Democracy and the Law

Department of the Interior and Related Agencies Appropriations for 2000: Justification of the budget estimates: United States Forest Service, Department of Energy

Critical Infrastructures State of the Art in Research and Application

As the need for proficient power resources continues to grow, it is becoming increasingly important to implement new strategies and technologies in energy distribution to meet consumption needs. The employment of smart grid networks assists in the efficient allocation of energy resources. Smart Grid as a Solution for Renewable and Efficient Energy features emergent research and trends in energy consumption and management, as well as communication techniques utilized to monitor power transmission and usage. Emphasizing developments and challenges occurring in the field, this book is a critical resource for researchers and students concerned with signal processing, power demand management, energy storage procedures, and control techniques within smart grid networks.

This book reflects the current state of knowledge on sustainability in a wide range of fields, from engineering to agriculture, to education. Though primarily intended to offer an update for experts and researchers in the field, it can also be used as a valuable educational tool for relevant undergraduate and graduate courses. Key aspects covered include the better and more responsible engineering and management of energy conversion processes, the development of renewable energy technologies, and improvements in conventional energy utilization and food production. In addition, the book addresses green buildings, the green economy, waste and recycling, water, ecopolitics and social sustainability.

For those in developed nations, suddenly being without electricity is a disaster: power cuts have us fretting over the food stored in the freezer, and even a few hours without lights, televisions, or air conditioning is an ordeal. However, for an estimated 1.6 billion people worldwide, the absence of electricity is their daily experience. An untold number of others live with electricity that is erratic and of poor quality. How can electric power be brought into their lives when the centralized utility models that have evolved in developed nations are not an economically viable option? Poor, rural communities in developing nations cannot simply be 'plugged in' to a grid. Small-scale Distributed Generation (DG), ranging from individual solar home systems to village level grids run off diesel generators, could provide the answer, and this book compares around 20 DG enterprises and projects in Brazil, Cambodia and China, each of which is considered to be a "business model" for distributed rural electrification. While large, centralized power projects often rely on big subsidies, this study shows that privately run and localized solutions can be both self-sustaining and replicable. Its three sections provide a general introduction to the issue of electrification and rural development, set out the details of the case studies and compare the models involved, and discuss the important thematic issues of equity, access to capital and cost-recovery. Hisham Zerriffi shows that in each case, it is not simply a matter of matching a particular technology to a particular need. Numerous institutional factors come into play including the regulatory regime, access to financial services, and government/utility support or opposition to the DG alternative. Despite this, in many countries, the question is not whether DG has a role to play. Rather it is a question of how it will play a role.

Sustainable Energy for All seeks to improve the lives of billions of people across the world and ensure a more sustainable future by working to achieve its three global objectives: universal access to energy; doubling of the rate of improvement in energy efficiency; and doubling of the share of renewable energy in the global energy mix. Accountability and transparency are essential for

tracking Sustainable Energy for All's global progress. Doing so will clarify where the initiative stands, how various actions are contributing to the three objectives, how much remains to be accomplished, and where more action is needed to achieve Sustainable Energy For All. The first edition of the Global Tracking Framework (2013) provided a system for regular reporting, based on indicators that are technically rigorous and at the same time feasible to compute from current energy data bases, and that offer scope for progressive improvement over time. This second edition of the SE4ALL Global Tracking Framework provides an update of how the world has been moving towards the three objectives over the period 2010-2012. The report also explores a number of complementary themes. First, it provides further analysis of the financial cost of meeting the SE4ALL objectives as well as the geographical and technological distribution of the investments that need to be made. Second, it explores the extent to which countries around the world have access to the technology needed to make progress towards the three goals. Third, it identifies the improvements in data collection methodologies and capacity building that will be needed to provide a more nuanced and accurate picture of progress over time. Finally, this new edition of the Global Tracking Framework explores and introduces nexus concepts focusing on the links between energy and four priority areas of development: food, water, human health, and gender. Links between most of these areas and energy are well established, but often presented in isolation of each other.

Distributed Generation in Liberalised Electricity Markets

Department of the Interior and Related Agencies Appropriations for 2003

Hearings Before a Subcommittee of the Committee on Appropriations, House of Representatives, One Hundred Seventh Congress, First Session

107-2 Hearings: Department of The Interior and Related Agencies Appropriations For 2003, Part 7, March 13, 2002, *

6th International Conference, HoloMAS 2013, Prague, Czech Republic, August 26-28, 2013, Proceedings

Toward a Sustainable Future

Distributed power generation is a technology that could help to enable efficient, renewable energy production both in the developed and developing world. It includes all use of small electric power generators, whether located on the utility system, at the site of a utility customer, or at an isolated site not connected to the power grid. Induction generator (IG) is the most commonly used and cheapest technology, compatible with renewable energy resources.

Permanent magnet (PM) generators have traditionally been avoided due to high fabrication costs; however, compared with IGs they are more reliable and productive. Distributed Generation thoroughly examines the principles, possibilities and limitations of creating energy with both IGs and PM generators. It takes an electrical engineering approach in the analysis and testing of these generators, and includes diagrams and extensive case study examples to better demonstrate how the integration of energy sources can be accomplished. The book also provides the practical tools needed to model and implement new techniques for generating energy through isolated or grid-connected systems. Besides a chapter introducing the technical, economic and environmental impacts of distributed generation, this book includes: an examination of various phase-balancing schemes for a three-phase IG operating on a single-phase power system; a coupled circuit 2-D finite element analysis of a grid-connected IG, with Steinmetz connection; a study of self-excited induction generator (SEIG) schemes for autonomous power systems, and the voltage and frequency control of SEIG with a slip-ring machine (SESRIG); a report on a PM synchronous generator with inset rotor for achieving a reduced voltage regulation when supplying an autonomous power system, and an analysis of its performance using a two-axis model and finite element method; experimental work on various IG and SEIG schemes. This book is a must-read for engineers, consultants, regulators, and environmentalists involved in energy production and delivery, helping them to evaluate renewable energy sources and to integrate these into an efficient energy delivery system. It is also a superior reference for undergraduates and postgraduates. Designers, operators, and planners will appreciate its unique contribution to the literature in this field.

Surveys the current situation and market status of distributed generation in selected OECD countries, including the impact of current energy policies.

Sustainable Energy Democracy and the Law offers a legal account of the concept of sustainable energy democracy. The book explains what the concept means in a legal context and how it can be translated into concrete legal instruments.

State-of-the-Art Approaches to Advance the Large-Scale Green Computing Movement Edited by one of the founders and lead investigator of the Green500 list, The Green Computing Book: Tackling Energy Efficiency at Large Scale explores seminal research in large-scale green computing. It begins with low-level, hardware-based approaches and then traverses up the software stack with increasingly higher-level, software-based approaches. In the first chapter, the IBM Blue Gene

team illustrates how to improve the energy efficiency of a supercomputer by an order of magnitude without any system performance loss in parallelizable applications. The next few chapters explain how to enhance the energy efficiency of a large-scale computing system via compiler-directed energy optimizations, an adaptive run-time system, and a general prediction performance framework. The book then explores the interactions between energy management and reliability and describes storage system organization that maximizes energy efficiency and reliability. It also addresses the need for coordinated power control across different layers and covers demand response policies in computing centers. The final chapter assesses the impact of servers on data center costs.

Sustainable Energy Systems: Innovative Perspectives

Rural Electrification

Information and Software Technologies

Environmental Engineering and Sustainable Design

Department of the Interior and Related Agencies Appropriations for 2002

Global Energy Assessment

Meeting today’s energy and climate challenges require not only technological advancement but also a good understanding of stakeholders’ perceptions, political sensitivity, well-informed policy analyses and innovative interdisciplinary solutions. This book will fill this gap. This is an interdisciplinary informative book to provide a holistic and integrated understanding of the technology-stakeholder-policy interactions of smart grid technologies. The unique features of the book include the following: (a) interdisciplinary approach – by bringing in the policy dimensions to smart grid technologies; (b) global and Asian perspective and (c) learning from national case studies. This book is organised into five sections. Part 1 discusses the historical and conceptual aspects of smart grids. Part 2 introduces the technological aspects and showcase the state of the art of the technologies. Part 3 explores the policy and governance dimensions by bringing in a stakeholder perspective. Part 4 presents a collection of national case studies. Part 5 shares insights and lesson learnt and provide policy recommendations. This book showcases the state-of-the-art R&D developments and policy experiences. This book contributes to a better understanding of governance institution and policy challenges and helps formulate policy recommendations for successful smart grid deployment.

This book reviews the status quo and visions for the future in the wind energy industry in China and around the globe, focusing on its roles in optimizing energy structure, alleviating environmental pollution, and coping with climate change. Providing a blueprint of wind power development till 2050, it suggests a series of further measures in the context of policies, regulations, laws, and marketing in order to overcome the existing bottlenecks. Moreover, it proposes a number of potential innovative technologies related to IT+ and advanced manufacturing, including integrated & distributed power and

micro-grid systems, multi-energy complement, green and intelligent manufacturing, reliability design, blade design, manufacturing and maintenance, drive drain systems, and offshore wind farms. This book offers researchers and engineers insights into sustainable development in the wind power industry.

Along with the increasing deregulation of European utility markets the dynamics of and the competitive pressure in the utility industries have steadily increased over the last years. These changes in the regulatory framework towards an integrated market environment have resulted in new challenges for the management of power and gas companies and in a substantial need for strategic reorientation. In the context of these developments the Handbook Utility Management reflects current challenges in the utility industries and provides solutions from a managerial perspective. The inclusion of latest insights from top managers, renowned researchers, professionals in utility-related investment banking and consulting, and professionals in public and supranational organizations on all value chain activities within the industry makes the Handbook an indispensable asset for both professionals and researchers.

Focus on critical contemporary issues as you examine engineering design and technologies within the context of models for managing systems' sustainability with ENVIRONMENTAL ENGINEERING AND SUSTAINABLE DESIGN, 2nd Edition. This best-selling invaluable resource, specifically designed for those studying engineering or applied environmental science, is updated with the latest developments and current, relevant case studies from across the globe. You learn how to incorporate sustainable practices into engineering design process, technological systems and the built environment. Expanded active learning exercises for each chapter guide you in applying theory to real situations. New chapters address developing issues and help bring sustainability science, environmental impact analysis and models of sustainability in engineering practice to the forefront. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Global Tracking Framework Report

Induction and Permanent Magnet Generators

The Green Computing Book

Hearing Before the Committee on Energy and Natural Resources, United States Senate, One Hundred Tenth Congress, Second Session, to Consider the Value and Examine the Progress of Electricity Generation from Concentrating Solar Power, Albuquerque, NM, July 2, 2008

Sustainability Principles and Practice

Smart Grid Applications and Developments

Presents the results of a study undertaken by the Nat. Coal Council (NCC) of the contributions to be made by coal to the nation's future energy requirements. Outlines a vision for the industry over the next 25 years, setting forth the NCC's beliefs that the future role of coal will be defined by the issues and policies challenging the industry now and over the 25-year time period. Advances ideas and recommendations to help address those issues. Discusses the role of coal in the nation's economic health, environmental issues, generation and end use technologies, international issues, and the role of the

Federal government vs. private industry.

ABSTRACT Distributed generation of electric energy has become part of the current electric power system. In this context a new scenario is arising in which small energy sources make up a new supply system: The microgrid. The most recent research projects show the technical difficulty of controlling the operation of microgrids, because they are complex systems in which several subsystems interact: energy sources, power electronic converters, energy storage systems, local, linear and non-linear loads and of course, the main grid. In next years, the electric grid will evolve from the current very centralized model toward a more distributed one. At the present time the generation, consumption and storage points are very far away one from each other. Under these circumstances, relatively frequent failures of the electric supply and important losses take place in the transport and distribution of energy, so that it can be stated that the efficiency of the supply system is low. In another context, electric companies are aiming at an electric grid, formed in a certain proportion by distributed generators, where the consumption points are near the generation points, avoiding high losses in the transmission lines and reducing the rate of shortcomings. Summing up, it is pursued the generation of small quantities of electric power by the users (this concept is called microgeneration in the origin), considering them not only as electric power consumers but also as responsible for the generation, becoming this way an integral part of the grid. In this context it is necessary to develop a new concept of flexible grid, i.e., with reconfiguration capability for operation with or without connection to the mains. The future microgrids should incorporate supervision and control systems that allow the efficient management of various kinds of energy generators, such as photovoltaic panels, energy storage systems, and local loads. Hence, we are dealing with intelligent flexible Microgrids.

This book gathers the latest advances, innovations, and applications in the field of sustainable energy systems, as presented by researchers and engineers at the International Conference Sustainable Energy Systems: Innovative Perspectives (SES), held in Saint-Petersburg, Russia, on October 29-30, 2020. It covers highly diverse topics, including applications of renewable energy sources, recycling of solid municipal and industrial waste, circular economy based on agricultural waste, energy-efficient and sustainable buildings, innovation management and technologies of sustainable cities, sustainable construction, creative construction technology and materials, construction simulation and virtual construction, BIM and rapid prototyping for construction, consumption practices in the digital era, sustainable operations management, and supply chain management in the digital era. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

Independent, scientifically based, integrated, policy-relevant analysis of current and emerging energy issues for specialists

and policymakers in academia, industry, government.

Strategies of Sustainable Development in China's Wind Power Industry

Vision 2020

Hearings Before a Subcommittee of the Committee on Appropriations, House of Representatives, One Hundred Seventh Congress, Second Session

Decentralized Control Techniques Applied to Electric Power Distributed Generation in Microgrids

27th International Conference, ICIST 2021, Kaunas, Lithuania, October 14–16, 2021, Proceedings

In the view of many power experts, distributed power generation represents the paradigm of the future. Distributed Power Generation: Planning and Evaluation explores the preparation and analysis of distributed generators (DGs) for residential, commercial and industrial, as well as electric utility applications. It examines distributed generation versus traditional, centralized power systems, power demands, reliability evaluation, planning processes, costs, reciprocating piston engine DGs, gas turbine powered DGs, fuel cell powered DGs, renewable resource DGs, and more. The authors include recommendations and guidelines for DG planners, and numerous case studies illustrate the discussions.

This book explores sustainable development from the perspective of resources and energy, based on China's practical experience and cross-disciplinary research. It focuses on major challenges, key solutions and policy recommendations, and studies and explores seven important themes of resources, energy and sustainable development, including: 1) China's low-carbon energy transition, 2) China's urbanization and low-carbon development, 3) China's low-carbon action in cities, 4) China's low-carbon power transition, 5) China's water resources management, 6) electric vehicle development and key metal resources and 7) China's low-carbon development of the iron & steel industry. This book contributes to a more integrated understanding of many themes and their relationships in the area of resources, energy and sustainable development and guides the related policy and management.

Electric transmission networks are among the largest human-made engineering systems: For example, the transmission network in the United States covers over 300,000 km of lines and is served by 500 companies (electric utilities). In sharp contrast to the very incremental developments of the last century, transmission and control technologies experienced a major breakthrough at the beginning of the 21st century. The rapid growth of new energy generation technologies (renewables), significant advances in information processing applied to system monitoring, planning, operation, control, and protection, radical changes in distribution networks, and key shifts in end user behavior (advanced metering and control of demand response) have combined to produce the modern integrated electrical infrastructure commonly referred to as the smart grid. Featuring state-of-the-art, peer-reviewed entries from the Encyclopedia of Sustainability Science and Technology, this book provides a detailed introduction to select key topics which span energy technology, engineering, and urban planning. Worldwide experts discuss the integration of electric energy infrastructure

into the broader critical infrastructures of the modern world and their various interdependencies. Dedicated chapters cover specific topics ranging from underground transmission and distribution, to energy and water interdependence, and their implications for urban areas. Coverage also includes the key role of new policy initiatives as catalysts of change.

This new and expanded edition builds upon the first edition's accessible and comprehensive overview of the interdisciplinary field of sustainability. The focus is on furnishing solutions and equipping the student with both conceptual understanding and technical skills for the workplace. Each chapter explores one aspect of the field, first introducing concepts and presenting issues, then supplying tools for working toward solutions. Techniques for management and measurement as well as case studies from around the world are provided. The second edition includes a complete update of the text, with increased coverage of major topics including the Anthropocene; complexity; resilience; environmental ethics; governance; the IPCC's latest findings on climate change; Sustainable Development Goals; and new thinking on native species and novel ecosystems. Chapters include further reading and discussion questions. The book is supported by a companion website with links, detailed reading lists, glossary, and additional case studies, together with projects, research problems, and group activities, all of which focus on real-world problem solving of sustainability issues. The textbook is designed to be used by undergraduate college and university students in sustainability degree programs and other programs in which sustainability is taught.

Investigate Centralized and Decentralized Information Infrastructure for Future Electricity Market

Electrical Transmission Systems and Smart Grids

The Power Paradigm for the New Millennium

Progress Toward Sustainable Energy 2015

Tackling Energy Efficiency at Large Scale

Distributed Generation

Critical Infrastructures: State of the Art in Research and Application, comprising a selection of reviewed and edited contributions from all over the world, aims to shed light on the various aspects of critical infrastructures. The editors of this book have opted for a broad view on the various criticality aspects on infrastructures itself as well as contributions that discuss the institutional and technical environment of critical infrastructures which are crucial for their proper functioning. Critical Infrastructures brings to light a number of eye-opening critical issues that have been only marginally touched upon in research and practice. Hence, the book is an indispensable resource for infrastructure policy makers, managers, consultants and researchers alike. The book is divided into four sections: *Vulnerability and Risk; *System Development and Adaptation; *Institutional Change; *Capacity Management.

Der Tagungsband enthält die wissenschaftlichen Beiträge der Konferenz "Mikro-Perspektiven auf dezentrale Energieversorgung" vom 23. bis 24.4.2015 in Bangalore, Indien. Die Beiträge umfassen eine große Bandbreite an Themen von technischen Herausforderungen dezentraler Energieversorgung über Konzepte für DC Micro

Grids bis zu Finanzierungs- und Geschäftsmodellen für die Implementierung dieser innovativen Technologien. Weiterhin enthält der Band Beiträge zu Planungs- und Governance-Stratgien, historische Analysen der Infrastrukturentwicklung und Technologie-Bewertung. Mit Fallstudien zu dezentraler Energieversorgung von Indien, Bangladesch, Ägypten, Äthiopien, Kenia, Nigeria, Tansanie und Brasilien geben die Artikel einen guten Überblick über die globalen Entwickung in diesem Sektor. The Proceedings present the scientific contributions of the Conference "Micro Perspectives for Decentralized Energy Supply" from 23rd till 24th of April in Bangalore, India. The papers cover a broad range of topics ranging from technical challenges of decentralized energy supply and concepts for solar DC micro grids till financing and business models for the implementation of those innovative technologies. The volume also contains contributions about planning and governance strategies, historical analyses of the infrastructural development and technology assessments. With case studies on decentralised energy supply from e.g. India, Bangladesh, Egypt, Ethiopia, Kenya, Nigeria, Tanzania and Brazil the papers give a good overview of the development of this sector all over the world.
Society heavily depends on infrastructure systems, such as road-traffic networks, water networks, electricity networks, etc. Infrastructure systems are hereby considered to be large-scale, networked systems, that almost everybody uses on a daily basis, and that are so vital that their incapacity or destruction would have a debilitating impact on the defense or economic security and functioning of society. The operation and control of existing infrastructures such as road-traffic networks, water networks, electricity networks, etc. are failing: too often we are confronted with capacity problems, unsafety, unreliability and inefficiency. This book concentrates on a wide range of problems concerning the way infrastructures are functioning today and discuss novel advanced, intelligent, methods and tools for the operation and control of existing and future infrastructures.
The power grid is undergoing a transformation from a monopolized control system to a more decentralized one. Distributed renewable energy generation, responsive loads, and distribution automation are posing a new challenge to the traditional centralized control method. To address these challenges, we propose two innovative centralized and decentralized solutions for the information infrastructure of the future electricity market. For the centralized approach, we investigate the applications of an open-source control system platform VOLTTRON in the areas of building control and electric vehicle charging. For the case study, we implement the VOLTTRON platform to solve the economic dispatch (ED) problem. The VOLTTRON platform is used as a central message bus and 16 single-board computers are used to simulate distributed generators and dispatchable loads. For the decentralized approach, we propose an innovative Bitcoin-style distributed transactional model "Bit-Energy" using radically different Internet-of-Things technologies (Blockchain and Ethereum's smart contract). "Bit-Energy" enables transparent, auditable, and peer-to-peer energy transactions between active market participants. We implement a highly efficient buyer/seller matching algorithm. Case studies demonstrate the accuracy, robustness, effectiveness, and scalability of the proposed Bit-Energy

platform under various operating conditions.
Micro Perspectives for Decentralized Energy Supply : Proceedings of the International Conference (2015, Bangalore)
Industrial Applications of Holonic and Multi-Agent Systems
Intelligent Techniques for Ubiquity and Optimization
Planning and Evaluation
Handbook of Research on New Solutions and Technologies in Electrical Distribution Networks
Smart Grid as a Solution for Renewable and Efficient Energy