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Descrizione fisica	1 online resource (xv, 270 pages) : illustrations
Collana	Artech House power engineering series
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Soggetti	Electric vehicles Battery charging stations (Electric vehicles) Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Plug-in Electric Vehicle Grid Integration; Contents; Preface; Introduction to Plug-in Electric Vehicles; Introduction; Environmental Aspects; Cost Savings; Energy Independence and Security; History of Electric Transportation; Early Days; Decline of Electric Vehicles; Electric Vehicle Models and Specifications; Battery Electric Vehicles; Plug-in Hybrid Electric Vehicles; Hybrid Electric Vehicles; Fuel-Cell Electric Vehicles; Fuel Efficiency Measures; Comparison of Carbon Emissions; Plug-in Electric Vehicle Sales; Chapter Summary; Enabling Technologies; Battery Technology; Lithium-ion Batteries. Basic Battery TerminologyDesign Criteria; Battery Management Systems; Plug-in Electric Vehicle Drivetrain Architectures; Electric Vehicle Service Equipment; Battery Charger Technology; Charging Rates and Options; Wireless Charging; Charging Station Deployment; Chapter Summary; Roadblocks to PEV Integration; Impacts of PEV Charging; Distribution Network; Impacts on Generation Portfolio; Transmission Network; Network of Charging Stations; High Acquisition Cost; Chapter Summary; PEV Cost Models; Battery Degradation Cost; PEV Battery Modeling; Modeling Approach I: NREL Model; Modeling Approach II. Modeling Approach IIIElectricity Cost; All-in-Rate; Time-of-Use Rates;

Critical-Peak Pricing; Real-Time Pricing; Inclining Block Rates; Case Study; Chapter Summary; Economics of Charging Services; Introduction; Charging for Services; Consumer's Perspective; Service Provider's Perspective; Socially Optimal Pricing; Other Pricing Constraints; Finite Capacity; Auction-based Pricing; Untruthful Behavior; Teletraffic Theory; Congestion and Its Effect on Pricing; Network Externalities; Demand Forecasting; Chapter Summary; Capacity Planning for Large-Scale PEV Charging Stations; Introduction.

System DescriptionStorage Capacity Analysis for Single-class PEVs; Energy Storage Access Dynamics; Analyzing Distributions; Single-charger Technology with One PEV; Single-charger Technology with Multiple PEVs; Storage Capacity Analysis for Multiclass PEVs; Effective Demand; Numerical Examples; Single-class Customers; Multi-class Customers; Chapter Summary; Capacity Planning for Small-Scale PEV Charging Stations; Introduction; System Description; Stochastic Model; Toy Example; Profit Model; Performance Evaluation; Stations with Competing Energy Storage Technologies.

System Metamodeling ApproachChapter Summary; PEV Demand Control; Introduction; Load Management for Fast-Charging Stations; Load Management at a Fast-Charging Station; Numerical Evaluation; Load Management at Multiple Charging Technology; System Model; Problem Formulation; Global Problem; Local Problems; Connection between Global and Local Problems; Computing LoLPs; Numerical Evaluation; Chapter Summary; Optimal Service Rates; Introduction; Competing Performance Measures for PEV Charging; Optimal Individual Battery Charging; Numerical Evaluation; Charging Control at a Fast-Charging Station.

Sommario/riassunto

This authoritative new resource provides a comprehensive introduction to plug-in electric vehicles (PEVs), including critical discussions on energy storage and converter technology. The architecture and models for sustainable charging infrastructures and capacity planning of small scale fast charging stations are presented. This book considers PEVs as mobile storage units and explains how PEVS can provide services to the grid. Enabling technologies are explored, including energy storage, converter, and charger technologies for home and park charging. The adoption of EV is discussed and examples are given from the individual battery level to the city level. This book provides guidance on how to build and design sustainable transportation systems. Optimal arrival rates, optimal service rates, facility location problems, load balancing, and demand forecasts are covered in this book. Time-saving MATLAB code and background tables are included in this resource to help engineers with their projects in the field.
