Low-to-No Emissions Journey of TransJakarta BRT System

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13 Corridors

220 Routes

3,548 Buses

1 mill Daily Ridership

US$ 1.1 billion Total subsidy for 15 years
TransJakarta Passengers and Routes

Number of Routes ~ Annual Passengers

Annual Passengers

Number of Routes

0 20,000,000 40,000,000 60,000,000 80,000,000 100,000,000 120,000,000 140,000,000 160,000,000 180,000,000 200,000,000

By September 30th 2019, 7.7 from 10 DKI Jakarta residents have access to use Transjakarta

- Transjakarta service coverage area is 549 km per September 2019 (include Depok, Tangerang, Bekasi)
- Transjakarta serves 77% of DKI Jakarta residents which spread around DKI Jakarta’s area (471 km)
- Transjakarta’s total passengers per day is around 1 million

*Updated September 2019

Source: Transjakarta
### Transjakarta Bus Fleet

#### Fleet by Registration Year

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Fleet</td>
<td>60</td>
<td>225</td>
<td>107</td>
<td>142</td>
<td>1172</td>
<td>847</td>
<td>723</td>
<td>272</td>
</tr>
</tbody>
</table>

#### Operational Bus Average per Year

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.520</td>
<td>2.120</td>
<td>3,548**</td>
</tr>
</tbody>
</table>

#### Operational Bus

<table>
<thead>
<tr>
<th>No</th>
<th>TYPE OF BUS</th>
<th>TYPE OF FUEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medium Bus 8 m</td>
<td>0 CNG, 410 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>2</td>
<td>Single Bus 10 m</td>
<td>0 CNG, 100 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>3</td>
<td>Single Bus 12 m</td>
<td>96 CNG, 757 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>4</td>
<td>Single low Entry</td>
<td>0 CNG, 289 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>5</td>
<td>Maxi Bus</td>
<td>0 CNG, 293 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>6</td>
<td>Double Decker</td>
<td>0 CNG, 28 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>7</td>
<td>Articulated</td>
<td>244 CNG, 0 DIESEL, 0 GASOLINE</td>
</tr>
<tr>
<td>8</td>
<td>Micro Bus</td>
<td>0 CNG, 46 DIESEL, 1285 GASOLINE</td>
</tr>
</tbody>
</table>

#### TOTAL

<table>
<thead>
<tr>
<th>CNG</th>
<th>DIESEL</th>
<th>GASOLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>340</td>
<td>1923</td>
<td>1285</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3548</strong></td>
</tr>
</tbody>
</table>

Source: Transjakarta
Transportation sector accounts for the main air pollutant contributor in Jakarta.

Motorcycles produced the most amount of pollutants compared to other modes.
Electric Bus Timeline 2019 - 2020

- **MAR 2019**: Electric bus concept exhibition in Jakarta
- **APR 2019**: Electric bus pre-trial with Governor
- **MAY 2019**: Electric bus first public trial in Car Free Day
- **JUN 2020**: 20 electric bus deployment plan at Formula E event
- **DEC 2019**: Electric bus public trial at National Monument until Jan 2020
- **DEC 2020**: 100 initial electric bus deployment goal
TransJakarta Pilot E-Bus

- Single Bus 12 meter
  Brand: BYD Type K9
  Dimension: 12 meter x 2.5 meter x 3.4 meter

- Medium Bus 7 meter
  Brand: BYD Type C6
  Dimension: 7 meter x 2.1 meter x 3 meter

- Single Bus 12 meter
  Brand: MAB Type MD12E
  Dimension: 12 meter x 2.5 meter x 3.4 meter
On August, 28th 2019 – using water gallons (without passengers) weighted maximum 16 tones – 17 hours traveled, there are still 46% battery power remaining.
Public Introduction of Electric Bus

Source: PT. Transportasi Jakarta
**Fuel Reduction Opportunity**

**DIESEL BUS**

- **Fuel Price**
  - IDR 5,150 per liter

- **Fuel Economy**
  - 1 liter per 2 km

- **Fuel Cost**
  - IDR 2,575 per km

**CNG BUS**

- **Fuel Price**
  - IDR 3,100 per liter

- **Fuel Economy**
  - 1 liter per 1.5 km

- **Fuel Cost**
  - IDR 2,067 per km

**ELECTRIC BUS**

- **Fuel Price**
  - IDR 1,450 per kWh (non-subsidy)

- **Fuel Economy**
  - 1 kWh per 1 km

- **Fuel Cost**
  - IDR 1,445 per km
Implementation Road Map

**Benchmarked**
- Desk Research
- Data Collection
- Case Study

**Pre-trial**
- Public Introduction
- Pre-trial Agreement with Operators
- Pre-trial on Bus Routes
- Pre-trial Report

**Trial**
- Trial Agreement with Operators
- Compliance to Technical Specification and Operation
- Trial on Bus Routes
- Trial Report

**Approval of Regulator**
- Compliance to Regulation
- Report Submission
- Regulation and Operation Supervision

**Deployment**
- Bus Procurement Process
- Tender Process
- Agreement with Tender Winners
- Bus Operation
- Bus Maintenance
Electric Bus Deployment Plan

Goal: By 2025, electric fleet would be 50%, and 100% by 2030.

Transjakarta Electric Bus Deployment Plan 2019 - 2030

Goal: By 2025, electric fleet would be 50%, and 100% by 2030.
## Investment Plan

<table>
<thead>
<tr>
<th>No</th>
<th>Component</th>
<th>Transjakarta</th>
<th>Bus Operators</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fleet</td>
<td>-</td>
<td>Transjakarta will contract operator to procure, operate and maintain the electric bus</td>
<td>For co-operatives (medium bus and mikrotrans), financing would be an issue, as well as the lack of centralized depot for the fleet. Centralized operation and maintenance should be developed first before they can shift into electric</td>
</tr>
<tr>
<td>2</td>
<td>Charging Infrastructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opportunity Charging</td>
<td>For overhead charging, TJ will build at BRT stations. For non-BRT routes, TJ will provide at terminus points</td>
<td>-</td>
<td>Electricity charge will still be paid by the operators</td>
</tr>
<tr>
<td></td>
<td>Overnight Charging</td>
<td>-</td>
<td>Operators will invest in depot along with bus procurement</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Bus Depot</td>
<td>-</td>
<td>Operators will invest for depot</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Technical Capacity Building</td>
<td>TJ will seek TA to facilitate the capacity building for operators</td>
<td>-</td>
<td>With shifting to electric, business model for operators (especially the co-operatives) need to be upgraded, including the depot investment and management</td>
</tr>
</tbody>
</table>
Electric Vehicle Policy in Indonesia

Government Regulation No 73 Year 2019
- **Theme: Sales Tax on Luxurious Goods (Motorised Vehicles)**
- Classification of electric vehicles: Plug-in Hybrid Electric Vehicles (PHEV), Battery Electric Vehicles (BEV), Fuel Cell Electric Vehicles (FCEV), Full Hybrid, Mild Hybrid
- PHEV, BEV, and FCEV are exempt from sales tax on luxurious goods if the fuel consumption is more than 28 km/l or carbon dioxide emission is less than 100 gr/km
- Hybrid vehicles are required to pay 15% - 30% of purchase cost as sales tax on luxurious goods

President Regulation No 55 Year 2019
- **Theme: Acceleration Program on Battery Electric Vehicle (BEV)**
- Acceleration Programs: BEV Industrial Development, Incentives, Infrastructure Provision, Technical Support for BEV, Environmental Conservation
- Stages of component localisation for BEV: 35% (2019), 40% (2022), 60% (2024), 80% (2030)
- Types of incentives: Fiscal (tax exemption, infrastructure support, free parking, etc.), Non-fiscal (exception for zone restriction, security, etc.)

Jakarta Governor Regulation No 3 Year 2020
- **Theme: Tax Incentives for Ownership Transfer of Vehicle**
- All battery electric vehicles in Jakarta are exempt from tax for ownership transfer of vehicles
- The regulation starts from January 2020 to Desember 2024
Operational and Technical Challenges

**HUMAN RESOURCES**
- Training for mechanics or technicians
- Training for drivers
- New operational training for attendant

**TECHNICAL SPECIFICATION**
- New technical specification for e-bus
- Policy and regulation of technical specification for e-bus

**CHARGING INFRASTRUCTURE**
- Business plan for charging infrastructure provider
- Construction and safety measure of charging infrastructure
- Training for infrastructure maintenance

**STANDARD OPERATING PROCEDURE**
- New standard operating procedure for e-bus
- Adjustment of passengers in e-bus
- Safety and security provision in e-bus
Economic and Policy Challenges

- Unknown procurement process guidelines for electric bus
- Business model is not clear, considering the new technology involved
- Total Cost of Ownership (TCO) is still unclear due to new adoption in Indonesia
- There is no direct and specific incentive (import fee, tax exempt, electrical special rates) declared by the government.
- Contract length with operators will need to be adjusted with electric bus performance
Technical Assistant Objectives

1. Develop an investment plan to deploy a fleet of electric buses;
2. Prepare the procurement documents for e-bus induction (a fleet of buses on pilot basis) in 2020
3. Assess the supportive policy requirements and actions required by the government of Jakarta and the government of Indonesia to facilitate the deployment of e-buses and related infrastructure
4. Develop a feasibility study of integrating renewable energy supply to the mobility operations of use in TransJakarta, including solar roofing for bus and/or the Mass Rapid Transit (MRT) stations
Thank You!

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