

# ST-1: Energy Efficient Urban Transport Network

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## Basic Information

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### Project name:

Transjakarta First 100 EV Buses

### Managing Organization:

PT Transportasi Jakarta (Transjakarta)

### Government Initiatives and Policies:

1. C40 Cities: Fossil-Fuel Free Street Initiatives  
This initiative was carried out by C40 Cities with the goal to reduce urban air pollution and combat climate change by transitioning to zero-emission transportation. Starting in 2024, all new buses procured Transjakarta must be zero-emission. This initiative ensures that most areas of Jakarta City are emission-free by 2030.
2. Governor Instruction 66/2019: Air Quality Control  
One of the key components of this instruction is to integrate 10,047 fleets into the public transportation system. Refers to a combination of zero-emission buses and the conversion or upgrade of existing vehicles to meet stricter emission standards.
3. Jakarta Province Strategic Program 71: Air Pollution Control  
Significantly reduce air pollution in Jakarta through various targeted actions, particularly in the public transportation sector. The Transition to Electric Buses program emphasizes the adoption of electric buses within the Transjakarta fleet. This involves replacing ICE buses with electric ones to reduce air pollution.
4. Governor' Decree 1053/2022: Guideline for Acceleration of Transjakarta Electrification Program  
Formally declared the target of 50% emission-free fleet by 2027 and 100% emission-free fleet by 2030. Laying out the roadmap and instruction for government agencies to accelerate the Transjakarta electrification program.

### Project Description:

Transjakarta as the largest bus-based public transportation service in Indonesia, has been serving passengers for 20 years in Jakarta. Jakarta has long faced severe air pollution problems, primary caused by vehicle emissions. Recognizing the urgency to improve air quality and reduce gas emissions, the government in collaboration with C40 Cities is setting targets to integrate electric buses into the public transportation system in Jakarta. To fulfill the commitment of implementing zero-emission transportation, Transjakarta pioneered a project by initiating the first 100 EV Buses in Jakarta.

This project began with detailed planning and preparation focusing on several key aspects. One of the primary preparations was implementing an initial trial of electric buses to evaluate their performance. The trial phase was crucial for assessing various factors such as route suitability, battery capacity, and overall efficiency of the service. Additionally, providing adequate charging facilities, electrical supply, and charging scenario was essential to ensure the buses recharged efficiently, minimizing downtime,

and maintaining reliable service for passengers. As of 2024, the availability and reliability of EV buses is proven to be better than the ICE buses (>99%).

Collaboration was a critical component for the project's success. Transjakarta worked closely with diverse stakeholders, including the government, bus operators, and state-owned enterprises. These collaborations were essential in addressing the challenges with transitioning from ICE buses to EV buses.

Like other Transjakarta buses, these EV buses feature a dedicated women's area at the front, ensuring that female passengers can travel with more safety and comfort. Moreover, the low-deck EV buses are also equipped with wheelchair ramps. The ramp located at bus entrance, provide a slop surface for easy boarding and disembarking for individuals using wheelchairs or other mobility aids. This design promotes inclusivity, allowing disabled passengers to access public transportation safely.

Transjakarta EV Buses officially start operating on March 2, 2022, starting with a fleet of 30 new low-deck electric buses. This introduction of EV Buses is a significant step towards greener and more efficient public transport solutions, aiming to significantly reduce air pollution and enhance the overall health and well-being of its residents. By the end of 2023, Transjakarta has successfully expanded its fleet to operate 100 EV buses across 9 routes, with operations managed by 3 different bus operators, each utilizing 3 different models of low-deck EV buses. This project has marked a major milestone towards sustainable public transportation in Jakarta, not only contributed to a cleaner environment but also set a benchmark for other cities in Indonesia and beyond to follow the initiative.

The continued success of the EV buses is expected to obtain numerous benefits. Additionally, the operational costs of running EV buses are lower in the long term compared to the ICE buses, resulting in significant savings. Moving forward, Transjakarta plans to further increase the number of EV buses in its fleet, aiming for 100% zero-emission buses by 2030. This effort will continue to develop a sustainable public transportation solution while improving the quality of life for Jakarta's residents.

## APEC Economy:

- ☐ Australia
- ☐ Brunei
- ☐ Canada
- ☐ Chile
- ☐ China
- ☐ Hong Kong, China
- ☒ Indonesia
- ☐ Japan
- ☐ Korea
- ☐ Malaysia
- ☐ Mexico
- ☐ New Zealand
- ☐ Papua New Guinea
- ☐ Peru
- ☐ Philippines
- ☐ Russia

- ☐ Singapore
- ☐ Chinese Taipei
- ☐ Thailand
- ☐ United States
- ☐ Viet Nam
- ☐ Non-APEC Economy \_\_\_\_\_

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## Energy Efficient Urban Transport Strategy:

See Appendix at end of document for complete descriptions of each strategy.

- ☐ Facility Efficiency
- ☒ Vehicle Efficiency
- ☐ Renewable Efficiency
- ☐ Fixed guideway/rail
- ☐ Fuel Cell
- ☐ Transit-oriented development
- ☐ Intelligent Transportation Systems (ITS)
- ☐ Bus Rapid Transit (BRT)
- ☐ Transportation Demand Management (TDM)
- ☐ Pedestrian/bicycle and other non-motorized facilities
- ☐ Other Transit Service enhancements

## Project Costs

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Capital Cost total: \$45,510,000

Change in net operating cost per year: \$1,107,000 (2023)

Change in societal cost per year: \$11,913,243.95 USD (2023)

Change in cost over Life Cycle of Project: \$20,071,000 (10-year contract)

### Project Cost Discussion

Transjakarta calculated Total Cost of Ownership (TCO) and total mileage of EV that it's procured. Third party bus operator was contracted with the specified work volume in kilometer and negotiated price per kilometer. Capital cost stated above was calculated from the investment cost component of the TCO stated in the contract. Operating cost of EV is based on the actual payment to the Bus Operator in 2023. The change in net operating cost is calculated from the cost difference if the actual kilometer operated by EV buses were to be operated by ICE buses with the price per kilometer adjusted to same contract volume as EV buses. The change in societal cost per year is calculated by subtracting the global social cost assuming EV buses operate from the global social cost assuming operation of 100% ICE buses. The change in cost over the Life Cycle of Project is calculated for the whole period of the contracts, which is 10 years.

## Effectiveness - Emissions

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CO2 reduction: 60,825.23 metric tons in 2023

NOx reduction: 715.69 metric tons in 2023

PM2.5 reduction: 18.89 metric tons in 2023

PM10 reduction: 10.40 metric tons in 2023

CO reduction: 677.67 metric tons in 2023

HC reduction: -

### Emissions Calculation Discussion

The calculation is done using the Emission Monitoring Tools by World Resources Institute (WRI) Indonesia. The emission reduction is calculated by subtracting the total emissions Transjakarta operating the 100 EV buses from the total emissions assuming Transjakarta operating 100% ICE buses (using the 2023 operation data). The total emission of each pollutant is calculated by multiplying the emission factor of each pollutant (kg/km) by the Transjakarta bus travel length (km). The total reduction for each emission is then converted into metric tons.

## Effectiveness – Fuel Displacement

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Liters of Gasoline Equivalents Displaced: -

Liters of Diesel Equivalents Displaced: 1,810,703 liter in 2023

Kilowatt-hours saved: -

### Fuel Displacement Calculations Discussion

Fuel displacement is calculated from the actual kilometer operated by EV Buses in 2023 divided by fuel efficiency ratio of an equivalent ICE bus. The fuel efficiency ratio is the ratio used by Transjakarta in the ICE bus contracts.

## Additional Project Details

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Image:





Upload:

[https://docs.google.com/presentation/d/1KR1\\_C3GUT3R\\_nWR71WQAvrchzmbUMsMq/edit?usp=sharing&oid=102003685174841059081&rtpof=true&sd=true](https://docs.google.com/presentation/d/1KR1_C3GUT3R_nWR71WQAvrchzmbUMsMq/edit?usp=sharing&oid=102003685174841059081&rtpof=true&sd=true)

Project Website:

<https://sustainability.transjakarta.co.id/>

## Contact Information

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## Appendix

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**Facility Efficiency** - This includes projects that reduce energy use, greenhouse gas emissions, and/or decrease overall environmental impact of transit facilities, including maintenance facilities, transit stations, offices, buildings, etc.

**Vehicle Efficiency** - This includes projects that reduce energy consumption and greenhouse gas emissions of transit vehicles. This may include the use of alternative fuels, as well as improvements in fleet logistics leading to more efficient scheduling and route optimization, and other enhancements.

**Renewable Energy** - This includes a wide range of renewable technologies, such as solar, wind, geothermal, etc., that provide off-the-grid power generation from renewable sources. While these technologies typically apply to improvements to transit facilities, this could also include vehicle improvements (e.g. solar panels on roof or rail cars, etc.).



**Fixed Guideway/Rail** - This includes any project that provides a dedicated guideway for (exclusive or shared) operation of transit vehicles. Both rail and bus projects may fall in this category.

**Fuel Cell** - This includes transit projects involving the conversion of chemical energy from a fuel (typically, hydrogen) into electricity through a chemical reaction with an oxidizing agent (typically, oxygen) and using that energy for vehicle propulsion or stationary uses. This covers both fuel cell vehicles and stationary fuel cell installations.

**Transit Oriented Development (TOD)** - Projects involving land development strategies that maximize access to public transportation, encourage transit ridership, and enable higher density mixed-use development, leading to reductions in energy consumption and greenhouse gas emissions.

**Intelligent Transportation Systems (ITS)** - Projects that make use of information and communication technologies to improve transit safety, travel reliability, environmental performance, and network operation resilience, or/and to enable informed travel choices, promote social equity, or provide other transportation benefits.

**Bus Rapid Transit (BRT)** - This includes a variety of public transportation projects involving the provision of highly reliable, fast, and more efficient bus service, compared to ordinary bus line. BRT projects can range from traffic signal prioritization, provided to public transportation vehicles, to dedicated lanes used exclusively by transit buses.

**Transportation Demand Management (TDM)** - This includes a variety of projects that use innovative transportation strategies and policies to reduce travel demand or to redistribute it in space or time. This may include projects involving various ride-sharing programs, such as carpooling or vanpooling, and policies that redistribute trips away from peak times, as well as congestion pricing, and other capacity management strategies.

**Pedestrian/Bicycle and Other Non-motorized Facilities** - Projects involving improvements in facilities used for non-motorized transport, leading to higher accessibility and usage of non-motorized modes of transportation. This may include pedestrian sidewalks, bike lanes, and other improvements.

**Other Transit Service Enhancements** - Projects that do not fit into any of the above categories.