ELECTRIC MOBILITY & DEVELOPMENT

AN ENGAGEMENT PAPER FROM THE WORLD BANK AND THE INTERNATIONAL ASSOCIATION OF PUBLIC TRANSPORT
The financial and technical support by the Energy Sector Management Assistance Program (ESMAP) is gratefully acknowledged. ESMAP—a global knowledge and technical assistance program administered by the World Bank—assists low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Canada, Denmark, the European Commission, Finland, France, Germany, Iceland, Italy, Japan, Lithuania, Luxemburg, the Netherlands, Norway, the Rockefeller Foundation, Sweden, Switzerland, the United Kingdom, and the World Bank.

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The team is grateful for the comments provided by Nupur Gupta, Demetrios Papathanasiou, Kwawu Mensan Gaba, Umberto Guida, Arno Kerkhof, Dionisio Gonzalez, Vivien Foster and Bianca Bianchi Alves.

December 2018
Foreword

This paper is a collaboration between the World Bank and the International Association of Public Transport (UITP) to assemble evidence, viewpoints, and analysis on eMobility programs. The objective is to contribute towards helping governments design and implement electric mobility programs that are effective at achieving their intended development aims across climate, economic, fiscal, technical, institutional, and policy dimensions. There is a clear global interest in electric mobility and demand for sharing experiences between countries of all income levels. We hope that our paper will contribute towards meeting that demand and facilitate collaboration between governments, development institutions, and other stakeholders under the “Katowice Partnership on E-mobility” that has been established under Poland’s leadership of the 24th Conference of the Parties to the United Nations Framework Convention on Climate Change.

The research approach used to develop the content in this paper included the following activities:

» Country cases: the Research Team undertook studies of individual country experiences using available data, interviews with officials, and field visits;

» Interviews with stakeholders: during interviews, the Team collected general observations as well as verbatim quotations where appropriate. These were then vetted by interview subjects for accuracy, acceptability, and permission to use with direct attribution or with appropriate anonymity. Attributed quotations that appear in the text have come from these interviews;

» Surveys administered to the public, transport operators and bus manufacturers: the Team used social media channels to distribute surveys in several languages (Arabic, Dutch, English, Polish, Portuguese, and Spanish) to capture the perspectives of eMobility users. In addition, UITP surveyed a sample of public transport operators who are deploying electric buses in their fleets. The results of this have been incorporated to showcase customer and operator perspectives;

» Direct observations: members of the Study Team collected experiences using their own observations and interactions with eMobility solutions (i.e. on buses, in cars, and on two-wheelers). In addition to direct field observations, the Team’s on-the-ground research included attempts to purchase electric private vehicles at dealerships to ascertain how the supply chain interacts with customers.

More work remains to be done on eMobility. It is important to note that this paper is neither a judgment on eMobility nor a comprehensive assessment of the demand, technology, and markets that underpin its development. All of these factors are evolving, highly dynamic, and subject to uncertainty. However, there are present opportunities to share experiences that will inform current and future actions on eMobility solutions as part of the effort to tackle the challenge of transport sector emissions. Addressing this problem will depend upon concerted action from the global community.

Sincerely,

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List of Abbreviations

BEV Battery Electric Vehicle
EV Electric Vehicle
FCEV Fuel Cell Electric Vehicle
ICE Internal Combustion Engine
NEV New Energy Vehicles
OEM Original Equipment Manufacturer
PHEV Plug-in Hybrid Electric Vehicle
TB Trolley Bus
TCO Total Cost of Ownership
UITP International Association of Public Transport
V2G Vehicle-to-Grid
Executive Summary

eMobility is fundamentally changing the traditional interaction between technology, market dynamics, production capacity, government policy, supply chains, manufacturing, and complex political economy. Like many disruptive transitions, there are both opportunities and challenges. These go beyond emissions reduction and include factors such as automotive industry supply chains, jobs, market structures, trade relations between countries, electricity networks, the roles of incumbent firms, and the introduction of new competitors. Uncertainty is an overarching theme above all considering the nascent state of eMobility uptake globally. While there are many unknowns, the analysis and recommendations detailed in this paper highlight the following:

» **There is potential for governments at all levels of capacity to engage with eMobility.** To date, the global market for eMobility has been underpinned by government interventions. The range of options vary from simply enabling initial uptake through basic regulations and customs procedures, to more advanced measures such as vehicle subsidies, non-price incentives (e.g. parking), support mechanisms for industry, and the development of charging networks. While more advanced programs are likely to steepen the uptake curve, the ability of simple government engagements to kick-start the early stages of uptake should not be underestimated. Above all, there is a need for governments to focus on policy predictability, and where possible, policy stability to support the continued development of eMobility solutions;

» **eMobility can and should be part of an integrated “avoid, shift, and improve” framework for tackling the challenge of transport sector emissions.** Governments looking to engage with eMobility should ensure that it fits within a broader low-emission transport strategy that has public transport at its heart. The capacity and availability of suitable eMobility solutions provides the opportunity for public transport operators, when supported by their authorities, to deploy new technologies. The development of business models that involve electric vehicle sharing (e.g. e-scooters), are also providing a complement to public transport that authorities can also seek to integrate within an overall low-emission strategy for transport;

» **While technology matters, shaping perceptions and confidence around eMobility is equally important.** While the financial costs and benefits of eMobility have a significant impact on uptake, addressing perceptions around eMobility’s capacity to meet mobility needs is critically important. Perhaps the most important factor for shaping public perceptions and the potential of eMobility technology to meet customer expectations, is the development and visibility of charging infrastructure. This provides customers with both the means and confidence necessary to catalyse a shift towards eMobility. The institutional, regulatory, and market structures around charging infrastructure (especially as they relate to interoperability) are critical elements in the overall effort to expand charging infrastructure and make it convenient for use;

» **Engaging different stakeholder groups proactively and continuously is a key element in the success of eMobility programs.** Like many aspects of the transport sector, eMobility has both technical and political economy dimensions. The best strategy for managing these factors is for governments to engage broadly, proactively, and continuously with different stakeholders. Vehicle OEMs, civil society organizations, public transport operators, utilities, local authorities, charging operators, and customers are essential points of contact for any government seeking to play a convening role around eMobility;
A key challenge facing eMobility programs is the alignment between government objectives and what OEMs and the supply chain can credibly deliver. The global automotive industry involves complex supply chains and economies of scale. EV technologies have been demonstrated as viable, but the supply chains behind these technologies have yet to achieve industrial scale on par with conventional technologies. This is an issue both for the industry’s production capability as well as its financial sustainability. There are jobs, companies, and entire industry clusters that are likely to undergo transition if the uptake of eMobility continues to accelerate. While governments may choose different strategies for addressing this, it will be key to have a strategy in place – particularly where automotive sector jobs affect the political economy of eMobility programs;

The sustainability benefits of eMobility are strongly linked to power system emissions as well as factors such as battery lifecycle. Fully capturing the environmental benefits of eMobility requires parallel effort to make full use of renewable energy sources. In addition, the lifecycle considerations around battery production, second lives, and recycling have important social and environmental consequences that eMobility programs must seek to address;

The power sector has a critical role to play as an enabler of eMobility. Network investments and modernization (including upgrades, smarter and cleaner grids, metering, standards) are important factors to enabling higher level of eMobility uptake in many countries. Future developments around eMobility may also use the potentially significant storage capacity of EV fleets as a two-way network resource; and

The transformational nature of eMobility opens opportunities for other evolutions in transport and other sectors such as energy. International experience suggests that this can be used to support important objectives such as increasing female participation, improving access to public transport, and the development of new markets in the energy sector. The new value and supply chains underpinning eMobility offer a new opportunity for embracing principles of social and environmental sustainability in a way that goes beyond what has been achieved for ICE vehicles. Governments should think of eMobility as a lever that can affect broader change in addition to the reduction of emissions. Development partners and civil society organizations can help to achieve this.

The uptake of eMobility around the world appears to be increasing, with the largest fleets in China, the United States, and countries in and around Europe. One of the contributions of this paper is to show how eMobility is also becoming relevant in other locations, serving contexts other than the big markets. Countries such as India, Jordan, Nepal, and Ukraine have engaged with eMobility in different ways that illustrate how eMobility can serve a wide array of mobility needs. The ability of mobility customers to drive change and “make things work” has been particularly encouraging and points to the potential that eMobility has for serving the 6.3 billion people who live in low and middle-income countries around the world.