

Sustainable Mass Electric Transportation to Support  
Green Smart City in West Java (2024~2027)

Indonesia

**Project Concept Paper**

January, 2023

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## PROJECT/PROGRAM CONCEPT PAPER (PCP)

SECTION 1. BASIC PROJECT INFORMATION		
1.1	Country	Indonesia
1.2	Title	Sustainable Mass Electric Transportation to Support Green Smart City in West Java (2024~2027)
1.3	Region(s)/Location(s)	West Java Province, Bandung Raya BRT Corridors
1.4	Duration	48 months (2024-2027)
1.5	Budget (total)	<u>US\$ 10 million</u>
1.6	Objectives	<ul style="list-style-type: none"> <li>• Implementation smart EV charging station on BRT corridors linked into green energy in Bandung Raya Area, West Java</li> <li>• Utilization of used battery to support ESS in charging station</li> <li>• Pilot project implementation of smart bus station and manpower program on gaining the capacity of human capital into related industries including technology transfer.</li> </ul>
1.7	Beneficiary	<ul style="list-style-type: none"> <li>• Ministry of Transportation, Indonesia</li> <li>• The Government of West Java Province</li> <li>• Bandung Society, 50million Indonesian</li> </ul>
SECTION2. PROJECT DESCRIPTION		
	<p><b>Objectives/Outcome/Outputs:</b> Please outline the objectives, the expected outcomes, and outputs of the Project. Please provide the detailed information as an annex 2(Project Design Matrix). If relevant, gender equality/women’s empowerment can be manifested as one of the objectives or sub-objectives.</p>	
2.1	<p><b>Objectives:</b></p> <p>This project is aiming on supporting to establish a sustainable massive transportation system in BRT corridors in Bandung Raya area through the implementation of electric vehicles within its charging station using green energy and human capital enhancement to meet the industry and market needs. This project will emphasize on carbon reduction through the utilization of new and renewable energy and also applying advanced technologies, which is recycling the used battery to support the charging station.</p>	

	<p>The targets of encouraging electrification in West Java transportation are increasing the number of chargers for easiness, accessibility, and equitable and providing the electric public transportation. Hence, leveraging smart city technologies and deploying related infrastructures is essential to increasing the adoption of electric vehicles and enabling the city to incorporate the expected surge in EV experience and ownership. Most of all, adopting the EV technology will help the city reduce carbon emissions and meet zero-emission goals.</p>
	<p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>• Renewable energy addition into transportation sector to establish energy diversification and carbon reduction.</li> <li>• Supports electric BRT mass transportation system to need in constructing green smart city system in Bandung Raya.</li> <li>• Enhance the human capital to meet the green industry requirements.</li> <li>• Technological transfer for self-sustain the sustainable EV charging station system.</li> <li>• Community education and introducing a green and sustainable EV transportation system.</li> </ul> <p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• Deployment of electric vehicle charging stations in BRT corridors to diversify energy supply in transportation sector.</li> <li>• Implementation of hybrid charging station by utilizing green energy and recycled batteries as supporting infrastructures for electric vehicles.</li> <li>• Capacity building of the electric vehicle transportation system to gain skill requirement</li> <li>• Technology transfer to local operator in form of maintenance training.</li> </ul>
2.2	<p><b>Activities:</b> Please describe what will be carried out in terms of planned activities, their timing and duration. It should indicate the sequence of all major activities and implementation milestones. Please provide the detailed information as an annex 3(Project Work Plan).</p>

### **[Activity 1] Working Group Meeting**

- 1<sup>st</sup> year: Creating and Establishing a masterplan for the construction and operation of eco-friendly electric vehicle charging station for supporting Bandung Raya BRT system, the green smart city of Bandung, West Java.
- 1<sup>st</sup> ~ 4<sup>th</sup> year: reviewing and inspecting the project and agenda details and holding technical conference for capacity building
  - : Investigation of the current BRT system to include the electric bus unit
  - : Suggest the proper policies and approaches by each stage

### **[Activity 2] Hybrid Green EV Charging Station: 2<sup>nd</sup> ~4<sup>th</sup> year**

- Developing three charging stations for approximately 50 buses and 20 electric cars simultaneously.
  - : Constructing Integrated green energy sources [solar power and energy storage system] to supply the charging station.
  - : Testing pilot operation and opening EV charging station

### **[Activity 3] Used Battery for Energy Storage System (ESS): 2<sup>nd</sup> ~4<sup>th</sup> year**

- Study of developing three EV charging stations for deploying the supporting infrastructure in which utilized green energy and ESS
- Interconnecting each site through a smart grid system

### **[Activity 4] Pilot and Manpower Programs: 1<sup>st</sup> ~ 4<sup>th</sup> year**

- Nurturing manpower and technology transfer into the local operator
- Creating a self-support system to sustain the whole EV charging system
- Pilot project to deploy the electric bus BRT system [green smart bus stop]
- Post 2026 preparation programs as a continuation of the EV deployment.

## SECTION 3. PROJECT RATIONALE

**SITUATION ANALYSIS:** Please provide a brief introduction to the current social and economic situation related to the Project (geographic region and beneficiaries, etc.)

### 1. Social Economic Situation

- (Background) The Republic of Korea's Country Partnership Strategy for the Republic of Indonesia; The Korean Government will support the Indonesian Government focusing on sustainable environment protection focused on climate change(Support improvement of access to renewable energy for greenhouse gas reduction and climate change response)

- Indonesia is a member of the G-20, the largest economy in Southeast Asia, the world's fourth most populous nation, and the world's 10th largest economy in terms of purchasing power parity. Indonesia has the largest car market and is the second-largest car manufacturer among the ASEAN countries; the country exploits its own resources of raw materials for this

purpose. However, Indonesia faces air pollution and climate challenges, and the transportation sector is a key contributor to each. The rapid growth of road-based transport and poor fuel quality have resulted in severe environmental degradation and increasing health costs from air pollution-related illnesses.

3.1

- Electro-mobility has gained momentum within public transport in an effort to improve its sustainability and green energy. Electric vehicles are believed to be a clean, low-emissions transportation solution. The massive of electric vehicles can reduce emissions in the transportation sector. In the context of Indonesia, massive penetration of EV must also be accompanied by rapid deployment of renewable energy in the power generation sector as the main power producer that will be used by electric vehicles. In terms of smart cities, decarbonizing transportation is central to the ambition to become an eco-friendly lifestyle. The EV charging blueprint city will pave the way for the transportation future. This infrastructure can make a positive impact on economic growth, environmental goals and services for residents in Indonesia.

- The Indonesian government itself has stated that the use of electric vehicles is one of Indonesia's energy transition strategies. The Ministry of Energy and Mineral Resources announced a target of electric vehicle penetration of 2 million electric cars and 13 million electric motorcycles by 2030. Also, the Ministry mentioned that electric motorcycles be sold from 2040 forward and that all vehicles sold from 2050

be EVs. The magnitude of the electric vehicle penetration target certainly needs to be accompanied by a supporting ecosystem such as the availability of charging infrastructure, various models of EV, as well as incentives for electric vehicle users. At present, there are several domestically produced and imported EV brands that cover different categories and segments. The table below provides information on available EVs by category.

Type	Brand	Domestic/ Foreign	Model: Battery Capacity and Specification	Note
Passenger vehicle	BYD	Foreign	E6: 75 kWh	Taxi/ by Bluebird group
	Hyundai	Foreign	Ioniq: 38.3 kWh	Taxi/ by Grab Indonesia
	Tesla	Foreign	X 75D: 75 kWh	Taxi/ by Bluebird group
	BMW	Foreign	I3: 42.4 kWh	I3 model is offered
	Mitsubishi	Foreign	Outlander PHEV: 13.8 kWh, 2360 cc	Offer Outlander PHEV
Bus	Mobil Anak Bangsa (MAB)	Domestic	City bus: 12 m, 315.85 kWh Inter-city bus: 12 m, 315.85 kWh	In production
	BYD	Foreign	K9: 12 m, 324 kWh C6: 7.4 m, 135 kWh	No production yet Prototype
	Skywell	Foreign	NJL612BEV: 12 m, 258 kWh	Prototype (no production yet)
	Inka	Domestic	E-Inobus: 8 m, 143 kWh	Prototype (no production yet)
	Higher	Foreign	Higher bus: 8 m, 385 kWh	Prototype (no production yet)

- The majority of policies and strategic documents to support EV uptake are made at the national level. Sub-national level (provincial and municipal governments) policies and regulations tend to focus on segment-specific development. Several local governments already issued regulations to support the uptake of EV. For example, since the third quarter of 2019, West Java Province provided fiscal incentives in form of tax discount for transfer fee for EV in amount of 2.5% for two wheelers and 10% for two wheelers. West Java Province, which is the neighboring province of Jakarta, also provides transfer tax reductions for EVs and was also the first province to use EVs in daily operations. In short, the national government is keen to accelerate the uptake of EVs. This intention has been reflected in various national strategies and regulations and the launch of various policies. Local governments have also put their efforts into providing incentives for the public to purchase and use EVs. There are also ongoing policy-making efforts by other regulatory agencies on relevant issues. For example, the Ministry of Home Affairs is currently working to establish a guideline for local governments to promote EVs through various local regulations and policies.

3.2

**PROBLEM TO BE ADDRESSED:** Please describe the problem or critical issue which the project seeks to resolve, how the problem was identified, and how will the Project address the problem. If relevant, analysis on gender equality needs to be described.

	<ul style="list-style-type: none"> <li>• <b>(Public Awareness)</b> The Indonesian public is not widely exposed to EV technology and not yet motivated to use EV as their primary mode. This was partly because of a lack of infrastructures offered. The general public, even in major cities such as Jakarta, is not exposed to EVs in daily life and therefore might not be aware of the reliability of the technology and the benefits in terms of fuel saving and reductions in emissions of both air pollution</li>   <li>• <b>(Infrastructure and the service chain)</b> As of end of 2020, infrastructure and service chain—all the services needed to operate a vehicle—are still in an early stage, <b><u>with the most significant problem being the limited extent of charging infrastructure</u></b>, although the government has tried to address this issue by assigning the Agency of Assessment and Application of Technology (BPPT) and the State-Owned Electric Company (PLN) to pioneer and develop charging infrastructure. PLN offers to cooperate with interested third parties to sell them electricity for EV charging at IDR 1480 (10 US cents) per kWh (bulk price), which they could then sell for up to IDR 2466 (17 US cents) per kWh. However, good business models for setting up charging infrastructures do not exist yet.</li>   <li>• Concerns over charging issues includes: long charging times (under current technology), (ii) questionable grid reliability and resilience, and (iii) high cost of charging, for public fleet companies that set up charging stations. Moreover, public fleet companies such as Trans Jakarta and Bluebird taxi are still finding the best solution on charging management, since the depot might not accommodate all the fleets that need to charge in the same time.</li> </ul>
<b>3.3</b>	<p><b>COUNTRY DEVELOPMENT STRATEGIES AND POLICIES:</b> Please describe how the Project relates to other relevant national development strategies and policies, and provide the ongoing status of their implementation, results and effects, if any.</p> <p>&lt;Existing Policy and Strategy Plans&gt;</p> <p>The national government is keen to accelerate the uptake of EVs. This intention has been reflected in various national strategies and regulations and the launch of various policies. Local governments have also put their efforts into providing incentives for the public to purchase and use EVs. There are also ongoing policy-making efforts by other regulatory agencies on relevant issues. For example, the Ministry of Home Affairs is currently working to establish a guideline for local governments to promote</p>

	<p>EVs through various local regulations and policies. The Ministry of Finance is also working to address the issue of fiscal policies related to cleaner vehicles.</p>	
<p>CPS  Country Partnership Strategy</p>	<p>Korean Government will support the Indonesian Government focusing on the following objectives:</p> <ul style="list-style-type: none"> <li>▪ <b>(Transport)</b> Expansion of intermodal and multimodal transport infrastructures and operation capacity <ul style="list-style-type: none"> <li>- Korea will take an integrated approach towards national connectivity which engages regions and transportation modes as a means to promote balanced development. On such note, Korea will provide policy-level advice, data construction, and analysis framework on multimodal and intermodal transportation integration.</li> </ul> </li>   <li>▪ <b>(Environment Protection)</b> Sustainable environment protection focused on climate change response and forest preservation <ul style="list-style-type: none"> <li>- Policy and project level efforts are being made in regards to the climate change response. For an effective response to climate change to take place, development cooperation and coordination aligned to the Indonesian government's policies and strategies on climate change response is needed. The government has announced the Climate Change Sectoral Roadmap (ICCSR) 2010-2030 and its detailed strategic plans on climate change response. Development cooperation projects are currently being implemented with the Indonesia Climate Change Trust Fund (ICCTF)</li> <li>- Korea's support strategy for Indonesia will be based on the needs and goals of greenhouse gas reduction and climate change response as identified in Indonesia's Vision 25/25, Climate</li> </ul> </li> </ul>	<p>SDG Related</p>



		<p>Change Sectoral Roadmap (ICCSR) 2010-2030, and the 2013 MOU on reforestation and ecotourism. Korea's familiarity with the forestry sector network as seen by the founding of the Korea-Indonesia Forest Center (KIFC) and project experience in forest, coastline, and river basin preservation; climate change adaptation and mitigation; and new and renewable energy will be reflected in the process.</p> <ul style="list-style-type: none"> <li>- Support for the capacity to promote renewable energy will take into consideration engaging renewable energy policy reform and implementation and improving access to electricity in geographically isolated and disadvantaged areas. Recognizing the limitation of ODA resources, Korea will promote partnerships with the private sector.</li> </ul>	
	<p>National Master Plan for Industry 2015–2035.</p>	<p>The Master Plan, which was enacted in 2015, provides guidance for domestic automotive industry development. The Automotive Industry Roadmap, which is used by the Ministry of Industry, encourages more synergy among automotive manufacturers. There are three different stages in the Master Plan. The first stage (2015–2019) aims to strengthen domestic manufacturing of automotive parts, more precise and efficient power trains, heavy equipment, and engines, of both conventional and electric motor. The second stage (2020 – 2024) and third stage (2025 – 2035) emphasize the development of electric motor and fuel cell engines.</p>	
	<p>Presidential Regulation No. 55/2019 on Battery Electric Vehicle</p>	<p>This regulation, issued in late 2019, provided the battery electric vehicle industry with supports in four main areas: (i) leading ministries/agencies responsible for implementation, (ii) Battery Electric Vehicle (BEV) definition and development of its technical specifications, (iii) BEV manufacturing capacity, and (iv) the market transition from ICE (Internal Combustion Engines) to BEV.</p>	

	<p><b>Ministry of Energy and Mineral Regulation No. 13/2020 on Provision of Charging Infrastructure for BEVs</b></p>	<p>The Decree was issued in response to the PR 55/2019. It provides detailed requirements for charging stations and battery swap stations. Some of the requirements include legal aspects for charging and battery swap providers, reference for business model and electricity tariffs for charging and battery swap. It also includes incentives for operators.</p>	
	<p>Regional Regulation No 2/2019 of Regional Energy Master Plan</p>	<p>West Java Province already has the energy master plan including the action matrix of energy supply and demand in transportation sector. One of the targets is electricity energy mix in transportation sector for 5.6% in 2050. This action relies on the implementation of EV including the supporting infrastructures either for private or public.</p>	
	<p>Regional Regulation no. 9/2019 of Regional Tax</p>	<p>West Java Province provides the tax incentives for electric vehicle within inside the province.</p>	
	<p>The state-owned electric company “Perusahaan Listrik Negara” or PLN</p>	<p>PLN has launched their roadmap for EV infrastructure, covering the period 2020–2024. By 2024 the number of charging stations across the country is expected to reach 3,853.</p>	
<p><b>3.4</b></p>	<p><b>JUSTIFICATION FOR INTERVENTION:</b> Please describe how the need for the Project was determined, and what the rationale/justification for the Project (why the Project is considered to be the most effective way the problem is resolved.).</p>		

In Indonesia has integrated EVs to Achieve Sustainable Energy as a service business model in Smart Cities. A smart city is a city where residents can securely gather, manage, and disseminate data that relates to all areas of their daily lives in a sustainable and ubiquitous manner. Thus smart city, electrified, require ample charging for both residents and commuters. EV charging feasible for a post-fossil-fuel future, but this infrastructure can make a positive impact on economic growth, environmental goals and services for residents.

- Government and high-level decision makers have presented their intention to encourage the uptake of EVs. A variety of regulations and policies have been issued or are in the pipeline to support this transition. Nevertheless, the vision of electrification and the supportive policies are not yet clear enough or strong enough to speed the transition. Given the current EV market share in Indonesia, it may take several years for EVs to enter the market at scale. There is a clear need for effort and investment from different parties to contribute to this transition.

- The Indonesian government needs to establish 2,500 Electric Vehicle Charging Stations (EVCS) per year to meet the target of 25,000 new EVCS by 2030, as stated in the National Grand Energy Strategy. However, the realization of available EVCS in Indonesia is still so far from the said objective. According to the data from the Ministry of Energy and Mineral Resources, the current established EVCS only reached 5.88% of the yearly target.

- Even before the rollout of PR 55/2019, BPPT made several assessments of issues related to charging infrastructure, and found that the challenges are mainly situated around the national electricity system. Most of the technology for charging infrastructure is still being imported from outside the country.

- Battery electric vehicles in general are considered to be more suitable for urban use due to short trip distances, light duty usage, and availability of charging stations. Collaborate with cities interested in electrification to develop electrification strategies to stimulate EV uptake at the city level. Candidate cities is Bandung, West Java. The city has already made efforts to incentivize electrification and have also received support from central government.

- Therefore, ODA host organization will support charging infrastructure development plans at the local level and bridge the efforts between national and local governments. While policies related to energy and charging technology may be addressed at the national level, land availability for charging, especially in strategic locations—for

	<p>example, at business centers, airports, and other public space/parking areas—are in the hands of local governments. For larger city like Bandung (with populations exceeding 1 million inhabitants), the municipal government could also consider undertaking an EV charging requirement that best fits the local circumstances.</p> <ul style="list-style-type: none"> <li>• Due to the low pollution and sustainable properties, using electric buses for public transportation systems has attracted considerable attention. Smart cities move with electric transportation as urban areas shift to a more sustainable approach. Transitioning public EV transportation improves air quality, reduces emissions and noise pollution, cuts costs, and provides the public with more comfortable and more extensive service.</li> <li>• This project encompasses a wide spectrum of capabilities from electric services management to urban mobility planning from charging station construction to fleet operation and maintenance. Host organization offers extends across the entire project, providing an end-to-end turnkey solution to deliver electrified public transportation systems. The origin and destination depots or terminals are potential sites for setting up charging stations for an e-bus fleet. Additionally, a route charging or an intermediate charging setup may also be required for longer distances.</li> <li>• Korea government, therefore, with international experience and ongoing electrification activities, suggest that West Java has great potential to lead early EV uptake, as city-level policies can be more flexible and innovative, to make electrified smart city which is a vital component in the light of emission reduction.</li> </ul>
3.5	<p><b>LESSONS LEARNED:</b> Please describe what lessons Partner Country has drawn on (from Partner Country’s own and other’s past experience) in designing this Project.</p> <ul style="list-style-type: none"> <li>• South Korea has invested hundreds of millions in recent years to sharply expand electric vehicle charging infrastructure nationwide as part of its efforts to foster the eco-friendly sector as a new growth engine. The number of fast-charging stations in the country stood at 9,805 in 2020. With the new 3,000 planned stations, the network should rise to over 12,000 DC charging sites in 2021. Korea has consistently developed EV and EV charging technology, information, and infrastructures. South Korea has experienced one of the largest economic transformations over the decades with ample experiences of international aids and information sharing. It is the best case to establish a national platform system on EV and EV charging stations in Indonesia as well as an information opening and technology sharing system.</li> </ul>

	<ul style="list-style-type: none"><li>• West Java has reviewed advanced experiences on industry and technology of EV and EV charging station, including utilization status of various countries. Especially, the case of Korea was examined intensively. In our view, Korea has consistently invested R&amp;D and established many flagships charging station. We have concluded that with fleet electrification management by Korea, they would provide a turnkey solution completed with consulting, charging infrastructure supply, and management services. Korea is the ideal partner to design, install, maintain and manage electro-charging stations for e-bus charging thanks to in-depth preliminary studies on topography, user habits, local traffic, and weather, etc.</li></ul>
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## SECTION 4. STAKEHOLDER ANALYSIS

**TARGET BENEFICIARY:** Please describe the following information: a) direct and indirect/wider beneficiary group, b) number of the beneficiary, with gender segregation if necessary (e.g. 300 children rather than children in 3 schools), c) how the target group was identified, d) why they were selected as target group, e) how intended beneficiaries have been involved in Project design, and their expected role in Project implementation and evaluation. If relevant, the target group needs be disaggregated by sex.

- Objectives

- Establishment of eco-friendly EV charging station for renewable energy (solar power grid) and ESS convergence
- ESS and charger power bank (power converter) integrated system (All in One)
- Power Bank-Dispenser Type EV Chargers
- Real operation through multi EV (car, bus, bike) deployment

- Contents

- Canopy solar power system (microgrid)
- Energy Storage System and power bank (made by used-battery)
- Public EV charging station including electric bus
- EMS (Energy Management System)
- Green smart bus stop: pilot project
- Nurturing manpower related to EV and charging station
- Technological information transfer for operation and management

\* **The scale and scope are determined through on-site surveys and consultations.**



- Introduce new technology EV charging system with micro-grid and integrated management system, in designing the most efficient infrastructure and to calibrate the smart charging software.

	<ul style="list-style-type: none"> <li>• Energy efficiency can be increased by using solar power generation and ESS, and dozens of buses can be charged at the same time through the smart charging management system</li> <li>• Electric buses are easier to operate and manage than gasoline and diesel buses, and electric charging stations have a cleaner environment and less noise compared to conventional ones. Also they are quieter, generating far less noise and vibrations than diesel buses, often making for a more comfortable journey</li> <li>• Introduction of standardization for EV charging station that links the solar power generation system and ESS which is repacked by once used in the battery cells in the EV car. This technology will be one of the core technology when the era of electric vehicle becomes normal trend on the street.</li> <li>• Developing technical manpower through the establishment of a charging system and creating various business models through related core and byproducts technologies</li> </ul> <p>&lt;Outputs&gt;</p> <ul style="list-style-type: none"> <li>• As cities seek to realize their future mobility goals, the first step, for many, involves moving toward smart, clean, integrated solutions made possible by EV-buses. Approached systematically, the transition to EV-bus by establishing eco charging station can open a clear pathway to a city’s future mobility goals and vision. For starters, it is an important first step toward a long-term vision of sustainable mobility and emission-free cities. In addition, the transition to the next technological horizon—autonomous transport, which will most likely have a major impact on urban mobility</li> <li>• E-powered public transportation solutions include upgrading bus stops and shelters, which will become smart and multifunctional. Sustainable, integrated, efficient and technological solutions also transform passengers’ public transport experience,</li> <li>• Introduce Korean-style charging system standardization and present it as a platform for building a smart city.</li> </ul>
4. 2	<p><b>OTHER STAKEHOLDERS:</b> Please describe other stakeholders (e.g. partner government agency, international organization, NGO, donor agency, etc.), if any, including a) name/group, b) respective role(s) and cooperation/coordination mechanism, etc.</p> <p>The central government: Issued PR No. 55/2019 and continues to promote EV uptake by providing instruction and direction toward electrification of the transport sector.</p> <ul style="list-style-type: none"> <li>• Other local government: Develop initiatives to promote the uptake of EVs within the smart city concept</li> <li>• Ministry of Transportation and related departments: Issue vehicle type approval, regulate periodic inspection and maintenance requirements, certify retrofit of the conventional engine into electric</li> </ul>

- Environment department: Issue regulations governing vehicle and power plant emission standards; monitor the environmental impact of used battery recycling.
- National-Owned Electric Company (PLN): Develop charging infrastructure for EV.
- Regional-Owned Enterprise: Infrastructures operator and legal holder.
- Automotive industry: Manufacture and distribute EVs to end-users
- Associations of vehicle industries: Four-wheeler manufacturer association and two-wheeler manufacturer association for the interests of the auto industry
- Civil society, university research centers, and development partners: Collaborate with the government to support all dimensions relevant to the uptake of EVs.



## SECTION 5. SUSTAINABILITY

Please describe whether Project operations are expected to continue, or expand to other areas or sectors, once the current phase of assistance is completed. This could include plans for introducing self-financing provisions to ensure continued viability of operations on Project completion.

The project has significance for deploying electric buses in the BRT Bandung Raya corridors in order to diversify the energy supply in the public transportation sector. This project will include the utilization of green energy through a charging station, piloting, and capacity building.

The project will involve the regional own enterprise to cope with the business aspect and the operation maintenance. The West Java Province including the regional owned enterprise is the participant of capacity building that will emphasizes on the technological transfers and the business case. In the future, the participant of initial capacity building can be mentors in the future to disseminate the knowledge in the copied project in other priority corridors.

### 5.1

The government of West Java Province and the regional owned enterprise needs to ensure the availability of budget to provide space and basic facilities for project implementation especially operation and maintenance budget will be crucial for project sustainability. Since the electric bus is an integral project of the existing BR project, the operation and maintenance budget could be included in the general BRT project.

To sum up, the project aims on reducing carbon in the transportation sector that is dominated by fossil fuel and inefficient energy utilization due to the profusion of a private vehicles. Providing a mass transportation system with the proportion of electric energy supply within the system will diversify the energy supply in the transportation sector to induce a renewable energy mix and reduce fossil fuel reliance. In addition, the electric BRT will give the community the experience of a sustainable transportation system. Thus targets hopefully will sustain the transportation system in Bandung Raya.

## SECTION 6. MONITORING AND EVALUATION

	<p>Please include proposed mechanisms and procedures for monitoring of Project operations to ensure that activities occur as planned, that they remain directed towards stated objectives, and that appropriate corrective action is taken if required. Specifically, please indicate who will be responsible for preparing periodic Project progress and final technical reports and for the accounting of expenditures, if needed, as well as how intended beneficiaries will be involved.</p>
<b>6.1</b>	<p>Transportation Division Bandung Basin Metropolitan Area (BBMA) Management Agency of West Java Province, Department of Transportation of West Java Province, Department of Energy and Mineral Resources Office, and other relevant stakeholders involved in the project should conduct regular meetings at least every 1 month for manager-level officers and every 2 weeks for technical level officers.</p> <p>Periodic project progress on the outputs of the project such as Master Plan, Cooperation agreements on the legal, assessment report, and capacity building programs should be evaluated in initial, interim, and final stages of the project. Final technical reports should be reported by the Transportation Division Bandung Basin Metropolitan Area (BBMA) Management Agency of West Java Province as West Java Counterpart.</p>

## SECTION 7. RISK AND ASSUMPTION

	<p>Please identify and list the major risk factors that could result in the Project not producing the expected results. These should include both internal and external factors. Please also propose risk mitigation measures to address the potential risks.</p>
<b>7.1</b>	<p>a. Major risk factors</p> <ul style="list-style-type: none"><li>• Internal Factor:<ul style="list-style-type: none"><li>- The project will be implemented on 2023 through 2026, which parallel with the project of Bandung Raya BRT system.</li><li>- Frequent rotation of position in counterpart ministries might cause the change of person in charge.</li><li>- The project implementation might be delayed due to technical or administrative issues (for example: supports for Korean experts' visa, tax exemption, etc.)</li></ul></li></ul>

- The readiness of the regional owned enterprise to cope with the project due to legal aspect.
- Difficulty to finish the project on time as proposed.
- Difficulty to obtain relevant data and utilize it due to confidentiality issue
- External Factor:
  - Local consultants and facilities required for the assessment might be not exist.

b. Mitigation Measures:

- The electric BRT System can be used as initial BRT system in certain corridor and introduce the BRT system to the community.
- Close and intense coordination is required to share information including the technical and administrative issues. Prompt response should be done on each party's undertaking (such as support on visa, tax exemption, and so on). In case that there is a replacement of person in charge, clear handover should be conducted by relevant officer.
- Involvement of all relevant stakeholders in formulation of master plan is necessary.
- The West Java Province must promote one of the regional owned enterprise to have the legal requirement to operate the electric bus system including providing the required manpower.
- Government of Indonesia should provide local consultants and basic facilities such as electricity, internet, etc. during a field survey for the assessment
- Periodic monitoring and evaluation by all stakeholders to make sure on-time project completion.
- Conduct discussions and establish an agreement if necessary between each stakeholder regarding confidential data utilization