Financing and Procurement Models for e-bus implementation: The Experience of Santiago de Chile

African Regional Workshop and Training on Cleaner Buses
November 29th 2021

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The current business model relies on six private operators (6,900+) to cover the needs of the city.
There has been a focus on improving vehicle technology by focusing on public transportation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Diesel Sulfur Content (PPM)</th>
<th>Emission Standard (Norm D.S.130/94 MTT)</th>
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</thead>
<tbody>
<tr>
<td>1990</td>
<td>5000</td>
<td>N/A</td>
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<tr>
<td>1994</td>
<td>3000</td>
<td>N/A</td>
</tr>
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<td>1997</td>
<td>1000</td>
<td>N/A</td>
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<tr>
<td>2002</td>
<td>300</td>
<td>Euro III/EPA 98</td>
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<td>2006</td>
<td>50</td>
<td>Euro III Advanced / EPA 98</td>
</tr>
<tr>
<td>2010</td>
<td>50</td>
<td>Euro III Advanced + DPF / EPA 98 + DPF</td>
</tr>
<tr>
<td>2012</td>
<td>15</td>
<td>Euro V / EPA 2004 + DPF</td>
</tr>
<tr>
<td>2016</td>
<td>15</td>
<td>Euro V / EPA 2007 + DPF</td>
</tr>
<tr>
<td>2018</td>
<td>15</td>
<td>Euro VI / EPA 2010</td>
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</table>
This focus has paved the way for the introduction of battery electric buses (BEBs)
Fleet renewal tender will change public transit model for the city & also include incentives for BEBs
The new business model seeks to improve quality of service through a number of conditions.
Traditional transit models rely on municipal operators in all areas.
Operators are not equipped to carry the risk

**Financial**
- Over-indebttment - Strain on capital budgets - Interest payment - Foreign currency
  - Low risk

**Demand**
- Lack of fare revenues due to fluctuating passenger demand and taxes
  - Default (low risk)

**Technology**
- Battery life expectancy - Range degradation
  - Traditional OEM warranties

**Availability**
- Ability to meet service requirements - Reliability of equipment - Operational performance
  - Depends on contract
Proposing alternative models for better risk distribution

Separating (unbundling) asset ownership from operation

Owner-Operator

Design / build infrastructure
Fleet specification and procurement
Financing
Ownership
Operation
Maintenance
End of life

3rd Party Asset Owner
Alternative transit models can involve third parties to share responsibilities

**Funding**
- Passengers
  - User fares
- City
  - Taxes

**Municipality**
- Operations payment ($/passenger)

**Finance**
- Investors
  - Debt + equity
  - Repayment
- Asset Owner
  - Lease payment
  - Operations contract

**Capital project**
- Infrastructure work
  - Upfront capital
- Charging OEM
  - Upfront capital

**Operation**
- Bus fleet + Charging infra
  - Design / Build Infrastructure
  - Procure vehicles
  - Finance
  - Own
  - Maintenance
  - End of life
  - Operate

**Private Operator**
- Lease payment
- Leasing contract
- Bus OEM
  - Upfront capital

**ZEBRA Report: Accelerating a market transition in Latin America: New business models for electric bus deployment**
Improving commercial models: Municipalities have a key role to play to ensure bankability

ZEBRA Report: Accelerating a market transition in Latin America: New business models for electric bus deployment
Innovative financing models have allowed electric bus pilots to quickly scale to 100+ bus operations.
By 2021, there are 784 BEBs in regular operation – hoping to add as many as 1,670 by 2022 - full electrification by 2035
The electric bus market has become more competitive

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<tbody>
<tr>
<td>B2</td>
<td>BYD</td>
<td>K9 FE</td>
<td>BYD 2912TZ-XY-A</td>
<td>300</td>
<td>276.5</td>
<td>81</td>
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<td>ZK6128BEVG</td>
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<td>K7</td>
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<td>130</td>
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<td>1.24</td>
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<tr>
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<td>374.65</td>
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<td>215.0</td>
</tr>
</tbody>
</table>
Thank You!

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