Barriers Faced by e-Mobility in Developing Countries

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Senior Energy Planner

Webinar
Upscaling E-Mobility in Developing Countries for Climate Mitigation
7 July 2022
Barriers for Which E-Vehicle?

• Which vehicle segment?

• How to select?
Barriers for which Electric Vehicle?

Methodology

Multi-criteria Analysis

Prioritization of EVs

Country Aims and Expectations

Stakeholders Consultations

Criteria for Prioritization and Weights

Results
e-Intra-city Bus,
E-bus
E-Taxi

Vehicle segments for switching to EVs
(Buses, taxis, three wheelers, two wheelers, retrofits, urban, rural)
Priorities for EVs

• Which vehicle segment?

• Criteria for prioritization and weights
  • **Costs**- capital & operational
  • **Benefits**-economic, social, air pollution, climate
  • **Local context**- Government preference, user characteristics, supporting ecosystem
### Prioritization matrix for EVs adoption in Zimbabwe

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<thead>
<tr>
<th>Criteria No</th>
<th>Level 1 (L1)</th>
<th>Level 2 (L2)</th>
<th>Level 3 (L3)</th>
<th>Weightage</th>
<th>2W-Personal</th>
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<th>4W-Taxi</th>
<th>Buses (Intercity)</th>
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#### Weightage

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<th>Criteria</th>
<th>Weightage</th>
<th>2W-Personal</th>
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<th>Kombis/Buses (IntraCity)</th>
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<td>Local Context</td>
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#### Overall Score

- Low Weightage
- Moderate Weightage
- High Weightage

Source: Mobility for Africa | pManifold
Electric Vehicle- Barrier Analysis

- Methodology
- Economic and Financial
- Infrastructure and Technical
- Stakeholder Consultations
- Policy, Regulatory and Institutional
- Others
- Awareness and Information
Barrier Analysis Framework

Vehicle Production & Imports
- Local Production
- Vehicle Standards & Classification
- Taxation on Vehicles
- Dealership for EVs

Vehicle Purchase & Registration
- Cost of EVs
- Customer Purchase Behaviour
- Ease of Vehicle Registration

Vehicle Use
- Vehicle performance and Reliability
- Fuel Standards
- Repeat Vehicle Taxation
- Ease of Charging
- Access to electricity for Charging

Vehicle Repair & Maintenance
- Availability of R&M services and spare parts

Vehicle Scrappage & Disposal
- Vehicle scrappage
- Battery scrappage

Source: Mobility for Africa | pManifold
**Technical Barrier- Charging; an example**

Which standard for basic charging, connectors, wireless charging, AC and others

- **CCS**, in the European Union (EU) and the U.S.: Relatively open protocol.

- **CHAdeMO**, in Japan: "CHArge de MOve", closed charging protocol. But special adaptors available.

- **GBT**, in China

- **ChaoJi, in China and Japan**: China Electricity Council and the CHAdeMO association collaboration 2020. Aim: faster, safer, and compatible with all other protocol. Target: 2035- International standard.

- India: Battery swapping and others under development.

<table>
<thead>
<tr>
<th>N. America</th>
<th>Japan</th>
<th>EU and the rest of markets</th>
<th>China</th>
<th>All Markets except EU</th>
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<td>J1772 (TYPE 1)</td>
<td>Mennekes (TYPE 2)</td>
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<td>CCS1</td>
<td>CHAdeMO</td>
<td>CCS2</td>
<td>GB/T</td>
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Economic / Financial Barriers- Charging; an example

• Cost of charging stations
  • Level 1 charger: $813 per charger (1.2-1.4 kW)
  • Level 2 3.3-6.6 kW $938-2793 per charger
  • DC Fast (Level 4-350kW)- $140000 per charger

• Need and uncertainty of demand

Source: Ultra fast chargers; thedriven.io
Electric Vehicle Policy Framework

- Methodology
- Economic and Financial Measures
- Infrastructural Measures
- Policy, Regulatory and Institutional Measures
- Awareness and Information Measures
- Other Measures (E.g. Development of Local Industry)
Electric Vehicle Policy Roadmap

Roadmap

- Prioritization of Identified Measures / Actions
- Timeline for Each Action / Measure
- Resource Requirements
- Identification of Institutions and Responsibilities
- M & V Framework
- Stakeholders consultation
Thank you very much for your attention