

# Preface

Plug in Electric Vehicles (PEVs) use energy storages usually in the form of battery banks that are designed to be recharged using utility grid power. One category of PEVs are Electric Vehicles (EVs) without an internal-combustion (IC) engine where the energy stored in the battery bank is the only source of power to drive the vehicle. These are also referred as Battery Electric Vehicles (BEVs). The second category of PEVs, which is more commercialized than the EVs, is the Plug in Hybrid Electric Vehicles (PHEVs) where the role of energy storage is to supplement the power produced by the IC engine. These two types of PEVs are predicted to dominate the automobile market by 2030. Widespread adoption of PEVs allows the world to reduce carbon emissions in transportation needs significantly. Therefore, it is vital to the success of a collective global effort in meeting the climate energy targets and to reduce the dependence on increasingly scarce fossil fuels. However, there are a host of challenges thrust upon utility grid operators on how best to meet, control and coordinate the power demand arising due to charging of PEVs. This book covers the recent research advancements in the area of charging strategies that can be employed to accommodate the anticipated high deployment of PEVs in smart grids. Recent literature has focused on various potential issues of uncoordinated charging of PEVs and methods of overcoming such challenges. 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 includes many new strategies proposed recently by researchers around the world to address the issues related to coordination of charging load of PEVs in a future smart grid. The book is aimed at engineers, system planners, researchers and graduate students who are searching for the latest developments in research related to charging strategies of PEVs in smart grids.

Plug In Electric Vehicles in Smart Grids

Charging Strategies

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