STARTING SMALL BUT AIMING BIG: ELECTRIC TWO-WHEELERS AND THREE-WHEELERS

Insights on IFC's support for market creation and early-stage project development

IFC International Finance Corporation WORLD BANK GROUP

Creating Markets, Creating Opportunities

Enhancing mobility for people and goods is a key driver of economic growth and access to opportunities in emerging markets. However, transportation is also a carbon-intensive activity that generates greenhouse gas (GHG) emissions and local pollutants. Making transportation sustainable will require scaling up public and private investment in transportation methods which use little or no fossil fuel. Electric mobility (e-mobility) offers an attractive solution in many regions. IFC supports the development and scale up of investments in e-mobility in emerging markets, bringing the world closer to a low-carbon future.

IFC seeks early engagement with both public and private entities to develop new private investment opportunities in e-mobility. Our partnerships help fill in market gaps and remove legal and regulatory barriers. Over the last two years, IFC has supported public and private clients through the implementation of multiple early-stage and pre-investment projects to develop investment opportunities in the sector. These e-mobility projects have encompassed a wide range of preparatory activities such as market assessments, identification of enabling reforms, and business model development. IFC has also supported investment project preparation and piloting.

This five-part Knowledge Series "Scaling Up E-mobility" illustrates IFC's early-stage work to develop new private investments in e-mobility. The series presents IFC's experience addressing market gaps and creating new investment opportunities in four segments of e-mobility: charging infrastructure, electric two-wheelers and three-wheelers, battery-electric buses, and last-mile transport services.

What are the challenges and opportunities?

Two-wheeler (2W) and three-wheeler (3W) vehicles are the fastest growing transport mode in many low- and middle-income countries. By 2050, more than 400 million motorcycles (two- or three-wheeled motor vehicles) will be on the road globally, which represents a 50 percent increase compared to today.[1] Electric two-wheelers (E2Ws) and electric three-wheelers (E3Ws) offer enormous potential to help shift passenger and cargo transportation towards global sustainability.

Due to their affordability, 2Ws already represent a large market share in developing countries. For example, 2Ws account for 80 percent of the total vehicles in India. In addition to personal mobility, these vehicles are commonly used in commercial fleets for ride-hailing, rentals, and last-mile delivery services, among other services. The need for affordable commercial vehicles to transport passengers and freight is also increasing the demand for 3Ws, which offer higher passenger and cargo capacity.

While the higher cost of some types of electric vehicles (EVs) is limiting their use, the total cost of ownership (TCO) of both E2Ws and E3Ws is becoming competitive with their internal combustion engine (ICE) counterparts. The attractive TCO significantly increases the potential of E2Ws and E3Ws for near-term adoption. In addition, environmental regulations and incentives are boosting the electrification of both segments. As a result, global sales of E2Ws and E3Ws are increasing by more than 14 percent annually.

Despite the cost competitiveness of E2Ws and E3Ws, there are several barriers holding back their market penetration. Many developing countries lack an enabling policy and regulatory framework which promotes these vehicles. In some cases, E2Ws and E3Ws cannot be registered as commercial vehicles. Moreover, potential users face high financing costs in several countries. Some buyers have concerns about battery performance and vehicle resale markets. Additionally, "range anxiety" is still an issue among potential users, so the development of accessible charging infrastructure is essential.

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1. UNEP, Clean Air and Reduced Greenhouse Gas Emissions with Electric Two and Three Wheelers.

Photo: Danilo Pinzon/ World Bank

How is IFC supporting market development and helping create new investment opportunities in E2Ws and E3Ws?

IFC has engaged in different market creation activities focused on addressing the barriers limiting the scale-up of E2Ws and E3Ws in developing countries.

In ***Indonesia***, IFC conducted an exhaustive market assessment that estimated the current and potential demand for E2Ws. The study included the assessment and selection of different business models based on commercial viability, potential scalability, and ease of implementation. Models included:

- Rental — Users pay for access to a vehicle for a specific length of time or mileage. Plug-in charging infrastructure may be required and provided by other parties.

- Vehicle-as-a-Service — Users pay for access to a vehicle and unlimited charging (battery swapping) for a specific length of time. In this model, the EV companies provide access to batteries and battery swap infrastructure.

- Lease to own (pay-as-you-go) — Users pay a regular fee until they own the vehicle. Both plug-in and battery swapping technologies could be used.

- Vehicle sales and battery swapping — Users purchase EVs without the battery. The EV providers own the batteries and the battery swapping infrastructure. Users lease batteries from charging stations or pay per battery swap.

Moreover, IFC identified enabling regulatory measures, such as standardizing vehicle and charging components and ensuring interoperability, as well as fiscal incentives to be implemented on the supply and the demand sides.

In ***India***, IFC assessed the market for E2Ws and E3Ws and identified the main barriers preventing market growth. The assessment included recommendations for

the development of enabling policies and regulatory reforms, such as:

- Regulating E2Ws and E3Ws (including commercial use)
- Facilitating vehicle registration
- Establishing standards and policies for battery second life and recycling
- Promoting a residual or secondary market of batteries and EVs
- Harmonizing value-added tax rates between battery and EV categories

In addition, IFC assessed potential E2W and E3W business models and identified investment opportunities in fleet-based ride-hailing and last-mile delivery models, which offer scalability and potential to increase EV penetration.

In ***Mexico*** and ***Colombia***, IFC supported pilot projects in E2W and E3W last-mile freight delivery services. The projects, which involved private sector companies and local authorities, tested the viability of different business models. Both projects were able to identify key enabling policy and regulatory measures for scaling up E2W and E3W use in Latin American cities.

In ***Rwanda***, IFC worked with the World Bank to support the city of Kigali as it assessed infrastructure requirements for improving last-mile passenger connectivity. The project examined how E2Ws and E3Ws could be deployed in areas of the city with limited access to the existing public transportation network.

IFC supports private sector clients as they develop investment projects in E2W and E3W markets, helping identify viable business models and piloting innovative solutions. Working in collaboration with the World Bank, IFC supports clients by engaging strategically with regulators and other key stakeholders. Moreover, IFC can also assist municipalities in designing E2W and E3W connectivity solutions to reduce urban emissions and pollution.

This series of notes on creating markets and investment opportunities in e-mobility also includes:

- **Creating an Enabling Environment for Private Investment in Electric Mobility**
- **Charging Infrastructure Powers the Electric Mobility Transition**
- **Electric Buses: Finding the Right Business Model**
- **Going the Last Mile in Electric Mobility**

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