

## Closure Report

### Technical Assistance for Supporting Jakarta's Transition to E-Mobility

**Submitted to:**

Climate Technology Centre and Network  
United Nations Industrial Development Organization

**Submitted by:**

Institute for Transportation and Development Policy (ITDP) Indonesia  
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June 2021

## Technical Assistance Closure Report

### 1. Basic Information

Title of response plan	<b>Supporting Jakarta's Transition to E-Mobility</b>
Technical assistance reference number	<b>2019000043</b>
Country/ Countries	<b>Indonesia</b>
NDE organisation	<b>Ministry of Environment and Forestry</b>
NDE focal point	<b>Dr. Ir. Ruandha Agung Sugardiman, MSc., Director General (Climate Change)</b>
NDE contact information	Phone: +62 813 99112007 Email: <a href="mailto:ra.sugardiman@gmail.com">ra.sugardiman@gmail.com</a> , <a href="mailto:ndectcn.idn@gmail.com">ndectcn.idn@gmail.com</a>
Proponent focal point and organisation	<i>Sri Haryati, Economic and Financial Assistant, the Provincial Secretary, Provincial Government of DKI Jakarta, Indonesia</i> Email: <a href="mailto:sriharyati7771@gmail.com">sriharyati7771@gmail.com</a> ; <a href="mailto:biroperekonomianjakarta@jakarta.go.id">biroperekonomianjakarta@jakarta.go.id</a>
Designer of the response plan	CTCN
Implementer(s) of technical assistance	PT Transportasi Jakarta (TransJakarta)
Beneficiaries	Ministry of Environment and Forestry Government of Jakarta (GoJ)
Sector(s) addressed	<ol style="list-style-type: none"> <li>1. Energy Efficiency</li> <li>2. Transport</li> </ol>
Technologies supported	<ol style="list-style-type: none"> <li>1. Energy Efficiency <ol style="list-style-type: none"> <li>i. Solar roofs</li> <li>ii. E-vehicle charging facilities</li> </ol> </li> <li>2. Transport <ol style="list-style-type: none"> <li>i. Electric mobility - e-buses</li> </ol> </li> </ol>
Implementation start date	April 2020
Implementation end date	June 2021
Total budget for implementation	USD 243,300
Description of delivered outputs and products as well as the activities undertaken to achieve them. In dong so, review	<ol style="list-style-type: none"> <li>1. <u><i>Inception, Development of Implementation Planning and Communication</i></u> <ol style="list-style-type: none"> <li>i. Minutes of Kick-off</li> <li>ii. Detailed Work Plan</li> <li>iii. Monitoring and Evaluation Plan</li> </ol> </li> </ol>

<p>the long from of the original response plan and refer to it as appropriate</p>	<ul style="list-style-type: none"> <li>iv. CTCTN Impact Description</li> <li>v. Closure and Data Collection Report</li> </ul> <p>2. <u>Policy Requirement and Actions Required to Facilitate the Deployment of E-bus &amp; Related Infrastructure</u></p> <ul style="list-style-type: none"> <li>i. Report on Transport Plans and Policies Relevant for E-mobility</li> <li>ii. Workshop and Meeting Reports</li> <li>iii. Draft Policies and Policy Recommendations</li> </ul> <p>3. <u>Transjakarta's Timetable and Roadmap of E-bus Deployment</u></p> <ul style="list-style-type: none"> <li>i. Methodology for Evaluating the Pilot E-bus Performance</li> <li>ii. Timetable and Roadmap of E-bus Deployment for Transjakarta</li> <li>iii. Investment Plan for E-bus Deployment of Transjakarta</li> <li>iv. Business Model and Financial Analysis for Transjakarta E-bus Deployment</li> </ul> <p>4. <u>Feasibility Study of Charging Stations Using Renewable Energy-based Electricity and Solar System for Transjakarta</u></p> <ul style="list-style-type: none"> <li>i. Assessment Report on the Supporting Infrastructure for E-bus Including the Potential Energy from Renewable Energy Sources and Related Incentives</li> <li>ii. Grid Capacity Requirement for E-bus Deployment</li> </ul>
<p>Methodologies applied to produce outputs and products</p>	<ul style="list-style-type: none"> <li>1. Desktop study</li> <li>2. Secondary data analysis</li> <li>3. Stakeholder consultation workshop and presentation</li> <li>4. Field survey</li> </ul>
<p>Reference to knowledge resources</p>	<p>No UNFCCC TEC knowledge products were used</p>
<p>Deviations</p>	<ul style="list-style-type: none"> <li>1. Stakeholder workshops are held as a series of webinars because of the COVID-19 situation.</li> <li>2. No real evidence for the similar projects in Indonesia before. Energy consumption, e-bus usage, and other assumptions based on benchmark studies, not based on real evidence.</li> </ul>
<p>Anticipated follow-up activities and next steps</p>	<ul style="list-style-type: none"> <li>1. Disseminate findings to relevant stakeholders, especially deliverables about policy recommendation.</li> <li>2. Disseminate findings to other cities that plan to deploy e-bus</li> <li>3. Follow-up of implementation of Transjakarta pilot project</li> </ul>

## 2. Lessons learned

	Lessons learned	Mitigation/ Response
<p>Lessons learned from the CTCTN TA process</p>	<ul style="list-style-type: none"> <li>• The Term of Reference (ToR) in several projects covering electric buses in Transjakarta was practically similar.</li> </ul>	<ul style="list-style-type: none"> <li>• The readjustment of ToR for this project was carried out to put more focus on longer term implementation and to ensure a roadmap and business plan for plans in 2030 was generated.</li> </ul>

	<ul style="list-style-type: none"> <li>• The needs of engagement with Transjakarta (main implementor) are essential to update progress of working deliverables, such as roadmap, timetable, and business plan.</li> <li>• Stakeholder engagement with key stakeholders is required to gain insights and action plans from them, including the future regulatory plans.</li> <li>• No real evidence as reference for establish the charging strategies' plans due to limited number of e-buses deployed worldwide</li> </ul>	<ul style="list-style-type: none"> <li>• Regular communication through meetings and document sharing was conducted to create a smooth coordination with Transjakarta, so more progress can be made.</li> <li>• A number of stakeholder engagements were conducted after the workshop. Few key stakeholders are the Ministry of Energy and Mineral Resources, PLN, and bus manufacturers.</li> <li>• Using data as real as possible from other countries. E-bus trial to test the bus performance and battery range is strongly recommended to collect the real evidence that can be used as a variable in planning process</li> </ul>
<p>Lessons learned about policy recommendation</p>	<p>Efforts to overcome high EV prices are needed. From the multiple stakeholder consultations and deep discussions with bus operators, the high capital cost of procuring electric buses is still the main challenge to accelerate the deployment in the city. A lack of policy and incentive support are seen as one upstream barrier to boost demand creation in e-mobility ecosystem</p> <p>A long term roadmap and mandates for bus operators are also required to ensure the sustainability of EV deployment and the investment that will be made by the players. Since e-bus deployment has a more complex component such as battery and charging facilities, some adjustment should also be needed in terms of contract policy</p>	<p>Fiscal policies can be financial aids or support for related stakeholders in electric bus deployments, particularly in the initial period. Fiscal aids for capital investments regulated by policies would open more opportunities to bring more electric buses onto roads.</p> <p>In this TA, a road map for Transjakarta's e-bus implementation has been provided as a guideline for Transjakarta to implement e-bus as stated in their long-term corporate plan. There are several aspects to consider in developing the roadmap and timetable, such as charging infrastructure, grid network, fleet technology, policy requirement, business model, capacity building, and gender equality</p>
<p>Lessons learned related to climate technology transfer</p>	<p>From the stakeholder consultation and multiple discussions with Transjakarta and bus operators, it was found that Technological choices affect the operational and financial aspects of electric buses in the planning process. However, a lack of real evidence and uncertain technology development</p>	<p>Conducting benchmark study and using data from manufacturers. For the case where the real evidence of e-bus performance is available (e.g. energy consumption, battery range, charging duration), using real data would be highly recommended to find the most cost effective technology.</p>

	<p>might complicate the planning process due to the limitation of e-bus deployment around the world</p> <p>Even Though, many cities including Jakarta have started the electric bus trial, given the small number of bus involved would not sufficient to give a real evidence in terms of fleets and battery performance</p>	<p>A sensitivity analysis should also be carried out to mitigate the uncertainty issue of future e-bus technology development</p>
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### 3. Illustration of the TA and photos

#### Objectives of the TA

The overall objective of the technical assistance is to:

- Develop a roadmap and investment plan to electrify all of Transjakarta fleets.
- Prepare business model and financing mechanism.
- Assess the supporting policy requirement and actions required by the Government of Jakarta and the Government of Indonesia to facilitate the deployment of e-buses and related infrastructure.
- Develop a feasibility study of integrating renewable energy supply to the mobility operations of use in Transjakarta, including solar roofing for Transjakarta buses, stations, and depots.
- Develop a methodology for evaluation of the pilot e-bus deployment.

The methodology for pilot e-bus deployment was finalized in December 2020. Transjakarta has confirmed the methodology and approved the documents. A road map and investment plan was developed for Transjakarta's fleet electrification in February 2021. These documents were generally agreed by Transjakarta through meetings and consultations. Business model and financing mechanism for Transjakarta were prepared in January - March 2021. Supporting policy requirements and actions were assessed through policy report and recommendation in September 2020.

The various outputs from the TA are represented in below figure:



Figure: List of outputs

**Methodology and Deliverables:**

The overall methodology for conducting the deliverables of the TA lists as follows:

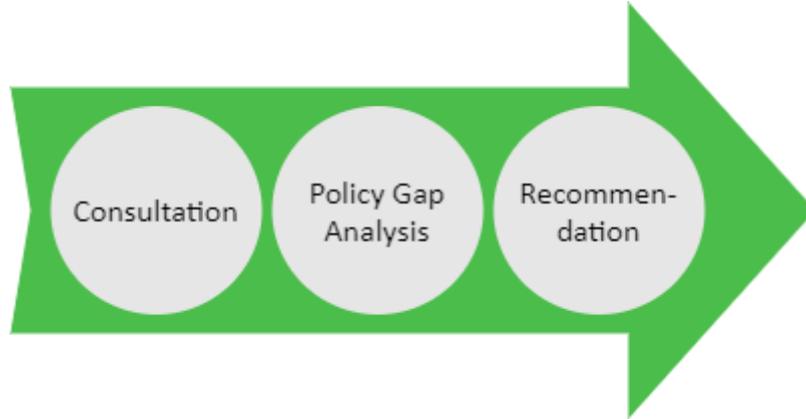


Figure: The Methodology for Formulating Policy Recommendation



Figure: The Methodology for Formulating Technical Works

Main approaches for generating deliverables of the TA lists as follows:

- Desktop research for conducting and processing related qualitative and quantitative data;
- Stakeholders consultation workshop. The workshop, conducted as a webinar series by ITDP under the CTCN program and in joint collaboration with ADB, aimed to raise the awareness on e-mobility and gain insights from the stakeholders on e-mobility development in Indonesia, especially from the policy sector;
- Field survey to obtain existing data about Transjakarta operational.

<b>1</b>	<b>Implementation Plan and Communication Documents</b>
	Generate detailed work plan
	Generate monitoring and evaluation plan
	Make CTCN Impact Description

	Arrange Closure and Data Collection report
<b>2.1</b>	<b>E-Mobility Policy Analysis</b>
	Review Overview of Current Transport Policy
	Collect and Analyze Transport Data in Jakarta
	Discuss about the Transport Policy
	Conduct Policy Recommendation
<b>2.2</b>	<b>Workshop Report</b>
	Arrange Background, Objectives, Expected Outcomes, List of participants, and methodology of the workshop
	Collect Workshop Findings
	Arrange Conclusion and Next Steps
<b>2.3</b>	<b>Policy Recommendation for EV Implementation in Indonesia</b>
	Conduct Stakeholder Consultation
	Generate Implementation Challenges
	Conduct Policy Recommendations
<b>3.1</b>	<b>Methodology for Evaluating the Pilot Electric Bus Performance</b>
	Arrange Electric Bus Evaluation Method
	Benchmarking with other cities
<b>3.2</b>	<b>Roadmap and Timetable of E-bus Deployment for Transjakarta</b>
	Desktop study
	Secondary data analysis: Transjakarta operational data
	Charging strategy tools development
	Discuss the findings with Transjakarta
<b>3.3</b>	<b>Investment Plan for Electric Bus Deployment of Transjakarta</b>
	Generate E-Bus Transition Cost Analysis
	Identify Potential Funding Options
<b>3.4</b>	<b>Business Model and Financial Analysis for Transjakarta Electric Bus Deployment</b>
	Establish Business Model
<b>4.1</b>	<b>Assessment report on the supporting infrastructure for e-buses including the potential energy</b>

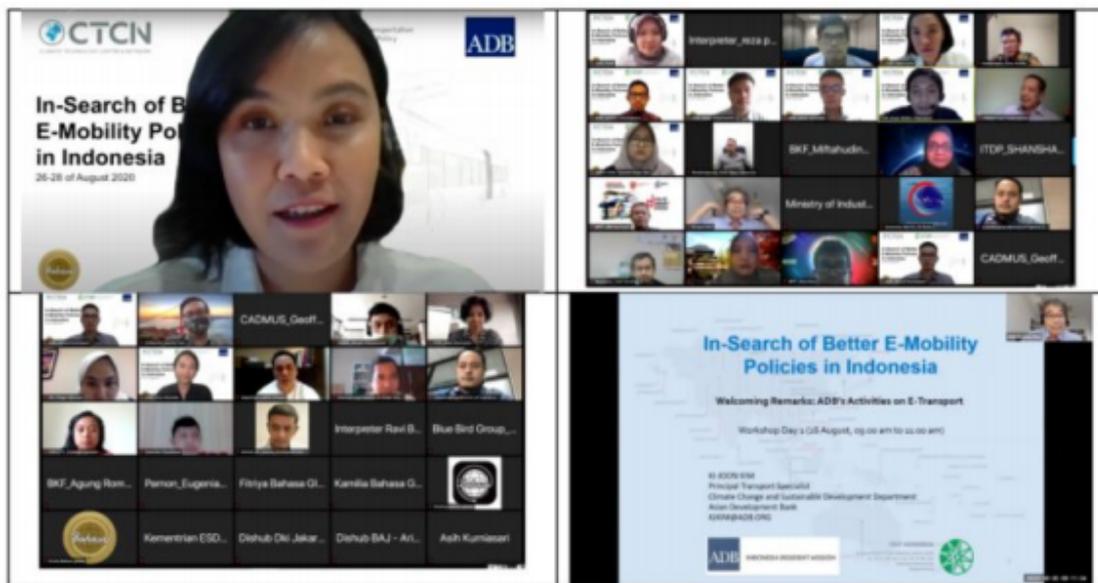
	<b>from renewable sources and related incentives.</b>
	Desktop Study
	Model development
	Testing the scenario: software HOMER
	Discuss the findings with Transjakarta
<b>4.2</b>	<b>Grid capacity requirement for e-bus deployment</b>
	Desktop study
	Secondary data analysis
	Stakeholder consultation: Coordination meeting with PLN and Transjakarta

### Stakeholder Consultation Workshop

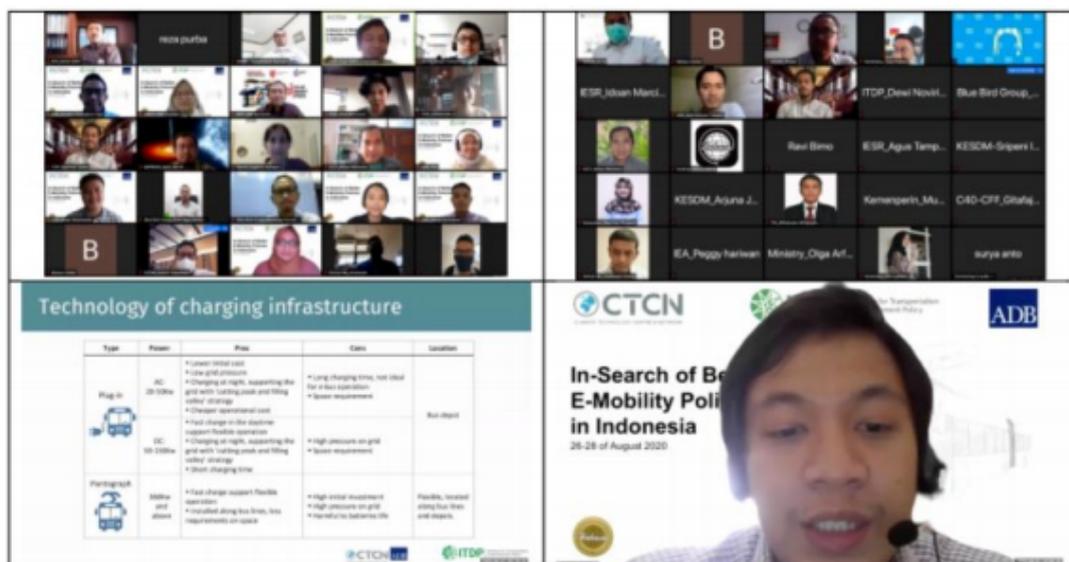
Stakeholder consultation workshop is a methodology for raising the awareness of e-mobility and gaining insights from the stakeholders on e-mobility development in Indonesia, especially from the policy sector. The workshop was conducted as a webinar series by ITDP under the CTCN program and in collaboration with ADB, consisting of three separate days. The dates of workshops were from August 26, 2020, to August 28, 2020.

The participants in the workshop were the stakeholders involved in e-mobility development in Indonesia, both from national and local level government agencies, the national power company, local transport operators, and bus manufacturers. A number of international experts were also present as speakers and resource persons in the discussion sessions. In total, there were 192 high-level participants and 32 key organisations involved in the series of workshops.

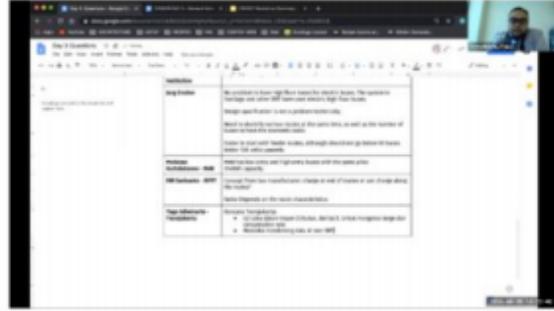
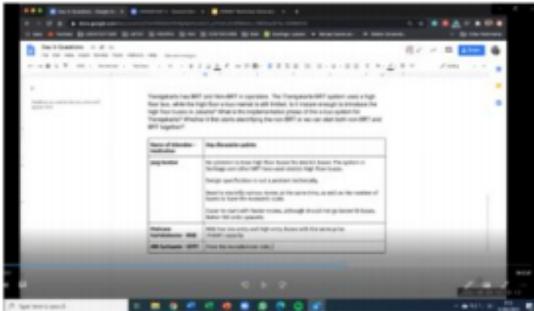
### Pictures from Stakeholder Workshop



Workshop Day 1



Workshop Day 2



Workshop Day 3

### GESI Workshop

In the development of e-bus implementation in Jakarta, there is a critical urgency to incorporate the Gender Equality and Social Inclusion (GESI) aspect into the e-bus implementation. While most of GESI aspects are still overlooked in the broader transportation landscape in Indonesia, it is essential to bring safe, inclusive, and accessible electric buses for the general public and vulnerable groups, especially in the pilot and initiation period in Jakarta.

Several issues need to be addressed in the deployment of electric buses, such as the lack of GESI issues included in the current policy including Presidential Regulation 55/2019 and no GESI provision in the policy related to charging infrastructures. As an impact, it means that the implementation of electric buses in Jakarta should consider GESI issues included in the planning, operation, maintenance, management, monitoring, and evaluation process.

Based on the terms of references in the program and the CTCN Gender Mainstreaming tools, the webinar has several objectives as follows.

1. To elaborate current policy and policy gaps of GESI issues in the e-mobility development, especially for electric buses deployment in Jakarta;
2. To disseminate the policy recommendation to improve the incorporation of GESI aspects in the deployment of electric buses; and
3. To raise awareness from the related stakeholders (government) regarding GESI issues in the context of e-mobility and e-buses development.

The outcomes from the workshop are as follows.

1. Support from key stakeholders and policymakers to incorporate GESI issues in the specific regulations and/or policies related to electric bus deployment.
2. Incorporate GESI issues into the development and implementation of electric buses deployment in Jakarta.
3. Constructive inputs and responses from essential GESI communities to answer the future challenges in terms of development in electric buses deployment in Jakarta.

### Pictures from GESI Workshop



Figure: Discussion of Gender Policy Mainstreaming by Ministry of Women Empowerment and Child Protection



Figure: Discussion of Transjakarta GESI Action Plan by Director of Engineering Transjakarta



Figure: Discussion of women empowerment in transport sectors by UN Women

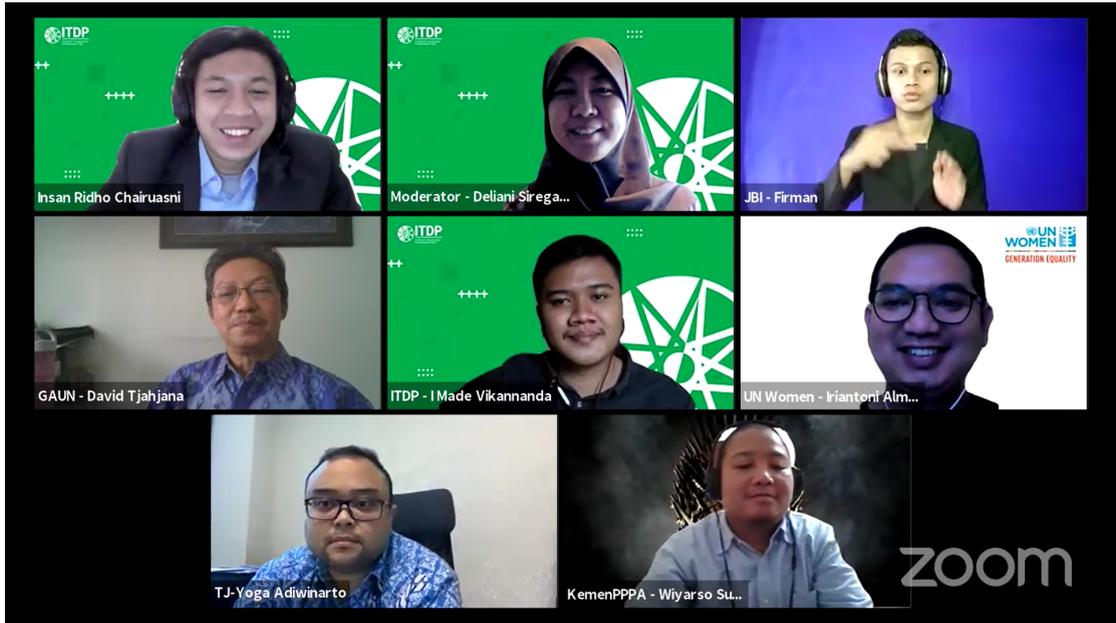


Figure: Panelists and Speakers

#### 4. Impact Statement

The information in the table below will be used to communicate results and anticipated impacts of this technical assistance publicly. Please copy information from the impact statement developed in the M&E Plan and update as relevant.

<p>Challenge</p>	<p>There is still a lack of awareness of e-bus technology and its benefits. As a result, there are still limited policies covering the transition to electric mobility in Indonesia. The government does not have targets/road maps for e-bus deployment. The government still uses the same business model for public transport development. The fiscal incentives, procurement, and cost of charging infrastructure are still uncertain. Moreover, there is a regulation inconsistency from the national government because of the fossil fuels subsidies. It results in the usage of fossil fuel for vehicles that is still dominant hence it causes air pollution in Jakarta. Including the e-bus plan, the transport policies and infrastructures mostly do not provide gender inclusiveness.</p>
<p>CTCN Assistance</p>	<ul style="list-style-type: none"> <li>● To assess the supportive policy requirements and actions required by the government of Jakarta and Indonesia to facilitate the deployment of e-buses and related infrastructure.</li> <li>● Develop a roadmap and investment plan to electrify all of Transjakarta fleets.</li> <li>● To develop a feasibility study of integrating renewable energy supply to the mobility operations of use in TransJakarta, including solar roofing.</li> <li>● To assess grid capacity and requirement in Jakarta</li> </ul>
<p>Anticipated Impact</p>	<ul style="list-style-type: none"> <li>● The TA has helped the Government of Indonesia (GoI) and Government of Jakarta in preparing policy support that will be needed to accelerate e-bus deployment in Jakarta</li> <li>● The TA has provided Transjakarta the step-by-step action for implementing electric bus on BRT and Non BRT corridors</li> <li>● An estimated GHG reduction has been provided in this TA. This will justify government plan to reduce emissions by involving the use of EV in transport sectors</li> <li>● The use of more environmentally friendly energy sources such as solar PV has been well suggested to Transjakarta and the government.</li> </ul>
<p>Co-benefits: Achieved or anticipated co-benefits from the TA</p>	<p>Electric buses have cleaner energy and can be a good replacement for diesel vehicles to reduce environmental pollutants and air pollutants including carbon emissions bringing better public health co-benefits. As one of the deliverables, the technical feasibility study of charging infrastructure will also analyze the usage of renewable energy such as solar energy considering our source of the grid in Indonesia is still using fossil fuels.</p>
<p>Gender aspects of the TA</p>	<p>Gender equality and social inclusion issues have been well captured from the stakeholder consultation and community workshop. Some issues that were discussed in the workshop are accessibility, safety, and labor provision. The future of the electric bus should consider the accessibility for women, especially pregnant women, women with children, and people with disabilities. The safety issues should include anti-sexual harassment measures, battery usage also charging infrastructure. Any job opportunities should be applicable to women and vulnerable groups. Currently the share of women working in Transjakarta is very limited (&lt;2%). Hence, a gender assessment should be provided earlier to identify the different needs of women's roles. Public consultation and training should also involve more opportunities for women.</p>

<p>Anticipated contribution to NDC</p>	<p>The TA has provided the estimation of total avoided GHG emissions that can be produced by electric bus deployment</p>
<p>The narrative story</p>	<p>Jakarta as the capital of Indonesia has introduced several steps providing initial actions for e-mobility deployment, including the introduction of the electric bus (e-bus). The initial implementation of e-bus in Jakarta will be provided by Transjakarta, the regional-owned company which operates the largest bus rapid transit (BRT) system in the world. Transjakarta expects to have a pilot project of 100 e-buses in 2021 and later implement fully electric bus fleets in 2030 as stated in their long-term plan. Although the deployment plan has existed and the pilot will be conducted in 2021, many aspects are still missing to give a step-by-step action plan to implement this procurement target. Therefore, this CTCN assistance has tried to fill the gap of Transjakarta's electric bus target by providing the roadmap and timetable of e-bus deployment with an intention to smoothen its transition to the electrification program.</p> <p>Over the last year, the CTCN assistance has worked closely with relevant stakeholders in e-mobility ecosystems to prepare a list of recommendations to accelerate the large scale e-bus deployment for Transjakarta's BRT and Non-BRT services including a list of policy recommendation, pilot project evaluation matrix, charging strategy and operational plan, road map of implementation, investment and business model, GHG reduction, assessment on renewable energy adoption and grid assessment. All these outputs have been discussed and approved by Transjakarta as the main implementers of the electric bus program in Jakarta. In the short future, the recommendations of this TA can be used by Transjakarta as their guidance for implementing large scale e-bus deployment on the road. The outputs of this project can also be adopted in other cities that want to deploy electric buses for their urban transport services.</p>
<p>Contribution to SDGs A complete list of SDGs and their targets is available here: <a href="https://sustainabledevelopment.un.org/partnership/register/">https://sustainabledevelopment.un.org/partnership/register/</a></p>	<p>This technical assistance will be supported by a gender specialist who has broad experiences in bringing more inclusiveness into the transport network (SDG #5 Gender Equality). The electric bus operation in Transjakarta will promote the use of the clean charging infrastructure in Jakarta (SDG #7 Affordable and Clean Energy). The upcoming electric bus operation will reduce the tail-pipe emission produced by transport sectors in Jakarta (SDG #13 Climate Action).</p>

## Annex 1 Technical assistance data collection

### A. Output and outcome indicators

Indicator	Quantitative Value	Qualitative Description
Total number of events organized by proponents and implementing partners	3	<ol style="list-style-type: none"> <li>1. Stakeholder Consultation Workshop for raising the awareness on e-mobility and gaining insights from the stakeholders on e-mobility development in Indonesia, especially from the policy sector.</li> <li>2. GESI Workshop, aims to:               <ol style="list-style-type: none"> <li>a. elaborate current policy and policy gaps of GESI issues in the e-mobility development, especially for electric buses deployment in Jakarta;</li> <li>b. disseminate the policy recommendation to improve the incorporation of GESI aspects in the deployment of electric buses; and</li> <li>c. raise awareness from the related stakeholders (government) regarding GESI issues in the context of e-mobility and e-buses development.</li> </ol> </li> <li>3. Follow up one-on-one consultation with National Government</li> </ol>
Number of participants in events organized by proponents and implementing partners	192	The workshop involved around 192 participants from various sectors including national government, regional government, bus operators, OEMs, MDBs, NGOs, private sectors and communities
a) Number of women	54	54 out of 192 participants are women (28%)
b) Number of men	138	138 out of 192 participants are men (72%)
Number of participants at GESI workshop	25	25 participants from GESI workshop
Number of ministries or agencies at national level that participated on stakeholder consultation	8	Ministry of Maritime and Investment Coordinator, BPPT, Ministry of Energy and Mineral Resources, Ministry of Industry, Ministry of Environment and Forestry, PLN, DAMRI, Fiscal Policy Agency & Ministry of Finance.
Number of bus manufacturer that participated at stakeholder consultation	5	<ul style="list-style-type: none"> <li>● Zhong Tong</li> <li>● BYD</li> <li>● PT Bakrie Autoparts</li> <li>● Mobil Anak Bangsa</li> <li>● PT INKA</li> </ul>
Number of moderator,	9	1. Deliani Siregar, ITDP

speakers and panelists at GESI Workshop		<ol style="list-style-type: none"> <li>2. Made Vikannanda, ITDP</li> <li>3. Insan Ridho Chairuasni, ITDP</li> <li>4. Dikshya Thapa, C40-CFF</li> <li>5. Wiyarso Suwarsono, Ministry of Women Empowerment and Child Protection</li> <li>6. Fani Nursyamsi, Jakarta Transport Agency</li> <li>7. Yoga Adiwianto, Transjakarta</li> <li>8. Iriantoni Alumna, UN Women</li> <li>9. David Tjahjana, National General Accessibility Movement (GAUN)</li> </ol>
Number of institution involved as panelists at GESI Workshop	5	<i>Ministry of Women Empowerment and Child Protection, Transport Agency of Jakarta, Transjakarta, UN Women, National General Accessibility Movement</i>
Total number of deliverables produced during the assistance (excluding mission, progress and internal reports)	7	<i>Event reports and workshop materials</i>
a) Number of communication materials, including news releases, newsletters, articles, presentations, social media postings, etc.	2	<p><i>The findings of output 2 - policy recommendation has been cited in ST Magazine article</i></p> <p><i>The findings of output 3 - roadmap and timetable has been presented in UNEP &amp; UATP event - Regional Forum for Promoting SOOT Free Bus in India</i></p>
b) Number of tools and technical documents strengthened, revised or developed	0	
c) Number of other information materials strengthened, revised or created (For example training and workshop reports, Power Points, exercise docs etc.)	2	<ul style="list-style-type: none"> <li>● <i>E-Mobility Workshop's event report</i></li> <li>● <i>GESI Integration's event report</i></li> </ul>
Total number of policies, strategies, plans, laws, agreements or regulations supported by the assistance	0	<i>The policy recommendations can become the references for the national government to accelerate the electric busses project in other cities in Indonesia</i>
a) Adaptation related	0	
b) Mitigation related	0	
c) Both adaptation- and mitigation related	0	
Anticipated number of policies, strategies, plans, laws, agreements or	0	

regulations proposed, adopted or implemented as a result of the TA		
a) Adaptation related	0	
b) Mitigation related	0	
c) Both adaptation- and mitigation related	0	
Anticipated number of technologies transferred or deployed as a result of CTCN support	2	<ol style="list-style-type: none"> <li>1. Renewable Energy           <ol style="list-style-type: none"> <li>I. Solar PV</li> </ol> </li> <li>2. Transport           <ol style="list-style-type: none"> <li>I. Electric Vehicle</li> </ol> </li> </ol>
Anticipated number of collaborations facilitated or enabled as a result of technical assistance	3	<ol style="list-style-type: none"> <li>1. <i>Joint workshop with Asian Development Bank (ADB)</i></li> <li>2. <i>Finding exchange with C40 CFF Study</i></li> <li>3. <i>GHG emissions estimation has been reviewed by International Council on Clean Transportation (ICCT)</i></li> </ol>
a) Number of South-South collaborations	0	
b) Number of RD&D collaborations	3	<ol style="list-style-type: none"> <li>1. <i>Joint workshop with Asian Development Bank (ADB)</i></li> <li>2. <i>Finding exchange with C40 CFF Study</i></li> <li>3. <i>GHG emissions estimation has been reviewed by International Council on Clean Transportation (ICCT)</i></li> </ol>
c) Number of private sector collaborations	0	
Number of secondary data used in the TA	7	<ol style="list-style-type: none"> <li>1. <i>Transjakarta operational data</i></li> <li>2. <i>Transjakarta ridership data</i></li> <li>3. <i>Transjakarta depot data</i></li> <li>4. <i>Grid capacity data</i></li> <li>5. <i>Transjakarta financial data</i></li> <li>6. <i>Global e-bus financial data</i></li> <li>7. <i>Global e-bus operational data</i></li> </ol>
Number of countries with strengthened National System of Innovation as a result of CTCN support	0	

## B. Core impact indicators

Core indicator 1	Anticipated metric tons of CO2 equivalent (CO2e) emissions reduced or avoided as a result of CTCN TA	
	Anticipated metric tons of CO2e reduced or avoided as a result of the TA on annual basis	Anticipated metric tons of CO2e reduced or avoided as a result of the TA in total
Quantitative value (emissions reductions)	10,089	100,892
Unit	tCO2eq	tCO2eq
<b>GHG assessment boundary (project emissions)</b>  Identify expected post-TA activities, associated effects and assess boundary for quantification of GHG emission reductions	Details provided in Annex A	Details provided in Annex A
<b>Baseline emissions</b>  Describe baseline scenario, baseline candidates, emission factors and emissions calculated	20,043	200,436
<b>Methodology</b>  Explain the method or process of verifying the indicator and how data was gathered	Using basic equations from IPCC Guidelines, avoided emissions will be generated as there is a shift from ICE bus to e-bus deployment	Using basic equations from IPCC Guidelines, avoided emissions will be generated as there is a shift from ICE bus to e-bus deployment
<b>Assumptions</b>  Describe assumptions made during calculation and quantification of GHG reductions	Emission factor for analysis (CO2, PM2.5, SO2, and NOx) is partially based on the COPERT Model data (all rights reserved), but the resulting analysis has been prepared by ITDP and does not necessarily reflect the views of the COPERT.	Emission factor for analysis (CO2, PM2.5, SO2, and NOx) is partially based on the COPERT Model data (all rights reserved), but the resulting analysis has been prepared by ITDP and does not necessarily reflect the views of the COPERT.

<b>Core indicator 2</b>	<b>Anticipated increased economic, health, well-being, infrastructure and built environment, and ecosystems resilience to climate change impacts as a result of technical assistance</b>
<b>Infrastructure and built environment</b> Anticipated increased infrastructure resilience (avoided/mitigated climate induced damages and strengthened physical assets)	<ul style="list-style-type: none"> <li>● 12 fast charging points</li> <li>● 4 staging facility</li> <li>● E-bus depots</li> <li>● Solar PV</li> </ul>
<b>Ecosystems and biodiversity</b> Anticipated increased ecosystem resilience (areas with increased resistance to climate-induced disturbances and with improved recovery rates)	-
<b>Economic</b> Anticipated increased economic resilience (e.g. less reliance on vulnerable economic sectors or diversification of livelihood)	Jobs opportunity for charging facility construction and health benefits as the impact of avoided emissions
<b>Health and wellbeing</b> Anticipated increased health and wellbeing of target group (e.g. improved basic health, water and food security)	Air quality improvement and health benefits may occurred due to reduction in tailpipe emissions

<b>Core indicator 3</b>	<b>Anticipated number of direct and indirect beneficiaries as a result of the TA</b>	
	<b>Quantitative value</b>	<b>Means of verification</b>
Total beneficiaries	Total number	
Number of adaptation beneficiaries	6	At least 6 governmental bodies have been directly or indirectly benefited by the existence of this CTCN assistance. It includes the Coordinating Ministry of Maritime and Investment Affairs, the Ministry of Environment and Forestry, the Ministry of Transportation, the Ministry of Energy and Mineral Resources, DKI Jakarta's Government and PT Perusahaan Listrik Negara (PLN)

	6	Number of bus operators (including Transjakarta) that were involved in the road map discussion and participated in workshops that have been done during the CTCN assistance. It includes Zhong Tong, BYD, PT Bakrie Autoparts, Mobil Anak Bangsa, PT INKA
	150 - 200	Number of persons which came from various sectors such as government staff, private, NGOs, MDBs, and local communities that are joined the workshops
Number of mitigation beneficiaries	N.A.	
Number of adaptation-and mitigation beneficiaries	N.A.	

Core indicator 4	Anticipated amount of funding/investment leveraged (USD) as a result of TA (disaggregated by public, private, national, and international sources, as well as between anticipated/confirmed funding)			
	Quantitative value confirmed in USD	Quantitative value anticipated in USD	Qualitative description	Methods
			List the institutions, timelines, and description or title of the investment	Describe methods used for quantification of funds leveraged
Total funding	Total number in USD	Total number in USD		
Anticipated amount of public funding mobilised from national/domestic sources	N.A.			

Anticipated amount of public funding mobilised from international/ regional sources	N.A.			
Anticipated amount of private funding mobilised from national/domestic sources	N.A.			
Anticipated amount of private funds mobilised from international/regional sources	N.A.			

**Annex 2 (for internal use – to be filled in by the CTCN)**

**CTCN evaluation**

This section will be completed by the relevant CTCN Technology Manager.

- Evaluation of the timeliness of the TA implementation as measured against the timeline included in the response plan;
- Evaluation of TA quality as defined in the response plan;
- Overall performance of the Implementers;
- Overall engagement of the NDE and Proponent;
- Lessons learned on the CTCN process and steps taken by the CTCN to improve.

## Annex A

GHG Assessment Boundary			
No	Expected post TA project activity	Primary Effect	Secondary effect
1	Pilot project for 100 electric buses	Reduction in tailpipe emissions from urban bus services	Job opening and capacity building for transport stakeholders
2	Introduction of Transport Demand Management: limiting parking, electronic road pricing and low emission zone	Reduction in tailpipe emissions from the use of private vehicle	More open space provided in the city
3	Start large scale e-bus deployment - replacement of ICE bus (road map implementation)	Reduction in tailpipe emissions from urban bus services	Job opening and capacity building for transport stakeholders
4	Start using renewable energy as electricity source	Reduction in WTW emissions, reducing carbon intensity	Increased productivity for EPC player