Roadmap for Feeder Transportation Electrification in Jabodetabek

An Executive Summary

October 2024

ITDP

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TABLE OF CONTENTS


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CIDANGIANG - SUKASARI
via Suryakencana
RUTE K3
CIDANGIANG -
SUKASARI via
07:38
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Executive Summary

Jabodetabek is one of the regions with the highest pollution levels in Indonesia. Data indicates that the transportation sector contributes 44% of total air pollution. This is driven by various factors, including rapid urbanization, limited availability of high-quality public transportation, and heavy reliance on private vehicles. In addressing the urgent issue of air pollution, transport electrification presents a highly promising solution, particularly in the public transportation sector. The transition to electric vehicles could reduce global CO_2 emissions by up to 30% by 2050. In addition to lowering emissions and improving efficiency, the electrification of public transportation can enhance service quality. Quieter and more comfortable electric vehicles can make public transport more appealing and encourage people to shift away from private vehicles.

Given the urgency of air pollution and the need for public transport electrification, this study will further elaborate on developing a roadmap for public transport electrification in Bogor City. Based on readiness criteria developed by ITDP, Bogor City is the most prepared to implement urban public transport electrification outside of the DKI Jakarta. This is demonstrated by the city meeting 11 out of 13 readiness criteria. However, two key criteria remain unmet: the absence of an electrification target set by the local government and the lack of electric bus testing facilities.

Bogor also has ongoing programs to improve public transportation services, which serve as a foundation for transitioning towards electrification. These include implementing BisKita Trans Pakuan, trialing Alibo, and potentially collaborating with electric vehicle providers.

Table 1 Recommendations for Implementing Public Transportation Reform in Bogor City

Recommendation Points	Recommendation Details
Building a base	• Preparation of master plan • Issuance of minimum service standards (MSS) that adapt to electric vehicle technology • Provision of adequate and accessible transit facilities • Planning and allocation of funds
Establish a public transportation authority	Regional Public Company for Pakuan Transportation (Perusahaan Umum Daerah Transportasi Pakuan/PTP) can be appointed as the public transportation authority of Bogor City. Trans Pakuan can be directed to become an "umbrella" for all public transportation services operating within Bogor City, including *angkot* services.

Recommendation Points	Recommendation Details
Increase operator capacity	After an agreement is reached between Trans Pakuan and the prospective operator, capacity-building activities—such as comparative studies and training on best practices in public transportation reform—will be carried out, for example, in Transjakarta or Trans Semarang.
Update list on e-catalog system	The registration of public transportation operators in the electronic catalog of the Goods or Services Procurement Service Agency (Badan Pelayanan Pengadaan Barang dan Jasa/BPPBJ) can provide indicators of the success of *angkot* integration into the Trans Pakuan service.

Contract with the selected operator	The ideal business scheme for revamping public transportation services, referring to successful examples in Jakarta and Semarang, is the gross cost contract scheme. With Bogor City's limited budget, this process must be done in stages, especially after BisKita is transferred from the Greater Jakarta Transportation Authority (Badan Pengelola Transportasi Jabodetabek/BPTJ) to the Bogor City Government.
Planning for electrification	The electrification of public transport as a whole must start from a comprehensive public transport reform. It should be emphasized that electrification programs can only be carried out on reformed public transport services.

The buy-the-service (BTS) business scheme is currently considered to meet the needs of cost, service, and compliance with regulations. The BTS scheme has advantages, such as it (1) focuses on service rather than profit, (2) guarantees standardization of service quality, (3) allows for incentive and disincentive policies to operators, (4) already has a good implementation example of the Teman Bus scheme from the Central Government and Transjakarta.

Electrification Roadmap

The preparation of the electrification roadmap in Bogor City must align with the central government's target of 90% electrification of public transportation by 2030. Considering Bogor City's electrification readiness, it is recommended that by 2030, the electrification of public transportation in Bogor City has reached 100%.

In the preparation process, several scenarios were developed that consider the level of public transportation use in Bogor City and the interventions that Bogor City can make to mitigate the funding needs

of the public transportation electrification program in accordance with the predetermined targets.

Table 2 Scenarios to Mitigate the Funding Needs of the Public Transportation Electrification Program

Aspect	Scenario 1A	Scenario 1B	Scenario 2
Demand	Mode use rate in 2023 projected to 2030		Application of the proportion between population and Transjakarta users applied in Bogor City and projected to the year 2030
Financing needs	Highly dependent on the regional revenue and expenditure budget (*anggaran pendapatan dan belanja daerah*/APBD), which is almost 90% of the funding source	Highly dependent on ridership (85% of funding source)	More balanced between farebox and APBD funding sources (34% and 31%)
Type of mitigation	A very large proportion of APBD funding, potentially requiring 13% funding from the Bogor City APBD to close the revenue gap	Relies on ridership requiring up to 299,568 passengers per day in 2030, almost 26% of the total Bogor City population	Still requires total extra funding of Rp196.33 billion for the last two years of implementation (2029—2030)

Amount of budget ceiling against APBD	Increasing annually, targeted to reach the same proportion as Jakarta in 2023 (4.49% of the regional budget) APBD)	Constant at Rp30 billion	Increasing per year, targeted to reach the same proportion as Jakarta by 2023 (4.49% of APBD)
Number of years of estimated surplus service	1 year (2026)	2 years (2026—2027)	3 years (2026—2028)
Ease of implementation	The APBD portion is too large and above the average APBD portion for public transportation, which is considered good enough at around 3%.	Ridership targets are considered too large if calculated based on the total population at the city scale. Jakarta alone has a Transjakarta network covering more than 80% of the city and a ridership proportion of 10.01%.	This scenario is the only one that seeks a realistically optimized proportion of APBD and mode share based on Indonesia's best urban public transport services examples. However, there are still funding gaps that need to be addressed.

Among the reviewed scenarios, Scenario 2 should be implemented. This scenario incorporates adjustments to service fleet requirements, an optimal share of public transportation funding by APBD, and ridership estimation based on the best existing examples in Indonesia.

Table 3 Implementation Steps of Scenario 2

Vehicle Type	Year of Implementation									
	2026		2027		2028		2029		2030	
	Route	Investment	Route	Investment	Route	Investment	Route	Investment	Route	Investment
Medium Bus	05-AP	31.8 M	02-AK	96.5 M	07-AK	87.8 M	-		-	
Microbus (*Angkot*)	17-AP	18.9 M	23-AP	6.3 M	03-AP	19 M	25-AP	28.1 M	14-AP	55.9 M
					10-AP	7.8 M	03-AK	46.8 M	K7	18 M
					13-AP	14.3 M	15-AP	28.1 M	K6	44.7 M
					30-AP	7.1 M	K2	40 M	K1	63.7 M
					09-AK	25.7 M	K5	42.1 M		
					24-AP	23.5 M	09-AP	9.7 M		
							22-AP	15.7 M		
							21-AK	19 M		
							01-AP	14.3 M		
							02-AP	10.4 M		
							08-AP	23.5 M		
							21-AP	12.5 M		
							19-AP	10.7 M		
							18-AP	30.3 M		

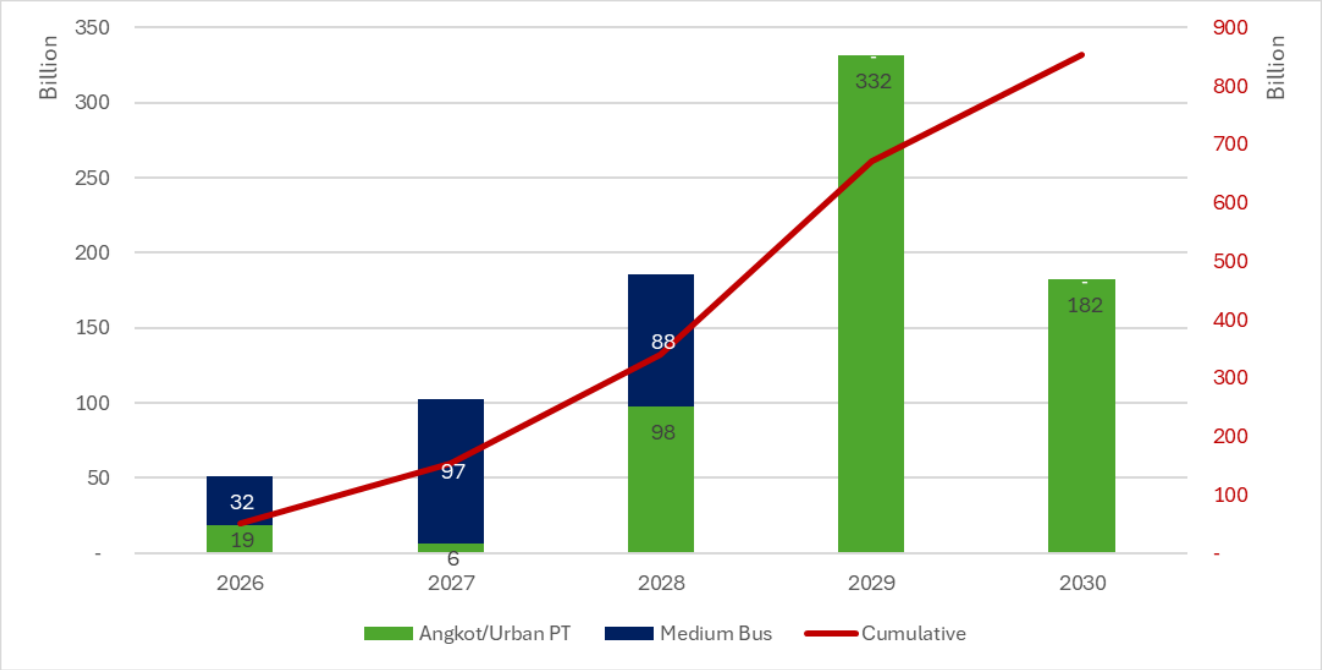

Figure 1 Implementation Steps of Scenario 2

The electrification initiative naturally impacts the electricity demand required to charge electric vehicles. Analysis results indicate that by the plan's final year in 2030, 26.5 GWh will be needed to meet the electricity demand arising from electrification activities. Compared to the available electricity capacity in Bogor City in 2022, which stands at 11.4 GWh, an additional 5.1 GWh will be required to fulfill the demand under Scenario 2. This need can be accommodated by increasing production capacity in the five electricity-producing districts of Bogor City or by requesting additional electricity supply from PLN's West Java Main Distribution Unit (Unit Induk Distribusi/UID).

An environmental assessment was also conducted to assess its impact on electricity demand. The analysis reveals that the public transport electrification program in Bogor City can significantly reduce overall greenhouse gas (GHG) emissions, even though the electricity grid still relies on fossil energy sources. Under electrification in Scenario 2, GHG emissions are projected to decrease by 41.9% by the end of 2030, equivalent to 15,112 tons of CO_2eq.


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