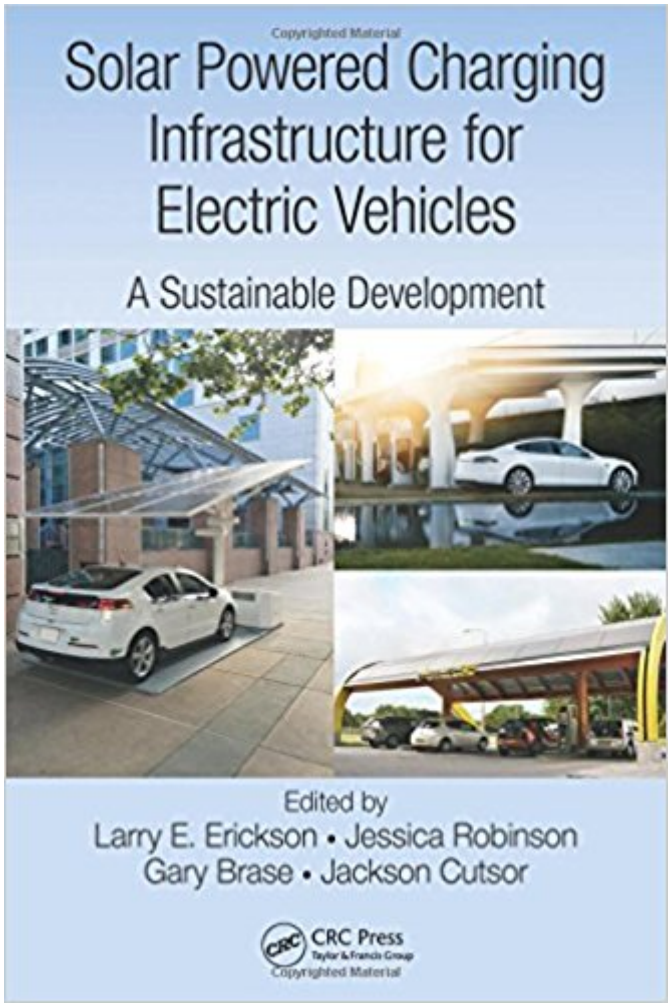
Solar Powered Charging Infrastructure For Electric Vehicles: A Sustainable Development



Synopsis

The Paris Agreement on Climate Change adopted on December 12, 2015 is a voluntary effort to reduce greenhouse gas emissions. In order to reach the goals of this agreement, there is a need to generate electricity without greenhouse gas emissions and to electrify transportation. An infrastructure of SPCSs can help accomplish both of these transitions. Globally, expenditures associated with the generation, transmission, and use of electricity are more than one trillion dollars per year. Annual transportation expenditures are also more than one trillion dollars per year. Almost everyone will be impacted by these changes in transportation, solar power generation, and smart grid developments. The benefits of reducing greenhouse gas emissions will differ with location, but all will be impacted. This book is about the benefits associated with adding solar panels to parking lots to generate electricity, reduce greenhouse gas emissions, and provide shade and shelter from rain and snow. The electricity can flow into the power grid or be used to charge electric vehicles (EVs). Solar powered charging stations (SPCSs) are already in many parking lots in many countries of the world. The prices of solar panels have decreased recently, and about 30% of the new U.S. electrical generating capacity in 2015 was from solar energy. More than one million EVs are in service in 2016, and there are significant benefits associated with a convenient charging infrastructure of SPCSs to support transportation with electric vehicles. Solar Powered Charging Infrastructure for Electric Vehicles: A Sustainable Development aims to share information on pathways from our present situation to a world with a more sustainable transportation system with EVs, SPCSs, a modernized smart power grid with energy storage, reduced greenhouse gas emissions, and better urban air quality. Covering 200 million parking spaces with solar panels can generate about 1/4 of the electricity that was generated in 2014 in the United States. Millions of EVs with 20 to 50 kWh of battery storage can help with the transition to wind and solar power generation through owners responding to time-of-use prices. Written for all audiences, high school and college teachers and students, those in industry and government, and those involved in community issues will benefit by learning more about the topics addressed in the book. Those working with electrical power and transportation, who will be in the middle of the transition, will want to learn about all of the challenges and developments that are addressed here.

Book Information

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Customer Reviews

"As a community educator, I feel this book will serve as a guide to the basics of both electric vehicles and solar powered charging infrastructure for a variety of audiences. Communities interested in addressing air quality issues in their neighborhoods will find this an accessible, informative, and digestible sourcebook for understanding the current issues and solutions available." Ã¢â ¬â ¢ Wendy Griswold, University of Memphis, Tennessee, USA "Larry E. Erikson, Jessica Robinson, Gary Brase, and Jackson Cutsor, authors of Solar Powered Charging Infrastructure for Electric Vehicles: A Sustainable Development have provided a thoughtful foundation for readers to explore the role of electric vehicles and solar powered charging stations in our effort to address climate change through carbon emission reductions in our transportation and electric generating systems. This book discusses necessary policy and regulatory solutions to advance this important transition to a low carbon economy. I am thrilled to endorse this book, which will be utilized by the public, regulators and policy makers alike." Ã¢â ¬â ¢ Dorothy Barnett, Climate + Energy Project, Hutchinson, Kansas, USA "The authors of this book take a detailed look at the nexus between abundant and increasingly cheaper solar energy, the emergence of affordable EV options, and the need for cost-effective ways to reduce carbon and other air emissions in urban areas. This book comes out at an important time when the cost of solar PV is finally on par with the cost of new forms of traditional power and EVs are on the cusp of becoming a significant form of personal transportation. May this book reach and inspire the young, the leaders and the doers throughout the country and the world." Ã¢â ¬â ¢ Scott W. White, Cromwell Solar, Lawrence, Kansas, USA "This is a great read for anybody in the industries of energy, transportation, development, or anyone else who is interested in the where we are headed with the future of personal vehicles and renewable energy infrastructures. The concepts and facts are presented in

such a way that this book can be enjoyed by the curious reader, or as a perfect starting point for the involved professional. For the information junkie like myself, once I picked it up, I couldnÃ¢â ¬â„¢t put it down." Ã¢â ¬â ¢Jake Staab, Cromwell Solar, Lawrence, Kansas, USA

Larry E. Erickson is professor of chemical engineering and director of the Center for Hazardous Substance Research at Kansas State University. He is one of the principal investigators on the National Science Foundation REU award and the Black and Veatch award for the project "Building a World of Difference with Solar Powered Charge Stations for Electric Vehicles". Jessica Robinson is a Class of 2016 graduate of the University of North Carolina with a Bachelor of Science degree in Environmental Science. She helped with the research and the book in the summers of 2014 and 2015 and the fall and winter of 2015. Gary Brase is professor of psychological sciences at Kansas State University. His research includes personal decision making processes.

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