KIRIBATI

BARRIER ANALYSIS AND ENABLING FRAMEWORK FOR CLIMATE CHANGE TECHNOLOGIES

MITIGATION REPORT

TNA TECHNOLOGY NEEDS ASSESSMENT

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TNA Step 2 Report: Barrier analysis and enabling framework for mitigation technologies in Kiribati.

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Foreword

Kiribati, as a member of the Small Island Developing States (SIDS) and classified as a Least Developed Country (LDC), remains highly vulnerable to the adverse impacts of climate change. The country continues to experience the escalating effects of extreme weather events, including intense storms and sea-level rise. These impacts are already undermining Kiribati's development aspirations and the wellbeing of its people. Without urgent action to address the drivers of climate change and to support the most vulnerable sectors, these challenges will continue to intensify.

As a Party to the United Nations Framework Convention on Climate Change (UNFCCC), the Government of Kiribati remains fully committed to developing and implementing measures that build resilience across key development sectors while reducing greenhouse gas emissions from potential sources. The Kiribati Nationally Determined Contribution (NDC) outlines a number of mitigation measures aimed at enabling sustainable, low-carbon development and strengthening climate resilience.

To support the implementation of the NDC and other national strategies, Kiribati is currently undertaking a Technology Needs Assessment (TNA) to identify priority technology transfer investments, and to determine which environmentally sound technologies (ESTs) will be most effective in addressing climate change mitigation challenges.

This Barrier Analysis and Enabling Framework (BAEF) Report represents the second phase of the TNA process. It highlights the range of barriers identified, analyzed, and ranked by key stakeholders for the adoption of electric vehicles as a priority mitigation technology. The report further classifies these barriers; economic, technical, and others, and outlines the enabling frameworks that need to be enhanced to facilitate the deployment of this technology.

Kiribati is proud to have successfully completed this second phase of the TNA, following the earlier completion of the Identification and Prioritization of Technologies Report under Phase One. The preparation of this BAEF Report for Mitigation was made possible through the active participation and contributions of key stakeholders, including representatives from line ministries, state-owned enterprises, and non-governmental organizations. Through this collaborative process, the barriers to technology adoption and deployment, along with corresponding enabling measures, were clearly identified.

I would like to extend my sincere gratitude to the members of the TNA National Team from both public and private sector entities, as well as my colleagues from the Climate Change and Disaster Risk Management Department, for their invaluable contributions in completing this critical second step in the BAEF development. I also wish to acknowledge the important contributions of the national consultant and the experts from the UNEP Copenhagen Climate Centre (UCCC) and the University of the South Pacific (USP) for their constant support and guidance throughout the implementation of the TNA project.

Mr. Tebwaatoki. T. Taawetia
Secretary
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Executive Summary

Kiribati first TNA report for selecting the transport sector mitigation technology priorities was completed in 21st February 2025. In this second TNA report, barriers hindering the transfer and diffusion of prioritized mitigation technologies for the land transport sector have been identified, and measures to overcome the barriers and facilitate the transfer, adoption and diffusion of these technologies are explained.

To facilitate the identification of root causes of the main barriers, expert working group for land transport sector was taken through exercises on creating Market Mapping for Consumer goods and Problem Tree/Objective Tree for Publicly provided goods from the prioritised technologies. The outcome of these exercises is provided in the annexes.

The three technologies that were identified have been categorized as indicated in Table 1 below for the purposes of the Barriers Analysis and Enabling Framework (BAEF).

Table 1. Prioritized Mitigation Technologies

Priority	Technology	Preliminary targets	Market Category
1	Electric bus for Government ministries and SOEs	Develop the EV mobility policy, institutions and infrastructures. Implement suitable fiscal incentives to facilitate the faster utilization of electric buses.	Publicly provided goods.
2	Electric motorbike for private users	Develop the EV mobility policy, institutions and infrastructures. Implement suitable fiscal incentives and loan schemes to facilitate the faster uptake of electric motorcycle by private suppliers and users.	Consumer goods
3	Electric SUVs/Cars for Government ministries and SOEs	Develop the EV mobility policy, institutions and infrastructures. Implement suitable fiscal incentives to facilitate the faster utilization of electric SUVs/Saloon cars.	Publicly provided goods

This report identified the following barriers to the development and transfer of the prioritized technologies: economic and financial, policy, legal and regulatory, and technical skills to deploy the technologies. Given the scale and magnitude of the technologies recommended for deployment, the report showed that greater institutional capacity is required to strengthen the regulatory process and build technical capacity within the local workforce to foster these mitigation projects. The report also underscored the need for greater capacity building throughout the various implementing agencies with adequate resources to carry out their respective mandates.

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Abbreviations and Acronyms

ADO	Automotive Diesel Oil
AUD	Australian Dollar
BAEF	Barrier Analysis and Enabling Framework
BEB	Battery Electric Bus
BEV	Battery Electric Vehicle
CCDRM	Climate Change and Disaster Risk Management Unit at OB
EM	Electric Motorcycles
EV	Electric Vehicle
GEF	Global Environment Fund
GHG	Greenhouse Gases
GOK	Government of Kiribati
KGES	Kiribati Green Energy Solution
KIT	Kiribati Institute of Technology
KLTA	Kiribati Land Transport Authority
KNEG	Kiribati National Expert Group
ktCO2e	kilo ton of carbon dioxide (equivalents) or 1,000,000kg equivalent
MCA	Multi Criteria Analysis
MELAD	Ministry of Environment, Lands and Agricultural Development
MFED	Ministry of Finance and Economic Development
MICTD	Ministry of Information Communication Transport Development
MISE	Ministry of Infrastructure and Sustainable Energy
NDC	Nationally Determined Contribution
NSO	National Statistics Office Kiribati
OB	Office of the President
PICs	Pacific Island Country(s)
PVU	Plant and Vehicle Unit
SOEs	State Owned Enterprise
SUV	Sport Utility Vehicle
TNA	Technology Need Assessment
ULP 93	Unleaded Petrol RON93
UNEP	United Nations Environment Programme
UCCC	UNEP Copenhagen Climate Centre
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
USP	University of the South Pacific

1. Introduction

The first deliverable, the Technology Need Assessment (TNA) report produced for the TNA Project in Kiribati, was submitted after addressing valuable comments from USP, UNEP CCC and OB Office on 13th January, 2025.

The TNA activity was systematically conducted through a country-driven process, involving all relevant stakeholders and taking national sustainable development priorities into consideration. The national stakeholders were involved in the first phase of the TNA Project in two rounds of consultation first in the inception workshop for screening the sectors where Land transport was selected and secondly during the retreat workshop where the identification and prioritization for the land transport technologies was conducted using the multi criteria analysis (MCA) methodology.

The results of the MCA exercise revealed the following top three technologies out of the six technologies (1) Electric Buses for Government and State-Owned Enterprises (SOEs), (2) Electric Motorcycle for private consumers, and (3) Electric SUVs/Saloon cars for Government and SOEs as shown in the following Table 2

Table 2: MCA scoring prioritization

Priority	Technology	General Name
1	T8 – Multi-modal Transit Initiative	Electric Bus
2	T2 – Bicycle/E-Bike Financing Initiative	Electric motorbike
3	T11 – Electric Vehicle Network Development	Electric SUV/Saloon/Pickup
4	T13 – Whole-of-Lifecycle Vehicle Programme	Recycling unused vehicle waste
5	T15 – Land Transport Infrastructure Upgrade for Non-motorized Transport	Walkways
6	T7 – Biofuel blends in Land and Maritime Transport	Biofuel blend for Diesel replacement

This first prioritized technology, Electric Bus will offer more passenger capacity per vehicle for transit between communities and daily commuting to and back from work. The second priority was T-2 for electric motorbike for the public and private sectors. Lastly, the third priority was T-11 for electric SUV/saloon/pickup targeting GOK and SOEs to transition the internal combustion engine SUV/saloon/pickup used currently by Secretaries, CEOs, Directors and department utility vehicles

2. Land Transport Sector

The land transportation vehicles in Kiribati are all internal combustion engines (ICE) relying on petroleum fuels namely Automotive Diesel Oil (ADO) fuel specifically designed for use in road vehicles and more expensive but also used solely for marine vessels and Unleaded Petrol (ULP 93) a type of gasoline that does not contain lead used for vehicles and marine outboard motors imported by the only supplier Kiribati Oil Company.

Recently, hybrid ICE/battery saloon cars or generally known as Hybrid electric vehicles (HEVs) had been imported and used by private users. These HEVs do not use electric charging station. In addition, only one electric vehicle (EV) had been imported and used for the Minister in one government ministry, which is charged from an electric charging system specific for the EV.

On the capital island, South Tarawa, recently, the experience of road congestions and heavy traffic along its two lanes only road is becoming an issue. Now it is becoming a new norm and cruising speed have frustratingly drops to 20km/hr in many instances during the morning and afternoon workday commutations as some workers used their private saloon cars to their work place and during holiday events.

In addition, with the limited land space area of the typical atoll island of South Tarawa, parking is another greater issue in places where events will be held. In the small islet of Bairiki and Betio where most of the government ministries, state owned enterprises and shopping centers are located, the available parking lots could not sustain the parking space for vehicles during major holiday events and functions. Besides that, the parking spills over onto the main road again causing congestion and increasing traffic. The same happens in most church headquarters during the religious events and most of the time the Police and Kiribati Land Transport Authority (KLTA) officers will be involved in managing and controlling the traffic situation for the whole day.

According to KLTA, the internal combustion engine vehicle registration in South Tarawa as shown in Figure 1 shows a noteworthy increase from 924 registered vehicles in 2020 to 2,170 vehicles in 2024. There is a huge two folds jump from 310 to 1, 208 private saloon cars between 2023 to 2024 respectively. These are affordable second-hand saloon cars imported from Japan and other Asian countries.

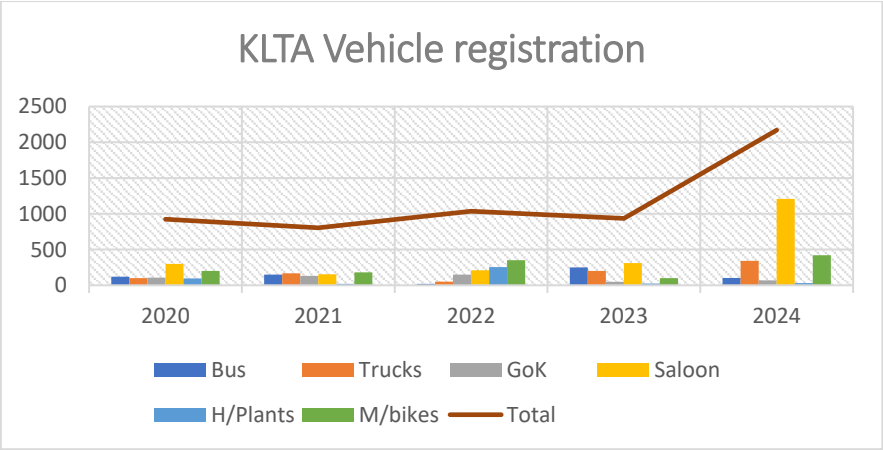

Figure 1: KLTA vehicle registration (Source: KLTA)

However, when KLTA registration data was compared to the National Statistics Office (NSO) data for the latest Census in 2020, for South Tarawa household vehicles depicted in Figure 2 showed an enormous difference in the number of vehicles at hand and registered. For instance, in 2020 the NSO data indicated that South Tarawa total private saloon car record was 2080 while KLTA registered only 300 private saloon cars. Therefore, it could be assumed that the actual vehicles used on the road could triple the amount of registered vehicles and trying to avoid capture from the authorities.

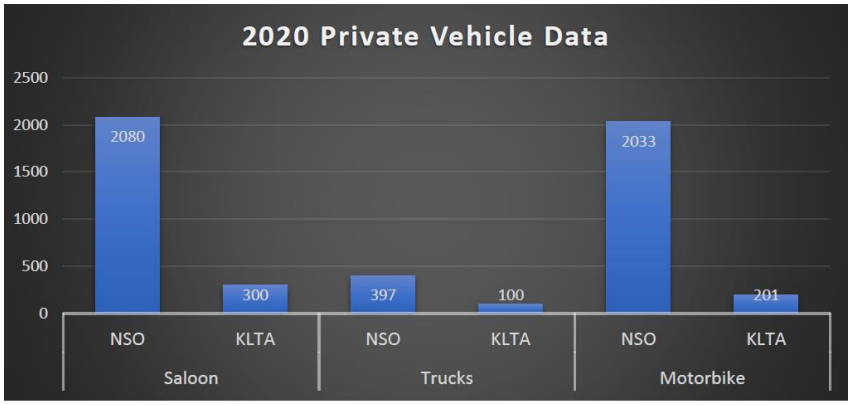

Figure 2: Comparison of vehicle data for NSO and KLTA

Up until now, Kiribati had not implemented any mitigation projects to reduce greenhouse gas emission from the road transport sector, On the other hand, in the power generation for electricity numerous multi million dollars solar grid and off-grid projects had been deployed and more are being implemented. According to the energy statistics in 2023, the energy consumption share for the Land transport was 17% as shown in Figure 3.

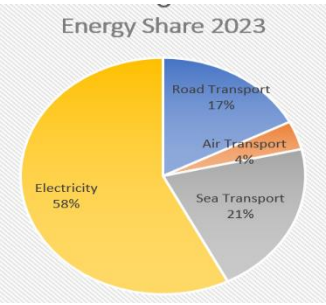

Figure 3; Energy consumption share 2023. Source: EPU Office

Conferring to the Energy Statistic Yearbook and current energy data from 2019 to 2023 from the Energy Department the road transport GHG emission trend was increasing periodically by two folds from 12.4 $ktCO_2e$ /year in 2010 to 32.3 $ktCO_2e$ /year in 2023 as shown in the following Figure 4. This also predict the trend in the increasing number of vehicles used annually. However, the fuel consumption data was not ready for 2024 and could exaggerate the GHG emission record to date.

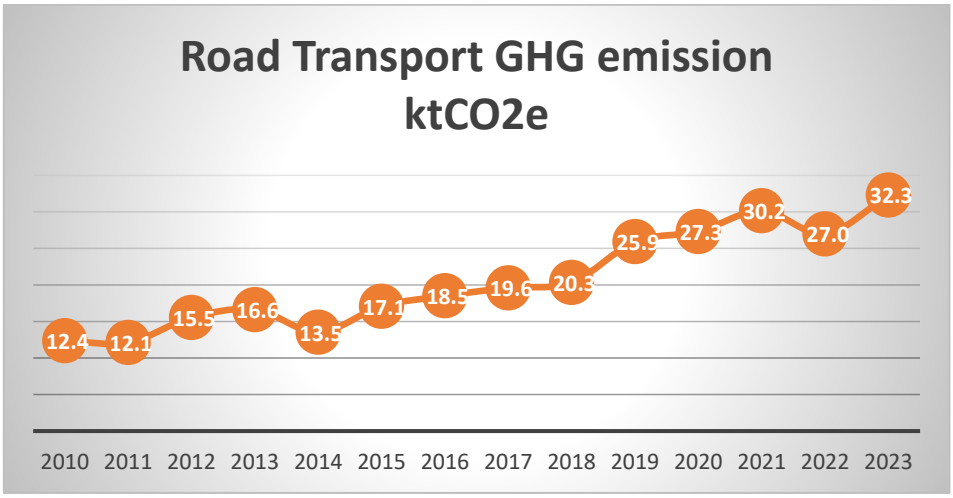

Figure 4. Road transport GHG emission in ktCO2e trend (Source: EPU Office)

The NDC Investment Plan target for the road transport sector GHG emission was set at 18.8 $ktCO_2e$ /year by 2030. However, the recent data depicted in the above chart showed the road transport emission overtook this target in 2017 with 19.6 $ktCO_2e$ /year and reached 32.3 $ktCO_2e$ /year in 2023. Therefore, transitioning to electric vehicles is a plausible conditional option to achieve the NDC target.

There are three basic types of electric vehicles available in the market: Hybridelectric vehicles (HEVs), Plug-in hybrid electric vehicles (PHEVs) and Battery electric vehicles (BEVs) battery (Prateek et al. 2022). BEVs run entirely on a battery powered electric motor and use on-board electric motors alone. PHEVs make use of both an on-board motor and a small internal combustion engine, drawing on that engine when more power is required or when battery life is low. HEV use a conventional internal combustion engine and electric drive, but differ from plug-in hybrid EV. According to NREL (2011), the difference of the two is that all the energy for propulsion is generated from fuel, with electric energy generated by a built-in alternator or regenerative braking systems.

For our case, in order to reverse the trend to meet the NDC target by 2030, the electric vehicle type to be considered could be dictated to use battery electric vehicle BEV solely for buses, SUVs, saloon cars, pickup trucks and motorbike to run on DC motors only supplied from the battery. BEV rely solely on a battery for stored energy to run vehicle electric motors and are charged from an external source and have other features for

harvesting power while the vehicle is in motion such as regenerative braking. BEV will not have an exhaust system and produce very little noise.

ECA and TTA (2022) had done an assessment of BEV viability in different Pacific Island Countries under various use cases, comparison on the upfront costs, fuel/charging costs, maintenance costs, and environmental costs of BEV versus ICE vehicles. The findings indicate that EVs are not economically viable in most Pacific Island Countries due to their higher upfront costs and limited environmental benefits. However, they anticipate that BEVs could become more viable if Pacific Island Countries utilise solar generation and promote daytime charging.

Furthermore, to negate GHG emission from the transport sector due to electrical charging from the grid, utilizing independent solar charging station for charging BEVs in Kiribati will be more beneficial as the sun hours are perfect in Kiribati all year round. This will completely eliminate GHG production from utilizing BEVs.

According to Priyanshu et al (2024), a solar charging station for BEVs could be developed integrating solar panels, power and battery energy storage to provide uninterrupted power for BEVs. The system operates using a three-stage charging strategy, with the PV array, battery bank, and can include grid electricity, ensuring a continuous power supply for BEVs. Additionally, the system can export surplus solar energy to the grid, reducing the load demand in the respective government ministry.

2.1. Preliminary targets for technology transfer and diffusion

The three types of EVs selected in the priorities were classified by stakeholders during Step 1 in the identification and prioritization process of the technologies. The group decided that since EV is new concept for Kiribati and had no existing frameworks to support its diffusion locally, the idea was to build the framework at the government transportation sector first on electric bus and SUVs/saloon car/pickups mostly used by government ministries and SOEs. Electric motorbikes due to its lower needed frameworks and cost implication could be diffused in the private sector. The following Table 3 provides information on the categorization of goods and market characteristics.

Table 3: Classification of electric vehicle types

Priority number	Technology	Preliminary targets	Market Category
1	Electric bus for Government ministries and SOEs	Develop the EV mobility policy, institutions and infrastructures. Implement suitable fiscal incentives to facilitate the faster utilization of electric buses.	Publicly provided goods
2	Electric motorbike for private users	Develop the EV mobility policy, institutions and infrastructures. Implement suitable fiscal incentives and loan schemes to facilitate the faster uptake of electric motorcycle by private suppliers and users.	Consumer goods
3	Electric SUVs/Cars for Government ministries and SOEs	Develop the EV mobility policy, institutions and infrastructures. Implement suitable fiscal incentives to facilitate the faster utilization of electric SUVs/Saloon cars.	Publicly provided goods

2.2. Barrier analysis and possible enabling measures

This exercise was carried out by key stakeholders from Government ministries and agencies during a retreat workshop on the 14th to 16th March, 2025 at Uaai Resort in North Tarawa.

During the retreat exercise deliberations and log frame tree analysis for the first priority on Electric Buses, the working group realized that the same barriers and measures are equally applicable for the third priority technology on Electric SUV/Saloon car also to be used initially for government ministries and SOEs. Therefore, the group decided that the same problem and solutions identified for Electric Bus will be used for Electric SUV/Saloon car for the government ministries and SOEs. On the other hand, the Electric Motorcycle due to be used by consumer or considered as a consumer good will utilize the Market Mapping tree.

3. Electric Bus

3.1. General description of technology -

A battery electric bus (BEB) is an all-electric bus that uses a battery pack to store the electrical energy that powers the drive motor. Sales of electric buses, comprising all medium- and large-sized buses, are far ahead of those of other heavy-duty vehicle. Several European countries (such as Belgium, Norway and Switzerland) and China achieved sales shares above 50% in 2023 (IEA, 2024).

While battery electric bus come with a higher upfront cost in the range of USD300,000, their long-term operating expenses are lower. Electric buses require less maintenance than conventional buses because they have fewer moving parts and don't need regular oil or filter changes. However, there's hope on the horizon as battery prices decrease and production scales up over the next few years, the cost of electric buses is expected to drop, paving the way for them to become the backbone of public transportation in major cities (INVI,2024).

One of the lead Chinese multinational manufacturing company had delivered over 74,000 BEBs thus the most experienced. They provide a wide variety of BEB vehicles to meet different operational needs of customers. The company have mastered the three core technologies of BEBs: batteries, electric motors and electric motor controllers.

Jin (2023) stated that on 20th November 2023, the company made an official announcement in Japan for releasing of the medium-sized electric bus designed for the Japanese market to accommodate 61 passengers and cruising range of 250km. The expected deliveries scheduled for fall 2025 with the factory price of USD246,000.

According to Made in China (2025), the electric bus 42-seater is priced at USD97,000 free on board. The freight could be estimated on the dimension of the bus using the average rate for shipping from China to Kiribati which is around USD500/cubic meter. This bus dimension is 7.2mx2.3mx3.9m equal to some 72 cubic meters averaging the freight to be around USD36,000. Therefore, the landing cost to Tarawa could be about USD97,000 plus USD36,000 estimated at around USD133,000.

BEBs technology are more advanced as their operation pivots on continuous close monitoring of the key operational components such as state-of-charge, battery management system, charging management system and electric motor allowing better integration and lower maintenance costs (Jain et al. 2023).

BEB batteries are charged by plugging the bus in to an electric power source and the range can cover from 150 to 450km depending on the battery capacity and the bus load. In South Tarawa, the road distance from the eastern end in Tanaea to western end in Betio is around 36km while the road contour is all flat very ideal for constant cruising to save battery energy along the main the road extends.

According to Daliah (2024), when BEBs are charged from the electric grid, the electricity is provided from diesel generators meaning that despites BEBs have insignificant tailpipe emissions their total environmental impact may not be entirely emissions-free. To achieve zero carbon emission, BEBs must utilize charging from renewable energy sources like solar. In Kiribati's case, there is abundant solar energy and long sun hours all year round, hence using solar charging will the best option.

The cost of Solar PV systems for charging BEB varies depending on the location, installation size, and battery storage systems. It is complicated to find the right estimate for the BEB solar charging stations and may range from USD55,000 to USD100,000. After the installation, maintenance cost is minimal, primarily involving regular cleaning and upkeep of the solar panels (Daliah, 2024). He also states that although upfront costs can be high, the return on investment could be achieved within 5-7 years. This is practical in countries where solar energy is abundant and electricity tariff are high. Additionally, government subsidies, tax incentives, and grants can further cushion the cost making solar PV installations more financially attractive for bus owners.

3.2. Identification of barriers for technology

3.2.1. Economic and financial barriers

The high upfront cost of EV as compared to its contender ICE had been the major obstacle for the wider adoption in many developing countries where policy and fiscal incentives support are not available to reduce the upfront cost (GGGI, 2022). Comparative cost analyses show that EV cost between 1.08 and more than two times that of ICE vehicles making acquisition costs as a major market restraint (Ha.T et al. 2021).

Stakeholders validated barriers identified cause

There are significant initial cost barriers for BEB starting with the issue of acquisition costs while the costs associated with charging, maintenance, and environmental factors is another additional challenge. The absence of enabling frameworks for BEB financial policy interventions has influenced the adoption for private business and are generally not considered economically viable in most Pacific Island countries due to the high upfront costs. It is essential to implement policies to ensure that solar charging of BEBs

is safe, accessible, affordable, and independent on the electricity grid but can feed extra energy to the grid.

The group had identified key barriers cause and effects and dig deeper to their root as shown in Annex 2 Problem tree 1a – Government Electric Bus. Table 4 summaries the various financial and fiscal barriers that have been confirmed and validated by the stakeholders group.

Table 4: Electric Bus financial barriers

Barriers Cause	Element of barriers
High investment cost	High capital cost Complex logistics issues is blamed for the high import cost of BEB and charging infrastructures. Poor inter/intra connectivity (Geographical Remoteness setting) Shipping routes from main suppliers of BEB and charging systems is another barrier in the shipment cost as most container routes have to transit in a number ports before arriving in Tarawa Port and then in outer islands accumulating the transshipment costs.
	Unavailable funds will not support institution in developing and providing training courses on electric vehicles and solar charging as one of its syllabuses. The Kiribati Institute of Technology (KIT) is currently proving training courses for mechanics, electricians and solar energy as part of its syllabuses. But need expert lecturers and practical models and laboratory to add electric vehicles and solar charging as part of its course or syllabuses. Fund is needed to recruit Experts or Lecturers who can become teachers for the KIT for the new course on electric vehicles and solar charging stations. Lack of local technicians trained and certified to carry out maintenance on electric vehicles and solar charging stations can be addressed if fund are available to KIT and the new course with lecturers.

3.2.2. Non-financial barriers

Institutional barriers is the major barrier identified for the lack of infrastructures and suppliers on BEBs. The unavailability of charging stations and lengthy charging times could not trigger consumers to go for BEBs and raise concerns for the reliability of charging and wasted time. Another vital component is to ensure skilled human resource capacity is readily available for maintenance and safety of BEBs and the public using it (GGGI, 2022).

Coordination and policy making on land transport aspects are fragmented among key stakeholders. The regulatory mandate of transport sector is embedded in the Land Transport Act managed by the Kiribati Land Transport Authority under the Ministry of Information, Communication and Transport Development. Policy and regulation for renewable energy and energy efficiency, energy supply demand logistics and tariff are regulated in the Energy Act managed by the Energy Department under the Ministry of Infrastructure and Sustainable Energy (MISE). Government transport vehicles procurement and maintenance are managed by the established Plant and Vehicle Unit (PVU) under the MISE. However, the new Procurement Act managed from Central Procurement Unit (CPU) under the Ministry of Finance and Economic Development (MFED) states that all government ministries and SOEs will have to procure their new vehicles in accordance to the procurement guidelines managed by CPU whereby PVU is also mandated to follow. There are overlapping mandates between the local councils and KLTA in the outer islands and this need to be rectified. Furthermore, the mandate for land use planning is currently carried out by the Land Management Division under the Ministry of Environment, Land and Agriculture Development and it will be important to have inclusive stakeholder consultations when allocating land area for parking or for solar charging infrastructure.

Safety in using EVs and solar charging station are utmost for the well-being of users, passenger infrastructure, and the environment. The challenges associated with EV adoption extend beyond concerns about models and battery safety. The introduction of new technology and limited expertise in service centres pose difficulties for both potential EV buyers and users (Tukuga, 2023).

It is important to note that not all incidents involving an EV will impact the battery and cause the hazards and risks such as multiple toxic and flammable gases and vapours are released when lithium-ion batteries are involved in fire. These hazards and risks exist through the abuse of the internal cells within the battery or another source of ignition or the vehicle being involved in a collision. Schmidt (2024) states that, EV becoming involved in fire caused by the battery with thermal runaway a self-sustaining chemical reaction

within the battery that can spark a fire if there is damage to the battery, and the ensuing chemical reaction causes a cell to become overheated. It cannot cool down, causing a chain reaction that heats up neighbouring cells. However as reported by Schmidt (2024), according to EV FireSafe, which is funded by the Australian Department of Defence to research EV battery fires, it has as of June 2024 positively identified 511 high voltage battery fires worldwide, out of an estimated 40 million BEVs on the road (IEA,2024) just 0.0013 per cent of the global BEV fleet.

Barriers to information and public awareness arise due to the novelty of electric vehicle technology in several nations and its limited adoption among certain demographics. Consequently, there exists a lack of knowledge and familiarity concerning the safety and performance of EVs. Consumers persist in expressing concerns about EVs, citing anxieties about potential explosions in extreme circumstances or the potential risks associated with the unique components of BEV batteries (GGGI, 2022).

The identified non-financial barriers are shown in Table 5 following.

Stakeholders validated barriers identified causes

Table 5: Electric Bus non-financial barriers

Barriers	**Element of barriers**
Limited infrastructure and suppliers	Unavailability of local supplier for electric vehicles in particular BEBs
	Unavailability of existing electric charging station currently. Limited power capacity for electric charging as the current PUB grid is under stress now with load shedding and black out due to the skyrocketing electricity demand from private and business sectors. Aging diesel generators used by PUB for the grid on the main island and will require repetitive maintenance and outages not reliable for charging BEVs whenever needed. This will impact an inconveniency charging station from Inefficient refilling or slow charging time impact on BEBs.
Lack of coordination	Information fragmentation among line agencies (Government ministries and SOEs) who work according to their roles and responsibilities. Individual knowledge and understanding among agencies may be different to another agency and there is no framework to levelized it across line agencies.
	Individual priority. Line agencies (Government ministries and SOEs) have their own priority and tends to work for their own interest and benefits.

Lack of regulation and policy	Lack of policy makers' support was considered why electric vehicle had not been adopted in Kiribati. It support has been provided, then EV could had been adopted in a sustainable and affordable manner. Absence in Government manifesto for EV adoption was identified in all previous and current government manifesto and may be this is why the adoption of EV was never eventuated.
	Lack of standard and certification was identified to be a critical barrier for the adoption of EV Lack of safety can be uncompromised if technicians not formally trained and certified are allowed to operate and maintain BEVs and solar charging station.
	Gender inequality came up with stakeholders in the sense that technician and operators also include women for equal opportunity and income generation.
Poor behavioural cultural/ social norm	Lack of awareness was identified a cause for the low adoption of EV. Also, stakeholders are not sure on the right government agency responsible to facilitate the promotion, awareness and marketing of EV nationally.
	Ignorant mindset of some users or passengers was identified as another issue to minimize the air condition cooling for saving the battery energy.

Identified barrier effects

The stakeholder group also in developing the problem tree identified barriers and their immediate effects as shown in the problem tree in Annex 2 Figure 1a. The starter problem identified effects are summarized in Table 6 following.

Table 6: Electric Bus starter problem effects

Effects	**Element of effects**
Increase in environmental concerns	Increase in noise/air/land pollution. This is effects was identified due to low adoption EV which has minimal motor noise, no toxic emissions and spillage Realtime GHG emission is now being accumulated from the sharp increase of ICE vehicles as highlighted in Figure 4 earlier. Increased physical global warming as an impact from this real time GHG emission.
	Heavily reliant in fossil fuel for electric buses is now the only option for mobilizing civil servants to and back from the office on working days.

	GHG emission target reduction to our national obligation in Multilateral agreements will be hard to achieve with the increase numbers of ICE vehicles.
Increase in road congestion	Increase in road traffic congestion is now currently experienced and getting worser with more ICE vehicles imported. Increase workloads KLTA/KPS for controlling the traffic. Increase in recurrent budget expenses for overtime and number of staff on shift.
	Inefficient commutation as work transport when caught in the road traffic will result in staff late to work. Decrease in work performance and productivity of staff when they could not come on time and yet have to leave office on the transport after official working hour.
Lack of confident and competent	With the lack of enabling framework for EV, potential buyers and consumers will refuse to accept EV. Low individual interest to buy EV by buyers or users.

3.3. Identified measures

The following economic and financial measures and non-financial mechanisms were identified by key stakeholders working group and these measures are based on the solution tree and root causes identified in the problem tree (See Annex 2 Figure 1b).

Stakeholder group identified that key stakeholders need to work together to formulate strategies on how to make the initial cost for BEB and solar charging including training and certification more affordable for public and private buyers. It is decisive for key authorities involved to come together, such as the Office of Beretitenti, Ministry of Finance and Economic Development, Ministry of Infrastructure and Sustainable Energy, , Ministry of Information Communication Transport Development, Ministry of Environment, Ministry of Culture and Internal Affairs, Plant Vehicle Unit, Kiribati Green Energy Solution, Kiribati Land Transport Authority, Kiribati Institute of Technology and others to vigorously participate in deliberations, processes, and planning aimed at addressing high investment cost of EVs and necessary capacity building development, setting up of charging stations and to develop supportive policies and fiscal incentives to make electric vehicles more affordable in Kiribati.

Providing a transparent justification for local vehicle costs is essential to address financial and fiscal challenges. Moreover, improving financial risk management by offering

financial incentives and exploring options like tax reductions or exemptions can help overcome fiscal and financial barriers (Tukuga, 2024).

Stakeholders agreed that the financial measures to be included are shown in Table 7 following.

3.3.1. Economic and financial measures

Table 7: Electric Bus financial measures

Solution	Element of solutions
Investment fund developed	Affordable capital cost for BEBs. Shipping routes from main suppliers of BEB and charging systems is improved providing direct shipping lines from supplier to Tarawa Port and minimizing transit times. Local shipment is improved to be more cost saving for transporting BEBs and solar charging stations to outer islands.
	Strengthen institutions. KIT is strengthened and improved to carry out training courses for EV and solar charging station to students. Pool of Experts on EV and solar charging are readily available as new lecturers' post at KIT. Training courses and syllabuses developed for EV and solar charging stations.

3.3.2. Non-financial measures

Stakeholders agreed that the non- financial measures to be included are shown in Table 8 following.

Table 8: Electric Bus non-financial measures

Causes	**Element of Causes**
Established infrastructure and suppliers	Availability of supplier who can supply quality BEBs and provide backup services.
	Availability of electric charging station in respective ministries and SOEs for their BEBs Reliable and convenient charging now possible.

	New independent solar charging station developed for efficient an fast charging of BEBs.
Improved coordination	Information centralization among line agencies (Government ministries and SOEs) who work jointly together on their roles and responsibilities and update one another through monthly meetings or central database developed. Individual knowledge and understanding among agencies may be different to another agency and there is no framework to levelized it across line agencies.
	Inclusive priorities developed coordinated among from line ministries and agencies to guide monitoring and compliance needed for EVs.
Developed regulation and policy	Policy makers' now support electric vehicle to be adopted and end ICE in Kiribati to meet its zero-carbon target in the land transport. Government manifesto for EV adoption will be included new government manifesto to support the adoption of EV.
	Stringent standard and certification are developed for electric vehicles and solar charging stations including certification of technicians, mechanics and drivers. Safety assurance now provided for technicians, mechanics and drivers to operate and maintain BEVs and solar charging station.
	Gender equality is honored where women have equal opportunity and income generation as drivers or mechanics.
Conducive behavioral, cultural/ social norm	Increase in awareness for safe keeping and looking after BEBs by users.
	Open minded by users on how to conserve battery energy on BEBs

4. Electric Motorbike

4.1. General description of technology

Electric motorbikes (EM) are motorcycles powered by electric battery and motor and categorized in two-wheeler (2W) and three-wheeler (3W), offering a zero-emission alternative to traditional ICE gasoline-powered motorbikes, with similar capabilities but without the need for petrol. EM batteries are charged by plugging in to an electric power source while some models use swap battery system.

According to IEA (2024), India, China and Association of Southeast Asian Nations (ASEAN) countries are the biggest 2W and 3W electric motorcycle markets worldwide. In 2023, the sales share of EM 2/3Ws was just 13% globally, while in terms of stock shares, it represents the most electrified road transport segment of about 8% of motorcycles being electric. China which accounted for 78% of global sales sold the most electric with nearly 6 million electric 2Ws in 2023, followed by India 880 000 (8%) and ASEAN countries 380 000 (3%).

EM battery ranges could cruise from 50 to 120 km range which is very applicable to our short road extends from Buota bridge to Betio with a total distance of around 36km.

EM may have a higher initial purchase price than their ICE counterparts, but the running costs (electricity versus fuel) and maintenance are significantly lower, making them a potentially cheaper option in the long run. However, according to recent price of EM available online from Alibaba in 2025, the acquisition price is now very comparable and some are cheaper than ICE sold locally.

4.2. Identification of barriers for technology

The Market Mapping tools were used in the identification of barriers and solutions for Electric Motorbike since it is considered to be market goods to be imported by local suppliers and sold to private users. Refer to Annex 2, Technology Priority 2 – Electric Motorcycle (EM) - Market Mapping for Electric motorbike.

4.2.1. Economic and financial barriers

High Investment Cost: In comparison with ICE motorbikes, Electric motorbike (EM) requires high capital cost. Currently average price of EMs is approximately 3 times higher than the price of ICEs. Following are elements identified:

- Acquisition costs for EM and charging systems have been identified as major market restraints.
- Cost for technical training to and local dealers and private mechanics for EM

4.2.2. Non-financial barriers

The non-financial barriers identified for Electric Buses also applies for Electric Motorbikes but following are more deliberated batteries during the working group discussion:

- Currently, there are no qualified and trained mechanics who has experience and certification for supplying and repairing EMs.
- There are limited qualified technicians to install, operate and maintain public solar charging station.
- There is no existing charging station for EMs or suppliers selling solar charging systems suitable for EMs.
- Lack and incompatibility of spare parts
- Lack of awareness despite EMs lower import duty rates as they not considered as ICE engines where duty is calculated on the engine size, public is not aware regarding these incentives. Furthermore, lack of advocacy for EMs that can be easily charged at home using basic solar panels and controller during the day.
- There are no clear mandates for regulation or policy making regarding the import and operation and maintenance requirement of EMs.

4.3. Identified measures

The following economic and financial measures and non-financial mechanisms were identified by the working group. Refer to Annex 2, Technology Priority 2 – Electric Motorcycle (EM) - Market Mapping for Electric motorbike.

4.3.1 Economic and financial measures

• Fiscal Incentives provided for the private sector EM suppliers, public solar charging suppliers and mechanics such soft loan schemes for acquisition and training cost.

After opening the market for EM, the next set of policies is to support the solar charging stations through direct incentives for charging infrastructure. Having reliable and abundant EV charging facilities becomes increasingly significant for EV adoption, with its effects adding up over the years (GGGI,2022). The number of available solar charging facilities and affordability of home solar charging systems can boost the EM consumers need to buy as a best alternative for repetitive fuel outages and price increase as experienced in the outer islands.

4.3.2 Non-financial measures

- Kiribati Institute of Technology (KIT) include training modules or syllabus for mechanics to repair EMs.
- KIT include training modules or syllabus technicians to install, operate and maintain public solar charging station.
- Established charging station for EMs and suppliers selling solar charging systems suitable for EMs.
- Compatible spare parts are available.
- Conduct awareness campaigns and promotion for EMs to potential suppliers and customers in zero gasoline reliance, zero emission and can also be charged at home more beneficial for outer island rural customer where fuel outage is a severe issue.
- Formulation of clear mandates for regulation or policy making regarding the import and operation and maintenance requirement of EMs.

5. Electric SUVs/Saloon cars

5.1. General description of technology

Electric SUVs/saloon cars or now selected as Battery electric vehicle (BEV) is an all-electric vehicle that uses a battery pack to store the electrical energy that powers the drive motor. BEV are charged by plugging in to an electric power source while some models use swap battery system.

Electric car sales neared 14 million in 2023, 95% of which were in China, Europe and the United States. Almost 14 million new electric cars1 were registered globally in 2023, bringing their total number on the roads to 40 million, closely tracking the sales forecast from the 2023 edition of the Global EV Outlook (GEVO-2023). Electric car sales in 2023 were 3.5 million higher than in 2022, a 35% year-on-year increase. These trends in Figure 6 below indicate that growth remains robust as electric car markets mature. Battery electric cars accounted for 70% of the electric car stock in 2023 (IEA,2024).

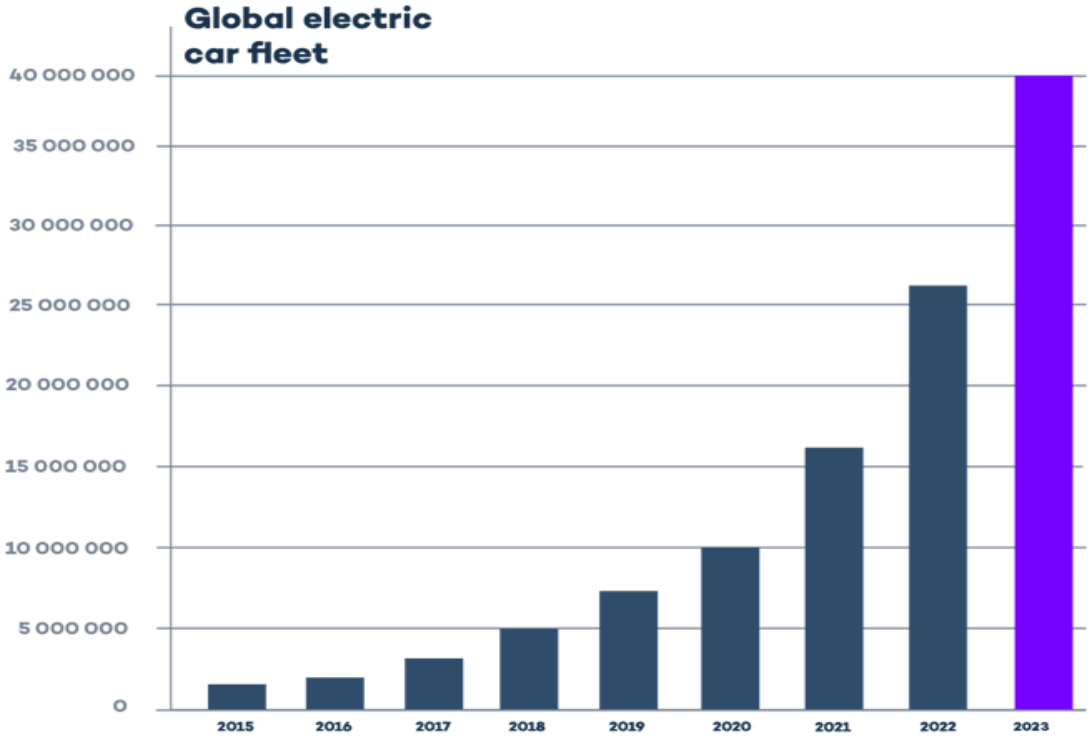

Figure 5; Global electric car trends (Source: IEA)

According to Wetterhahn (2022) the cost gap between BEV and ICE continues to decrease each year while in some circumstances, EVs are now cheaper to run. When comparing costs, it is essential to look at the total cost of ownership such as maintenance cost, energy and fuel cost and tire repair. However, in most situations in Europe – BEV are already cheaper than ICE vehicles, assuming costs are averaged over the first four years of ownership and an annual mileage.

5.2. Identification of barriers for technology

As discussed earlier for the identification of barriers to Electric Bus, the group realized that the same barriers are also applicable for BEV for SUVs and saloon cars. Therefore, the same financial and non-financial barriers will be used for this technology.

5.2.3. Economic and financial barriers

Economics seem to be at the forefront of themes impending widespread EV adoption, with diverse studies identifying high upfront costs as the most common or well-known factor. The average cost of EVs remains higher than that of internal combustion engine (ICE) vehicles, with many consumers repelled by the high manufacturing costs driven by advanced EV production technology. Providing incentives to reduce the upfront costs is an important asset since the largest barrier to EV adoption is the market price difference between EVs and ICE vehicles. (GGGI, 2022)

The stakeholders group confirmed that Electric Bus financial barriers are also applicable for BEV and duplicated in the log frame analysis shown in Annex 2 for Technology Priority 3 - Government Electric SUVs/saloon car problem tree, Table 9 shows the identified the Economic and Financial barriers by the Stakeholders.

Table 9: Financial Barriers for Electric SUVs/Saloon cars

Barriers Cause	Element of barriers
High investment cost	High capital cost Complex logistics issues is blamed for the high import cost of BEB and charging infrastructures. Poor inter/intra connectivity (Geographical Remoteness setting) Shipping routes from main suppliers of BEB and charging systems is another barrier in the shipment cost as most container routes have to transit in a number ports before arriving in Tarawa Port and then in outer islands accumulating the transshipment costs.
	Unavailable funds will not support institution in developing and providing training courses on electric vehicles and solar charging as one of its syllabuses. The Kiribati Institute of Technology (KIT) is currently proving training courses for mechanics, electricians and solar energy as part of its syllabuses. But need expert lecturers and practical models and laboratory to add electric vehicles and solar charging as part of its course or syllabuses. Fund is needed to recruit Experts or Lecturers who can become teachers for the KIT for the new course on electric vehicles and solar charging stations. Lack of local technicians trained and certified to carry out maintenance on electric vehicles and solar charging stations can be addressed if fund are available to KIT and the new course with lecturers.

5.2.3. Non-financial barriers

The group identified barriers are convenience and the waiting time needed for charging. This is also exemplified by GGGI (2022) where convenience is explored as the last category of EV adoption criteria, and how well the infrastructure is ready to support electromobility. Since EVs are highly dependent on charging infrastructure availability, the lack of charging stations directly affects consumers' openness to purchasing an EV.

The stakeholders group confirmed that barrier identified for Electric Bus non-financial barriers are also applicable for BEV and duplicated in the log frame analysis shown in Annex 2 for Technology Priority 3 - Government Electric SUVs/saloon car problem tree. Table 10 shows the identified the Non-financial barriers by the Stakeholders.

Table 10: Non-financial barriers for Electric SUVs/saloon cars

Barriers	Element of barriers
Limited infrastructure and suppliers	Unavailability of local supplier for electric vehicles in particular BEBs
	Unavailability of existing electric charging station currently. Limited power capacity for electric charging as the current PUB grid is under stress now with load shedding and black out due to the skyrocketing electricity demand from private and business sectors. Aging diesel generators used by PUB for the grid on the main island and will require repetitive maintenance and outages not reliable for charging BEVs whenever needed. This will impact an inconveniency charging station from Inefficient refilling or slow charging time impact on BEBs.
Lack of coordination	Information fragmentation among line agencies (Government ministries and SOEs) who work according to their roles and responsibilities. Individual knowledge and understanding among agencies may be different to another agency and there is no framework to levelized it across line agencies.
	Individual priority. Line agencies (Government ministries and SOEs) have their own priority and tends to work for their own interest and benefits.
	Lack of policy makers' support was considered why electric vehicle had not been adopted in Kiribati. It support has been provided, then EV could had been adopted in a sustainable and affordable manner.

Lack of regulation and policy	Absence in Government manifesto for EV adoption was identified in all previous and current government manifesto and may be this is why the adoption of EV was never eventuated.
	Lack of standard and certification was identified to be a critical barrier for the adoption of EV Lack of safety can be uncompromised if technicians not formally trained and certified are allowed to operate and maintain BEVs and solar charging station.
	Gender inequality came up with stakeholders in the sense that technician and operators also include women for equal opportunity and income generation.
Poor behavioural cultural/ social norm	Lack of awareness was identified a cause for the low adoption of EV. Also, stakeholders are not sure on the right government agency responsible to facilitate the promotion, awareness and marketing of EV nationally.
	Ignorant mindset of some users or passengers was identified as another issue to minimise the air condition cooling for saving the battery energy.

5.3. Identified measures

As discussed earlier on the same situational analysis, the identification of measures to Electric Bus, the group also confirmed that the same barriers are also applicable for BEV for SUVs and saloon cars. Therefore, the same financial and non-financial measures will be used for this technology.

5.3.1. Economic and financial measures

Table 11 shows the identified the financial measures by the Stakeholders.

Table 11: Financial measures for Electric SUVs/Saloon Car

Solution	Element of solutions
Investment fund developed	Affordable capital cost for BEVs. Shipping routes from main suppliers of BEVs and charging systems is improved providing direct shipping lines from supplier to Tarawa Port and minimizing transit times. Local shipment is improved to be more cost saving for transporting BEVs and solar charging stations to outer islands.

	Strengthen institutions. KIT is strengthened and improved to carry out training courses for EV and solar charging station to students. Pool of Experts on EV and solar charging are readily available as new lecturers' post at KIT. Training courses and syllabuses developed for EV and solar charging stations.

5.3.2. Non-financial measures

The following Table 12 shows the non- financial measures identified by the Stakeholders.

Table 12: Non-financial measures for Electric SUVs/Saloon cars

Causes	Element of Causes
Established infrastructure and suppliers	Availability of supplier who can supply quality BEBs and provide backup services.
	Availability of electric charging station in respective ministries and SOEs for their BEBs Reliable and convenient charging now possible. New independent solar charging station developed for efficient an fast charging of BEBs.
Improved coordination	Information centralisation among line agencies (Government ministries and SOEs) who work jointly together on their roles and responsibilities and update one another through monthly meetings or central database developed. Individual knowledge and understanding among agencies may be different to another agency and there is no framework to levelized it across line agencies.
	Inclusive priorities developed coordinated among from line ministries and agencies to guide monitoring and compliance needed for EVs.
Developed regulation and policy	Policy makers' now support electric vehicle to be adopted and end ICE in Kiribati to meet its zero-carbon target in the land transport. Government manifesto for EV adoption will be included new government manifesto to support the adoption of EV.

	Stringent standard and certification are developed for electric vehicles and solar charging stations including certification of technicians, mechanics and drivers. Safety assurance now provided for technicians, mechanics and drivers to operate and maintain BEVs and solar charging station.
	Gender equality is honoured where women have equal opportunity and income generation as drivers or mechanics.
Conducive behavioural, cultural/ social norm	Increase in awareness for safe keeping and looking after BEBs by users.
	Open minded by users on how to conserve battery energy on BEBs

6. Linkages of the barriers identified

Most of the barriers identified in the analysis apply to all technologies and this is due to non-existence of EV dealers and infrastructure in the country.

The common barriers identified:

- High investment and acquisition cost.
- Limited infrastructure and suppliers
- Lack of coordination
- Lack of regulation and policy
- Poor behavioral cultural/ social norm

Due to its high investment cost and inconvenience as discussed earlier, EV had been neglected in government priorities as compared to the more affordable and convenience ICE vehicles. Furthermore, EV is a new technology coming to market in the early 2012 and people have been relying and trusting ICE vehicles since the 1960s in Kiribati.

Since 2020, EV shows a tremendous leap and becoming now the alternative for ICE vehicles in developed countries and more in Asia where petroleum fuel is not their resources but relying from OPEC countries for the oil supply. In Kiribati, we had been relying on petroleum fuel for our transport sector but our case is more complicated when it comes to petroleum supply agreement as we are located in a very remote location and transshipment of refined petroleum products is a real issue for price increase imported from oil refineries in Asia.

Enabling framework for overcoming the barriers in the land transport sector.

6.1. High investment and acquisition cost.

The group select a suitable enabling framework for the public provided goods and consumer goods:

Publicly provided goods on bus and SUVs

- Complex logistics was identified as the major barrier responsible for the high capital cost to EV and solar charging systems. The group recommends the application of various incentives such as import duties, customs taxes, excise taxes, and other tariffs related to international trade to make EV imports more affordable and appealing.
- The lack of confident and competent of the public for the safety of EV as a public transport is another barrier. The group recommend that fundings are streamed to strengthen KIT to carry out training for EV and solar charging station and certification to students to be employed in EV workshops and solar charging stations when established.

Consumer goods for electric motorbike

- To address the high capital costs of Electric motorbikes, financial risk management strategies are essential along with government incentives and tax reductions or exemptions to bring cost down.
- To address the acquisition cost issue for solar charging financial risk management strategies are essential for along with government incentives and tax reductions or exemptions to lower cost. In the outer islands, users are recommended to buy simple essential solar systems (500Wp panel and MPPT controller and cables) for charging at home their electric motorbikes independently.
- The lack of confident and competent of the public for the safety of EV as a public transport is another barrier. The group recommend that fundings are made available to strengthen KIT to carry out training for electric motorbike repair and solar charging training and certification to students and private business interested in EV.

6.2. Limited infrastructure and suppliers

Publicly provided goods on bus and SUVs

- Lack of Supplier

The PVU is strengthened with technical and financial capacities on EV and assigned to lead the import and repair to Government and SOEs EVs. Injection of fund for capacity building of technical staff, tools for maintenance and spare part stocks inventory.

- Lack of charging stations

KGES is strengthened with technical and financial capacities to assist Government ministries and SOEs in setting up their respective solar charging stations and

training operators trained and certified from KIT responsible for the solar charging EVs.

Consumer goods for electric motorbike

- Lack of Supplier

Government incentives such as import duties, customs taxes, excise taxes, and other tariffs related to international trade to make EV imports more affordable and appealing including Loan schemes are made available for the private sectors interested in importing and selling electric motorbikes locally.

- Lack of charging stations

The group recommends that private sectors are assisted financially and fund available building solar charging infrastructures for the public. In addition, in rural areas financial assistance will be made available for locals to afford the simple solar charging components for electric motorbikes.

6.3. Lack of coordination

Publicly provided goods on bus and SUVs

The Ministry of Transport (MICTD) as a lead in the transport sector in collaboration with the Office of Beretitenti CCDRM, Ministry of Finance and Economic Development, Ministry of Infrastructure and Sustainable Energy, Environment Conservation Division (MELAD) and key SOEs like KLTA, PVU, KGES will need to work together to share information and to be inclusive when carrying out their various mandates for the diffusion of Electric Vehicles in the land transport sector as the most reliable and clean vehicle alternative.

Furthermore, these entities responsible for deploying these EV must design a communication strategy and education campaign to change cultural attitudes towards transportation innovations that mitigate climate change and advance sustainable development.

Consumer goods for electric motorbike

The group also identified that information sharing to private sector was another barrier whereby there is limited interest for local dealers to supply electric motorbikes.

Responsible government entities will need to share information and provide technical support to local private businesses to encourage them in supplying electric motorbikes and simple cheap solar charging system especially for the outer islands where petroleum fuel outages is a great issue.

6.4. Lack of regulation and policy

The group identified enabling framework for the lack of regulation and policy on EVs is both applicable for the public provided good and consumer good. The group recommended the development of policies involving all key stakeholders, along with the establishment of targets, mandates, and national policies to address the lack of policies and policy actions for EVs. In order to meet our NDC Target, it is imperative to promote EVs to meet our NDC targets. Provision of financial policies to address high acquisition cost for the EVs, spare parts and solar charging will support the EVs diffusion. It may be necessary to develop technical standards policy for the battery-powered EVs and solar charging systems rather than grid charging due to the limited capacity of the grid power.

6.5. Poor behavioral cultural/ social norm

Lastly, the group also identified mainly for the publicly provided goods that effective promotions and awareness is carried out to civil servants and drivers to address the key challenges for efficiency on public EV transports. EVs' motor propulsion efficiency may be affected by accessory loads such as passenger load exceeded and driving styles such as repetitive accelerating and inconstant cruising. In addition, the use of air condition and very cold temperature control will consume up the EVs' battery much sooner. Furthermore, the excessive use of stereo with powerful sounds and subwoofers consume a lot of energy and will also drain the battery. Therefore, use of natural wind and open windows for cooling and minimal stereo use could help in conserving the battery capacity for motor propulsion only.

7. Conclusions

The BAEF was completed utilizing the guidelines and methodology provided by key stakeholders group during the 2 days Retreat workshop. Despite the limited time, the stakeholders' representatives were very pragmatic and keen to share their insights and experience for a new technology rarely introduced in Kiribati.

The BAEF report has identified potential barriers and measures for the deployment and diffusion of electric vehicles in accordance to the priorities. Based on the categorization, ranking, and decomposition of the barriers, a common pattern emerged, the barriers was compiled under six main categories: economic, institutional, legal/regulatory, technical/capacity, resources/information, and social/cultural.

Financial barriers for acquisition of EV, solar charging and human resource capacity building were identified as important economic barriers for the diffusion of EV in Kiribati and the group all agree to seek donor funding to mobilize the diffusion.

Other non-financial measures can be aligned and developed by responsible agencies identified to develop the plans and regulation needed for diffusing the EV technology smoothly including safe guards.

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Annex 2 - Market maps and problem trees,

Technology Priority 1 – Government Electric Bus

Figure 1a. Problem tree – Government Electric Bus

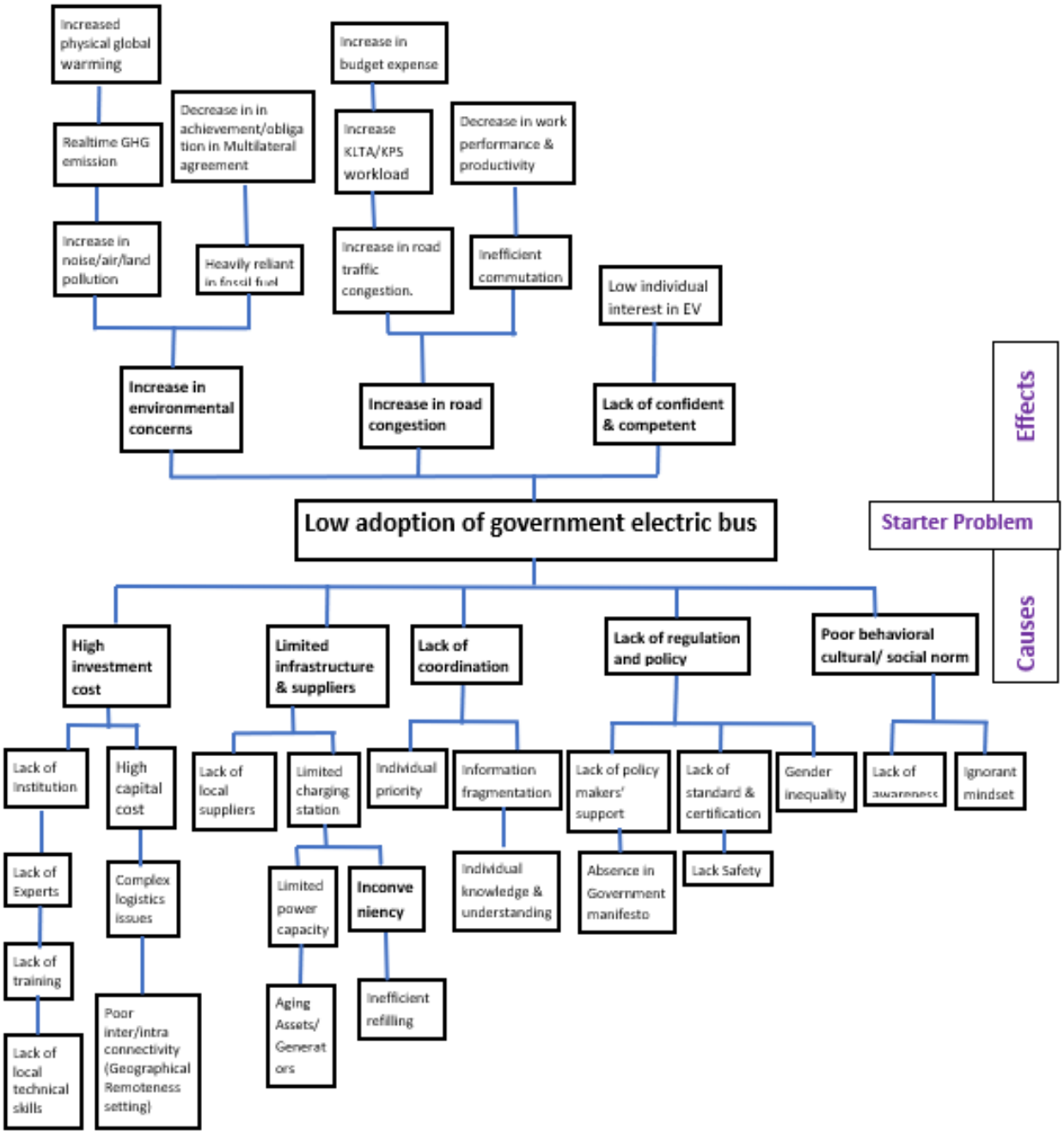
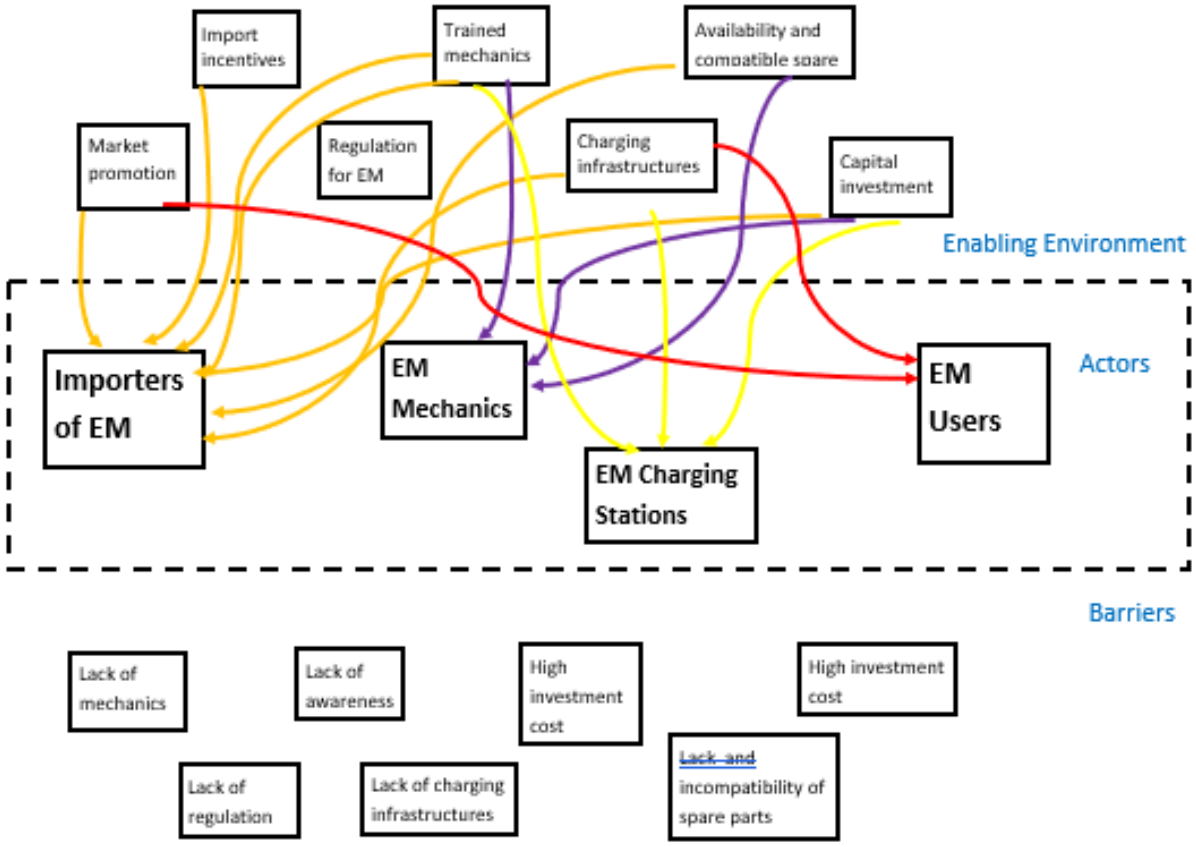


Figure 1b. Solution Tree – Government Electric Bus

Technology Priority 2 – Electric Motorcycle (EM)

Figure 2a. Market Mapping for Electric motorbike



Technology Priority 3 - Government Electric SUVs/saloon car

Figure 3a. Problem Tree – Government Electric SUVs/saloon car

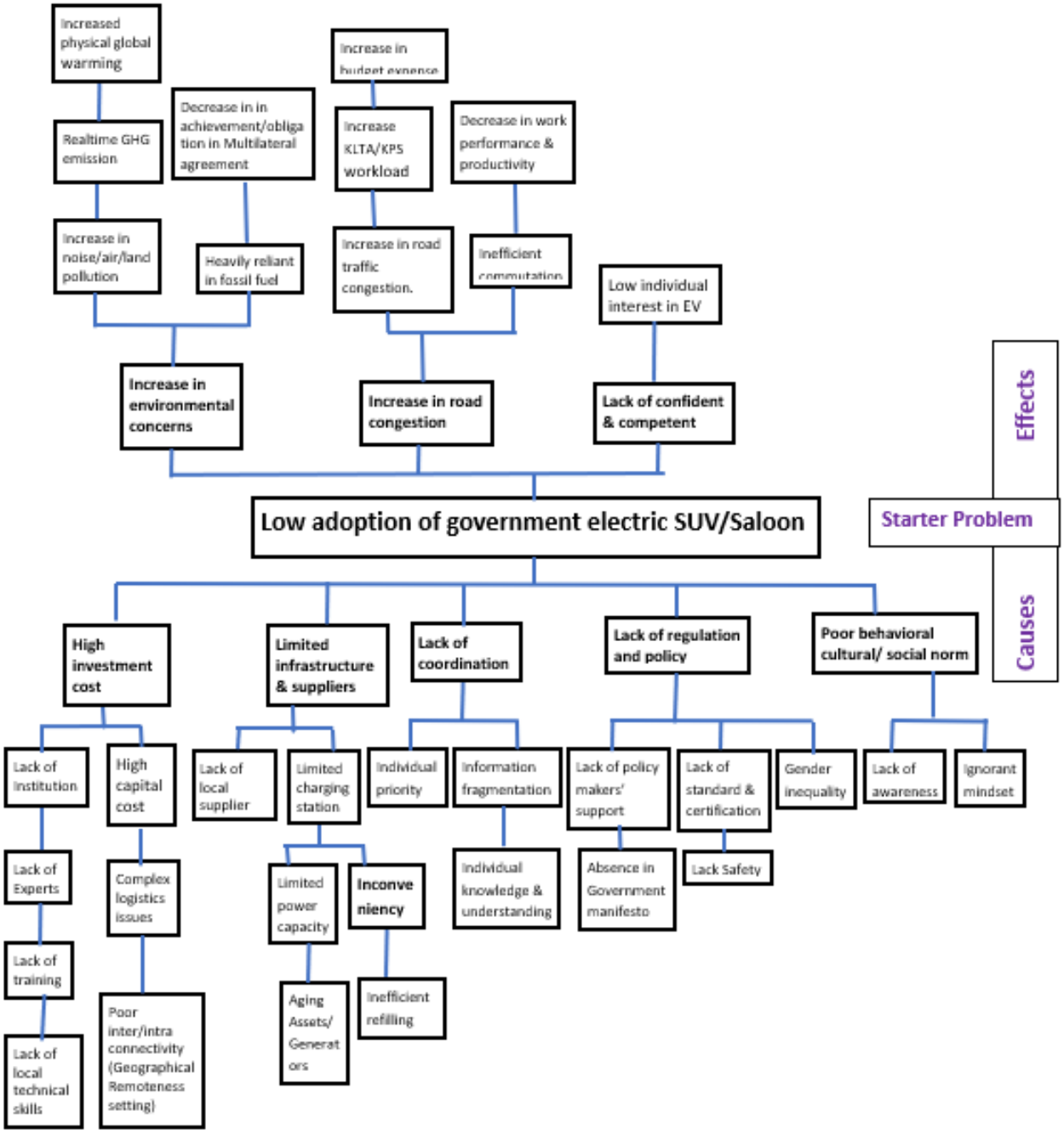
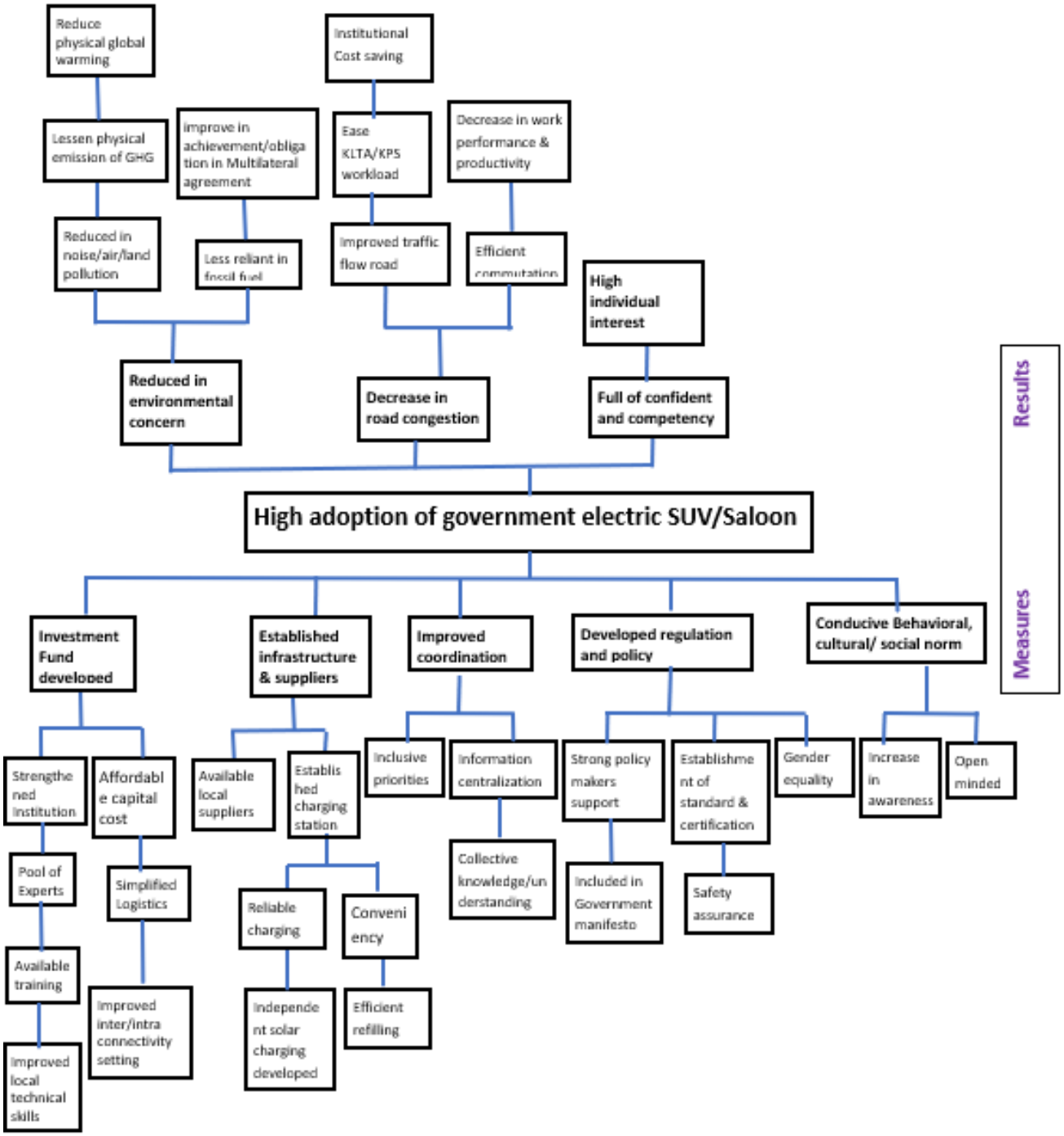


Figure 3b. Solution Tree – Government Electric SUVs/saloon car



Annex 3- Stakeholders

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Tarawaniman Iamti	Ministry of Women	tarawaniman.iamti@mwyssa.gov.ki
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