

Preface

Electric vehicles are a global phenomenon. Global in that every corner of the planet is affected by the environmental, energy security and health imperatives for increased adoption of electric vehicles. Global in that the challenges and opportunities this presents are universal to governments and industry worldwide. Global in that achieving this transformation requires a holistic system of innovative technologies, policies and business models.

This book therefore sets out to explore these global perspectives. It presents insights from around the world and across the network of organisations, technologies, consumers, products and services which characterise the electric vehicle ecosystem. It draws on the networks of the International Energy Agency's Hybrid and Electric Vehicle Implementing Agreement to present commentary and case studies from experts in eleven different countries from across five continents.

The focus on electric vehicle business models recognises that market development will be a key enabler in realising a rapid transition from niche to mainstream adoption. This will demand that electric mobility products and services are developed to provide benefits which exceed apparent costs and supersede any perceived relative advantage of fossil fuelled vehicles. In simple terms, the goal is to make electric vehicles more cost-effective, convenient, desirable and rewarding to use.

History suggests that this is seldom a straightforward process. The right business model is rarely apparent early on in emerging industries. Furthermore, customers and incumbent industry players often face multiple restraining forces and switching costs in adjusting to new technologies or ways of doing business. Therefore, while business model innovation can undoubtedly facilitate greater market adoption of electric vehicles, it also represents an area that is replete with challenges and exposed to continuous change.

This book considers this further and presents a series of discussion papers on electric vehicle business models. This provides expert commentary and analysis from cities, boardrooms and research labs around the world.

It commences by considering the macro dynamics and changes that are at play in the industry as a whole. Electric vehicle business models are placed in a wider

context, and conceptual structure is provided for the various solutions and approaches that are emerging in this space.

The next section explores business models for recharging infrastructure. This includes market models and billing strategies for public charge points, the business case for deploying rapid chargers on a motorway network, and solutions for residents of multi-unit dwellings. Consideration is also given to the potential for wireless charging technologies and the associated business models that are emerging for this new technology.

Energy systems are then considered from two perspectives. The first is the potential for electric vehicle batteries to be integrated with grids to provide dynamic storage and supply. The second focuses on the vehicle itself, considering how vehicle design and battery systems influence energy efficiency and the associated total cost of ownership.

Attention then turns to fleet applications of electric vehicles. This reviews the evolution of electric mobility in carsharing business models and the challenges and opportunities that electric vehicles present to carsharing operators around the world. It then presents an example of how fleet managers can use analytical tools to identify applications for electric vehicles to save money and significantly reduce emissions.

The final section presents a series of case studies on different aspects of electric vehicle business models from around the world. This provides lessons learned and conceptual insights from experiences in Japan, China, Hawaii and Chile.

Most new business models emerge from analogy and lessons learned. Thus, we hope readers find the analysis presented in this book helpful and inspiring to launch multiple initiatives that further accelerate the *global* deployment of electric vehicles.

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Global Perspectives

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