




ELECTRIC BUSES: FINDING THE RIGHT BUSINESS MODEL

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



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.

Replacing traditional diesel-powered buses with battery-powered electric buses, or e-buses¹, contributes to multiple sustainability goals. Quiet, comfortable e-buses reduce greenhouse gas emissions, as well as local air and noise pollution, while increasing access to quality public transit services.

The e-bus market is growing rapidly. E-buses are projected to account for 62 percent of the total global bus fleet by 2040². In 2020, China alone had 600,000 electric buses on its roads in 2020, accounting for 98 percent of all such vehicles worldwide. Other countries will follow China's lead. India has an ambitious goal to increase e-bus sales by 40 percent by 2030. In Latin America, the cities of Santiago, Chile and Bogota, Colombia are leading the way with 1770 e-buses in Santiago and 1,061 e-buses in Bogota respectively³.

What is the market gap?

Despite the high potential of e-buses in emerging markets, both public and private transportation providers will need to overcome significant institutional, regulatory, financial, and technical challenges as they transition their fleets from diesel to electric.

Transit authorities will need to increase their understanding of the technical and operational specifications of e-buses, coordinate the

interested stakeholders across different sectors and levels of government, amend existing contracts with operators to enable e-bus deployment, and enhance their capacity to design and implement effective business models that allow a sustainable scale up of private investment on the basis of bankable contracts with strong financial securities and enforceable provisions.

Financial challenges are significant in the public transport sector. Fare revenues are usually insufficient to cover the cost of operations, let alone capital investments in rolling stock. Fare increases are both politically difficult and constrained by affordability. As a result, bus operators are generally dependent on subsidies to fund at least a portion of their operational and capital expenses.

Although the operating costs of e-buses are usually lower than those of their diesel counterparts, e-buses require a larger upfront capital expenditure (CAPEX). Viable financing for e-buses systems requires that operators achieve a cost advantage over the life of the operation and generate a surplus to cover higher upfront capital cost. A long financing tenor must match the life span of the system. Countries with limited or non-existent domestic bus manufacturing capacity face the additional burdens of import tariffs and foreign exchange considerations.

1. In this note we focus on battery electric buses rather than fuel cell buses, since their adoption is at least three times higher than the fuel cells and their technology and infrastructure are cheaper.

2. Bloomberg Energy Finance, 2022 Electric Vehicle Outlook.

3. <https://www.elespectador.com/bogota/distrito-entregó-406-buses-electricos-que-prometen-reducir-17000-toneladas-de-co2-al-ano-en-bogota/>
<https://www.bnamericas.com/en/news/contracts-awarded-to-operate-santiago-bus-routes>

How is IFC supporting market development and helping create new investment opportunities in e-buses?

IFC is currently engaged in a series of early-stage project preparation and pre-investment projects in emerging market nations. These projects have supported local, regional, and national governments, as well as private sector players, in the development and scale up of new investment opportunities in e-buses:

In **India**, IFC, together with the World Bank, supported the Central Government's Planning Commission and Convergence Energy Services Ltd (CESL), in evaluating new business models and refining a demand-aggregation program for e-buses. The program incorporated many of the World Bank Group recommendations and allowed the procurement of over 5,000 e-buses for five cities through a common tendering process (the Grand Challenge). The demand aggregation and standardization of tender conditions related to technical specifications (buses, terminal and charging stations), access to national and state-level incentives, payment security mechanisms and service level agreements helped state agencies reduce purchase prices. The tender structure also ensured active participation from the private sector by including a term of 12 years and assured daily distance coverage of approximately 230 km per bus, which enhances the bankability of the contract. This contract would save an estimated 1.9 billion liters of fossil fuel and reduce tailpipe GHG emissions

by 3.3 million tons in comparison to using traditional ICE buses. The success of the first Grand Challenge led to more cities expressing interest future tendering processes. CESL has already announced its intent to procure 50,000 more e-buses in the next five to seven years. Both the new tendering process and the attention garnered by the Grand Challenge will scale up e-bus deployment across India.

In **Brazil** and **Colombia**, IFC and the World Bank studied optimal business models for the deployment of the e-buses in select cities.⁴ The team calculated the total cost of ownership (TCO) for e-buses and electric infrastructure over the lifetime of the buses, reviewed the existing concession contracts and procurement practices to propose amendments or new concessions, and evaluated new models, such as splitting bus provision from operations and maintenance. In the case of São Paulo, a simulation was performed to assess the viability of electrification of existing routes and prioritize transit routes for deployment. IFC-supported studies of Brazilian cities showed that introduction of e-buses could result in significant cost savings when factoring in reductions in GHG emissions, local pollutants, and noise and their resulting health benefits.

In **Indonesia**, IFC assessed the market for private investment in e-buses. It evaluated the barriers and the drivers for deployment, and provided recommendations on enabling policies, optimal business models and financing options.

In **Rwanda**, IFC worked with World Bank colleagues to evaluate different bus

4. Belo Horizonte, Fortaleza, Salvador and São Paulo, Brazil; and Bucaramanga, Cali and Pereira, Colombia.

technologies and assess potential e-bus routes in the city of Kigali. IFC also explored the viability of various business models with the objective of leveraging private investment. The study highlighted the advantages of deploying a single technology on multiple e-bus routes, as that approach reduces both unit prices and capital expenditures.

In **Morocco** and **Ukraine**, IFC helped conduct feasibility analyses that prioritized cities for potential e-bus deployment and identified useful routes and equipment. Due to the high TCO for e-buses, as well as the smaller fleets envisioned at the city level, both studies

analyzed the use of a national-level asset company. Such an asset company, which could be formed as a public private partnership, could invest in electric vehicles and charging infrastructure, and lease both elements to private bus operators. The company could also provide energy, maintenance, and parts for e-bus fleets. The study also included a gender assessment that determined that the routes selected for electrification were primarily used by men. The study proposed that this gender imbalance could be addressed by adding electric transit options, including on-demand transport, to serve the different needs of women riders.

IFC is supporting clients in emerging markets, including private investors and sub-national governments, with a range of early-stage project preparation and pre-investment services. In the case of e-bus deployment, this includes sharing knowledge about international best practices and lessons learned as well as providing technical assistance. IFC can help evaluate e-bus business models and assess the economic feasibility of a particular project. In addition, IFC can help assess the suitability of different technologies and support the development of plans for route prioritization. Together with the World Bank, IFC can also support the identification of legal and regulatory changes required to enable the deployment of e-buses.

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**
- **Starting Small but Aiming Big: Electric Two-wheelers and Three-wheelers**
- **Going the Last Mile in Electric Mobility**

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