Wireless Electric Vehicle Charging Third Edition

#wireless EV charging #electric vehicle inductive charging #EV wireless power transfer #electric car charging technology #future EV charging solutions

Explore the cutting-edge advancements in wireless EV charging with this comprehensive third edition, covering the latest electric vehicle inductive charging technologies. Delve into innovative EV wireless power transfer systems, understanding how this electric car charging technology is shaping future EV charging solutions for enhanced convenience and efficiency in electric mobility.

Wireless Electric Vehicle Charging Third Edition

Are assumptions made in Wireless Electric Vehicle Charging stated explicitly? What other jobs or tasks affect the performance of the steps in the Wireless Electric Vehicle Charging process? Does Wireless Electric Vehicle Charging analysis show the relationships among important Wireless Electric Vehicle Charging factors? Are there any constraints known that bear on the ability to perform Wireless Electric Vehicle Charging work? How is the team addressing them? When was the Wireless Electric Vehicle Charging start date? Defining, designing, creating, and implementing a process to solve a challenge or meet an objective is the most valuable role... In EVERY group, company, organization and department. Unless you are talking a one-time, single-use project, there should be a process. Whether that process is managed and implemented by humans, AI, or a combination of the two, it needs to be designed by someone with a complex enough perspective to ask the right questions. Someone capable of asking the right questions and step back and say, 'What are we really trying to accomplish here? And is there a different way to look at it?' This Self-Assessment empowers people to do just that - whether their title is entrepreneur, manager, consultant, (Vice-)President, CxO etc... - they are the people who rule the future. They are the person who asks the right questions to make Wireless Electric Vehicle Charging investments work better. This Wireless Electric Vehicle Charging All-Inclusive Self-Assessment enables You to be that person. All the tools you need to an in-depth Wireless Electric Vehicle Charging Self-Assessment. Featuring 677 new and updated case-based questions, organized into seven core areas of process design, this Self-Assessment will help you identify areas in which Wireless Electric Vehicle Charging improvements can be made. In using the questions you will be better able to: - diagnose Wireless Electric Vehicle Charging projects, initiatives, organizations, businesses and processes using accepted diagnostic standards and practices - implement evidence-based best practice strategies aligned with overall goals - integrate recent advances in Wireless Electric Vehicle

Charging and process design strategies into practice according to best practice guidelines Using a Self-Assessment tool known as the Wireless Electric Vehicle Charging Scorecard, you will develop a clear picture of which Wireless Electric Vehicle Charging areas need attention. Your purchase includes access details to the Wireless Electric Vehicle Charging self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows your organization exactly what to do next. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard, and... - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation ...plus an extra, special, resource that helps you with project managing. INCLUDES LIFETIME SELF ASSESSMENT UPDATES Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips.

Wireless Power Transfer for Electric Vehicles: Foundations and Design Approach

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.

Wireless Charging Technology and the Future of Electric Transportation

Around the world, the major automakers are developing their strategies for conductive and wireless charging technologies, with concerted efforts to establish technical standards on wireless electric vehicle charging, mainly focused on the safety considerations and inter-operability. Wireless Charging Technology and the Future of Electric Transportation covers the current status of wireless power transfer (WPT) technology and its potential applications to the future road and rail transportation systems. Focusing on the applications of WPT technology to electric vehicle charging and the future green transportation field, Wireless Charging Technology and the Future of Electric Transportation was written collaboratively by nine experts in the field, led by Dr. In-Soo Suh, a professor and researcher from the Korean Advanced Institute of Technology (KAIST). This book brings an in-depth analysis of the most important areas of interest in this new area, such as: • Working principles of wireless power transfer technology • Current technology and its projected future impact on electric vehicles • Comparison between conductive and wireless charging of electric vehicles • Introduction to dynamic wireless charging systems • Technological challenges and international technical standards activities • Applications in consumer electronics, rail, aviation, marine, and off-road transportation • Long-distance electrical energy transfer

Build Your Own Electric Vehicle, Third Edition

BUILD, CONVERT, OR BUY A STATE-OF-THE-ART ELECTRIC VEHICLE Thoroughly revised and expanded, Build Your Own Electric Vehicle, Third Edition, is your go-to guide for converting an internal combustion engine vehicle to electric or building an EV from the ground up. You'll also find out about the wide variety of EVs available for purchase and how they're being built. This new edition details all the latest breakthroughs, including AC propulsion and regenerative braking systems, intelligent controllers, batteries, and charging technologies. Filled with updated photos, this cutting-edge resource fully describes each component--motor, battery, controller, charger, and chassis--and provides illus-

trated, step-by-step instructions on how to assemble all the parts. Exclusive web content features current supplier and dealer lists. Custom-built for environmentalists, engineers, students, hobbyists, and mechanics, this hands-on guide puts you in the fast lane toward a cost-effective, reliable green machine. Build Your Own Electric Vehicle, Third Edition, covers: Environmental impact and energy savings The best EV for you--purchase trade-offs, conversion trade-offs, and conversion costs Chassis and design Different types of electric motors and controllers Lithium EV batteries Chargers and electrical systems EV builds and conversions Licensing and insuring your EV Driving and maintenance List of manufacturers and dealers regularly updated on website

Fast Charging Infrastructure for Electric and Hybrid Electric Vehicles

Fast-Charging Infrastructure for Electric and Hybrid Electric Vehicles Comprehensive resource describing fast-charging infrastructure in electric vehicles, including various subsystems involved in the power system architecture needed for fast-charging Fast-Charging Infrastructure for Electric and Hybrid Electric Vehicles presents various aspects of fast-charging infrastructure, including the location of fast-charging stations, revenue models and tariff structures, power electronic converters, power quality problems such as harmonics & supraharmonics, energy storage systems, and wireless-charging, electrical distribution infrastructures and planning. This book serves as a guide to learn recent advanced technologies with examples and case studies. It also considers problems that arise, and the mitigation methods involved, in fast-charging stations in global aspects and provides tools for analysis. Sample topics covered in Fast-Charging Infrastructure for Electric and Hybrid Electric Vehicles include: Selection of fast-charging stations, advanced power electronic converter topologies for EV fast-charging, wireless charging for plug-in HEV/EVs, and batteries for fast-charging infrastructure Standards for fast-charging infrastructure and power quality issues (analysis of harmonic injection and system resonance conditions due to large-scale penetration of EVs and supraharmonic injection) For professionals in electric vehicle technology, along with graduate and senior undergraduates, professors, and researchers in related fields, Fast-Charging Infrastructure for Electric and Hybrid Electric Vehicles is a useful, comprehensive, and accessible guide to gain an overview of the current state of the art.

Coherent Wireless Power Charging and Data Transfer for Electric Vehicles

Focusing on reducing emissions and improving fuel economy, automotive manufacturers are developing electric vehicles (EV) to replace fuel and diesel vehicles starting in 2030 onwards. The EVs, with their green power supplies maximize environmental benefits with zero emissions thereby lowering air pollution levels. There is now an increased demand for stable electric storage systems (ESS) that are part of the design of new electric vehicles. This timely reference gives an overview of modern electrical power systems applied in the current generation of electric vehicles which require an ESS, and how these can be utilized for simultaneous power and data communication. The book starts with an introduction to the topic, before giving a summary of the green power trend for the electric vehicle market. The book then delves into the theoretical and analytical framework required to understand adaptive compensation of the magnetic inductive system (ACMIS), based on zero voltage switch (ZVS). The chapters demonstrate how these systems are used for transmitting electric power from a single-end inverter combined with a compensated network of parallel to parallel (P-P) type and an auto-tuning impedance of LC tank. The book also covers the experimental method for a multifunctional contactless power flow of the G2V mode and bidirectional outer communication and inner communication with giant magnetoresistance (GMR) effect for car parking guidance. The experiment shows how to analyze data transferring performance including the current trimming method and how to evaluate data transmission quality according to the relevant parameters. Overall the book serves to familiarize automotive engineers and industry professionals involved in the electric vehicle market with the issues that surround wireless power charging and data transfer systems for electric vehicles, and introduces them to more coherent designs.

Wireless Power Transfer Technologies for Electric Vehicles

This book introduces the most state-of-the-art wireless power transfer technologies for electric vehicles from the fundamental theories to practical designs and applications, especially on the circuit analysis methods, resonant compensation networks, magnetic couplers, and related power electronics converters. Moreover, some other necessary design considerations, such as communication systems, detection of foreign and living objects, EMI issues, and battery charging strategies, are also introduced

to provide sufficient insights into the industrial applications. Finally, some future points are mentioned in brief. Different from other works, all the WPT technologies in this book are applied in real EV applications, whose effectiveness and reliability have been already tested and verified. From this book, readers who are interested in the area of wireless power transfer can have a broad view of modern WPT technologies. Readers who have no experience in the WPT area can learn the basic concept, analysis methods, and design principles of the WPT system for EV charging. Even for the readers who are occupied in this area, this book also provides rich knowledge on engineering applications and future trends of EV wireless charging.

Electric Vehicles

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.

Wireless Charging Technology and the Future of Electric Transportation

This book brings an in-depth analysis of the most important areas of interest in this new area, such as: Working principles of wireless power transfer technology; Current technology and its projected future impact on electric vehicles; Comparison between conductive and wireless charging of electric vehicles; Introduction to dynamic wireless charging systems; Technological challenges and international technical standards activities; Applications in consumer electronics, rail, aviation, marine, and off-road transportation; Long-distance electrical energy transfer .

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Cable Based and Wireless Charging Systems for Electric Vehicles

Electric Vehicles are part of the solution to both reducing urban air pollution and staving off climate change. This book covers the latest in charging technology, both stationary as well as wireless and in-motion. Grid integration, simulations, fast charging, and battery management are also addressed.

Wireless Power Transfer for Electric Vehicles and Mobile Devices

From mobile, cable-free re-charging of electric vehicles, smart phones and laptops to collecting solar electricity from orbiting solar farms, wireless power transfer (WPT) technologies offer consumers and society enormous benefits. Written by innovators in the field, this comprehensive resource explains the fundamental principles and latest advances in WPT and illustrates key applications of this emergent technology. Key features and coverage include: The fundamental principles of WPT to practical applications on dynamic charging and static charging of EVs and smartphones. Theories for inductive power transfer (IPT) such as the coupled inductor model, gyrator circuit model, and magnetic mirror model. IPTs for road powered EVs, including controller, compensation circuit, electro-magnetic field cancel, large tolerance, power rail segmentation, and foreign object detection. IPTs for static charging for EVs and large tolerance and capacitive charging issues, as well as IPT mobile applications such as free space omnidirectional IPT by dipole coils and 2D IPT for robots. Principle and applications of capacitive power transfer. Synthesized magnetic field focusing, wireless nuclear instrumentation, and future WPT. A technical asset for engineers in the power electronics, internet of things and automotive sectors, Wireless Power Transfer for Electric Vehicles and Mobile Devices is an essential design and

analysis guide and an important reference for graduate and higher undergraduate students preparing for careers in these industries.

The On-line Electric Vehicle

This book details the design and technology of the on-line electric vehicle (OLEV) system and its enabling wireless power-transfer technology, the “shaped magnetic field in resonance” (SMFIR). The text shows how OLEV systems can achieve their three linked important goals: reduction of CO2 produced by ground transportation; improved energy efficiency of ground transportation; and contribution to the amelioration or prevention of climate change and global warming. SMFIR provides power to the OLEV by wireless transmission from underground cables using an alternating magnetic field and the reader learns how this is done. This cable network will in future be part of any local smart grid for energy supply and use thereby exploiting local and renewable energy generation to further its aims. In addition to the technical details involved with design and realization of a fleet of vehicles combined with extensive subsurface charging infrastructure, practical issues such as those involved with pedestrian safety are considered. Furthermore, the benefits of reductions in harmful emissions without recourse to large banks of batteries are made apparent. Importantly, the use of Professor Suh’s axiomatic design paradigm enables such a complicated transportation system to be developed at reasonable cost and delivered on time. The book covers both the detailed design and the relevant systems-engineering knowledge and draws on experience gained in the successful implementation of OLEV systems in four Korean cities. The introduction to axiomatic design and the in-depth discussion of system and technology development provided by The On-line Electric Vehicle is instructive to graduate students in electrical, mechanical and transportation engineering and will help engineers and designers to master the efficient, timely and to-cost implementation of large-scale networked systems. Managers responsible for the running of large transportation infrastructure projects and concerned with technology management more generally will also find much to interest them in this book.

Developing Charging Infrastructure and Technologies for Electric Vehicles

The increase in air pollution and vehicular emissions has led to the development of the renewable energy-based generation and electrification of transportation. Further, the electrification shift faces an enormous challenge due to limited driving range, long charging time, and high initial cost of deployment. Firstly, there has been a discussion on renewable energy such as how wind power and solar power can be generated by wind turbines and photovoltaics, respectively, while these are intermittent in nature. The combination of these renewable energy resources with available power generation system will make electric vehicle (EV) charging sustainable and viable after the payback period. Recently, there has also been a significant discussion focused on various EV charging types and the level of power for charging to minimize the charging time. By focusing on both sustainable and renewable energy, as well as charging infrastructures and technologies, the future for EV can be explored. Developing Charging Infrastructure and Technologies for Electric Vehicles reviews and discusses the state of the art in electric vehicle charging technologies, their applications, economic, environmental, and social impact, and integration with renewable energy. This book captures the state of the art in electric vehicle charging infrastructure deployment, their applications, architectures, and relevant technologies. In addition, this book identifies potential research directions and technologies that facilitate insights on EV charging in various charging places such as smart home charging, parking EV charging, and charging stations. This book will be essential for power system architects, mechanics, electrical engineers, practitioners, developers, practitioners, researchers, academicians, and students interested in the problems and solutions to the state-of-the-art status of electric vehicles.

Cable Based and Wireless Charging Systems for Electric Vehicles

Electric Vehicles are part of the solution to both reducing urban air pollution and staving off climate change. This book covers the latest in charging technology, both stationary as well as wireless and in-motion. Grid integration, simulations, fast charging, and battery management are also addressed.

Hybrid Electric 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.

Wireless Power Transfer

What Is Wireless Power Transfer The transmission of electrical energy in the absence of cables as a physical connection is referred to variously as wireless power transfer (WPT), wireless power transmission (WPT), wireless energy transmission (WET), or electromagnetic power transfer (EPT). In a system for wirelessly transmitting power, a transmitter device is propelled by electric power derived from a power source. This drives the device to generate a time-varying electromagnetic field, which in turn transmits power across space to a receiver device. The receiver device then extracts power from the field and supplies it to an electrical load. By removing the need for cables and batteries, the technology of wireless power transfer may increase the portability, convenience, and safety of an electronic gadget for all of its users. It is helpful to employ wireless power transmission in order to power electrical equipment in situations where physically connecting cables would be difficult, harmful, or otherwise impossible. How You Will Benefit (I) Insights, and validations about the following topics: Chapter 1: Wireless power transfer Chapter 2: Microwave Chapter 3: Electromagnetic compatibility Chapter 4: Antenna (radio) Chapter 5: Klystron Chapter 6: Near and far field Chapter 7: Index of electronics articles Chapter 8: Resonator Chapter 9: Spark-gap transmitter Chapter 10: Loop antenna Chapter 11: Index of electrical engineering articles Chapter 12: Grid dip oscillator Chapter 13: Coupling (electronics) Chapter 14: Inductive charging Chapter 15: Dielectric resonator antenna Chapter 16: WREL (technology) Chapter 17: Resonant inductive coupling Chapter 18: Qi (standard) Chapter 19: Magnetoquasistatic field Chapter 20: Glossary of electrical and electronics engineering Chapter 21: History of the Tesla coil (II) Answering the public top questions about wireless power transfer. (III) Real world examples for the usage of wireless power transfer in many fields. (IV) 17 appendices to explain, briefly, 266 emerging technologies in each industry to have 360-degree full understanding of wireless power transfer' technologies. Who This Book Is For Professionals, undergraduate and graduate students, enthusiasts, hobbyists, and those who want to go beyond basic knowledge or information for any kind of wireless power transfer.

Build Your Own Electric Vehicle, Third Edition

Discusses the benefits of electric vehicles, describing each component and including step-by-step instructions for assembling the parts.

Electric Vehicle Integration into Modern Power Networks

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.

Mobile Electric Vehicles

This book examines recent research on designing online charging and discharging strategies for mobile electric vehicles (EVs) in smart grid. First, the architecture and applications are provided. Then, the authors review the existing works on charging and discharging strategy design for EVs. Critical challenges and research problems are identified. Promising solutions are proposed to accommodate the issues of high EV mobility, vehicle range anxiety, and power systems overload. The authors investigate innovating charging and discharging potentials for mobile EVS based on real-time information collections (via VANETS and/or cellular networks) and offer the power system adjustable load management methods. Several innovative charging/discharging strategy designs to address the challenging issues in smart grid, i.e., overload avoidance and range anxiety for individual EVs, are presented. This book presents an alternative and promising way to release the pressure of the power grid caused by peak-time EV charging demand. Mobile Electric Vehicles: Online Charging and Discharging provides valuable insights on charging/ discharging strategy design for mobile EVs and the power system management in a smart grid. The authors' findings indicate that the proposed strategies considerably outperform the traditional EV charging strategies without real-time collections on the metrics of the overall energy utilizat ion, the average EV travel cost and the number of successfully charged EVs. Research and graduate students who are working on smart grid and vehicular communication will find this book a valuable resource. Customs and systems operators will also find this book useful.

Design Challenges and Considerations for Wireless Electric Vehicle Charging

This Standard defines the terms and definitions related to charging and battery swap facilities for electric vehicles. This Standard is applicable to electric vehicle charging and swap facilities that provide electrical energy for pure electric vehicles and plug-in hybrid vehicles.

GB/T 29317-2021 Translated English of Chinese Standard (GBT29317-2021)

Wireless Power Transfer Presents a detailed overview of multiple-objective wireless power transfer (WPT) technologies, including the latest research developments and emerging applications Wireless Power Transfer: Principles and Applications offers comprehensive coverage of all key aspects of wireless power transfer (WPT) technologies, including fundamental theory, intelligent control, configuration analysis, and emerging power electronics techniques. This unique resource is the first book of its kind to provide in-depth discussion of energy transmission control schemes with emphasis on omni-directional vector control, energy-encryption-based security control, demand-based optimal designs for transmitter, pickup, and self-resonance coils, multiple-objective power distribution, and maximum efficiency and power control under various conditions. In addition, this text: Presents the methodologies and approaches of emerging multiple-objective WPT technologies Discusses various applications for wireless charging techniques, including contactless power for electric vehicles, in-flight charging for unmanned aerial vehicles, and underwater wireless charging Covers both intermittent and continuous impedance matching methods for different classes of coils Features more than 400 high-quality illustrations and numerous figures and tables throughout Wireless Power Transfer: Principles and Applications is an invaluable technical reference for academic researchers and industry professionals in power and energy engineering, and an excellent textbook for postgraduate courses in relevant areas of industrial and electronic engineering.

Modelling and Location Optimization of Dynamic Wireless Charging Infrastructure for Electric Vehicles

In the past decades, battery and power shaping technologies are the limitations of putting EVs out from the market success. However, battery technology is evolving in terms of increased energy density, lesser weight, and high efficiency for a few past decades. Additionally, an appropriate battery solution improves EVs driving range, maintenance cycle, reduced carbon footprint, and end-user economy.

Wireless Power Transfer

This Code of Practice provides a clear overview of EV charging equipment, as well as setting out the considerations needed prior to installation and the necessary physical and electrical installation requirements. It also details what needs to be considered when installing electric vehicle charging

equipment in various different locations - such as domestic dwellings, on-street locations, and commercial and industrial premises. Key changes from the second edition include: Two completely new sections Vehicles as Energy Storage Integration with smart metering and control, automation and monitoring systems A new Annex A complete update to the new requirements in BS 7671:2018 Bringing the Code in line with revised regulations and good practice The risk assessments and checklists have also been reviewed and revised. This very well established Code of Practice, supported by all the major stakeholders in the industry, is essential reading for anyone involved in the rapid expansion of EV charging points, and those involved in maintenance, extension, modification and periodic verification of electrical installations that incorporate EV charging.

Efficient Wireless Electric Vehicle Battery Charging

This book explains the basic and advanced technology behind the Power Electronics Converters for EV charging, and their significant developments, and introduces the Grid Impact issues that underpin the grid integration of electric vehicles. Advanced Concepts and Technologies for Electric Vehicles reviews state-of-the-art and new configurations and concepts of more electric vehicles and EV charging, mitigating the impact of EV charging on the power grid, and technical considerations of EV charging infrastructures. The book considers the environmental benefits and advantages of electric vehicles and their component devices. It includes case studies of different power electronic converters used for charging EVs. It offers a review of PFC-based AC chargers, WBG-based chargers, and Wireless chargers. The authors also explore multistage charging systems and their possible implementations. The book also examines the challenges and opportunities posed by the progressive integration of electric drive vehicles on the power grid and reported solutions for their mitigation. The book is intended for professionals, researchers, and engineers in the electric vehicle industry as well as advanced students in electrical engineering who benefit from this comprehensive coverage of electric vehicle technology. Readers can get an in-depth insight into the technology deployment in EV transportation and utilize that knowledge to develop novel ideas in the EV area.

Code of Practice for Electric Vehicle Charging Equipment Installation

SMART CHARGING SOLUTIONS The most comprehensive and up-to-date study of smart charging solutions for hybrid and electric vehicles for engineers, scientists, students, and other professionals. As our dependence on fossil fuels continues to wane all over the world, demand for dependable and economically feasible energy sources continues to grow. As environmental regulations become more stringent, energy production is relying more and more heavily on locally available renewable resources. Furthermore, fuel consumption and emissions are facilitating the transition to sustainable transportation. The market for electric vehicles (EVs) has been increasing steadily over the past few years throughout the world. With the increasing popularity of EVs, a competitive market between charging stations (CSS) to attract more EVs is expected. This outstanding new volume is a resource for engineers, researchers, and practitioners interested in getting acquainted with smart charging for electric vehicles technologies. It includes many chapters dealing with the state-of-the-art studies on EV smart charging along with charging infrastructure. Whether for the veteran engineer or student, this is a must-have volume for any library. Smart Charging Solutions for Hybrid and Electric Vehicles: Presents the state of the art of smart charging for hybrid and electric vehicles, from a technological point of view Focuses on optimization and prospective solutions for practical problems Covers the most important recent developmental technologies related to renewable energy, to keep the engineer up to date and well informed Includes economic considerations, such as business models and price structures Covers standards and regulatory frameworks for smart charging solutions

Advanced Concepts and Technologies for Electric Vehicles

The objective of this book is to publish the most recent technological advancements, and theoretical and practical research outcomes, alongside high-quality literature reviews on wireless power transfer to charge electric vehicles. More substantial research is proposed due to the fast-growing market for electric vehicles, and recent advances in wireless power transfer techniques have the potential to make this technology available for all consumers by overcoming its drawbacks. For instance, one of the major downsides to EVs is the requirement for an automobile to be idle during charging times. This problem can be solved by implementing dynamic wireless power transfer (WPT) with a higher power transfer efficiency (PTE). So, this book endeavors to create a major forum for investigating recent advances and the envisioned future in wireless power transfer for electric vehicles in terms

of modeling, design, performance, operation, control, implementation, storage, electric machines, power electronics converters, optimization, cost, charging techniques, and applications. This book provides valuable contributions to the field of electric vehicles: inductive power transfer concepts; airport inductive charging infrastructures; the design of a wireless charging system for an e-bike with grid connection; control of renewables; social, economic, political, and technical factors for dynamic wireless charging; the influence of posture and coil position on the safety of a WPT; double-coil dynamic shielding technology for WPT; reduction in cogging torque in a PM brushless DC motor; and optimal dynamic scheduling of EVs in a parking lot.

Smart Charging Solutions for Hybrid and Electric Vehicles

Focusing on reducing emissions and improving fuel economy, automotive manufacturers are developing electric vehicles (EV) to replace fuel and diesel vehicles starting in 2030 onwards. The EVs, with their green power supplies maximize environmental benefits with zero emissions thereby lowering air pollution levels. There is now an increased demand for stable electric storage systems (ESS) that are part of the design of new electric vehicles. This timely reference gives an overview of modern electrical power systems applied in the current generation of electric vehicles which require an ESS, and how these can be utilized for simultaneous power and data communication. The book starts with an introduction to the topic, before giving a summary of the green power trend for the electric vehicle market. The book then delves into the theoretical and analytical framework required to understand adaptive compensation of the magnetic inductive system (ACMIS), based on zero voltage switch (ZVS). The chapters demonstrate how these systems are used for transmitting electric power from a single-end inverter combined with a compensated network of parallel to parallel (P-P) type and an auto-tuning impedance of LC tank. The book also covers the experimental method for a multifunctional contactless power flow of the G2V mode and bidirectional outer communication and inner communication with giant magnetoresistance (GMR) effect for car parking guidance. The experiment shows how to analyze data transferring performance including the current trimming method and how to evaluate data transmission quality according to the relevant parameters. Overall the book serves to familiarize automotive engineers and industry professionals involved in the electric vehicle market with the issues that surround wireless power charging and data transfer systems for electric vehicles, and introduces them to more coherent designs.

Wireless Power Transfer for Electric Vehicles

Bound to play an ever increasing role in the driver-vehicle relationship, connectivity is becoming a basic consumer requirement when it comes to choosing a vehicle. Moving from the computer into the car, the ability to stay in touch, informed and entertained has reached yet a higher level of technology ubiquity. Featuring 20 SAE technical papers published in 2010 and 2011, Connectivity and the Mobility Industry addresses important aspects of one of the most cutting-edge topics in the industry today. Edited by Dr. Andrew Brown, Jr. 2010 SAE International President and Chief Technologist for Delphi Corporation, this book also includes three original articles on the subject, written by various experts: • What to Expect Beyond 2015 - Fourth Generation Wireless and the Vehicle • The Evolution of the Driving Experience and Associated Technologies • Wireless Charging of Electric Vehicle Converged with Communication Technology Part of the new paradigm of "green, safe and connected," this title is of special interest to those looking for an integrated view of how the driving experience will develop within these boundaries, and what emerging technologies are likely to be successful in the upcoming years. This book is the third in the trilogy from SAE on "Safe, Green and Connected" vehicles in the mobility industry edited by Dr. Andrew Brown, Jr. The other two books in this trilogy are: Green Technologies and the Mobility Industry Active Safety and the Mobility Industry Buy a Combination of Books and Save!> This trilogy can be purchased in a combination of two books as follows: Green Technologies and Active Safety in the Mobility Industry Green Technologies and Connectivity in the Mobility Industry Active Safety and Connectivity in the Mobility Industry Buy the Entire 3 Book Set and Save the Most! Green, Safe & Connected: The Future of Mobility

Coherent Wireless Power Charging and Data Transfer for Electric Vehicles

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 minimalized 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.

Connectivity and the Mobility Industry

The worldwide challenge of air pollution is primarily due to ICE based vehicles. The current era of global warming mainly caused by harmful emissions is a deep concern for the nations to bring a viable solution for reducing these emissions mainly from transportation infrastructure [1.1] (Figure 1.1). In addition, the extensive use of fossil fuels for transportation is a major issue leading to the existing environmental concerns such as climate change, air pollution, and the greenhouse effect, which leads to global renovation in the automotive industries by switching the ICE vehicle to Electric Vehicle. The induction of Electric Vehicles (EVs) is a potential and viable solution to the environmental challenges faced by the automotive industry. Global automotive investors are supporting the research and development to enhance the EV technology at par with ICE based vehicles.

Electric Vehicle Integration in a Smart Microgrid Environment

"This 10-volume compilation of authoritative, research-based articles contributed by thousands of researchers and experts from all over the world emphasized modern issues and the presentation of potential opportunities, prospective solutions, and future directions in the field of information science and technology"--Provided by publisher.

ANALYSIS OF WIRELESS CHARGING SCHEMES FOR ELECTRIC VEHICLES

In the past few years, interest in plug-in electric vehicles (PEVs) has grown. Advances in battery and other technologies, new federal standards for carbon-dioxide emissions and fuel economy, state zero-emission-vehicle requirements, and the current administration's goal of putting millions of alternative-fuel vehicles on the road have all highlighted PEVs as a transportation alternative. Consumers are also beginning to recognize the advantages of PEVs over conventional vehicles, such as lower operating costs, smoother operation, and better acceleration; the ability to fuel up at home; and zero tailpipe emissions when the vehicle operates solely on its battery. There are, however, barriers to PEV deployment, including the vehicle cost, the short all-electric driving range, the long battery charging time, uncertainties about battery life, the few choices of vehicle models, and the need for a charging infrastructure to support PEVs. What should industry do to improve the performance of PEVs and make them more attractive to consumers? At the request of Congress, Overcoming Barriers to Deployment of Plug-in Electric Vehicles identifies barriers to the introduction of electric vehicles and recommends ways to mitigate these barriers. This report examines the characteristics and capabilities of electric vehicle technologies, such as cost, performance, range, safety, and durability, and assesses how these factors might create barriers to widespread deployment. Overcoming Barriers to Deployment of Plug-in Electric Vehicles provides an overview of the current status of PEVs and makes recommendations to spur the industry and increase the attractiveness of this promising technology for consumers. Through consideration of consumer behaviors, tax incentives, business models, incentive programs, and infrastructure needs, this book studies the state of the industry and makes recommendations to further its development and acceptance.

Encyclopedia of Information Science and Technology, Third Edition

The first book on electric and hybrid vehicles (EVs) written specifically for automotive students and vehicle owners Clear diagrams, photos and flow charts outline the charging infrastructure, how EV technology works, and how to repair and maintain hybrid and electric vehicles Optional IMI online eLearning materials enable students to study the subject further and test their knowledge Full coverage of IMI Level 2 Award in Hybrid Electric Vehicle Operation and Maintenance, IMI Level 3 Award in Hybrid Electric Vehicle Repair and Replacement, IMI Accreditation, C&G and other EV/Hybrid courses. The first book on electric and hybrid vehicles (endorsed by the IMI) starts with an introduction to the market, covering the different types of electric vehicle, costs and emissions, and the charging infrastructure, before moving on to explain how hybrid and electric vehicles work. A chapter on electrical technology introduces learners to subjects such as batteries, control systems and charging which are then covered in more detail within their own chapters. The book also covers the maintenance and repair procedures of these vehicles, including fault finding, servicing, repair and first-responder information. Case studies are used throughout to illustrate different technologies.

Overcoming Barriers to Deployment of Plug-in Electric Vehicles

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.

Electric and Hybrid Vehicles

The electric vehicle offers many promises—increasing U.S. energy security by reducing petroleum dependence, contributing to climate-change initiatives by decreasing greenhouse gas (GHG) emissions, stimulating long-term economic growth through the development of new technologies and industries, and improving public health by improving local air quality. There are, however, substantial technical, social, and economic barriers to widespread adoption of electric vehicles, including vehicle cost, small driving range, long charging times, and the need for a charging infrastructure. In addition, people are unfamiliar with electric vehicles, are uncertain about their costs and benefits, and have diverse needs that current electric vehicles might not meet. Although a person might derive some personal benefits from ownership, the costs of achieving the social benefits, such as reduced GHG emissions, are borne largely by the people who purchase the vehicles. Given the recognized barriers to electric-vehicle adoption, Congress asked the Department of Energy (DOE) to commission a study by the National Academies to address market barriers that are slowing the purchase of electric vehicles and hindering the deployment of supporting infrastructure. As a result of the request, the National Research Council (NRC)—a part of the National Academies—appointed the Committee on Overcoming Barriers to Electric-Vehicle Deployment. This committee documented their findings in two reports—a short interim report focused on near-term options, and a final comprehensive report. Overcoming Barriers to Electric-Vehicle Deployment fulfills the request for the short interim report that addresses specifically the following issues: infrastructure needs for electric vehicles, barriers to deploying the infrastructure, and possible roles of the federal government in overcoming the barriers. This report also includes an initial discussion of the pros and cons of the possible roles. This interim report does not address the committee's full statement of task and does not offer any recommendations because the committee is still in its early stages of data-gathering. The committee will continue to gather and review information and conduct analyses through late spring 2014 and will issue its final report in late summer 2014. Overcoming Barriers to Electric-Vehicle Deployment focuses on the light-duty vehicle sector in the United States and restricts its discussion of electric vehicles to plug-in electric vehicles (PEVs), which include battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). The common feature of these vehicles is that their batteries are charged by being plugged into the electric grid. BEVs differ from PHEVs because they operate solely on electricity stored in a battery (that is, there is no other power source); PHEVs have internal combustion engines that can supplement the electric

power train. Although this report considers PEVs generally, the committee recognizes that there are fundamental differences between PHEVs and BEVs.

Plug In Electric Vehicles in Smart Grids

Electric and hybrid vehicles are now the present, not the future. This straightforward and highly illustrated full-colour textbook is endorsed by the Institute of the Motor Industry (IMI) and introduces the subject for further education and undergraduate students as well as technicians and workshop owners, with sections for drivers who are interested to know more. This new edition contains extensively updated content, especially on batteries, charging and the high-voltage pathway and includes all new case studies and new images, photos and flow charts throughout. It covers the different types of electric vehicle, costs and emissions and the charging infrastructure before moving on to explain how hybrid and electric vehicles work. A chapter on electrical technology introduces learners to subjects such as batteries, control systems and charging, which are then covered in more detail within their own chapters. The book also covers the maintenance and repair procedures of these vehicles, including diagnostics, servicing, repair and first-responder information. The book is particularly suitable for students studying towards IMI Level 1 Award in Hybrid Electric Vehicle Awareness, IMI Level 2 Award in Hybrid Electric Vehicle Operation and Maintenance, IMI Level 3 Award in Hybrid Electric Vehicle Repair and Replacement, IMI Level 4 Award in the Diagnosis, Testing and Repair of Electric/Hybrid Vehicles and Components, IMI accreditation, City & Guilds (C&G) and all other EV/hybrid courses.

Wireless Charging of Electric Vehicles

Overcoming Barriers to Electric-Vehicle Deployment