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This book describes the fundamentals and applications of wireless power transfer (WPT) in electric vehicles (EVs). Wireless power transfer (WPT) is a technology that allows devices to be powered without having to be connected to the electrical grid by a cable. Electric vehicles can greatly benefit from WPT, as it does away with the need for users to manually recharge the vehicles' batteries, leading to safer charging operations. Some wireless chargers are available already, and research is underway to develop even more efficient and practical chargers for EVs. This book brings readers up to date on the state-of-the-art worldwide. In particular, it provides:

- The fundamental principles of WPT for the wireless charging of electric vehicles (car, bicycles and drones), including compensation topologies, bi-directionality and coil topologies.
- Information on international standards for EV wireless charging.
- Design procedures for EV wireless chargers, including software files to help readers test their own designs.
- Guidelines on the components and materials for EV wireless chargers.
- Review and analysis of the main control algorithms applied to EV wireless chargers.
- Review and analysis of commercial EV wireless charger products coming to the market and the main research projects on this topic being carried out worldwide.

The book provides essential practical guidance on how to design wireless chargers for electric vehicles, and supplies MATLAB files that demonstrate the complexities of WPT technology, and which can help readers design their own chargers.

The book describes methods of modeling, planning and implementing electric energy storage systems. Energy storage becomes an important issue when more and more electric power is generated by wind mills and photovoltaics systems, because green energy is more volatile. So energy storage is necessary to guarantee safe and secure electric energy supply. Market and power system oriented operations of electric energy storage require different planning methods and different algorithms for searching the optimal solution. These methods are described in detail for energy storage implementations in generation, transmission and distribution levels. Economic aspects are considered. For many years, the authors have been developing smart grid solutions as well as a methodology of modeling and planning electric energy storage usage. The aim has been to increase the flexibility of the power system heading for an energy system which is completely generated by green energy.

Wireless power transfer (WPT) is a promising technology used to transfer electric energy from a transmitter to a receiver wirelessly without wires through various methods and technologies using time-varying electric, magnetic, or electromagnetic fields. It is an attractive solution for many industrial applications due to its many benefits over wired connections. This book discusses the theory and practical aspects of WPT technology.

The electric vehicle market has been gradually gaining prominence in the world due to the rise in pollution levels caused by traditional IC engine-based vehicles. The advantages of electric vehicles are multi-pronged in terms of cost, energy efficiency, and environmental impact. The running and maintenance cost are considerably less than traditional models. The harmful exhaust emissions are reduced, besides the greenhouse gas emissions, when the electric vehicle is supplied from a renewable energy source. However, apart from some Western nations, many developing and underdeveloped countries have yet to take up this initiative. This lack of enthusiasm has been primarily attributed to the capital investment required for charging infrastructure and the slow transition of energy generation from the fossil fuel to the renewable energy format. Currently, there are very few charging stations, and the construction of the same needs to be ramped up to supplement the growth of electric vehicles. Grid integration issues also crop up when the electric vehicle is used to either do supply addition to or draw power from the grid. These problems need to be fixed at all the levels to enhance the future of energy efficient transportation. Electric Vehicles and the Future of Energy Efficient

Transportation explores the growth and adoption of electric vehicles for the purpose of sustainable transportation and presents a critical analysis in terms of the economics, technology, and environmental perspectives of electric vehicles. The chapters cover the benefits and limitations of electric vehicles, techno-economic feasibility of the technologies being developed, and the impact this has on society. Specific points of discussion include electric vehicle architecture, wireless power transfer, battery management, and renewable resources. This book is of interest for individuals in the automotive sector and allied industries, policymakers, practitioners, engineers, technicians, researchers, academicians, and students looking for updated information on the technology, economics, policy, and environmental aspects of electric vehicles.

The continued growth of any nation depends largely on the development of their built infrastructures and communities. By creating stable infrastructures, countries can more easily thrive in competitive international markets. Sustainable Infrastructure: Breakthroughs in Research and Practice examines sustainable development through the lens of transportation, waste management, land use planning, and governance. Highlighting a range of topics such as sustainable development, transportation planning, and regional and urban infrastructure planning, this publication is an ideal reference source for engineers, planners, government officials, developers, policymakers, legislators, researchers, academicians, and graduate-level students seeking current research on the latest trends in sustainable infrastructure.

Important factor in political decision-making is a public opinion as well. Therefore, it is very important to raise global ecological awareness and wider public education regarding ecology. Goal of this book is to bring closer to the readers new drive technologies that are intended to environment and nature protection. The book presents modern technique achievements and technologies applied in the implementation of electric vehicles. Special attention was paid to energy efficiency of EV's. Also today's trends, mathematical models and computer design elements of future cars are presented.

This book presents selected papers from the 2021 International Conference on Electrical and Electronics Engineering (ICEEE 2020), held on January 2, 2021. The book focuses on the current developments in various fields of electrical and electronics engineering, such as power generation, transmission and distribution; renewable energy sources and technologies; power electronics and applications; robotics; artificial intelligence and IoT; control, automation and instrumentation; electronics devices, circuits and systems; wireless and optical communication; RF and microwaves; VLSI; and signal processing. The book is a valuable resource for academics and industry professionals alike.

Smart Grid: Networking, Data Management, and Business Models delivers a comprehensive overview of smart grid communications, discussing the latest advances in the technology, the related cyber security issues, and the best ways to manage user demand and pricing.

Comprised of 16 chapters authored by world-renowned experts, this book: Considers the use of cognitive radio and software-defined networking in the smart grid Explores the space of attacks in the energy management process, the need for a smart grid simulator, and the management issues that arise around smart cities Describes a real-time pricing scheme that aims to reduce the peak-to-average load ratio Explains how to realize low-carbon economies and the green smart grid through the pervasive management of demand Presents cutting-edge research on microgrids, electric vehicles, and energy trading in the smart grid Thus, Smart Grid: Networking, Data Management, and Business Models provides a valuable reference for utility operators, telecom operators, communications engineers, power engineers, electric vehicle original equipment manufacturers (OEMs), electric vehicle service providers, university professors, researchers, and students.

A fully comprehensive introduction to smart grid standards and their applications for developers, consumers and service providers The critical role of standards for smart

grid has already been realized by world-wide governments and industrial organizations. There are hundreds of standards for Smart Grid which have been developed in parallel by different organizations. It is therefore necessary to arrange those standards in such a way that it is easier for readers to easily understand and select a particular standard according to their requirements without going into the depth of each standard, which often spans from hundreds to thousands of pages. The book will allow people in the smart grid areas and in the related industries to easily understand the fundamental standards of smart grid, and quickly find the building-block standards they need from hundreds of standards for implementing a smart grid system. The authors highlight the most advanced works and efforts now under way to realize an integrated and interoperable smart grid, such as the "NIST Framework and Roadmap for Smart Grid Interoperability Standards Release 2.0", the "IEC Smart Grid Standardization Roadmap", the ISO/IEC's "Smart Grid Standards for Residential Customers", the ZigBee/HomePlug's "Smart Energy Profile Specification 2.0", IEEE's P2030 "Draft Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), and End-Use Applications and Loads", and the latest joint research project results between the world's two largest economies, US and China. The book enables readers to fully understand the latest achievements and ongoing technical works of smart grid standards, and assist industry utilities, vendors, academia, regulators, and other smart grid stakeholders in future decision making. The book begins with an overview of the smart grid, and introduces the opportunities in both developed and developing countries. It then examines the standards for power grid domain of the smart grid, including standards for blackout prevention and energy management, smart transmission, advanced distribution management and automation, smart substation automation, and condition monitoring. Communication and security standards as a whole are the backbone of smart grid and their standards, including those for wired and wireless communications, are then assessed. Finally the authors consider the standards and ongoing work and efforts for interoperability and integration between different standards and networks, including the latest joint research effort between the world's two largest economies, US and China. A fully comprehensive introduction to smart grid standards and their applications for developers, consumers and service providers. Covers all up-to-date standards of smart grid, including the key standards from NIST, IEC, ISO ZigBee, IEEE, HomePlug, SAE, and other international and regional standardization organizations. The Appendix summarizes all of the standards mentioned in the book. Presents standards for renewable energy and smart generation, covering wind energy, solar voltaic, fuel cells, pumped storage, distributed generation, and nuclear generation standards. Standards for other alternative sources of energy such as geothermal energy, and bioenergy are briefly introduced. Introduces the standards for smart storage and plug-in electric vehicles, including standards for distributed energy resources (DER), electric storage, and E-mobility/plug-in vehicles. The book is written in an accessible style, ideal as an introduction to the topic, yet contains sufficient detail and research to appeal to the more advanced and specialist reader.

This book presents a comprehensive coverage of the five fundamental yet intertwined pillars paving the road towards the future of connected autonomous electric vehicles and smart cities. The connectivity pillar covers all the latest advancements and various

technologies on vehicle-to-everything (V2X) communications/networking and vehicular cloud computing, with special emphasis on their role towards vehicle autonomy and smart cities applications. On the other hand, the autonomy track focuses on the different efforts to improve vehicle spatiotemporal perception of its surroundings using multiple sensors and different perception technologies. Since most of CAVs are expected to run on electric power, studies on their electrification technologies, satisfaction of their charging demands, interactions with the grid, and the reliance of these components on their connectivity and autonomy, is the third pillar that this book covers. On the smart services side, the book highlights the game-changing roles CAV will play in future mobility services and intelligent transportation systems. The book also details the ground-breaking directions exploiting CAVs in broad spectrum of smart cities applications. Example of such revolutionary applications are autonomous mobility on-demand services with integration to public transit, smart homes, and buildings. The fifth and final pillar involves the illustration of security mechanisms, innovative business models, market opportunities, and societal/economic impacts resulting from the soon-to-be-deployed CAVs. This book contains an archival collection of top quality, cutting-edge and multidisciplinary research on connected autonomous electric vehicles and smart cities. The book is an authoritative reference for smart city decision makers, automotive manufacturers, utility operators, smart-mobility service providers, telecom operators, communications engineers, power engineers, vehicle charging providers, university professors, researchers, and students who would like to learn more about the advances in CAEVs connectivity, autonomy, electrification, security, and integration into smart cities and intelligent transportation systems.

This book focuses on the latest emerging technologies in electric vehicles (EV), and their economic and environmental impact. The topics covered include different types of EV such as hybrid electrical vehicle (HEV), battery electrical vehicle (BEV), fuel cell electrical vehicle (FCEV), plug-in hybrid electrical vehicle (PHEV). Theoretical background and practical examples of conventional electrical machines, advanced electrical machines, battery energy sources, on-board charging and off-board charging techniques, and optimization methods are presented here. This book can be useful for students, researchers and practitioners interested in different problems and challenges associated with electric vehicles.

This book presents the proceedings of the INternational CongRess on Engineering and Sustainability in the XXI cEntury – INCREaSE 2017, which was held in Faro, Portugal, from October 11 to 13, 2017. The book promotes a multidisciplinary approach to sustainable development, exploring a number of transversal challenges. It discusses natural and anthropogenic risks; tourism and sustainability; healthy food; water and society; sustainable mobility; renewable energy; and energy efficiency, offering perspectives from civil, electronics, mechanical and food engineering.

Power Converters for Electric Vehicles gives an overview, topology, design, and simulation of different types of converters used in electric vehicles (EV). It covers a wide range of topics ranging from the fundamentals of EV, Hybrid EV and its stepwise approach, simulation of the proposed converters for real-time applications and corresponding experimental results, performance improvement paradigms, and overall analysis. Drawing upon the need for novel converter topologies, this book provides the complete solution for the power converters for EV applications along with simulation

exercises and experimental results. It explains the need for power electronics in the improvement of performance in EV. This book: Presents exclusive information on the power electronics of EV including traction drives. Provides step-by-step procedure for converter design. Discusses various topologies having different isolated and non-isolated converters. Describes control circuit design including renewable energy systems and electrical drives. Includes practical case studies incorporated with simulation and experimental results. Power Converters for Electric Vehicles will provide researchers and graduate students in Power Electronics, Electric Drives, Vehicle Engineering a useful resource for stimulating their efforts in this important field of the search for renewable technologies.

The objective of this textbook is to introduce students and professionals to fundamental principles and techniques and emerging technologies in energy informatics and the digitalization of power markets and systems. The book covers such areas as smart grids and artificial intelligence (AI) and distributed ledger technology (DLT), with a focus on information and communication technologies (ICT) deployed to modernize the electric energy infrastructure. It also provides an overview of the smart grid and its main components: smart grid applications at transmission, distribution, and customer level, network requirements with communications technologies, and standards and protocols. In addition, the book addresses emerging technologies and trends in next-generation power systems, i.e., energy informatics, such as digital green shift, energy cyber-physical-social systems (E-CPSS), energy IoT, energy blockchain, and advanced optimization. Future aspects of digitalized power markets and systems will be discussed with real-world energy informatics projects. The book is designed to be a core text in upper-undergraduate and graduate courses such as Introduction to Smart Grids, Digitalization of Power Systems, and Advanced Power System Topics in Energy Informatics.

For many, smart grids are the biggest technological revolutions since the Internet. They have the potential to reduce carbon dioxide emissions, increase the reliability of electricity supply, and increase the efficiency of our energy infrastructure. Smart Grid Applications, Communications, and Security explains how diverse technologies play hand-in-hand in building and maintaining smart grids around the globe. The book delves into the communication aspects of smart grids, provides incredible insight into power electronics, sensing, monitoring, and control technologies, and points out the potential for new technologies and markets. Extensively cross-referenced, the book contains comprehensive coverage in four major parts: Part I: Applications provides a detailed introduction to smart grid applications—spanning the transmission, distribution, and consumer side of the electricity grid Part II: Communications discusses wireless, wireline, and optical communication solutions—from the physical layers up to sensing, automation, and control protocols running on the application layers Part III: Security deals with cybersecurity—sharpening the awareness of security threats, reviewing the ongoing standardization, and outlining the future of authentication and encryption key management Part IV: Case Studies and Field Trials presents self-contained chapters of studies where the smart grid of tomorrow has already been put into practice With contributions from major industry stakeholders such as Siemens, Cisco, ABB, and Motorola, this is the ideal book for both engineering professionals and students.

Electric Vehicles for Smart Cities: Trends, Challenges, and Opportunities uniquely examines different approaches to electric vehicle deployment in the context of smart cities. It provides a holistic picture of electromobility within urban areas, offering an integrated approach to city transportation systems by considering the energy systems, latest vehicle technologies, and transport infrastructure. Electric Vehicles for Smart Cities addresses the interaction between grid infrastructure, vehicles, costs and benefits, and operational reliability within an integrated framework. The book examines the role electric vehicles play in the social and political aspects of climate change mitigation, as well as a renewable energy-based economy. It explains how electric vehicles and their system requirements work, including recharging techniques and infrastructures, and discusses alternative market deployment approaches. Includes case studies from cities around the world, including Amsterdam, London, Oslo, Barcelona, Los Angeles, New York, Silicon Valley, Los Angeles, Beijing, Shanghai, Tianjin, Tokyo, and Goto Islands Traces the developments, innovations, advantages, and disadvantages in the electric car industry Provides learning aids such as discussion questions and text boxes

In a fast changing world governed by innovative Enterprise Services and the Future Internet, the issue of Enterprise Interoperability is no longer limited to the interoperation of systems within a single company, but has become a much greater multi-view issue of interoperability throughout a Network of Enterprises. This book contains the proceedings of 13 workshops presented as short papers and discussions held at each workshop. The workshops were co-located with the I-ESA'12 Conference organized by the Polytechnic University of Valencia, Spain. Complementary to the conference program, the workshops aimed at exploiting new issues, challenges and solutions for Enterprise Interoperability. The scope of the workshops spanned a wide range of interoperability issues in Service Science and Innovation, Model Driven Interoperability, Service Oriented Architectures, Factories of the Future, Enterprise Networks and Management, SME Aspects and Standards.

The first successful finished Smart Grid Prototype Projects deliver new requirements and best practices to meet them. These solutions will be the base for the upcoming norms and standards in the near future. This domain is not only part of one Standard developing Organization (SDO), but also of many different organizations like ITU, ISO, IEC and additionally for the electro mobility part the SAE. This results in many standards which are based on different aspects. Furthermore the European mirror organizations (ETSI, CEN, CENELEC) as well as the German mirror groups of these groups are involved, which are delivering further rules and adaption for the local market. Because of this diversity of organizations involved, it is difficult for the local companies (which includes energy utility, manufacturer and software producer specialized on integration) to identify the relevant trends, standardization groups and technologies necessary. With the EU Mandate M490 to CEN/CNELEC and TESI and the Commission being a driving force (e.g.

<ftp://ftp.cenelec.eu/CENELEC/Smartgrid/SmartGridFinalReport.pdf> and

<http://www.cenelec.eu/aboutcenelec/whatwedo/technologysectors/smartgrids.html>)

standardization becomes more and more important – but it's complex and not easy to be understood. Here at OFFIS, we provide training but we are always asked for textbooks on our trainings. Based on our modules for the SG trainings, we would estimate the following chapters to be relevant to SG stakeholders in standardization (roughly 16-20 pages per chapter).

Electric Vehicle Integration in a Smart Microgrid Environment The growing demand for energy in today's world, especially in the Middle East and Southeast Asia, has been met with massive exploitation of fossil fuels, resulting in an increase in environmental pollutants. In order to mitigate the issues arising from conventional internal combustion engine-powered vehicles,

there has been a considerable acceleration in the adoption of electric vehicles (EVs). Research has shown that the impact of fossil fuel use in transportation and surging demand in power owing to the growing EV charging infrastructure can potentially be minimized by smart microgrids. As EVs find wider acceptance with major advancements in high efficiency drivetrain and vehicle design, it has become clear that there is a need for a system-level understanding of energy storage and management in a microgrid environment. Practical issues, such as fleet management, coordinated operation, repurposing of batteries, and environmental impact of recycling and disposal, need to be carefully studied in the context of an ageing grid infrastructure. This book explores such a perspective with contributions from leading experts on planning, analysis, optimization, and management of electrified transportation and the transportation infrastructure. The primary purpose of this book is to capture state-of-the-art development in smart microgrid management with EV integration and their applications. It also aims to identify potential research directions and technologies that will facilitate insight generation in various domains, from smart homes to smart cities, and within industry, business, and consumer applications. We expect the book to serve as a reference for a larger audience, including power system architects, practitioners, developers, new researchers, and graduate-level students, especially for emerging clean energy and transportation electrification sectors in the Middle East and Southeast Asia.

Electric Vehicle Integration into Modern Power Networks provides coverage of the challenges and opportunities posed by the progressive integration of electric drive vehicles. Starting with a thorough overview of the current electric vehicle and battery state-of-the-art, this work describes dynamic software tools to assess the impacts resulting from the electric vehicles deployment on the steady state and dynamic operation of electricity grids, identifies strategies to mitigate them and the possibility to support simultaneously large-scale integration of renewable energy sources. New business models and control management architectures, as well as the communication infrastructure required to integrate electric vehicles as active demand are presented. Finally, regulatory issues of integrating electric vehicles into modern power systems are addressed. Inspired by two courses held under the EES-UETP umbrella in 2010 and 2011, this contributed volume consists of nine chapters written by leading researchers and professionals from the industry as well as academia.

This book covers the recent research advancements in the area of charging strategies that can be employed to accommodate the anticipated high deployment of Plug-in Electric Vehicles (PEVs) in smart grids. Recent literature has focused on various potential issues of uncoordinated charging of PEVs and methods of overcoming such challenges. After an introduction to charging coordination paradigms of PEVs, this book will present various ways the coordinated control can be accomplished. These innovative approaches include hierarchical coordinated control, model predictive control, optimal control strategies to minimize load variance, smart PEV load management based on load forecasting, integrating renewable energy sources such as photovoltaic arrays to supplement grid power, using wireless communication networks to coordinate the charging load of a smart grid and using market price of electricity and customers payment to coordinate the charging load. Hence, this book proposes many new strategies proposed recently by the researchers around the world to address the issues related to coordination of charging load of PEVs in a future smart grid.

Electrical energy usage is increasing every year due to population growth and new forms of consumption. As such, it is increasingly imperative to research methods of energy control and safe use. Security Solutions and Applied Cryptography in Smart Grid Communications is a pivotal reference source for the latest research on the development of smart grid technology and best practices of utilization. Featuring extensive coverage across a range of relevant perspectives and topics, such as threat detection, authentication, and intrusion detection, this book is ideally designed for academicians, researchers, engineers and students seeking

current research on ways in which to implement smart grid platforms all over the globe. *Electric and Hybrid Vehicles: Power Sources, Models, Sustainability, Infrastructure and the Market* reviews the performance, cost, safety, and sustainability of battery systems for hybrid electric vehicles (HEVs) and electric vehicles (EVs), including nickel-metal hydride batteries and Li-ion batteries. Throughout this book, especially in the first chapters, alternative vehicles with different power trains are compared in terms of lifetime cost, fuel consumption, and environmental impact. The emissions of greenhouse gases are particularly dealt with. The improvement of the battery, or fuel cell, performance and governmental incentives will play a fundamental role in determining how far and how substantial alternative vehicles will penetrate into the market. An adequate recharging infrastructure is of paramount importance for the diffusion of vehicles powered by batteries and fuel cells, as it may contribute to overcome the so-called range anxiety." Thus, proposed battery charging techniques are summarized and hydrogen refueling stations are described. The final chapter reviews the state of the art of the current models of hybrid and electric vehicles along with the powertrain solutions adopted by the major automakers. Contributions from the worlds leading industry and research experts Executive summaries of specific case studies Information on basic research and application approaches

This book covers advancements of power electronic converters and their control techniques for grid integration of large-scale renewable energy sources and electrical vehicles. Major emphasis are on transformer-less direct grid integration, bidirectional power transfer, compensation of grid power quality issues, DC system protection and grounding, interaction in mixed AC/DC system, AC and DC system stability, magnetic design for high-frequency high power density systems with advanced soft magnetic materials, modelling and simulation of mixed AC/DC system, switching strategies for enhanced efficiency, and protection and reliability for sustainable grid integration. This book is an invaluable resource for professionals active in the field of renewable energy and power conversion.

This two-volume set LNCS 10907 and 10908 constitutes the refereed proceedings of the 12th International Conference on Universal Access in Human-Computer Interaction, UAHCI 2018, held as part of HCI International 2018 in Las Vegas, NV, USA, in July 2018. The total of 1170 papers and 195 posters included in the 30 HCII 2018 proceedings volumes was carefully reviewed and selected from 4373 submissions. The 48 papers presented in this volume were organized in topical sections named: virtual and augmented reality for universal access; intelligent assistive environments; and access to the web, social media, education, culture and social innovation.

This book surveys state-of-the-art research on and developments in lithium-ion batteries for hybrid and electric vehicles. It summarizes their features in terms of performance, cost, service life, management, charging facilities, and safety. Vehicle electrification is now commonly accepted as a means of reducing fossil-fuels consumption and air pollution. At present, every electric vehicle on the road is powered by a lithium-ion battery. Currently, batteries based on lithium-ion technology are ranked first in terms of performance, reliability and safety. Though other systems, e.g., metal-air, lithium-sulphur, solid state, and aluminium-ion, are now being investigated, the lithium-ion system is likely to dominate for at least the next decade – which is why several manufacturers, e.g., Toyota, Nissan and Tesla, are chiefly focusing on this technology. Providing comprehensive information on lithium-ion batteries, the book includes contributions by the world's leading experts on Li-ion batteries and vehicles. The latest developments in the field of hybrid electric vehicles *Hybrid Electric Vehicles* provides an introduction to hybrid vehicles, which include purely electric, hybrid electric,

hybrid hydraulic, fuel cell vehicles, plug-in hybrid electric, and off-road hybrid vehicular systems. It focuses on the power and propulsion systems for these vehicles, including issues related to power and energy management. Other topics covered include hybrid vs. pure electric, HEV system architecture (including plug-in & charging control and hydraulic), off-road and other industrial utility vehicles, safety and EMC, storage technologies, vehicular power and energy management, diagnostics and prognostics, and electromechanical vibration issues. Hybrid Electric Vehicles, Second Edition is a comprehensively updated new edition with four new chapters covering recent advances in hybrid vehicle technology. New areas covered include battery modelling, charger design, and wireless charging. Substantial details have also been included on the architecture of hybrid excavators in the chapter related to special hybrid vehicles. Also included is a chapter providing an overview of hybrid vehicle technology, which offers a perspective on the current debate on sustainability and the environmental impact of hybrid and electric vehicle technology. Completely updated with new chapters Covers recent developments, breakthroughs, and technologies, including new drive topologies Explains HEV fundamentals and applications Offers a holistic perspective on vehicle electrification Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives, Second Edition is a great resource for researchers and practitioners in the automotive industry, as well as for graduate students in automotive engineering. This book is an essential resource for the increasing number of facilitators who wish to help students learn about the promise and pitfalls of social enterprise. The oikos-Ashoka case competition for social entrepreneurship was conceived in 2007 as a way to help find great material and case studies in this emerging field. This fourth collection of oikos case studies is based on the winning cases from the 2010 to 2014 annual case competitions. These cases have been highly praised because they provide excellent learning opportunities, tell engaging stories, deal with recent situations, include quotations from key actors, are thought-provoking and controversial, require decision-making and provide clear take-aways. This new volume of social entrepreneurship case studies highlights cases from around the globe authored by teachers from around the globe. The selected cases span many industries and geographic contexts; nevertheless, they are connected by a shared ambition: to highlight the power of entrepreneurship to solve social problems. The cases are clustered in three different sections: Socially oriented Enterprise Cases – Health and Fair trade, Ecologically oriented social enterprises, and Corporate Social Entrepreneurship. Case Studies in Social Entrepreneurship will be an essential purchase for educators and is likely to be a widely used as a course textbook at all levels of management education. Online Teaching Notes to accompany each chapter are available on request with the purchase of the book.

Industrial Applications of Batteries looks at both the applications and the batteries and covers the relevant scientific and technological features. Presenting large batteries for stationary applications, e.g. energy storage, and also batteries for hybrid vehicles or different tools. The important aerospace field is covered both in connection with satellites and space missions. Examples of applications include, telecommunications, uninterruptible power supplies, systems for safety/alarms, car accessories, toll collection, asset tracking systems, medical equipment, and oil drilling. The first chapter on applications deals with electric and hybrid vehicles. Four chapters are devoted to

stationary applications, i.e. energy storage (from the electric grid or solar/wind energy), load levelling, telecommunications, uninterruptible power supplies, back-up for safety/alarms. Battery management by intelligent systems and prediction of battery life are dealt with in a dedicated chapter. The topic of used battery collection and recycling, with the description of specific treatments for the different systems, is also extensively treated in view of its environmental relevance. Finally, the world market of these batteries is presented, with detailed figures for the various applications. * Updated and full overview of the power sources for industries * Written by leading scientists in their fields * Well balanced in terms of scientific and technical information

The Global Practice of Forensic Science presents histories, issues, patterns, and diversity in the applications of international forensic science. Written by 64 experienced and internationally recognized forensic scientists, the volume documents the practice of forensic science in 28 countries from Africa, the Americas, Asia, Australia and Europe. Each country's chapter explores factors of political history, academic linkages, the influence of individual cases, facility development, types of cases examined, integration within forensic science, recruitment, training, funding, certification, accreditation, quality control, technology, disaster preparedness, legal issues, research and future directions. Aimed at all scholars interested in international forensic science, the volume provides detail on the diverse fields within forensic science and their applications around the world.

A comprehensive and up-to-date reference book on modern electric vehicle technology, which covers the engineering philosophy, state-of-the-art technology, and commercialisation of electrical vehicles.

This book examines education about standardization in the context of sustainable management. It shows the role of standardization education in the global economy, and in markets, industries and businesses. The book presents knowledge on standardization for sustainable management, describes measures that can be taken to stimulate it, and highlights strategies for teaching and disseminating the concept. Subsequently presenting a number of best practices and case studies, the book seeks to align theory and practice. For researchers, this is the first academic publication that interconnects the concepts of sustainability, standardization and education. For professionals in the area of sustainability it shows that standardization is an essential instrument for enhancing sustainability for which proper education is needed. For standardization professionals the book reveals the links to sustainability and it shows not only the importance of education about standardization but also how this can be organized, and finally, for universities, the book shows that standardization deserves to be included in the curriculum, and it provides guidance and best practice examples about how this can be done.

Previously published as: Power line communications: theory and applications for narrowband and broadband communications over power lines, 2010.

This edited volume presents research results of the PPP European Green Vehicle Initiative (EGVI), focusing on Electric Vehicle Systems Architecture and Standardization Needs. The objectives of energy efficiency and zero emissions in road transportation imply a paradigm shift in the concept of the automobile regarding design, materials, and propulsion technology. A redesign of the electric and electronic architecture provides in many aspects additional potential for reaching these goals. At the same time,

standardization within a broad range of features, components and systems is a key enabling factor for a successful market entry of the electric vehicle (EV). It would lower production cost, increase interoperability and compatibilities, and sustain market penetration. Hence, novel architectures and testing concepts and standardization approaches for the EV have been the topic of an expert workshop of the European Green Vehicles Initiative PPP. This book contains the contributions of current European research projects on EV architecture and an expert view on the status of EV standardization. The target audience primarily comprises researchers and experts in the field.

This workshop concentrated on the technologies to improve the design, performance, manufacturing, and economics of the critical components for the next generation of electric vehicles and hybrid electric vehicles for the year 2000 and beyond. Over 100 illustrations.

In this book, theoretical basis and design guidelines for electric vehicles have been emphasized chapter by chapter with valuable contribution of many researchers who work on both technical and regulatory sides of the field. Multidisciplinary research results from electrical engineering, chemical engineering and mechanical engineering were examined and merged together to make this book a guide for industry, academia and policy maker.

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