



This document will outline the Gender Impact Assessment and GESI Analysis of The Transjakarta E-Bus Project Implementation

Building a Regulatory and Financial Basis for Transjakarta First Phase E-bus Deployment

Task 4.2. Gender Impact Assessment & GESI Analysis of the E-Bus Project Implementation

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List of Abbreviations

BRT	Bus Rapid Transit
CCTV	Closed Circuit Television
E-Bus	Electric Bus
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse Gases
GIA	Gender Impact Assessment
ITDP	Institute for Transportation and Development Policy
IRR	Internal Rate of Return
SCC	Social Cost of Carbon
TCO	Total Cost of Ownership
UK PACT	UK Partnering for Accelerated Climate Transitions
EUM	Electrifying Urban Mobility

Executive Summary

A high sense of gender equity and social inclusion throughout the UKPACT EUM 124 project has proven to be an integral part of the electrification of Transjakarta's fleets. In the first phase of the project, it was proven that vulnerable groups such as women, children, older persons, and people with disabilities highly rely on Transjakarta for their day-to-day mobility, changes in fleets should always improve the accessibility of vulnerable groups towards their day-to-day activities. In phase two of this project, which is also the subject of this report, the definition of vulnerability expanded and also looked upon market players, staff, and society as a whole, and identified vulnerable groups who may have a disadvantage and negative impact due to the electrification of bus fleets, as opposed to just passengers of Transjakarta.

This report gives a holistic view and analyses the current condition of the e-bus ecosystem, the effects that the electrification of Transjakarta will have on the mentioned vulnerable groups, as well as ways in which the ITDP team has ensured the GESI aspects as well as the mitigation of negative impacts of vulnerable groups. The report includes a detailed GESI analysis of the market, implementation phase, technical considerations, detailed technical plan, financial and economic analysis, as well as the business model and structured financing.

The results of the report show that electrification of Transjakarta will be able to positively impact, vulnerable passengers, vulnerable market players, as well as society as a whole. Firstly, new procured electric buses must ensure the design is accessible to all of its passengers by accommodating universal design principles, and undergoing trials with vulnerable groups. Secondly, it was found that smaller operators that have less capital/knowledge capacity have more barriers to be able to participate in the electrification process, therefore, creative business models and alternative financing is important to ensure these operators are able to participate in the electrification process. Lastly, society as a whole will be positively impacted by lower GHG and air pollution, specifically those who live in urban villages, people who are more prone to diseases due to low air quality and those in areas that are more affected by climate change.

1. Introduction

1.1. Background

Throughout the UKPACT EUM 124 Project, several initiatives have been conducted by the ITDP team to ensure gender equity and social inclusion (GESI) is mainstreamed throughout the entire project. The mainstreaming of GESI can be seen in participatory planning process with vulnerable groups such as women, children, people with disabilities and older persons, as well as ensuring non-discriminatory dialogues of within the institutions responsible for the electrification of Transjakarta buses and inclusion of GESI perspectives in all analysis done at each phase of the project.

In terms of participatory planning processes, ITDP in October 2021 to November 2021, ITDP conducted separate focus group discussions (FGD) with women, children, and people with disabilities as well as interviews with older persons to gather their perceptions and input into creating inclusive buses that uphold universal design principles. This was followed by a joint trial session of the Transjakarta electric buses with the same participants, to verify their concerns that they had previously voiced out and give more input regarding the fleet designs. Through these FGDs and trial runs, various inputs have been accommodated by Transjakarta as electric buses fleet design were given major intervention, as well as proposed recommendations to existing regulations to secure gender-responsive and inclusive e-bus deployment and services provided by the company. Following this, a GESI checklist was developed as a guide for other cities that wish to electrify their bus fleets.

When the UKPACT EUM 124 project was ended and then extended in 2022, GESI mainstreaming was also conducted whilst analysing the legal framework of the deployment of electric buses in Jakarta and creating a Gender Impact Assessment (GIA) in output 2. To support the analysis, another FGD involving various stakeholders such as women group's representatives, people with disability representatives, and government institutions such as the Transport Agency, Ministry of women empowerment and child protection were brought together to analyse the impact of current laws and regulations related to E-bus, their impact on GESI and inputs to further empower vulnerable groups. This, as well as desk studies regarding 12 regulations connected to the E-bus program, were used to conduct a GIA on the current legal framework and ways to ensure GESI mainstreaming within the legal framework. The results of the analysis showed that. Takeaways from the analysis in output 2 include:

1. Monitoring the effects of GHG emissions and air pollution would be done regularly which includes the impacts to vulnerable groups such as those who are more vulnerable to premature deaths due to respiratory diseases, in Jakarta's Governor Instruction No. 66/2019 on Air Quality Control.
2. A prioritization of policies has not been indicated, and there needs to be a prioritization of policies that promote actions that significantly lower negative impact on public health, with supporting push and pull policies.
3. GESI Mainstreaming within institutions is still very low and several regulations may need to be updated to ensure the no one left behind principle is upheld during changes in technologies.

This report will present another gender impact assessment, this time focusing on Transjakarta’s e-bus market, the implementation plan, technical plan as well as its financial and business plan. This assessment will complement previous studies and assessment in ensuring that the implementation of Transjakarta electrification is GESI-responsive and inclusive. The gender impact assessment will examine how the application of the proposed implementation plan will affect vulnerable communities and what are the mitigation steps (if any) that need to be taken should there be a possibility that certain vulnerable groups will be negatively affected by this plan.

1.2. Objectives

This gender impact assessment is conducted through series of desk studies on the implementation plan and close examination of proposed route to electrify 10.047 fleets in a span of 9 years. Building on previous reports, this report aims to conduct an analysis of the following outputs to ensure vulnerable groups are considered within each phase of the EUM 124 Extension project. The scope of the report will include A GESI analysis of the following outputs:

Table 1. Outputs/ Tasks Analysed in This Report

Outputs/ Tasks	Title
3.1	Market Analysis
3.2 & 3.3	Implementation Phase: Technical Considerations
4.1	Detailed Technical Plan
4.4 & 4.5	Financial and Economic Analysis
4.6	Business Model and Structured Financing

1.3. Methodology

This report is conducted by analysing the GESI mainstreaming efforts and considerations that were made in all outputs of the project, and analyse the impact of these efforts, whether the impact has a direct or indirect impact towards vulnerable groups. It must be noted that GESI in this section refers to the most vulnerable stakeholder in the system, which includes stakeholders such as vulnerable passengers, vulnerable staff, society as a whole, as well as vulnerable institutions relating to the e-bus processes.

2. GESI Analysis

2.1. Market Analysis

The Market analysis identified the market landscape of e-bus worldwide and within Indonesia, which included the identification of key players including e-bus and charger suppliers, financing institutions, and other relevant stakeholders. Preliminary consultations were also conducted with the various stakeholders to assess the willingness of the market players to be involved in Transjakarta's electrification of its fleets and identified perceived barriers to establish solutions that will ensure the project attractiveness to the market.

The replacement of conventional buses to e-buses must ensure accessibility for all users, specifically vulnerable groups. Through consultations with Transjakarta, it was revealed that Transjakarta does not have bias in choosing manufacturers such as preferred brand or country of origin. Assessment of preferred manufacturers are purely based on durable products and reliability. However, as seen from the e-bus trials that were conducted with Higer buses in February 2022 with vulnerable groups, the buses used during the trials were not yet fully accessible to vulnerable groups in terms of fleet design. This highlights the need to ensure that new e-buses that will be procured should also uphold universal design principles along with technical performance, and should minimize negative impact to vulnerable groups as much as possible. In addition, the procurement of new buses can also act as an opportunity to improve the fleet designs in comparison to the older conventional buses.

Consultations with OEMs also revealed that e-bus for high entry fleets is less common in the market in comparison to low entry fleets. Even though low entry fleets are more accessible to various users, specifically wheelchair users and other wheels, high entry-buses are needed to replace the current buses along the BRT corridors which are served by high-entry buses. Retrofitting was mentioned as a solution, in which conventional diesel buses will be adapted to become e-buses. This may extend the lifespan of a bus, but may also result in lower costs for operators procuring their e-buses. That being said, retrofitting may introduce a safety hazard and buses that are retrofitted must ensure that they comply with the current safety standards.

In terms of the current procurement process, Transjakarta is open to as many market players as possible and people of all backgrounds can participate. There is no discrimination involved in the procurement process, and procurement is based purely on the performance of tenderers.

2.2. Implementation Plan

The implementation plan specifies the detailed yearly plan towards fully electrifying Transjakarta's fleets by 2030, and 50% of the fleets by 2027. This implementation plan is based on a study on year-on-year e-bus deployment between 2022 – 2030 that addressed policy support needed and GESI milestones. The result is an e-bus implementation plan that focuses on increasing the proportion of e-buses operating each year as compared to the total number of fleets. Among the e-buses, medium bus (7 m) and single bus (12 m) serve 18 routes to affordable housing and the border area of the Greater Jakarta or Jabodetabek, with direct access to BRT corridors. Microbuses, with a wider range,

serve 80 routes under the Transjakarta, through Mikrotrans and Transcare service. These routes are considered closely related to GEDSI issues due to the following reasons:

- The targeting of passengers from affordable housing area showed that the service is prioritizing to serve passengers who come from underprivileged families and are likely to depend on public transportation for their daily needs.
- The targeting of the border area of the Greater Jakarta showed that the service is considering the transportation costs of residents in the Jabodetabek area who work in Jakarta and trying to reduce air pollution from private vehicles (cars and motorbikes) in the capital city.
- The minibuses, accounted for approximately 63% of Transjakarta electrification, have the most routes and are among the closest public transportation service to the residential area (aside from ride-hailing services). Based on its operation routes and its closeness to the community it served, minibuses are considered significant in supporting GEDSI practical needs through the provision of daily mobility support for women, children, elderly, and people with disabilities.

Several scenarios were developed that specified the number of e-buses that will be deployed yearly, for each e-bus technology. The analysis highlights two scenarios of Transjakarta year on year implementation phase. Scenario A follows Transjakarta's target which includes 100 medium buses and 100 single 12 m BRT buses to be procured in 2023. On the other hand, Scenario B also took into account the electrification of minibuses in 2023 for a faster electrification trajectory in comparison to scenario A.

Scenario A:

This scenario follows Transjakarta's target which includes 100 medium buses and 100 single 12-m BRT buses to be procured in 2023 and the current procurement process for the 100 e-bus of which 26 are planned for 2023.

Table 2. Scenario A of Transjakarta's electrification for the implementation phase

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
Articulated bus		0	0	91	185	19	22	23	24
Low Entry	74	26	0	0	0	154	116	19	20
Single Bus		100	0	181	224	261	128	93	380
Medium bus		0	75	97	204	178	203	260	401
microbus		0	100	200	400	600	1129	1800	2160
Total buses added yearly	74	226	175	619	1063	1312	1691	2195	2985

Cumulative electric buses	74	300	470	1044	2057	3269	4867	7062	10047
No. of diesel buses	3860	3634	3960	3978	3671	3288	2667	1622	0
Total number of buses	3934	3934	4435	5022	5728	6557	7634	8684	10047
% Electrification	2%	8%	11%	21%	36%	50%	65%	81%	100%

Scenario B:

This scenario considers a faster electrification plan and altering the previous scenario by accelerating the electrification of minibuses. The minibuses represent the dominant fleet size reaching around 60% of the total fleet size by 2030. The TCO for e-minibuses is also lower making this alternative economically viable.

Table 3. Scenario B of Transjakarta's electrification for the implementation phase

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
Articulated bus		0	0	91	185	19	22	23	24
Low Entry	74	26	0	0	0	154	116	19	20
Single Bus		100	0	0	305	261	128	93	480
Medium bus		100	75	97	204	178	203	260	401
microbus		50	450	585	783	977	1129	1186	1219
Total buses added yearly	74	276	525	823	1537	1689	1691	1581	2144
Cumulative electric buses	74	350	875	1648	3135	4724	6322	7903	10047
% Electrification	2%	9%	20%	33%	55%	72%	84%	91%	100%

2.3. Technology selection

The current technology deployed for Transjakarta buses include 12 m single buses, both high deck and low deck, 18 articulated buses, 13.5 m maxi buses, 7 m medium buses and 4 m minibuses. The electric buses must therefore replace or retrofit these existing diesel buses. Low deck buses are more accessible to people with physical disabilities and people using strollers as they ensure a less steep vertical gap whilst onboarding. The e-buses that are currently operational in Jakarta are also 12 m low deck buses, which have undergone trials with representatives of vulnerable groups to ensure that these fleets are accessible to all groups. Other buses on the other hand, have not gone

through trials with vulnerable groups, therefore prioritization of trials the upcoming buses must be prioritized in 2023 in the succeeding years. These trials are most important with minibuses and articulated buses, as e-buses for those two types are less common, therefore trials with vulnerable groups will ensure that all the fleet designs can accommodate all mobility needs.

Moreover, BRT buses of Transjakarta are high-deck, as the current infrastructure such as stations are also suited for high deck buses. As adjusting the stations to accommodate low deck BRT buses would cause a higher cost, ensuring accessibility towards these buses for all users, means ensuring accessibility from sidewalks towards the station gate, platform, and during the onboarding process. Supporting infrastructure such as crossings towards BRT stations and pedestrian accessibility towards stations, must also be improved to ensure full accessibility of e-buses.

2.4. Year-on-year implementation

As mentioned previously, there are two scenarios for the year-on-year implementation plan of Transjakarta’s e-buses. These plans are based on bus types, fleet provisions options, number of buses, charging infrastructure and technology. The difference between the two scenarios, being scenario B procuring minibuses in 2023 and accelerating the E-bus procurement. With the acceleration of procurement of Mikrotrans, this means more people will be able to access e-buses for their day-to-day basis, including those in urban villages (*kampung kota*) in Jakarta in which many of the microbus routes pass. This will ensure that there is a more equal distribution of the benefits of e-bus, as it has been shown that the mode share of minibuses are mostly vulnerable groups such as older persons and women.

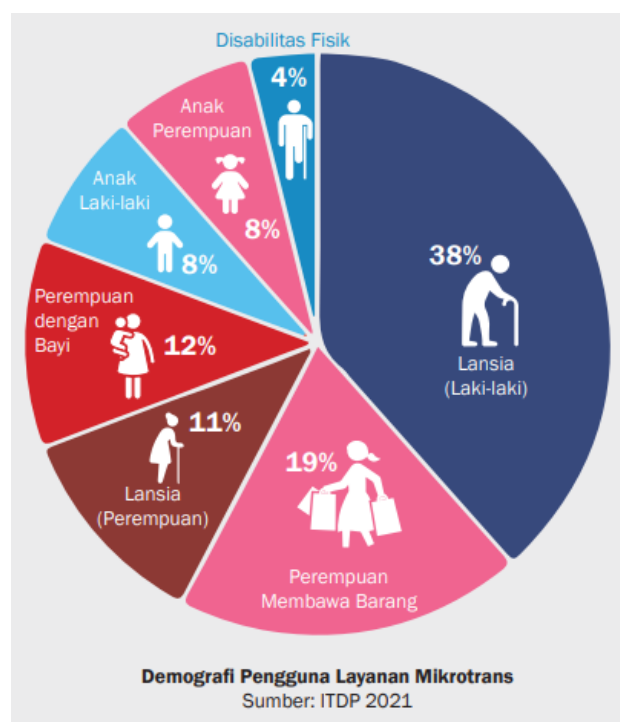


Figure 1. Vulnerable groups mode share in Mikrotrans

However, bus operators' capacity to provide maintenance to electric minibuses remains in question. Especially because minibuses are usually run by cooperatives of individual owner-operators. Capacity building of owner-operators, drivers, and mechanics is imperative to ensure the durability of electric-minibus fleets. Capacity enhancement to these parties is also important in terms of providing GESI-responsive and inclusive public transportation services.

Moreover, it must be noted that Mikrotrans, by design, currently do not allow for the ability of wheelchair access as well as strollers. Therefore, Mikrotrans are not fully accessible for everyone. Moreover, Mikrotrans stops also have less facilities, less inclusive wayfinding such as visual and audio information regarding routes, as well as less supporting facilities on their bus stops such as lighting and CCTV. Future planning for Mikrotrans must ensure GESI aspects are mainstreamed with the electrification of Mikrotrans. In doing so, participatory planning with various vulnerable groups as well as the assurance of a GESI vision for Mikrotrans, as well as all of Transjakarta's fleets is needed, specifically after the UKPACT EUM 124 project is accomplished, to ensure GESI mainstreaming is sustained even after the project. Ideally, with year-on-year implementation of the Transjakarta E-bus fleets, GESI Visions that are made should also have yearly targets.

2.5. Economic Analysis

In reports 3.2 and 3.3, Economic analysis of the e-buses were calculated to compare the TCO of conventional diesel buses with E-bus. The analysis showed that the TCO of electric minibuses is 25% lower than its petrol counterpart, which indicates operators will benefit economically from the electrification of minibus. The same observation is found with single electric buses, in which electrifying these fleets will result in a TCO that is 15% lower than the current conventional buses.

In terms of articulated buses, and medium buses however, findings show that the TCO of the electric buses for these two types still are higher than their conventional counterparts. However, with an alternate scenario of improved bus range and lower future costs, it is predicted that the TCO of medium electric buses and articulated electric buses can be brought down to lower values. This is necessary to ensure operators do not have further burden of higher capital costs during the electrification process, and to ensure the principle of 'no one left behind', specifically for operators who may be disadvantaged by lower capital/knowledge capacity.

With the transition to E-bus, this will bring more benefits to not only passengers, and institutions involved in the electrification of Transjakarta, but to society as a whole, which can be translated economically. The benefit of e-buses to society can therefore be seen with a lower social cost to carbon (SCC), that is the impact in, monetary terms, caused by emitting one extra ton of greenhouse gas, inclusive of 'non-market' impacts on the environment and human health. E-buses emit much lower GHG pollutants to the environment therefore society will benefit from less damage due to climate change as well as better public health. These will benefit vulnerable groups the most, such as people living areas prone to flooding, and people more susceptible to premature deaths due to respiratory diseases. Overall, the economic benefits that are gained by lower SCCs will bring positive impact to citizens of Jakarta, but most importantly, vulnerable groups.

3. Technical Plan

3.1. Route-Level Prioritisation

Route level prioritization refers to the ranking of routes that will be prioritized when electrifying fleets. The variables used to determine the priority of the routes include:

1. Number of buses
2. Ridership or fleet visibility and usability
3. Charging strategy
4. Percentage TCO differences from diesel bus for each route
5. Commercial viability

Although variables that directly impact vulnerable groups are not mentioned (example: proximity to lower income households, social housing, etc.), The current variables used are highly important to ensure the sustainability of the e-buses and must be prioritized in the route level prioritization. That being said, the variables that are used are still related to GESI, and will have a positive impact on vulnerable groups, as these variables are also chosen to ensure the most effective transition to e-buses, and therefore will ensure that the targets that are set to fully electrify fleets by 2030 are met on time, and benefit all stakeholders.

An example of a variable that may benefit vulnerable users is visibility and usability. These variables will prioritize areas that are within the city centre where the traffic restriction applied to support people shifting to public transportation. Moreover, running the e-bus in the city centre will make a quick demonstration to the citizens to promote the e-bus itself. The effect of e-buses, therefore, will mostly be seen in lower GHGs and pollution as more people shift from private vehicles to e-buses, and conventional diesel buses are removed. Areas that are passed by these prioritized routes will then benefit from the lower air pollution. These benefits will be especially felt by vulnerable groups such as groups that are more sensitive towards air pollution.

As for the accessibility, as electrification will mostly affect the energy source of the bus, even though not all fleets will be electrified at once, current Transjakarta routes will still operate as usual to ensure mobility of all groups is maintained. This will ensure that through the e-bus program, no harm is inflicted to vulnerable groups in terms of accessibility to basic needs, daily mobility patterns, and to ensure no harm is done throughout the process.

3.2. Charging Location Selection

The selection of charging station location is very crucial as any incidents in the charging location may affect the operation of buses. Overall, charging location of the e-buses are determined by:

1. Land ownership and land use plan
2. Space availability a from survey
3. Grid capacity
4. Ranking on route served
5. Prone of flooding

In terms of GESI, no variables are directed to aim at vulnerable groups, however the selection of location based on the above criteria will ensure safety standards are upheld for users as well as staff.

4. Business Models and Financing

4.1. Business Models

Various entities such as operators on the business models may have different risk profiles, as some have less financial and knowledge capacity than others. During discussions with operators, it was mentioned that many operators are worried regarding the high upfront costs of e-buses, even though the operational costs are lower than the diesel buses. This is highly relevant for all bus operators, but especially smaller operators that may not benefit as much from economies of scale. Alternative financing schemes will therefore lower risk and lower the burden of operators from having to fully finance their services. This will therefore ensure more resilience of Transjakarta's operators and ensure the ability of the operators to continuously provide their services to passengers. This may also translate to ensuring job security of the operators and staff such as drivers and technical staff

Lower resilience of Transjakarta's operators can then also have an impact on the inconsistency of the operations of E-Bus. In situations of incidents or inability to provide services by the bus operators, passengers may be impacted due to loss of buses, lower frequency of buses, and inconsistent service that is provided by the operators. Due to this, a passenger's mobility will be affected the most. Moreover, lack of good service may also lead to distrust towards institutions that are responsible for E-buses, and may have a negative impact on ridership.

4.2. Structured Financing Options

As mentioned previously, alternative financing schemes will enable less risk for operators and ensure that No One Left Behind on the tendering or when processing the financing options. Potential sources of financing include public financing, public and semi-public debt financing, private financing, as well as credit support and enhancement instruments. Several strategies are done to ensure transition to e-bus is financially doable and feasible being:

1. **Lowering upfront costs and adding flexibility**, this includes concessional financing for asset owners from finance providers as well as separation of assets ownerships. The latter would be beneficial for smaller operators to mitigate financing barriers of electrifying their fleets and reduce risks. Third party asset owners would be able to purchase e-bus components to reduce upfront cost and risks.
2. **Attracting various types and sizes of investors and adding flexibility**, which includes identifying routes that have attractive IRRs) for investors. In this case, routes with higher demands, less risks, and ready charging infrastructure will be prioritized to be electrified.
3. **Lowering e-bus implementation project risks**, which can be achieved by Transjakarta support assistance program. Through this, a collaboration with fund management and multi finance is recommended to ensure lowered risks of electrifying bus fleets.

5. Financial Analysis

5.1. Financial Analysis

As previously mentioned, one of the biggest barriers for market players, specifically operators, to participate in the electrification process is the large upfront capital required for electrification. To support the operators, attracting investors may relieve the operators from high upfront costs. To ensure investors are interested, identification of routes with high IRRs is needed which include routes that have high demand. This will ensure sustainability of the operators to maintain their services without having to cover all the cost themselves.

Moreover, Transjakarta is also recommended to open opportunities for women who are interested in becoming bus operators, by for example encouraging the development of alternative business models for leasing and loans, without requiring women to obtain approval from their husbands. This recommendation is served especially for medium and microbus operators that are usually run by cooperatives or individual owner-operators, and not just for women, but also PWD who are interested in the business.

The challenges for women to get involved in the business as microbus operators include that microbus operator business is still predominantly owned by men and the business requires a large amount of capital to start and run. Meanwhile, the access of women entrepreneurs to financing resources, bank loans, and leasing is still very limited. For the government and government-owned businesses, the procurement process is also dominated by men-owned businesses.

When women-owned businesses are denied the same right to be engaged by companies, including government-owned, the companies missed their opportunities to expand markets, diversify supply chains, and drive economic growth, while helping to improve the lives of women. Women-owned businesses are key to economic growth, as they provide 4 out of 5 new jobs in emerging markets. Investing in women's businesses is not only a social obligation, but a viable economic move.

5.2. Cost Benefit Analysis

With the full transition towards e-bus, society as a whole will benefit from lower social costs, as the conventional diesel buses produce larger negative externalities. Lower GHG emissions within the city as well as GHG savings from electricity production in comparison to the conventional buses. Air pollutants such as SO_x, NO_x and PPM that highly affect public health, especially for vulnerable groups are also significantly lowered. These pollutants may cause health problems related to respiratory disease with sulphur dioxide being heavily linked to cardiovascular diseases. Particulate matter is also found to have links to cancer, reproductive and developmental harm. All of these translate into increased healthcare costs and premature deaths, therefore the change to electric buses increases overall public health and wellbeing, especially those more prone to these diseases.

emissions from public buses expose children and elderly to high levels of air pollution, hence retrofitting and electrifying bus engines can substantially reduce this exposure. Children and elderly are more prone to health risk related to air pollution. For children, electrification of Transjakarta

could mean the improvement of their aerobic capacity and respiratory health. Electrification can also have a positive impact on children's academic achievement (Austin, W., et.al. 2019). While in elderly, impact of bus electrification means an improvement of respiratory health and reduces risk of dementia or diminished cognitive function (Kim, H., et. al, 2019).

6. Conclusion and Recommendations

Throughout the project, as GESI mainstreaming is maintained and predicted impacts on vulnerable groups are closely monitored, several conclusions can be made.

1. Vulnerable groups are seen as the most vulnerable stakeholders within a system and throughout the entire Transjakarta system this can include vulnerable passengers such as Women, children, people with disabilities, older persons, people living in urban villages, low income households, operators with less financial and knowledge capacity, drivers, technical workers, staff, as well as society as a whole, specifically those more vulnerable to negative impacts due to GHG and air pollution. Therefore, further GESI analysis should look at all stakeholders that may be impacted by the electrification process and ensure the no one left behind principle is always accommodated.
2. Market soundings show that there is high interest by market players to participate in the Transjakarta electrification, however high upfront costs may cause as a burden for operators who cannot benefit as much from economies of scale. Current procurement processes for the e-buses do not necessarily discriminate against any players from participating, however, extra attention should be given to market players with lower financial/knowledge capacity.
3. The Implementation plan is divided into two scenarios in which scenario A is the default scenario to electrify all of Transjakarta's fleets by 2030, and scenario B aims to accelerate the process by also electrifying minibuses early on by 2023. The latter will also ensure more residential areas such as urban villages will have access to e-buses, and benefit from the lower GHG and pollution produced, however, it must be noted that minibuses are still less accessible for wheelchairs and strollers due to its smaller size and dimensions. As minibus has proven to be one of the buses that has a high number of vulnerable groups, it is important to do further participatory planning with vulnerable groups when electrifying this type of bus.
4. Yearly GESI visions should be placed to monitor the electrification process of Transjakarta buses, after the UK PACT EUM 124 Project is finished, to ensure the sustainability of the GESI mainstreaming efforts.
5. Charging infrastructure remains one of the most crucial aspects to be planned, as incidents in charging locations may cause a disturbance in Transjakarta's operations, highly affecting the mobility of vulnerable groups who make up a high percentage of Transjakarta's passengers.
6. The current variables that are used to identify the route level analysis ensure the sustainability of the e-buses to meet Transjakarta's target to be fully electrified by 2023. The variables ensure effective electrification therefore people can benefit from the lower GHG and air pollution, specifically vulnerable groups that are more prone to negative impacts due to low air quality.

7. Alternative financing is necessary to support stakeholders that may have lower financial capacity to electrify their fleets. A distribution of risks through alternative financing will ensure that smaller operators will not be left behind during the electrification process.
8. Electrifying Transjakarta's buses will lower social costs and benefit society as a whole. Increased air quality due to lower levels of GHG, pollutants and particulate matter will benefit society, especially vulnerable populations such as those more susceptible to respiratory diseases.