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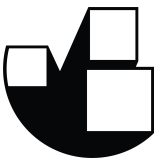
Investment Plan for Electric Bus Deployment of Transjakarta

Supporting Jakarta's Transition to E-mobility

March 2021



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1. Introduction

Transjakarta is preparing the transition from the conventional diesel bus operation to the electric bus operations. The transition would require a proper investment plan to project the required investment and funding sources. The investment plan would include the transition cost analysis of shifting to electric buses, based on the implementation phases developed in Deliverable 3.2. Identification of potential funding options is also a part of this investment plan deliverable to identify various funding options available both for Transjakarta and bus operators to procure and maintain their fleets as well as charging infrastructure.

2. E-bus Transition Cost Analysis

A preliminary TCO calculation for each implementation phase was carried out to get a general insight on the amount of investment and operational costs and how they could be distributed between Transjakarta, bus operators, and other stakeholders such as PLN as the utility company. The investment costs include fleet replacement and battery costs, charging infrastructure costs, land acquisition and construction costs for the staging facilities, as well as battery replacement costs after their 8-year lifetime. The analysis also considers operational costs such as maintenance, energy, insurance, and legal costs (operational taxes).

2.1 Approach and Limitations

Preliminary TCO calculations were made for two scenarios: 1) Shifting to electric bus and 2) Continue using diesel buses, to be able to compare the costs associated with each scenario. The calculations were carried out per implementation phase, each extended for a 10-year forecast period. The values are expressed in USD.

Given the preliminary nature of these calculations, some caveats have to be noted:

- The implementation of Group 12 is distributed among Phase 1-4. For simplicity reasons the costs are distributed evenly for each phase.
- Since we do not know yet when each of the phases will be implemented, the TCO values are in present values on the year the implementation takes place.

The scenarios are based on the recommendations made in Deliverable 3.2 Timetable and Roadmap of E-bus Deployment for Transjakarta, which are as follows:

A. Shifting to electric buses scenario

In Deliverable 3.2, it was recommended that, in addition to a pilot phase, the e-bus transition is implemented in four implementation phases as follows.

Table 1. Transjakarta E-Bus Implementation Phase

E-Bus Implementation Stages	Pilot Project	Post Pilot	Post Pilot	Post Pilot	Post Pilot
	Phase Pilot	Phase 1	Phase 2	Phase 3	Phase 4
Technology Readiness	• Transjakarta provides staging facility at Pejaten • 5 Charging Point at Terminal provided by Transjakarta	• 9 Charging Point at Terminal provided by Transjakarta • E-bus depot provided by Bus Operators	• 10 Charging Point at Terminal provided by Transjakarta • 1 staging location ready to be used • E-Bus depot provided by Bus Operators	• 11 Charging Point at Terminal provided by Transjakarta • 2 staging locations ready to be used • E-Bus depot provided by Bus Operators	• 12 Charging Point at Terminal provided by Transjakarta • 3 staging locations ready to be used • E-bus depot provided by Bus Operators

Charging Strategy	Depot + Staging	At Depot + Terminals	At Depot + Terminals + Staging Facilities	At Depot + Terminals + Staging Facilities	At Depot + Terminals + Staging Facilities
Staging Facility Location	Pejaten	-	Pesing	Kampung Rambutan	Ancol (Utara)
Type of Bus	Single Bus	Single Bus & Medium Bus	Single Bus & Medium Bus	Single, Medium & Articulated Bus	Singe, Medium & Articulated Bus
Fast Charging at Terminal	Lebak Bulus Ragunan Kampung Melayu Blok M Ciledug	Pinang Ranti Kampung Rambutan Pulogadung Priok	Kalideres	Ancol	Pulogebang
Charging Power	• Depot: Plug-in 150 kW • Stagging: Plug-in 180kW • Terminal Pantograph 450 kW	• Depot: Plug-in 150 kW • Stagging: Plug-in 180kW • Terminal: Pantograph 450 kW	• Depot: Plug-in 150 kW • Stagging: Plug-in 180kW • Terminal: Pantograph 450 kW	• Depot: Plug-in 150 kW • Stagging: Plug-in 180kW • Terminal: Pantograph 450 kW	• Depot: Plug-in 150 kW • Stagging: Plug-in 180kW • Terminal: Pantograph 450 kW
Route Grouping	Group 2	Group 7, Group 8, Group 12	Group 1, Group 6, Group 9, Group 12	Group 4, Group 5, Group 12	Group 3, Group 10, Group 12

The number of buses per implementation phase for this scenario can be seen in Annex 1.

The cost structure of the electric bus implementation scenario is as follows:

1. **Capital expenditure (CAPEX) elements:**
    - Fleet costs, which include bus procurement cost, battery procurement cost, and battery replacement cost
    - Charging infrastructure costs, which include charger procurement and installation costs
    - Staging facility costs, which include land procurement and construction costs
    - RE adoption costs, which include infrastructure cost of solar PV installation
    - Insurance and legal costs, which include fleet taxes and annual insurance and legal costs
2. **Operating expenditure (OPEX) elements:**
    - Electric energy cost
    - Maintenance costs, including fleet and charging infrastructure maintenance costs
    - Operation savings, due to solar PV adoption
    - Staff and overhead costs
    - Training costs

B. Continue using diesel buses scenario

The number of diesel buses per route are assumed to be the number of existing buses, which can be seen in Annex 2.

The cost structure of the electric bus implementation scenario is as follows:

1. **Capital expenditure (CAPEX) elements:**
    - Fleet cost, which include bus and battery procurement cost
    - Insurance and legal costs, which include fleet taxes and annual insurance and legal costs
2. **Operating expenditure (OPEX) elements:**
    - Diesel fuel energy cost
    - Fleet maintenance cost
    - Staff and overhead costs

2.2 Assumptions

The cost implication analysis is carried out for a 10 years forecast period for each implementation phase. A 6% discount rate is used to calculate the present value of the costs and no inflation costs are considered. The conversion rate of USD to IDR is assumed to be 14,000. The annual running days for each bus is 338 days. Other assumptions are elaborated below.

A. Bus procurement costs

It is assumed that Transjakarta schedules and operations remain the same, therefore the number of buses procured for each route is based on the existing number of buses unless additional electric buses are needed to cover the daily distance as identified in the previous section. The number of buses are as specified in Table 2. The cost analysis assumes that the bus procurement costs are paid in annual installments for 7 years, with a 6.26% loan rate.

The procurement costs of single, low entry, and medium electric and diesel buses are based on the costs in a 2020 study by C40-CFF. The cost of articulated buses is based on the assumptions in a 2019 study of Corridor 1 and 6 electrification by ADB and Grutter Consulting. The bus costs (excludes battery costs, which will be discussed next) used in this analysis are as follows:

Table 2. Bus costs assumptions (in USD per bus)

Bus type	Single bus		Low entry		Medium bus	Articulated bus
Electric	324 kWh	180 kWh	324 kWh	180 kWh	135 kWh	350 kWh
	370,000	300,000	370,000	300,000	228,500	550,000
Diesel	154,354		159,183		59,286	330,000

B. Battery and battery replacement costs

Electric vehicle batteries commonly have an 8-year guarantee period. In this assumption, we include costs associated with expected battery replacement at the 8th year of operation. The battery is assumed to be valued at USD 100/kWh. It is expected that battery prices will decline over the years, and therefore we assume that the battery replacement cost at year 8 will be valued USD 80/kWh.

C. Charging infrastructure costs

There are several types of charging infrastructures for the electric bus scenario, which costs are as follows.

Table 3. Charging infrastructure costs assumptions (in USD per charger)

Depot charger cost (150 kW)	75,000
Terminal fast charger cost (450 kW)	330,000
Staging charger for single bus (180 kW)	92,500
Staging charger for artic bus (450 kW)	330,000

The charger installation costs are assumed to be 10% of charger cost. To estimate the number of depot chargers, we assume a 1:5 ratio of charger and electric bus to align with a previous study in 2020 by C40-CFF. However, it has to be noted that based on lessons learned in China the ratio might not be enough and thus many Chinese cities have recommended the ratio of 2 or 3 e-buses per 1 charger (120 kW). A further study needs to be conducted to refine the assumptions.

For the terminal fast charger, we assume that there will be 1 charger per terminal. Not all terminals will be equipped with fast chargers; the number of terminals equipped with fast chargers are listed in Table 1 (Implementation Phase). The number of chargers at staging facilities are estimated based on the minimum number of buses which need to be charged simultaneously to fulfill the energy required within the split operational period time window of 4 hours, which are as follows.

Table 4. Charging infrastructure at staging facilities

Staging Facility	**No. of chargers**		**Area (m^2)**
	180 kW	**450 kW**	
Staging Facility 1	20	13	2202.2
Staging Facility 2	20	0	1137.5
Staging Facility 3	7	9	0
Staging Facility 4	2	10	0
Total	**49**	**32**	**3339.7**

It is assumed that there will be no charging equipment replacement during the course of the 10 year analysis period.

D. Renewable energy (RE) adoption costs

The renewable energy costs include the infrastructure costs and the net savings received from the operation of solar PV as the electricity source which will be deducted in operational expenditure. It is assumed that the solar PV will be installed in the four staging facilities that have been assessed in the previous section. Table shows the economics value for implementing the solar PV in the staging facility with 220 e-buses capacity (for more detail please refer to Deliverables 4.1 "Feasibility Study of Charging Stations Using Renewable Energy-Based Electricity and Solar PV Systems for Transjakarta" report). In this assessment, the cost will be weighted based on the estimated capacity of each staging facility.

Table 5. Economic parameters of Solar PV Adoption

Economic Parameters	Grid	Grid + Solar (521 kWp, 50% canopy)	Grid + Solar + Battery (521 kWp, 50% canopy; 1 MWh)
NPC (IDR)	2,042,857	2,192,857	2,685,714
Initial capital (IDR)	0	424,286	771,429
Operation cost (IDR/year)	157,857	136,429	147,857
Bill savings (IDR/year)	0	30,071	30,071
ROI (%)	0	1%	-2.70%
Simple payback period (year)	0	20	-

E. Staff and overhead costs

The staff and overhead costs are in cost/km. The costs are based on Transjakarta's Owner Estimate (OE) document, which are IDR 74.64/km and IDR 1925.56/km for overhead costs and staff costs, respectively. It will also include the costs for training and capacity building for Transjakarta's staff to ensure a smooth transition to the electrification program. No annual cost increase is considered.

F. Training costs

To support the transition to electric buses, a number of trainings for Transjakarta staff are needed. Since a detailed training needs assessment has yet to be conducted, the budget allocated for training is assumed to be 10% of staff and overhead costs.

G. Energy costs

The energy costs are calculated based on the energy efficiency rate of each bus type and electricity and diesel costs. The electricity cost is based on MEMR Regulation No. 13/2020 which states that a preferential tariff applies for privately used charging stations for public transport. The tariff can be calculated as Q * IDR 707/kWh, where Q ranges from 0.8 to 2. For this analysis, we assumed that the lowest tariff applies, i.e. Q = 0.8. Taxes, such as 10% value-added tax and 5% streetlamp tax are also included in the calculation. No dynamic preferential tariff, e.g. lower

electricity costs for overnight charging, was considered since the policy is not yet formally issued.

The values used in this analysis are as below and no annual energy cost increase is considered.

Table 6. Energy costs assumptions

Bus type	Single bus		Low entry		Medium bus	Articulated bus
Electric bus energy efficiency	324 kWh	180 kWh	324 kWh	180 kWh	135 kWh	350 kWh
	1.2 kWh/km	1 kWh/km	1.2 kWh/km	1 kWh/km	1 kWh/km	2.3 kWh/km
Diesel bus energy efficiency	2.03 km/liter				3.2 km/liter	1.45 km/liter
Electricity cost	IDR 654/kWh					
Diesel cost	IDR 5,150/liter					

H. Maintenance costs

The maintenance costs for the fleets are expressed as cost/km. The assumed values of maintenance costs are as follows:

Table 7. Maintenance costs assumptions

Bus type	Single bus		Low entry		Medium bus	Articulated bus
Electric bus	324 kWh	180 kWh	324 kWh	180 kWh	135 kWh	350 kWh
	IDR 3,500/km					IDR 6.500/km
Diesel bus	IDR 5,450/km				IDR 3,000/km	IDR 11,679/km

There will also be annual maintenance costs for charging equipment, which are assumed to be 2.5% of charger procurement cost. Both the fleet and charging infrastructure maintenance costs are considered to be constant over the analysis period.

I. Land procurement and staging facility construction costs

The fleet and operations analysis in Deliverable 3.2 Timetable and Roadmap of E-bus Deployment for Transjakarta identified the recommendation for staging facilities establishment at four locations: Pesing, Pejaten, Ancol (North Jakarta), and Pinang Ranti. We assumed that the land is already available for Ancol and Pinang Ranti staging facilities, hence the costs are only applicable for Pesing and Pejaten facilities. The land procurement costs are assumed to be valued at IDR 18,000,000/m^2, and additional construction costs of IDR 8,000,000/m^2 for buildings and IDR 2,000,000/m^2 for pavements are added to the total costs (based on

Transjakarta's previous project). It is assumed that 30% of the land will be allocated for building areas.

To roughly estimate the area needed for the staging facilities, we first identify the minimum number of buses needed to be charged at the same time to fulfill the energy requirement within the available time window of 4 hours. Then, the required charging area plus excess for onsite circulation is calculated.

For the staging facility at Pesing area, 20 single buses and 13 articulated buses needed to be charged at the same time and hence require around 2,200 m^2 of space. At Pejaten, 20 single buses needed to be charged at the same time, requiring a minimum space of around 1,130 m^2.

J. Insurance and legal costs

It is assumed that there will be a one-off 20% import tax for e-buses, calculated from the bus price. For all buses, the annual insurance and legal costs are assumed to be 1.5% of the bus price.

2.3 Results

Based on the various cost assumptions, we calculated the 10-year NPV cost of implementing electric buses for each implementation phase. The 10-year NPV cost of implementing diesel buses was also calculated to compare the TCO difference between the two types of buses.

Table 8. Implementation Costs (in USD)

Group	Phase Pilot	Phase 1	Phase 2	Phase 3	Phase 4
E-bus procurement cost	75,674,524	153,376,083	157,551,576	109,936,728	100,876,454
Battery and battery replacement cost	6,872,144	13,229,598	13,896,037	9,585,627	9,093,227
E-bus import tax	15,134,905	30,675,217	31,510,315	21,987,346	20,175,291
Depot charger procurement and installation costs	4,125,000	9,343,125	8,105,625	6,455,625	4,888,125
Terminal charger procurement and installation costs	1,815,000	1,452,000	363,000	363,000	363,000
Staging charger procurement and installation costs	1,729,750	0	6,855,750	3,107,500	4,488,000
Staff and overhead costs	20,173,876	30,918,580	26,939,824	23,044,898	16,547,498
Energy cost	6,736,886	10,235,016	11,972,358	8,602,702	7,799,394
Insurance and legal costs	9,319,084	18,887,790	19,401,989	13,538,368	12,422,623

Fleet maintenance costs	35,300,753	54,659,302	62,000,692	45,305,607	39,998,077
Charger maintenance costs	1,431,070	2,454,472	3,367,298	2,698,713	2,121,975
Staging land procurement and construction costs	12,360,358	0	28,879,612	0	0
Solar panel initial cost (at staging facilities only)	32,785.71	0	65,571.43	19,285.71	40,500.00
Energy cost savings from solar panel	-19,077.11	0	-38,154.22	-11,221.83	-23,565.84
Total CAPEX	117,744,467	208,076,022	247,227,487	151,455,111	139,924,597
Total OPEX	72,942,592	117,155,160	123,644,007	93,179,067	78,866,001
Total investment costs	190,687,059	325,231,182	370,871,494	244,634,178	218,790,598
Diesel costs	135,324,856	208,264,442	232,656,082	166,790,399	144,882,190
% TCO difference	40.91%	56.16%	59.41%	46.67%	51.01%

The preliminary financial calculation indicated that the investment costs vary for each implementation phase, due to difference in number of routes, number and type of buses, route length, and also costs related to charging infrastructure, including staging facility costs. As shown in the Figure 1 below, the capital cost structure is dominated by fleet costs, followed by staff and overhead costs and maintenance costs.

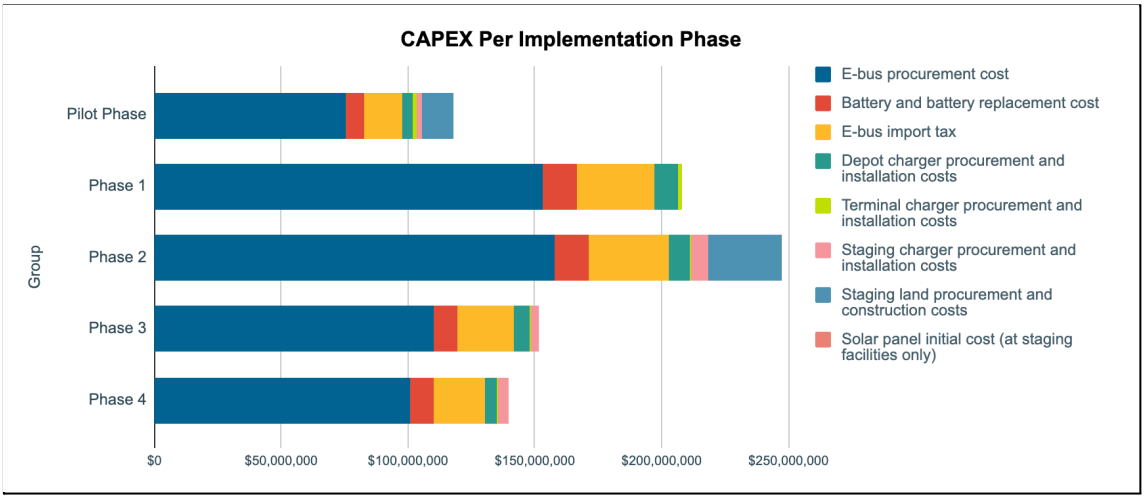

Figure 1. Capital Cost Structure (in USD)

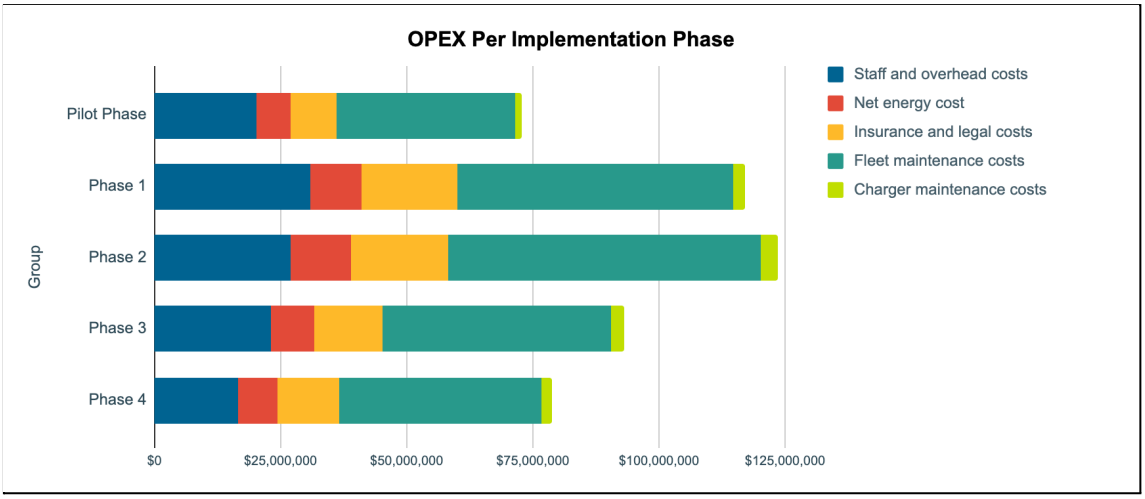

Figure 2. Operational Cost Structure (in USD)

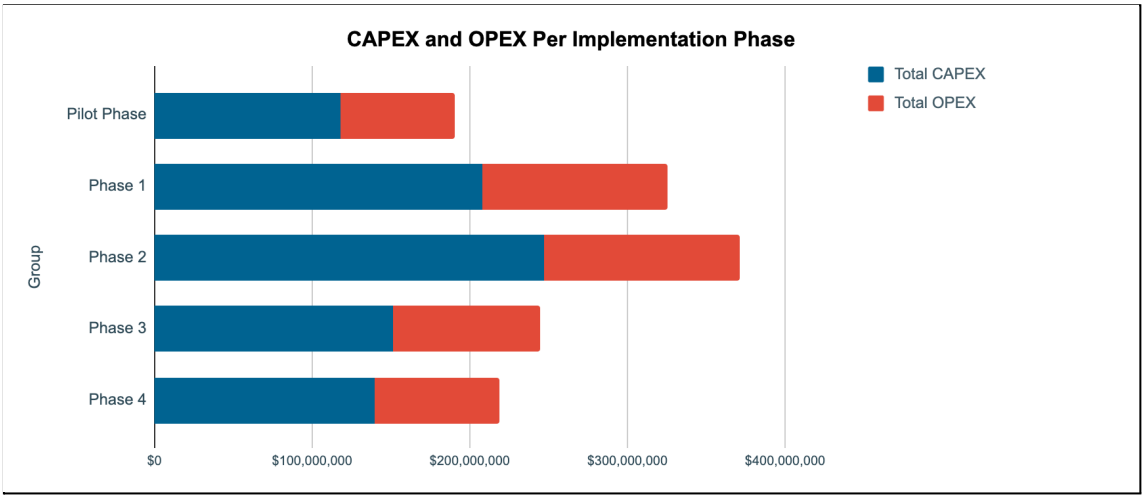

Figure 3. TCO Structure (in USD)

3. Potential Funding Options

One of the major challenges of fleet transition to electric buses is the high capital costs of the electric buses. There is also an additional capital expenditure element of charging infrastructure provision, which does not exist when operating conventional diesel buses. Depending on the business model employed, the fleet capital costs could be distributed between Transjakarta and bus operators under the management of Transjakarta. Other institutions, for example bus manufacturers/Original Equipment Manufacturers (OEMs) or other entities, could also bear the capital costs of bus procurement if a leasing scheme is applied, where the institutions own and lease the buses to Transjakarta or bus operators. Meanwhile, the charging infrastructure capital costs could be distributed between Transjakarta, bus operators, and charging infrastructure providers which may include the State Utility Company (PLN).

Different funding sources are potentially available for Transjakarta and bus operators, as will be elaborated below.

3.1 Potential Funding Options for Transjakarta

Legal funding sources for Regional-Owned Enterprise/ROEs (Badan Usaha Milik Daerah/BUMD), such as Transjakarta, are listed in Government Regulation No. 54/2017, as follows:

1. Local government capital (*penyertaan modal daerah*)
2. Loans
3. Grants
4. Other funding sources, such as reserve capitals (*kapitalisasi cadangan*), asset revaluation profits (*keuntungan revaluasi aset*), and capital in excess of par (*agio saham*)

3.1.1 Government capital

The Government of Jakarta can allocate government capital to Transjakarta, provided there has been an investment analysis conducted by the government and a sound business plan from Transjakarta. However, the feasibility of capital provision by the government highly depends on their financial capacity.

As with other global cities, Jakarta's financial capacity was heavily hit due to the COVID-19 pandemic. During 2020, there were several revisions on Jakarta's Regional Government Budget (*Anggaran Pendapatan dan Belanja Daerah/APBD*) for that year. By November 2020, Jakarta's 2020 revenue plan in its APBD was cut 33.7% from around IDR 82.2 trillion (USD ~5.7 billion)[1] to IDR 54.5 trillion (USD ~3.8 billion) and their expenditure cut from IDR 79.61 trillion (USD ~5.5

[1] USD 1 = IDR 14,300

billion) to IDR 56.11 trillion (USD ~3.9 billion). For 2021, however, there is a plan to increase the projected revenue by 25% to IDR 68.2 trillion (USD ~4.8 billion)[2].

Between 2014-2017, Jakarta recorded surpluses in their yearly regional budget with an average of 7.533 trillion per year (C40-CFF, 2020). However, their financial performance was in deficit in 2018-2019, and also in their 2020 budget plan revision.

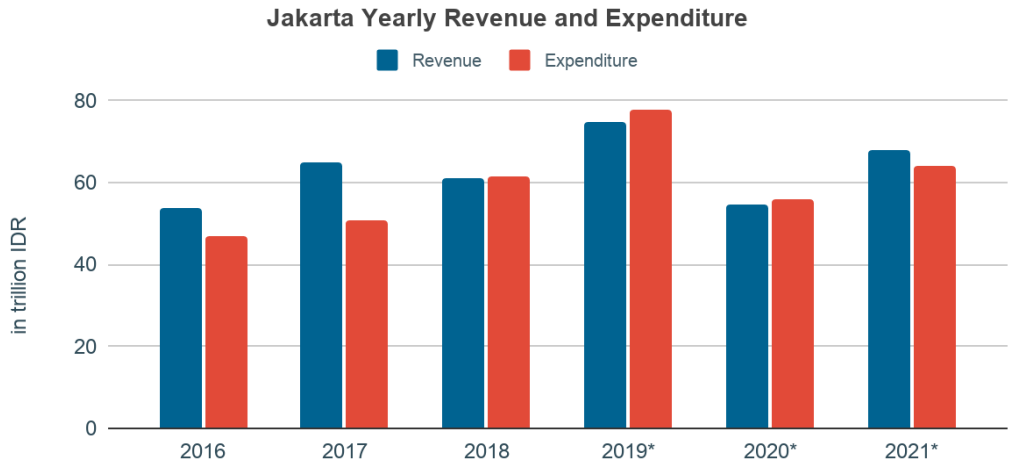

Figure 4. Jakarta Yearly Revenue and Expenditure

Table 9. Jakarta Yearly Revenue and Expenditure

Year	2016	2017	2018	2019*	2020*	2021*
Revenue (in billion USD)	3.79	4.57	4.31	5.28	3.84	4.80
Expenditure (in billion USD)	3.32	3.59	4.32	5.48	3.95	4.52

* Projected revenue and expenditure

Each year, the Government of Jakarta provided financial support to several of their ROEs and joint companies through government capital. The amounts of budget allocated over the years by the Government of Jakarta to fund the companies through government capital are as follows (in billion USD):

Table 10. Jakarta Yearly Budget Allocation

Year	2017	2018	2019	2020
Government capital for ROEs and joint companies	0.70	0.52	0.60	0.31
Government capital for Public Transport ROEs and joint companies (MRT, Jakarta Propertindo, Transjakarta)	0.65	0.41	0.41	0.23
Government capital for Transjakarta	0.03	0.00	0.02	0.01

[2] apbd.jakarta.co.id, accessed on March 2, 2021

In 2017-2020, the majority of Jakarta's budget allocations for government capital were provided for public transport companies, such as PT MRT, PT Jakarta Propertindo, and PT Transjakarta. Jakarta's support to regional companies in the public transport sector services through the provision of government capital mostly went to PT MRT and PT Jakarta Propertindo, which operates the LRT, since the two public transport systems are still having construction.

3.1.2 Domestic loans

As an ROE, Transjakarta is able to directly access domestic loans, based on Government Regulation No. 2/2006 on Loan/Grant Procurement Procedures and Loan/Grant Channeling.

ROEs can get domestic loans in Indonesia from local governments, banks, or other financing institutions such as PT Sarana Multi Infrastruktur (PT SMI). The discussion of loans below focuses on loans available for covering capital expenditures.

1. **Loan from Government of Jakarta:** A local government can provide loans for their ROEs. The amounts of domestic loans allocated per year by Jakarta were included in their APBD documents. However, there were no further details on the loan recipients.
2. **Loan from commercial banks:** Loans or credits from commercial banks can also be utilized by Transjakarta to access funds. However, it has to be considered that the company needs sufficient collateral to access the loans.
3. **Loan from PT SMI:** PT Sarana Multi Infrastruktur (PT SMI) is one of the Special Mission Vehicles (SMV) under the Ministry of Finance which is engaged in financing and preparing infrastructure projects. To further accelerate infrastructure project funding, a blended financing platform called SDG Indonesia One has been established by PT SMI and the Ministry of Finance to raise private and public funds to be channeled to projects that contribute to Sustainable Development Goals (SDG) achievements. As of June 2020, SIO is able to access USD 3.03 billions from 32 of its SDG partners, and has committed to 38 programs from multi-sectoral, green, health, water, and social infrastructure sectors.

   Several financing facilities eligible for transport projects are accessible through PT SMI, such as:

   a. Green Climate Fund (GCF), which is a financing mechanism established under UNFCCC. Through its Project Preparation Facility (PPF), GCF can provide grants up to USD 1.5 million/project. For project implementation, through its Funding Proposal (FP) facility, GCF can provide grants or concessional loans up to USD 150 million/project. GCF invests in the built environment; energy and industry; human security; livelihoods and wellbeing; and land-use, forests, and ecosystems. An example of green transport projects funded by GCF through PT SMI is BRT Semarang.
   b. SIO On-lending and De-risking Facilities from AFD and EU. The credit facility can provide on-lending up to USD 150 million, with a maturity period of 7 years

(including a grace period of 3 years). Grants up to EUR 3 million can be accessed for technical assistance and de-risking activities.

c. SIO-Green Finance Facility (SIO-GFF) from ADB. A total of USD 600 million in credit facilities can be disbursed to finance projects' de-risking activities in Indonesia, and an additional USD 5 million is proposed to fund technical assistance activities for green projects.

3.1.3 Foreign loans

For large-scale electric bus adoption projects, foreign loans can be one of the attractive financing options. The discussion of loans below focuses on loans available for covering capital expenditures.

It is important to consider opportunities provided by multilateral development banks (MDBs) may not exist with commercial banks. Large-scale electric bus adoption projects can be risky investments and may not gain the interest of local commercial banks. Commercial banks may not have the capital to support the projects or may not want to take on the risk. On the other hand, multilateral development banks (MDBs) operate under a specific mission and invest in projects that align with it, even though they may be riskier. Given this, MDBs have systems in place to mitigate risks, such as grant financing, debt management products, guarantees, and a public-private partnership structure. MDBs may also offer longer term loans or lower interest rates that commercial banks, which can bring down the overall cost of capital for the project. Unlike domestic entities, MDBs may be more willing to support risky projects as long as they align with their mission.

While the specific list of documents needed to apply and the application processes overall will vary based on the MDB and the funding opportunities, it is important to foster relationships with the partner MDB to work collaboratively throughout the application process and ensure all entities are clear on requirements.

Foreign loans which can be accepted in Indonesia can be from:

1. Multilateral creditors
2. Bilateral creditors
3. Private foreign creditors
4. Export Credit Agencies (ECAs)

The regulation on foreign loan acceptance is similar to grants; ROEs such as Transjakarta and local governments cannot directly access foreign loans. Foreign loans can only be accepted by the Ministry of Finance (MoF). The Minister allocates the fund based on an annual List of Planned Priority External Loans or *Daftar Rencana Prioritas Pinjaman Luar Negeri* (DRPPLN)/Green Book by the Ministry of National Development Planning/National Development Planning Agency (BAPPENAS). Programs or projects in the document are shortlisted from a List of Medium-Term Planned External Loans or *Daftar Rencana Pinjaman Luar Negeri Jangka Menengah* (DRPLN-JM)/Blue Book, which is issued every five years based on the Medium Term Development Plan or *Rencana Pembangunan Jangka Menengah* (RPJM).

Based on the Government Regulation No. 10/2011, proposed loans from Transjakarta can be included to DRPPLN through a proposal from the local government, i.e. the Government of Jakarta, to BAPPENAS with an endorsement from the Ministry of Home Affairs (MoHA). The Government of Jakarta can on-lend the fund to Transjakarta. The submitted proposal must be accompanied by at least:

1. Terms of reference of the project
2. Feasibility study of the project
3. Approval letter from the Regional House of Representatives (DPRD)

However, there are some caveats of the above approach to access foreign funding. Electric bus adoption has not been cited in the National Medium Term Development Plan (RPJMN) 2020-2024; only research budgets on BEV propulsion systems and charging infrastructure have been allocated in the document. Bus electrification has also yet to be included in the local planning document namely the Regional Medium Term Development Plan (RPJMD) 2017-2022. Therefore, it would be difficult to specifically enlist the Transjakarta e-bus implementation project in DRPPLN and DRPLN-JM in particular for 2020-2024 period. These caveats above show the importance of pushing the bus electrification plan of Transjakarta to be included in planning documents, both local and national.

3.1.4 Grants

Many cities have used non-reimbursable grants to start their electric bus transition program. Technically, based on Government Regulation No. 10/2011 on Foreign Loan and Grant Acception, both domestic and foreign grants only be accepted by the Minister of Finance, who could subgrant the funding to local governments or other ministries. Ministries e.g. the Ministry of Transportation or local governments, which in this case the Jakarta Government, can in turn allocate the fund to Transjakarta.

However, since the amount of grants are typically limited and might be limited to fund capital expenditures, e.g. electric bus procurement, the use of grants is usually only for pilot projects instead of larger-scale electric bus implementation projects.

Examples of organizations that provide grants include:

1. *Global Environment Facility (GEF)* provides up to $2 million in grants to projects focused on addressing environmental issues, such as climate change, developing sustainable cities, and capacity development. Eligible projects must be driven by a country and support the nation's sustainable development. Several countries and local governments have received funding from GEF, including DKI Jakarta. To be eligible for funding, countries must adhere to certain conditions, such as ratifying GEF conventions. An example of electric transport initiatives GEF supports is a project in Mauritius focused on promoting low-carbon electric public bus transport.[3]

[3] https://www.thegef.org/project/promoting-low-carbon-electric-public-bus-transport-mauritius

2. The *NAMA Facility* is a joint initiative across several European agencies, including German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the Department for Business, Energy and Industrial Strategy (BEIS) of the United Kingdom (UK). The organization supports cities looking to reduce emissions and build sustainable economies. Eligible projects have the potential to receive EUR 5 - 25 million in grant funding. Only countries with ambitious Nationally Determined Contributions presented to the United Nations Framework Convention on Climate Change are eligible to receive support. Previously, NAMA Facility provided Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Ministry of Transportation in Indonesia with EUR 14 million to fund transport demand management measures, such as park and ride facilities, in select Indonesian cities.[4]
3. *City Climate Finance Gap Fund* provides financial resources to cities to help finance their climate-resilient projects. They offer technical assistance in the early stages of project development. The Gap Fund helps cities finance their climate-resilient projects and offers technical and advisory services.
4. P4G aims to develop public-private partnerships to meet Sustainable Development Goals. P4G has partnerships in various countries, including Bangladesh, Chile, and Indonesia. They offer up to $1 million in funding based on the type of partnerships (start-up versus scale-up). P4G is involved in several projects and endeavours, including an e-mobility project in rural areas of Western-Kenya.[5]
5. Clean Technology Fund provides financial support to developing countries to invest in clean technology projects. CTF has invested in Indonesia before, funding several geothermal energy programs across Indonesia. Currently, the fund has approved over $4 billion for projects involving renewable energy, energy efficiency, and clean transport. CTF provided a co-financing loan to Botoga, Colombia to improve public transport and reduce emissions. Up to 344 hybrid or electric buses were financed.[6] Indonesia and CTF have an established relationship, with CTF funding several geothermal energy programs in Indonesia.

3.1.5 Summary Table

Below is a table (Table 10) containing a summary of potential funding sources that were described above.

[4] https://www.nama-facility.org/projects/indonesia-sustainable-urban-transport-program-sutri-nama/

[5] https://p4gpartnerships.org/partnership/accelerating-e-mobility-solutions-social-change

[6] https://www.climateinvestmentfunds.org/sites/cif_enc/files/ctf_tfc.11_4_revised_ctf_investment_plan_for_colombia_1.pd

Table 11. Summary of Potential Funding Sources

Program Name/Sponsor	Funding Type	Funding Amount	Applicability of Funding	Technical Assistance Type (if applicable)
Commercial Banks	Loans	Varies	Capital, operational, and technical assistance	
PT SMI	Loans	$3.03 billions of total funds	Capital, operational, and technical assistance	
Green Climate Fund (GCF) / United Nations Framework Convention on Climate Change	Grants, concessional debt, guarantees, and equity instruments	$7.2 billion of total funds; Up to $1.5 million per project	Capital, operational, and technical assistance	Capacity building, feasibility studies, and tools and metrics
SIO On-lending and De-risking Facilities / AFD and EU	Credit, lending	up to $150 million	Technical assistance	
SIO-Green Finance Facility / African Development Bank	Credit	$600 million	Operational and technical assistance	
Global Environment Facility (GEF) / World Bank and donor nations	Grants, co-financing	Dependent on project size (full-sized projects: > $2 million; medium-sized projects: < $2 million)	Capital, operational, and technical assistance	Capacity building, feasibility studies, tools and metrics, Monitoring and Evaluation (M&E) tools, awareness raising, and communication strategies
City Climate Gap Fund / World Bank and European Investment Bank	Grants	Vaies	Technical assistance	Capacity building, feasibility studies, and project support
P4G partnership Funding / Government of Denmark	Public-private partnerships	Start-up partnerships: <$100,000 Scale-up partnerships: <$1 million	Capital and operational	
Clean Technology Fund (CTF) / World Bank	Investments	Varies	Capital and technical assistance	Capacity building, feasibility studies, and project development and management

3.2 Potential Funding Options for Bus Operators

Based on the Presidential Decree No. 55/2019, public transport companies which operate battery electric vehicles (BEV) are one of the sectors eligible for government fiscal and non-fiscal incentives. Some of the possible fiscal incentives stated can potentially reduce the capital and operational costs needed by the bus operators.

Regarding funding options, the on-lending scheme from the Government of Jakarta or the national government is currently not possible for bus operators, thus loans from commercial banks or other financing companies are the most feasible option. The Bank of Indonesia and the Financial Services Authority (*Otoritas Jasa Keuangan/OJK*) have issued policies to support the procurement of BEVs in Indonesia through several incentives to encourage the provision of preferential credits by commercial banks or other financing institutions[7].

7 https://www.ojk.go.id/id/berita-dan-kegiatan/siaran-pers/Pages/Insentif-OJK-untuk-Dukung-Program-Kendaraan-Bermotor-Ramah-Lingkungan-.aspx

Annex 1. E-bus Implementation Phase Recommendation

Phase 0 (Pilot)

Group(s) implemented: Group 2

Table 12. Group 2 - Staging Facility at Pejaten

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
6	RAGUNAN - HALIMUN	BRT	Single	180	25	Terminal+Staging
13	CILEDUG - TENDEAN	BRT	Single	180	75	Terminal
13B	PURI BETA - PANCORAN BARAT	BRT	Single	180	17	Terminal
13C	PURI BETA - DUKUH ATAS	BRT	Single	180	15	Terminal+Staging
13D	PURI BETA - RAGUNAN	BRT	Single	180	4	Terminal
13E	PURI BETA - KUNINGAN	BRT	Single	180	8	Terminal+Staging
13F	PURI BETA - KAMPUNG MELAYU	BRT	Single	180	5	Terminal
6A	RAGUNAN - MONAS VIA KUNINGAN	BRT	Single	180	18	Terminal+Staging
6B	RAGUNAN - MONAS VIA SEMANGGI	BRT	Single	180	15	Terminal+Staging
M6	RAGUNAN - HARMONI	BRT	Single	180	7	Overnight
6H	SENEN - LEBAK BULUS	Non BRT	Single	324	24	Terminal (Use bigger buses)
5N	KAMPUNG MELAYU - RAGUNAN	Non BRT	Medium	135	11	Terminal
6F	STASIUN MANGGARAI - RAGUNAN	Non BRT	Medium	135	5	Overnight
6R	RAGUNAN - STASIUN MRT FATMAWATI	Non BRT	Low Entry	180	5	Terminal

Phase 1

Group(s) implemented: Group 7, Group 8, Group 12[8]

Table 13. Group 7 - Blok M Routes

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
1	BLOK M - KOTA	BRT	Single	180	48	Terminal
10H	TANJUNG PRIOK - BLOK M	BRT	Single	180	7	Terminal
13A	PURI BETA - BLOK M	BRT	Single	180	25	Terminal
4K	PULO GADUNG 2 - BLOK M	BRT	Single	180	4	Terminal
6M	STASIUN MANGGARAI - BLOK M	Non BRT	Single	180	15	Terminal
7B	KAMPUNG RAMBUTAN - BLOK M	Non BRT	Single	180	12	Terminal
1C	PESANGGRAHAN - BLOK M	Non BRT	Medium	135	11	Terminal
1M	MERUYA - BLOK M	Non BRT	Medium	135	9	Terminal (Add more buses)

[8] The implementation cost of Group 12 is distributed equally to Phase 1, 2, 3, and 4

1Q	REMPOA - BLOK M	Non BRT	Medium	135	9	Terminal
8D	JOGLO - BLOK M	Non BRT	Medium	135	12	Terminal
8E	BINTARO - BLOK M	Non BRT	Medium	135	10	Terminal (Add more buses)
9H	CIPEDAK - BLOK M	Non BRT	Medium	135	16	Terminal (Add more buses)
1E	PONDOK LABU - BLOK M	Non BRT	Low Entry	180	14	Terminal
1N	TANAH ABANG - BLOK M	Non BRT	Low Entry	180	9	Terminal
1P	SENEN - BUNDARAN SENAYAN	Non BRT	Low Entry	180	11	Overnight (Add more buses)
6N	RAGUNAN - BLOK M VIA KEMANG	Non BRT	Low Entry	180	14	Terminal
7B	KAMPUNG RAMBUTAN - BLOK M	Non BRT	Low Entry	180	8	Terminal

Table 14. Group 8 - Depot Area

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
2	PULO GADUNG 1 - HARMONI	BRT	Single	180	31	Terminal
4	PULO GADUNG 2 - TOSARI	BRT	Single	180	29	Terminal
2C	MONAS - JIEXPO	BRT	Single	180	1	Overnight
4C	TU GAS - BUNDARAN SENAYAN	BRT	Single	180	27	Overnight
4D	PULO GADUNG 2 - KUNINGAN	BRT	Single	180	10	Terminal
4H	PULO GADUNG 2 - RAGUNAN	BRT	Single	180	6	Overnight
4M	PULO GADUNG 2 - KOTA	BRT	Single	180	3	Terminal
5C	PGC 1 - HARMONI	BRT	Single	180	24	Overnight
L4	PGC 2 - DUKUH ATAS 2	BRT	Single	180	5	Overnight
4C	TU GAS - BUNDARAN SENAYAN	BRT	Articulated	350	7	Overnight
4A	TU GAS - JELAMBAR	Non BRT	Single	180	26	Overnight (Add more buses)
4F	PINANG RANTI - PULO GADUNG	Non BRT	Low Entry	180	19	Terminal

Table 15. Group 12 - Scattered Non-BRT Routes

Route Code	OD	Service Type	Bus Type	Battery	Number of Bus	Charging Strategy
4B	STASIUN MANGGARAI - UI	Non BRT	Single	180	5	Overnight
4B	STASIUN MANGGARAI - UI	Non BRT	Low Entry	180	15	Overnight
4B	STASIUN MANGGARAI - UI	Non BRT	Medium	135	14	Overnight (Add more buses)
GR1	BUNDARAN SENAYAN - HARMONI	Non BRT	Low Entry	324	9	Overnight (Use bigger buses)
6D	STASIUN TEBET - KARET VIA UNDERPASS	Non BRT	Low Entry	180	10	Overnight (Add more buses)
6D	STASIUN TEBET - KARET VIA UNDERPASS	Non BRT	Medium	135	7	Overnight (Add more buses)
6C	STASIUN TEBET - KARET VIA PATRA KUNINGAN	Non BRT	Medium	135	23	Overnight (Add more buses)
GR2	TANAH ABANG EXPLORER	Non BRT	Low Entry	180	10	Overnight
9D	PASAR MINGGU - TANAH ABANG	Non BRT	Single	180	11	Overnight (Add more buses)
9D	PASAR MINGGU - TANAH ABANG	Non BRT	Low Entry	180	11	Overnight (Add more buses)
MR9	SOUTH QUARTER - LEBAK BULUS	Non BRT	Medium	135	4	Terminal
5F	KAMPUNG MELAYU - TANAH ABANG	Non BRT	Low Entry	180	9	Terminal
MR5	STASIUN MRT BLOK A - RADIO DALAM	Non BRT	Medium	135	8	Overnight (Add more buses)
1R	TANAH ABANG - SENEN	Non BRT	Low Entry	180	10	Overnight
1H	TANAH ABANG - STASIUN	Non BRT	Low Entry	180	9	Overnight (Add more buses)

	GONDANGDIA					
MR1	CSW - PAKUBUWONO	Non BRT	Low Entry	180	2	Overnight
MR2	CSW - KRAMAT PELA	Non BRT	Medium	135	4	Overnight (Add more buses)
6E	STASIUN TEBET - KARET VIA MEGA KUNINGAN	Non BRT	Medium	135	2	Overnight (Add more buses)
5M	KAMPUNG MELAYU - TANAH ABANG VIA CIKINI	Non BRT	Low Entry	180	9	Terminal
5B	STASIUN TEBET - BIDARA CINA	Non BRT	Medium	135	6	Overnight (Add more buses)
1F	STASIUN PALMERAH - BUNDARAN SENAYAN	Non BRT	Single	180	4	Overnight
1F	STASIUN PALMERAH - BUNDARAN SENAYAN	Non BRT	Low Entry	180	4	Overnight
MR3	CSW - WIJAYA	Non BRT	Low Entry	180	2	Overnight
1B	STASIUN PALMERAH - TOSARI	Non BRT	Single	324	6	Overnight (Use bigger buses)
10F	SUNTER KELAPA GADING - STASIUN LRT PEGANGSAAN DUA	Non BRT	Medium	135	4	Overnight (Add more buses)
7P	PONDOK KELAPA - BKN	Non BRT	Medium	135	18	Overnight (Add more buses)
DA1	DUKUH ATAS - SAM RATULANGI VIA SEMANGGI	Non BRT	Low Entry	180	1	Overnight
8C	KEBAYORAN LAMA - TANAH ABANG	Non BRT	Low Entry	180	15	Overnight (Add more buses)
1A	PIK - BALAI KOTA	Non BRT	Single	180	28	Overnight (Add more buses)
DA4	DUKUH ATAS - KOTA VIA BUNSEN	Non BRT	Low Entry	180	6	Overnight (Add more buses)
DA3	DUKUH ATAS - KUNINGAN VIA SEMANGGI	Non BRT	Single	180	5	Overnight (Add more buses)
6Q	EPICENTRUM - KOTA KASABLANKA	Non BRT	Low Entry	180	6	Overnight (Add more buses)
DA2	DUKUH ATAS - TANAH ABANG	Non BRT	Low Entry	180	2	Overnight
2K	JAKARTA GARDEN CITY - HARAPAN INDAH	Non BRT	Medium	135	4	Overnight (Add more buses)

Phase 2

Group(s) implemented: Group 1, Group 6, Group 9, Group 12[9]

Table 16. Group 1 - Staging Facility at Pesing

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
8	LEBAK BULUS - HARMONI	BRT	Single	180	30	Terminal+Staging
9	PINANG RANTI - PLUIT	BRT	Single	180	32	Terminal+Staging
2D	KALIDERES - ASMI	BRT	Single	180	10	Terminal+Staging
8A	GROGOL 2 - HARMONI	BRT	Single	180	11	Staging
2	PULO GADUNG 1 - HARMONI	BRT	Articulated	350	16	Terminal
3	KALIDERES - PASAR BARU	BRT	Articulated	350	18	Terminal+Staging
8	LEBAK BULUS - HARMONI	BRT	Articulated	350	26	Terminal+Staging
9	PINANG RANTI - PLUIT	BRT	Articulated	350	23	Terminal+Staging
2A	PULO GADUNG 1 - RAWA BUAYA	BRT	Articulated	350	8	Terminal
3D	PENJARINGAN - RAWA BUAYA	Non BRT	Single	180	2	Terminal
9E	KEBAYORAN LAMA - JELAMBAR	Non BRT	Single	180	12	Overnight (Add more buses)
3D	PENJARINGAN - RAWA BUAYA	Non BRT	Medium	135	8	Terminal+Staging

[9] The implementation cost of Group 12 is distributed equally to Phase 1, 2, 3, and 4

3E	SENTRALAND CENGKARENG - PURI KEMBANGAN	Non BRT	Medium	135	7	Staging
8K	BATU SARI - TANAH ABANG	Non BRT	Medium	135	8	Staging
9E	KEBAYORAN LAMA - JELAMBAR	Non BRT	Medium	135	2	Staging

Table 17. Group 6 - Corridor 9 Intersects

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
9A	PGC 2 - GROGOL 2	BRT	Single	180	20	Overnight
9B	PINANG RANTI - KOTA	BRT	Single	180	22	Overnight
9M	PINANG RANTI - HALIMUN VIA KUNINGAN	BRT	Single	180	6	Overnight
M7	KAMPUNG RAMBUTAN - HARMONI	BRT	Single	180	12	Overnight
9A	PGC 2 - GROGOL 2	BRT	Articulated	350	11	Overnight

Table 18. Group 9 - Corridor 3

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
3	KALIDERES - PASAR BARU	BRT	Single	180	38	Terminal
3F	KALIDERES - GELORA BUNG KARNO	BRT	Single	180	22	Overnight
3F	KALIDERES - GELORA BUNG KARNO	BRT	Articulated	350	1	Overnight

Phase 3

Group(s) implemented: Group 4, Group 5, Group 12[10]

Table 19. Group 4 - Staging Facility at Pinang Ranti

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
7F	KAMPUNG RAMBUTAN - HARMONI VIA CEMPAKA PUTIH	BRT	Single	180	6	Terminal+Staging
7	KAMPUNG RAMBUTAN - KAMPUNG MELAYU	BRT	Articulated	350	4	Terminal+Staging
10	PGC 2 - TANJUNG PRIOK	BRT	Articulated	350	19	Terminal+Staging
10D	KAMPUNG RAMBUTAN - TANJUNG PRIOK	BRT	Articulated	350	3	Terminal+Staging
5E	KAMPUNG RAMBUTAN - ANCOL	BRT	Articulated	350	2	Terminal+Staging
9K	KAMPUNG RAMBUTAN - GROGOL 2	BRT	Articulated	350	4	Terminal+Staging

Table 20. Group 5 - Kampung Rambutan Route

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
7	KAMPUNG RAMBUTAN - KAMPUNG MELAYU	BRT	Single	180	24	Terminal
10	PGC 2 - TANJUNG PRIOK	BRT	Single	180	37	Terminal

[10] The implementation cost of Group 12 is distributed equally to Phase 1, 2, 3, and 4

10D	KAMPUNG RAMBUTAN - TANJUNG PRIOK	BRT	Single	180	5	Terminal
5D	PGC 1 - ANCOL	BRT	Single	180	14	Terminal
5E	KAMPUNG RAMBUTAN - ANCOL	BRT	Single	180	15	Terminal
7M	KAMPUNG RAMBUTAN - PULO GADUNG 2	BRT	Single	180	7	Terminal
9K	KAMPUNG RAMBUTAN - GROGOL 2	BRT	Single	180	6	Terminal
7A	KAMPUNG RAMBUTAN - LEBAK BULUS	Non BRT	Single	180	15	Terminal
7D	PANCORAN - TMII	Non BRT	Single	180	17	Overnight (Add more buses)
7E	KAMPUNG RAMBUTAN - RAGUNAN	Non BRT	Single	180	5	Overnight
7N	KAMPUNG RAMBUTAN - GANDARIA	Non BRT	Medium	135	3	Terminal

Phase 4

Group(s) implemented: Group 3, Group 10, Group 12[11]

Table 21. Group 3 - Staging Facility at North Jakarta (Ancol)

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
12	PENJARINGAN - SUNTER BOULEVARD BARAT	BRT	Single	180	24	Staging
12M	SUNTER BOULEVARD BARAT - HARMONI	BRT	Single	180	6	Staging
1	BLOK M - KOTA	BRT	Articulated	350	40	Terminal+Staging
5C	PGC 1 - HARMONI	BRT	Articulated	350	2	Staging
5D	PGC 1 - ANCOL	BRT	Articulated	350	3	Terminal+Staging
10K	TANJUNG PRIOK - SENEN VIA TAMAN BMW	Non BRT	Medium	135	8	Terminal+Staging
12A	PELABUHAN KALIADEM - KOTA	Non BRT	Medium	135	3	Staging
12B	PLUIT - SENEN	Non BRT	Medium	135	5	Staging

Table 22. Group 10 - North Jakarta Routes

Route code	OD	Service Type	Bus Type	Battery Size	Number of Bus	Charging Strategy
5	KAMPUNG MELAYU - ANCOL	BRT	Single	180	15	Terminal
5H	HARMONI - ANCOL	BRT	Single	180	3	Terminal
5K	KAMPUNG MELAYU - KOTA	BRT	Single	180	8	Terminal
5	KAMPUNG MELAYU - ANCOL	BRT	Articulated	350	33	Terminal
12B	PLUIT - SENEN	Non BRT	Single	324	7	Overnight (Use bigger buses)
5A	KAMPUNG MELAYU - GROGOL 1	Non BRT	Single	180	15	Terminal
12E	HISTORY OF JAKARTA EXPLORER	Non BRT	Low Entry	180	5	Overnight (Add more buses)
12K	ASEMKA EXPLORER	Non BRT	Low Entry	180	6	Overnight (Add more buses)

[11] The implementation cost of Group 12 is distributed equally to Phase 1, 2, 3, and 4

Annex 2. Existing Bus Operations

Table 23. Existing Bus Operations

No	Route Code	Service Category	Monthly Distance Travelled (km)	Number articulated bus	Number medium bus	Number single+maxi bus	Number single LE
1	10C	Non BRT	0	0	0	0	0
2	10F	Non BRT	10,380	0	3	0	0
3	10K	Non BRT	43,612	0	8	0	0
4	11A	Non BRT	47,119	0	0	8	0
5	11D	Non BRT	69,136	0	12	2	0
6	11Q	Non BRT	82,882	0	15	0	0
7	11T	Non BRT	13,239	0	0	2	0
8	11U	Non BRT	7,703	0	0	2	0
9	12A	Non BRT	14,075	0	3	0	0
10	12B	Non BRT	58,872	0	5	7	0
11	12E	Non BRT	17,532	0	0	0	4
12	12K	Non BRT	21,225	0	0	0	5
13	1A	Non BRT	109,754	0	0	17	0
14	1B	Non BRT	33,787	0	0	6	0
15	1C	Non BRT	50,790	0	11	0	0
16	1E	Non BRT	73,009	0	0	0	14
17	1F	Non BRT	31,380	0	0	4	4
18	1H	Non BRT	32,622	0	0	0	8
19	1M	Non BRT	44,316	0	8	0	0
20	1N	Non BRT	41,447	0	0	0	9
21	1P	Non BRT	42,064	0	0	0	9
22	1Q	Non BRT	49,712	0	9	0	0
23	1R	Non BRT	38,503	0	0	0	10
24	2K	Non BRT	11,598	0	2	0	0
25	3D	Non BRT	57,465	0	8	2	0
26	3E	Non BRT	45,725	0	7	0	0
27	4A	Non BRT	120,402	4	0	21	0
28	4B	Non BRT	108,046	0	12	5	15
29	4F	Non BRT	78,885	0	0	0	19
30	5A	Non BRT	68,389	0	0	15	0
31	5B	Non BRT	16,778	0	3	0	0
32	5F	Non BRT	43,647	0	0	0	9
33	5M	Non BRT	40,803	0	0	0	9

34	5N	Non BRT	62,606	0	11	0	0
35	6C	Non BRT	69,486	0	14	0	0
36	6D	Non BRT	57,293	0	5	0	9
37	6E	Non BRT	3,078	0	1	0	0
38	6F	Non BRT	10,071	0	5	0	0
39	6H	Non BRT	220,135	9	0	24	0
40	6M	Non BRT	83,252	0	0	15	0
41	6N	Non BRT	73,063	0	0	0	14
42	6Q	Non BRT	23,443	0	0	0	5
43	6R	Non BRT	23,995	0	0	0	5
44	7A	Non BRT	82,153	0	0	15	0
45	7B	Non BRT	83,758	0	0	12	8
46	7D	Non BRT	66,581	0	0	9	0
47	7E	Non BRT	19,786	0	0	5	0
48	7N	Non BRT	15,671	0	3	0	0
49	7P	Non BRT	51,645	0	9	0	0
50	8C	Non BRT	58,779	0	0	0	13
51	8D	Non BRT	57,766	0	12	0	0
52	8E	Non BRT	52,417	0	9	0	0
53	8K	Non BRT	43,708	0	8	0	0
54	9D	Non BRT	84,216	0	0	9	9
55	9E	Non BRT	54,179	0	2	11	0
56	9H	Non BRT	71,309	0	11	0	0
57	DA1	Non BRT	2,941	0	0	0	1
58	DA2	Non BRT	7,652	0	0	0	2
59	DA3	Non BRT	17,546	0	0	0	4
60	DA4	Non BRT	21,103	0	0	0	5
61	GR1	Non BRT	46,943	0	0	0	9
62	GR2	Non BRT	22,197	0	0	0	10
63	MR1	Non BRT	3,942	0	0	0	2
64	MR2	Non BRT	10,837	0	3	0	0
65	MR3	Non BRT	7,928	0	0	0	2
66	MR5	Non BRT	22,419	0	6	0	0
67	MR8	Non BRT	0	0	0	0	0
68	MR9	Non BRT	13,643	0	4	0	0
69	W1	Non BRT	0	0	0	0	0
70	1	BRT	439,988	40	0	48	0
71	2	BRT	208,409	16	0	31	0
72	3	BRT	326,521	18	0	38	0
73	4	BRT	162,605	0	0	29	0

74	5	BRT	243,032	33	0	15	0
75	6	BRT	169,507	0	0	25	0
76	7	BRT	154,594	4	0	24	0
77	8	BRT	369,183	26	0	30	0
78	9	BRT	262,416	23	0	32	0
79	10	BRT	315,867	19	0	37	0
80	11	BRT	125,362	0	0	24	0
81	12	BRT	132,998	0	0	24	0
82	13	BRT	422,865	0	0	75	0
83	10D	BRT	41,288	3	0	5	0
84	10H	BRT	31,397	0	0	7	0
85	11V	BRT	33,987	0	0	5	0
86	12M	BRT	34,066	0	0	6	0
87	13A	BRT	158,677	0	0	25	0
88	13B	BRT	116,336	0	0	17	0
89	13C	BRT	104,053	0	0	15	0
90	13D	BRT	26,323	0	0	4	0
91	13E	BRT	55,991	0	0	8	0
92	13F	BRT	32,444	0	0	5	0
93	2A	BRT	28,758	8	0	0	0
94	2C	BRT	1,559	0	0	1	0
95	2D	BRT	65,119	0	0	10	0
96	3F	BRT	59,578	1	0	22	0
97	4C	BRT	95,580	7	0	27	0
98	4D	BRT	47,579	0	0	10	0
99	4H	BRT	12,370	0	0	6	0
100	4K	BRT	19,312	0	0	4	0
101	4M	BRT	18,785	0	0	3	0
102	5C	BRT	98,600	2	0	24	0
103	5D	BRT	86,874	3	0	14	0
104	5E	BRT	79,790	2	0	15	0
105	5H	BRT	20,224	0	0	3	0
106	5K	BRT	41,149	0	0	8	0
107	6A	BRT	118,739	0	0	18	0
108	6B	BRT	104,052	0	0	15	0
109	7F	BRT	49,552	0	0	6	0
110	7M	BRT	46,241	0	0	7	0
111	8A	BRT	49,011	0	0	11	0
112	9A	BRT	102,679	11	0	20	0
113	9B	BRT	69,895	0	0	22	0

114	9C	BRT	0	0	0	10	0
115	9K	BRT	54,474	4	0	6	0
116	9M	BRT	17,200	0	0	6	0
117	L10	BRT	0	0	0	0	0
118	L13C	BRT	0	0	0	0	0
119	L13E	BRT	0	0	0	0	0
120	L2	BRT	0	0	0	0	0
121	L4	BRT	13,794	0	0	5	0
122	L7	BRT	0	0	0	0	0
123	M6	BRT	17,717	0	0	7	0
124	M7	BRT	29,666	0	0	12	0