Strategies to Accelerate Electric Mobility

Workshop on Public Transport Governance, Integration, and Paratransit Capacity Building: Lessons From Africa and Latin America

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The WB’s active transport portfolio has 180 lending projects across 86 countries, and comprises USD $36bn in commitments.

- 40+ Bank lending and advisory projects have e-mobility component.
World Bank has advised or is engaged in 12+ Bus Rapid Transit Projects in Sub-Saharan Africa

Example: Senegal Dakar Bus Rapid Transit Pilot Project (P156186)

- First 100% electric BRT in Africa
- 20km fully segregated BRT
- Transit time between downtown Dakar and north suburb (Guediawaye) to be reduced from 3 hours to 45 minutes with the BRT and improved road safety.
- Connect 300,000 daily passengers to jobs and services while saving 67,000 tons of CO2 every year.
E-Mobility is increasingly relevant for developing countries. Once understood as a solution only in major global markets, developing countries have more reasons than ever to care about e-mobility.

- **Why** is electric mobility for passenger transportation relevant to the developing world?
- **When/Where** does it make sense for developing countries to proactively pursue the transition?
- **How** can policymakers accelerate adoption of electric passenger vehicles?

**Emissions are rising**
Emissions from transport are increasing – and faster in developing countries than anywhere else

**Improve local air quality**
In developing country megacities, EVs can help reduce local air pollution

**Last mile connectivity**
In places where public transport can’t yet reach, EVs can be a nimble and affordable option

**Supply chain opportunities**
EV production offers new business opportunities and jobs
Question: Should countries prioritize electrification of certain vehicle categories, and if so, which?

Urban buses and 2/3 wheelers are much more promising than Cars in most countries

Electrifying one bus brings externality benefits that are 30x higher than electrifying one Car

Sources: World Bank, “The Economics of Electric Vehicles for Passenger Transportation” and “Electric Mobility Scoping Tool” (2022)
There are two feasible e-mobility entry points for developing countries:

- **Electric two- and three-wheelers**
  - Affordable and build on preexisting habits

**Electric Buses**
- Long mileage; high occupancy
Pre-Feasibility Analysis of Clean Bus Technologies

- Diesel Euro VI buses;
- Biodiesel Euro VI buses;
- Natural gas Euro VI buses (CNG and LNG);
- Hybrid diesel Euro VI buses;
- Fully electric buses (fast charge and slow charge); and
- Hydrogen fuel cell buses.

https://elibrary.worldbank.org/doi/abs/10.1596/38382
Comparing Total Cost of Ownership (TCO) for Clean Bus Technologies

Key considerations in financing electric buses

1. **Upfront Costs:** Although becoming more competitive, e-bus CAPEX is still greater than conventional buses.

2. **Operating Costs:** E-buses typically have lower OPEX due to lower fuel and maintenance expenses but depends on operational factors (see next slide). Consider how to finance the long-term savings by transitioning to electric buses.

3. **Infrastructure:** Electric buses require charging infrastructure, which may not be readily available in some countries, and may need upgrades to the electrical grid.

4. **Local Manufacturing and Capacity Building:** Can create jobs in new industries but can also impact existing jobs and create a need to re-training bus drivers, mechanics and other staff to ensure the successful adoption of electric buses.

5. **Regulatory Environment:** Governments can create incentives for e-bus adoption, such as tax credits or subsidies, and establish regulations that require bus fleets to transition to electric over time.

6. **Financing Mechanisms:** If traditional methods (bank loans or bond issuances) are limited, may want to consider public-private partnerships (PPP), blended public-private finance, and different e-bus provision models (See next slides).
Figure 2.2: Total cost of bus ownership comparison with different annual distance driven.

Source: Bloomberg New Energy Finance, AFLEET, Advanced Clean Transit Notes: Diesel price at $0.66/litre ($2.5/gallon). Electricity price at $0.10 kWh, annual km. traveled - variable. Bus route length will not always correspond.
Case Studies on E-Bus Financing/Provision Models

World Bank (2022) “IMPROVING BANKABILITY OF E-BUS PROCUREMENT IN INDIA”
Conclusions (1): How can policymakers accelerate adoption of electric passenger vehicles?

1) Strategic Recommendations:
   • Position e-mobility within an integrated national strategy for sustainable mobility
   • Evaluate the economic case for and timing of electric mobility at the country level, e.g. using the WB Electric Mobility Scoping Tool

2) Transport Sector Recommendations:
   • Target adoption of electric mobility towards most promising vehicle segments
   • Prioritize use of public funds for subsidization of charging infrastructure
   • Facilitate recycling of batteries and swapping for electric vehicles
   • Adopt demand pooling mechanisms in procurement for buses

Economics of Electric Vehicles for Passenger Transportation, World Bank (2022):
https://openknowledge.worldbank.org/handle/10986/38265
Conclusions (2): How can policymakers accelerate adoption of electric passenger vehicles?

3) Energy Sector Recommendations:
• Integrate demand for electric mobility into power sector planning
• Adopt electricity demand management measures to shift charging demand away from peak periods
• Reform electricity tariff structures to provide incentives for more efficient charging behavior
• Reform energy prices with suitable incentives for EV adoption

4) Finance Recommendations:
•Aggregate demand and enlarge markets, e.g. regional facility and creation of financing mechanisms to spread higher capital costs
• Tap into carbon finance to offset public investment needs
• Examine fiscal implications of e-mobility and adjust taxation