

KINGDOM OF TONGA

TNA MITIGATION FOR CLIMATE CHANGE TECHNOLOGIES

Technology Action Plan (TAP)

Report

(January, 2025)





TECHNOLOGY ACTION PLAN REPORT FOR CLIMATE CHANGE TECHNOLOGIES

Author: Dr Tevita Tukunga Former Director of Energy Current Director of the Board of Utilities

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2 List of Abbreviation

AC – Alternating Current ADB – Asian Development Bank **BAEF-** Barrier and Analysis and Enabling Framework **BAU - Business-As-Usual** BESS – Battery Energy Storage System CNBC – Consumer News and Business Channel CTCN – Climate Technology Centre and Network DC – Direct Current **EE** – Energy Efficiency Eff - Efficiency EU – European Union ESCAP - Economic and Social Commission for Asia and the Pacific **EV** – Electric Vehicle GCF - Green Climate Fund **GEF-** Global Environment Facility GHGs - Green House Gases GGGI – Global Green Growth Institute GOT – Government of Tonga **ICE** – Internal Combustion Engine IEA – International Energy Agency IMF - International Monetary Fund INDC – Intended Nationally Determined Contribution IPCC –Inter-governmental Panels on Climate Change **IPP-** Independent Power Producers IRENA – International Renewable Energy Agency LED – Light Emitting Diode MCA – Multi-Criteria Analysis MEIDECC - Ministry of Meteorology, Energy, Information, Disaster, Environment, Climate Change and Communication **Climate Change Policy** NEXSTEP - National Expert SDG Tool for Energy Planning NDC - Nationally Determined Contribution NDC IP - Nationally Determined Contribution Implementation Plan NREL - National Renewable Energy Laboratory O&M – Operation and Maintenance OIREP – Outer Islands Renewable Energy Project PCREEE – Pacific Centre for Renewable Energy and Energy Efficiency PICs – Pacific Island Countries PPA – Power Purchase Agreement PV – Photovoltaic **RE - Renewable Energy** SHS – Solar Home System SIDS – Smal Islands Developing States **TAPs** -Technology Action Plans

TEC - Tonga Electricity Commission

TERM - Tonga Energy Road Map

TERM – IU Tonga Energy Road Map Implementation Unit

TEEMP – Tonga Energy Efficiency Master Plan

TNA – Technology Needs Assessment

TNC = Third National Communication

TOP – Tongan Paanga, \$

TPL – Tonga Power Limited

TREP – Tonga Renewable Energy Project

UNDP – United Nation Development Programme

UNEP - United Nations Environment Programme

UNEP/CCC-United Nations Environment Programme (UNEP) and Copenhagen Climate Centre)

UNFCCC - United Nation Framework Convention Climate Change

V2G – Vehicle to Grid

V2H – Vehicle to Home

3 FOREWORD

The Kingdom of Tonga has successfully conducted a Technology Needs Assessment (TNA) aimed at addressing the negative impacts of climate change on the mitigation sector. This initiative was launched following a stakeholder meeting held in 2023. The completed TNA report, along with the BAEF report, has led to the identification and prioritization of technologies related to energy and transportation, as well as the recognition of barriers and the enabling framework that Tonga must adopt to tackle climate change challenges. Tonga's commitment to the TNA process is evident in its ability to incorporate an action plan and the necessary activities for implementing specific measures to combat the adverse effects of climate change within the nation. The country has experienced significant challenges, including severe cyclones, flooding, and extreme temperatures, compounded by erratic rainfall patterns during the wet season and rising average temperatures, all of which have adversely impacted the livelihoods and wellbeing of its population. The frequency of such climatic events is expected to rise, posing a threat to the developmental progress made over recent decades due to the consequences of climate change. Consequently, Tonga, in partnership with other small island nations, recognizes the importance of fostering global initiatives to mitigate climate change through Technology Needs Assessments (TNA).

The TNA process aimed at climate change mitigation in Tonga has resulted in three interrelated reports that collectively summarize its findings:

1. Technology Needs Assessment Report - This report delineates the methodology utilized in the Technology Needs Assessment (TNA) process, providing a comprehensive overview of how different sectors and technologies were identified and prioritized. The Energy and Transportation sectors were identified as the key focal points for climate change mitigation, resulting in their selection for detailed analysis. Within each sector, three specific technologies were selected for the energy sector: on-grid photovoltaic systems, on-grid wind energy, and energy-efficient appliances. Additionally, three technologies were chosen for the transportation sector: battery electric vehicles, hybrid vehicles, and on-grid electric vehicles, to facilitate a thorough examination of the associated barriers.

2. Barrier Analysis and Enabling Framework Report - This document emphasizes the obstacles to technology diffusion recognized by stakeholders, as well as the fundamental reasons behind these challenges. Additionally, it delineates the essential measures and enabling framework needed to facilitate technology diffusion across the relevant sectors and for each chosen technology.

3. Technology Action Plans - This report has been finalized and is presented below as a significant component of this document. It outlines the essential steps and actions necessary for the effective dissemination of each prioritized mitigation technology within the energy and transportation sectors. The primary actions to facilitate technology

diffusion encompass: a) recruitment of a team as institutional arrangement for implementation of Technology Action Plan b) conducting research to evaluate the economic feasibility of the technologies, c) implementing initiatives to raise public awareness, d) identifying financing opportunities for technology and creating financial incentives and opportunities, and collaborating with development organizations to obtain financing, e) procurement of pilot projects and identifying and evaluating supportive policies and legislation, and f) Maintenance, testing, management of the project improving institutional frameworks and fostering collaboration

4. We can now compile a project concept and proposal based on the three reports mentioned above, as the concluding phase of the TNA assessment in Tonga to be addressed as final deliverable of the TNA report.

I would like to express my sincere appreciation to all stakeholders who have been involved in this process over the past two to three years. I extend special thanks to our partners, including the United Nations Environment Programme (UNEP) and the UNEP Copenhagen Climate Centre (UNEPCCC), along with the Regional Energy Research Centre at the University of the South Pacific and GEF, for their invaluable financial support of the TNA process in Tonga.

I would like to take this opportunity to acknowledge the significant contributions made by our Consultants, including Dr. Tevita Tukunga from the Board of Utilities of Tonga, Dr. Subash, and Dr. Sandra from UNEPCCC, and Dr. Hilda from USP. Their efforts have been vital in guiding the process and consolidating the insights gathered from stakeholder consultations into the aforementioned reports. It is essential that we collaborate effectively to ensure that the outcomes of this comprehensive process lead to impactful and actionable initiatives on the ground. The Department of Energy and the Department of Climate Change within the Ministry of MEIDECC in the Kingdom of Tonga have prioritized climate change on their agenda. Project coordinator Mr. Filimone Fifita, the Director of the Department of Energy, Ms. Emeline Veikoso Laumanu , and I are committed to diligently progressing the identified projects. We will require the ongoing support of all stakeholders involved.



4 Executive Summary

The primary objective of the TNA project is to support countries that are Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in identifying their technology priorities for reducing greenhouse gas emissions and adapting to the impacts of climate change. The TNA encompasses both mitigation and adaptation components, which are carried out in three phases, resulting in three distinct reports: the Technology Needs Assessment Report (TNA) focusing on technology prioritization; the Barriers Analysis and Enabling Framework Report (BA&EF); and the Technology Action Plan (TAP) report.

Under the financial assistance of the Global Environment Facility, which was carried out by UNEPCCC, the Department of Energy of the Ministry of Meteorology, Energy, Information, Disaster, Environment, Climate Change and Communication (MEIDECC) of the Kingdom of Tonga coordinated the many multi-stakeholders' the Technology Action Plan (TAP) assessment of the six prioritized climate technologies.

This final report, referred to as the TAP, expands on the insights gathered from previous reports and integrates feedback from stakeholders concerning key decisions. The main aim of the TAP is to outline a strategic action plan for the prioritized technologies identified in the first stage (TNA report), which were later assessed for implementation challenges in the second stage (BAEF report). In this latter phase (TAP report), strategies to tackle the identified barriers for each technology were also deliberated. As a result, the BAEF analysis was instrumental in informing the TAP for each technology. In this regard, the strategies devised to overcome obstacles were transformed into critical actions designed to support the effective deployment of the technology.

A consensus was reached to evaluate six specific technologies: on-grid solar (PV) systems, on-grid wind power system, energy efficient home appliances, EV battery vehicle, hybrid vehicle and electric vehicles (EVs) grid connected vehicle. Given the similarities in barriers and strategies for three stated technologies in the energy sector, these three technologies were combined into a single Technology Action Plan (TAP) focused on energy sector. Given the similarities in barriers and strategies for three stated technologies were combined into a single Technology Action Plan (TAP) focused on energy sector. Given the similarities in barriers and strategies for three stated technologies in the transport sector, these three technologies were combined into a single TAP focused on transport sector. The overarching objectives for each TAP are driven by the necessity for inclusive economic growth and development, while also prioritizing environmental sustainability. Essentially, the TAP aims to foster the sustainable development of the Kingdom of Tonga. As highlighted in the Technology Needs Assessment (TNA) and the Barriers Analysis and Enabling Framework (BA&EF) Reports, the primary goals of the TNA-Mitigation are to support:

- 1. Sustainable economic development
- 2. Poverty alleviation through enhanced employment opportunities or income
- 3. Climate change mitigation and environmental protection.

4.1 Objective of the Technologies Action Plan (TAP) for Mitigation

The TAP plays a significant role in advancing two essential sustainable development goals: SDG 7, which promotes sustainable energy access for all, and SDG 13, which addresses the challenges of climate change. The initiatives outlined in this report demonstrate how the TAP can effectively support these goals. From a sustainable development standpoint, the TAP not only fosters socio-economic growth in Tonga but also emphasizes social inclusion and aims to minimize the island's carbon footprint. Furthermore, the climate change policy for Tonga outlines the vision and objectives necessary for addressing climate change on the island. In conjunction with this, the Nationally Determined Contribution (NDC) sets specific targets for reducing greenhouse gas (GHG) emissions, with an overarching goal of achieving a 30% reduction by 2025 compared to 2010 levels, and an indicative target of 40% reduction by 2030 (GOT,2020a).

4.2 Key Sectors and Technologies for TAP

4.2.1 National Target for Energy Sector

In 2024, the Prime Minister of Tonga, Hon Hu'akavameiliku, emphasized the significance of the government's objective to achieve 70% renewable energy by 2025 through the new RAPID PROJECT (TPL, 2024). However, it may be wise to adopt the findings of the TNA, thus consider the technology action plans both energy and transportation sectors in the race to achieve 70% renewable energy or 100% renewable in the Kingdom.

4.2.2 Prioritised Technologies for TAP

The two sectors identified for the Technology Needs Assessment (TNA) process in the Kingdom of Tonga are: (1) energy and (2) transportation, encompassing a total of six technologies. This Technology Action Plan (TAP) report outlines these six prioritized technologies for each sector, as detailed below:

- 1. Technologies for the energy sector include:
- i. On-grid photovoltaic (PV) systems
- ii. On-grid wind energy
- iii. Energy-efficient home appliances

2. Technologies for the transportation sector comprise:

- i. Battery electric vehicles (EVs)
- ii. Hybrid vehicles
- iii. On-grid electric vehicles (EVs)

4.2.3 Development of TAP.

The Technical Assistance Plan (TAP) was formulated through a participatory methodology based on the preceding steps of the Training Needs Assessment (TNA), including TNA report and BAEF report for Mitigation. A diverse array of stakeholders,

encompassing individuals from both the public and private sectors, along with members of the TNA Steering Committee, were engaged to ascertain that the selected measures are fitting for the context of Tonga.

This process employed several guiding criteria, including:

- 1) Effectiveness: To what extent do these actions facilitate the achievement of the implementation target?
- 2) Efficiency: Does the action promote implementation at the minimal possible cost regarding human and financial resources?
- 3) Interactions: Is the action in harmony with existing policies?
- 4) Suitability: Are the actions appropriately aligned with the country's context?
- 5) Cost and benefits: Do the expected benefits surpass the anticipated social, environmental, and economic costs?

The identified measures were subsequently transformed into specific actions, with each action delineated into activities that include established deadlines and associated costs.

The following technology descriptions are provided as Policy and Advocacy Brief for each technology to guide the action plan and activities for the technology.

- 4.3 Policy Brief for Prioritized Mitigation Technologies
- 4.3.1 Energy Sector
- 4.3.1.1 On-Grid Solar (PV) Systems

4.3.1.1.1 Technical Description OF On-Grid PV

The on-grid photovoltaic (PV) system is engineered to generate approximately 20 MW of solar energy alongside 50 MWh of battery storage capacity. This initiative is aligned with the national goal of achieving 70% renewable energy by 2025, with an ambitious long-term objective of reaching a complete 100% renewable energy share by 2035 (TPL, 2024). This 20MW solar farm/50MWh BESS on-grid photovoltaic system is making a significant contribution towards achieving the target of a 50% share of renewable energy by 2020, a 70% share by 2025, and a 100% share by 2035. The TAP connection to the on-grid network will be established through three distinct methods: first, by connecting the network to a solar farm located on the main islands; second, by linking the electricity network to rooftop installations on the main islands; and third, by connecting micro-grid networks in remote islands to smaller photovoltaic farms

The total hardware cost/budget for this TAP is approximately 50m USD for on-grid PV and 30m USD for PV on-grid Rooftop and 20m USD for remote islands individual on-grid networks. The actual costs and benefits will be contingent upon the least cost procurement process and methodology employed.

4.3.1.1.2 Climate Rationale of On-Grid PV

Tonga INDC report in 2015 reported a total of 69.1 Gigagrams of carbon emissions from electricity and 15.0 Gigagrams of GHG emissions from other energy sources compared to 120.2 Gigagrams of GHG from Transportation sector (GOT, 2020a). The Tonga Third National Communication in 2019 reported 40.2 Gigagrams of GHG from electricity and 7.8 Gigagrams of GHG from other energy compare to 72.3 Gigagrams of GHG emissions from the Transportation sector (GOT, 2020a).

The Tonga Energy Efficiency Master Plan Report in 2021 indicates that a 50% reduction in emissions by 2030 is achievable, using 2020 as the baseline year. This translates to a decrease from the business-as-usual (BAU) emissions of 210,000 metric tonnes of CO2 equivalent (UNCTCN, 2020).

4.3.1.1.3 Ambition of the Technology

The TAP aims to enhance socio-economic development by providing approximately 20MW/50MWh of on-grid electricity to the main electricity grids as well as adding new micro-grids to households and communities in remote islands addressing energy poverty, thereby further soliciting the complete share of renewable energy to help mitigate the adverse impacts of climate change. The project is also intended to enhance the existing 100% renewable power generation, which is currently operational in eight remote islands of Tonga, by extending its reach to additional outer islands and integrating their electricity networks into the renewable energy framework. Consequently, Tonga is on track to become the first small island nation in the South Pacific to achieve a 100% renewable energy share for its electricity micro-grids across all remote islands. Furthermore, to facilitate this transition towards a 100% renewable energy share in the capital and larger outer islands, a solar rooftop initiative has been proposed and included in the project to inform the decisions of the Kingdom's Electricity Boards.

4.3.1.1.4 Scale for Implementation and Timeline

This TAP on installing on-grid solar system-based in Tonga is scheduled from 2025 to 2027, beginning with recruiting consultants/local experts and establishing to the institutional set up to manage and assess the implementation of on-grid solar projects, energy storage, and infrastructure requirements. In 2025-2026, the focus will shift to engaging stakeholders from public and private sectors, including local communities, to ensure the technology meets Tonga's on-grid PV needs based on local contexts. Draft findings will be shared for feedback, promoting inclusivity and local buy-in. By 2026-2027, the project assessment and evaluation will be finalized, with results informing potential legislation to support renewable energy infrastructure, aligning with Tonga's low-carbon development objectives. By 2026-2030, the project will focused on installation of on-grid PV technologies according to three stages, including on-grid PV solar farm for capital island and other 3 main islands, on-grid solar forms for remaining 12 remote islands of Tonga, and finally the on-grid PV for solar roof-top.

4.3.1.1.5 Expected Impacts of the Technology

This strategy is anticipated to provide a more substantial impact on the national energy objectives than a solitary 20MW / 50MWh BESS and solar farm to the national electricity grid.

Renewable energy sources are expected to account for 40% of the reductions, or 43,500 metric tonnes of CO2e, while energy efficiency improvements in the electric sector will contribute 29.6%, amounting to 32,500 metric tonnes of CO2e (GOT, 2021c). Efforts in the ground transportation sector are projected to contribute to 30.4% of the total emissions reductions, equating to 33,400 metric tonnes of CO2e.

4.3.1.1.6 Ambition for Technology Readiness Level

The Technology Action Plan (TAP) outlines that this level of readiness encompasses essential activities such as the recruitment of specialists, acquisition of funding, and the execution of technical studies to assess the reliability and feasibility of on-grid photovoltaic systems, the established independent power producer (IPP) tariffs, and the opportunities for reducing emissions. Although on-grid solar-powered IPPs are already well-integrated, this project's technical assessment and evaluation seek to tailor these systems to align with Tonga's existing electricity infrastructure, regulatory framework, and local energy requirements. The current state of readiness is considered moderate, with the TAP specifying vital measures to improve readiness through focused capacity-building initiatives and collaboration with key stakeholders, thereby facilitating successful implementation.

4.3.1.1.7 Policy Actions for Technology Implementation

This Technology Action Plan (TAP) is well-suited to enhance the effectiveness and efficiency of on-grid PV initiatives, given the presence of established policies and ongoing projects related to solar farm connections to the grid, as well as policies and agreements for rooftop connections to the national grid and existing policy frameworks for micro-grid connections to solar farms on remote islands. The TAP is appropriate for the country's context, considering the current projects in place. Additionally, it offers cost benefits due to its potential to significantly reduce carbon emissions. Table 1 presents a comprehensive overview of the essential policies currently in place that pertain to on-grid solar power technology.

Name of Policy	Year of	Contents	
	Enacted		
1. National Climate Change Policy	2020	The purpose of the Tonga Climate Change Policy i to provide a clear vision, goal, and objectives to direct responses to climate change and disaster ris reduction over the next five years.	
2. National Energy Act	2021	A legislation to create the Ministry in charge of Energy, the Energy Commission, and the Regulatory Authorities, aimed at establishing a coherent institutional, regulatory, and policy	

Table 1: Existing Policies related to the dissemination of on-grid PV

		framework for the energy sector
3. Tonga Energy 20)10	TONGA ENERGY ROAD MAP (TERM) 2010-2020
Road Map		A Ten Year Road Map to Reduce Tonga's
		Vulnerability to Oil Price Shocks and to Achieve an
		Increase in Quality Access to Modern Energy
		Services in an Environmentally Sustainable Manner
4. Tonga Energy 20)21	The Tonga Energy Road Map 2021-2035
Road Map Plus		(TERMPLUS) is Tonga's national energy policy and
		15-year roadmap, to achieve ambitious renewable
		energy targets of 70% and 100% renewable
		electricity by 2025 and 2035, respectively, through
		actionable energy strategies.
5. Tonga INDC 20)15	Tonga's Intended Nationally Determined
		Contributions (INDC) – 2015 is designed for both
		reduced emission and increased investing in climate
		resilience, Tonga makes an explicit call for a more
		cost-effective national response and avoids the
		much bigger costs caused by climate inaction.
6. Tonga NDC 20)20	This NDC review process was designed to provide a
reports		formal framework within which governments
		would increase the ambition of their actions against
		climate change and reduce its GHG emission
		over time, with the intention that each successive
		NDC would represent a progression beyond a
		country's current NDC and ultimately allow to meet
		the aims of the Paris Agreement goal.
7. Tonga SDG 7 20)21	The key objective of this SDG 7 roadmap is to assist
Report		the Government of Tonga develop enabling policy
		measures to achieve the targets of SDG 7. This
		roadmap contains a matrix of technological options
		and enabling policy measures for the Government to
		consider. It presents several scenarios that have
		been developed using national data, considering
		existing energy policies and strategies, and
		reflecting on other development plans.
8. Tonga Grid 20)20	The primary objective of this grid connection code is
Code		to specify minimum technical and design grid
		connection requirements for Renewable Power
		Plants connected to or seeking connection to the
		Tonga Power Limited's network
9. Tonga Energy 20)21	This document builds on Tonga's ratification of the
Efficiency Master		Paris Agreement in 2016 and contains priority
Plan Report		ambitious and urgent actions that would contribute to
		pursuing targets in Tonga's Nationally Determined
		Contribution. The TEEMP represents the Tonga
		Government's commitment to join the global
		community in addressing the challenges of climate

		change and improving national energy security. It is a whole of government's approach to maximizing benefits from the low hanging fruits in energy efficiency
10. Tonga Green Climate Fund Country Programme(CP)	2018	The Tonga CP for the Green Climate Fund (GCF) is one of the outputs of Tonga's Green Climate Fund (GEF) Readiness and Preparatory Support programme. Tonga's – GCF CP consolidates nationally driven priorities for GCF support. The CP is to also guide international and regional GCF accredited entities and nationally accredited on the resilient development priorities that they should be focusing on and developed for GCF funding

4.3.1.1.8 Proposed Policies to Enhance Technology Implementation

The lack of a regulatory support framework within the existing concession contract for ongrid PV systems due to insufficient legislation and policies on ON-GRID PV systems currently hinders the inter-ministerial collaboration that is vital for effective implementation. Although the Ministry of MEIDECC has been provided with the approved Energy Act of 2021, it has yet to be utilized. It is essential to establish dedicated legislation or policies for solar power that emphasize the use and production of renewable energy sources in preference to traditional energy forms. This approach would facilitate a national shift towards sustainable energy and could enable the seamless integration of maximum solar power generated from solar farm projects into the existing grid. Furthermore, it seeks to enhance the institutional framework for electricity, ensuring that it can draw in the essential investments needed to achieve renewable energy objectives.

4.3.1.1.9 Cost for proposed Policies

The estimated cost for these activities is approximately USD 104,355,000 with the Department of Energy, MEIDECC serving as the primary implementing entity.

4.3.1.2 : On-grid Wind Power Systems.

4.3.1.2.1 Technical Description

The on-grid wind power project is ongoing of which JICA installed 1 MW of wind power project in 2019 and through China Aid, 2.3 MW of wind power is currently installing by a Chinese company in the eastern part of Tongatapu at a total cost of 20-23m USD. This TAP aims to build a total of 2.3MW on-grid wind power projects in the main island of Tongatapu, and other outer islands of Tonga after the installation of the China funded on-grid wind projects in 2025.

4.3.1.2.2 Climate Rationale of the Technology.

The currently installing wind project financed by China and other future follow up wind project will contribute to the achieving 70% or 100% share of RE in the country.

4.3.1.2.3 Scale for Implementation and Timeline

4.3.1.2.4 Expected Impacts of the Technology

TAP aims to establish on-grid wind power projects, targeting a reduction of GHG emissions by roughly 21,750 Metric Tonnes of CO2 equivalent. Furthermore, these wind power projects are expected to help power utility lower their diesel power energy-related operational expenses by approximately 20%.

4.3.1.2.5 Ambition for Technology Readiness Level

That represents a reduction from the BAU emissions of 210,000 metric tonnes of CO2e (UNCTCN, 2020c). Renewable electricity is responsible for 40% (43,500 metric tonnes CO2 emissions (UNCTCN, 2020c).

4.3.1.2.6 Policy Actions for Technology Implementation

This Technology Action Plan (TAP) is well-suited to enhance the effectiveness and efficiency of on-grid wind power initiatives, given the presence of established policies like the grid code and IPP/PPA contracts and ongoing projects related to wind farm connections to the grid, as well as existing policy frameworks for micro-grid connections for 100% renewable energy electricity network connections in the remote islands of Tonga. It is appropriate to make suitable regulatory policy for wind power generation

4.3.1.2.7 Proposed Policies to Enhance Technology Implementation

The TAP is appropriate for the country's context, considering the current projects in place. Additionally, it offers cost benefits due to its potential to significantly reduce carbon emissions. However, it is important to review the existing policy to be able to allow maximum volume of power generation from wind power into the grid, at all time. It is essential to establish dedicated legislation or policies for on-grid wind power that emphasize the use and production of wind energy sources in preference to traditional energy forms. This approach would facilitate a national shift towards sustainable energy and could enable the seamless integration of maximum wind power generated from any wind farm projects into the existing grid.

4.3.1.2.8 Cost Related to the Implementation of Policies

The estimated funding required for this TAP is around US\$ 20-23 Millions for new 2.3MW on-grid wind power. According to the Tonga Energy Efficiency Master Plan, it is estimated that a reduction of 50% of total emission a year by 2030 is possible using 2020 as the reference year.

4.3.1.3 : Energy Efficient Home Appliances – LED Lighting, Refrigerators, Freezers, and High-Efficiency Air Conditioning Units

4.3.1.3.1 Technical Description

The aim of the initiative involving the installation of LED lights and high-efficient freezers, refrigerators, and air conditioners to reduce electricity consumption by 20%.

4.3.1.3.2 Climate Rationale of the Technology

This program seeks to potentially lower CO2 equivalent emissions by approximately 20% from the use of high-efficiency freezers, refrigerators, and air conditioners, in addition to

an expected 15% reduction from lighting. Furthermore, it is projected that energy-related operational costs for both the power utility and energy consumers could decrease by 30%.

4.3.1.3.3 Scale for Implementation of the Timeline

The estimated funding required for this initiative is around US\$ 27- 30 million.

According to Tonga's Progress on the SDGs Report, Tonga has just passed the energy intensity rate of 4MJ/USD of GDP in 2018 (GOT, 2020b), so we can target the national energy intensity to 3MJ/USD of GDP by 2030, and through this Technology Action Plan.

4.3.1.3.4 Expected Impacts of the Technology

Tonga Energy Road Map Plus Report set up our national energy targets for 2021-2035 is to improve demand side energy efficiency by reducing the total energy consumption from 65GWh in 2021 to 40GWh by 2035 (GOT, 2021b).

4.3.1.3.5 Ambition for Technology Readiness Level

Appropriate energy efficient action are essential to reduce from 4MJ/USD in 2018 to 3MJ/USD by 2030.

4.3.1.3.6 Policy Actions for Technology Implementation

The TERMPlus report also set up target to maintain electricity network losses under 8% by 2035 (GOT, 2021B). According to the Tonga Energy Efficiency Master Plan, it is estimated that a GHGs reduction of 50% a year by 2030 is possible using 2020 as the reference year. That represents a reduction from the BAU emissions of 210,000 metric tonnes of CO2e. Action taken in the EE in the electric sector is responsible for 29.6% of the reduction (32,500 metric tonnes CO2e) (GOT, 2021c).

4.3.1.3.7 Proposed Policies to Enhance Technology Implementation

A new energy efficiency policy for minimum energy performances energy appliances efficiency standard is needed as well as new energy efficiency act. It is essential to establish dedicated legislation or policies for energy efficient appliances that emphasize the use and production of renewable energy sources in preference to traditional energy forms. This approach would facilitate a national shift towards sustainable energy and could enable the seamless integration of maximum energy efficient projects into the existing grid.

4.3.1.3.8 Cost Related to the Implementation of Policies

The estimated funding required for this initiative is around US\$ 27- 30 million.

- 4.3.2 Transportation Sector
- 4.3.2.1 EVs battery Powered

4.3.2.1.1 Technical Description

The plan culminates in a project proposal centered on electric vehicles, named the Tonga Integrated PV Systems and EV Plug-in Demonstration Project (TIPVEV Project)

4.3.2.1.2 Climate Rationale of the Technology

According to the Tonga Energy Efficiency Master Plan, it is estimated that a reduction of 50% a year by 2030 is possible using 2020 as the reference year. That represents a reduction from the BAU emissions of 210,000 metric tonnes of CO2e. Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e), renewable electricity is responsible for 40% (43,500 metric tonnes CO2e), and EE in the electric sector is responsible for 29.6% of the reduction (32,500 metric tonnes CO2e) (GOT, 2021c). Action taken in the ground transportation field is responsible for 30.4% of the projected emissions (33,400) metric tonnes CO2e) (GOT, 2021c).

4.3.2.1.3 Scale for Implementation of the Timeline

Tonga Energy Road Map Plus (TERMPlus) set out target to limit growth in oil consumption for road transport to an average of 1.4% per year and overall to limit growth to 25% increase by 2035(GOT, 2021b). TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030 (GOT, 2021b).

4.3.2.1.4 Expected Impacts of the Technology

The Electric Vehicle Technology Action Plan (EV TAP) has the capacity to reduce carbon dioxide emissions by approximately 10 kilotons each year.

4.3.2.1.5 Ambition for Technology Readiness Level

Additionally, research will be undertaken to evaluate the economic feasibility of battery powered electric vehicles, along with recommendations for specific policy incentives and regulatory system to facilitate their growth.

4.3.2.1.6 Policy Actions for Technology Implementation

This initiative will build on the findings from the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) research conducted in 2020 and aims to achieve a 10% decrease in greenhouse gas emissions across the Pacific Island Countries. Tonga is still access to insufficient policy tools that are directly related to the safety and operation of the battery charged electric vehicles.

4.3.2.1.7 Proposed Policies to Enhance Technology Implementation

It is important to identify policies and regulatory tools that are necessary for installing solar recharging station in order to operation the battery charged EVs in Tonga. It is essential to establish dedicated legislation or policies for battery charged electric vehicles (EVs) that emphasize the use and production of renewable energy sources in preference to traditional energy forms in the charging EVs. This strategy would promote a nationwide transition to sustainable energy and could allow for the utilization of the maximum potential of renewable energy sources that are generated but currently excluded from the electricity grids.

4.3.2.1.8 Cost Related to the Implementation of Policies

The projected costs for executing this action plan are estimated to be between US\$4 million and US\$5 million.

4.3.2.2 Hybrid Vehicle

4.3.2.2.1 Technical Description

The TAP culminates in a project proposal centered on Hybrid Electric Vehicles, titled: Tonga Hybrid Electric Vehicle Project.

4.3.2.2.2 Climate Rationale of the Technology

The Hybrid Electric Vehicle Technology Action Plan (TAP) has the capacity to significantly reduce emissions, potentially saving approximately 10 kilotons of carbon dioxide each year. This TAP will leverage the findings from the CNBC's research conducted in 2023 and aims to achieve a 7% decrease in greenhouse gas emissions in Tonga.

4.3.2.2.3 Scale for Implementation of the Timeline

Research will be undertaken to evaluate the economic feasibility of Hybrid Electric Vehicles, along with recommendations for incentives to facilitate their growth.

4.3.2.2.4 Expected Impacts of the Technology

Tonga Energy Road Map Plus (TERMPlus) set out target to limit growth in oil consumption for road transport to an average of 1.4% per year and overall to limit growth to 25% increase by 2035(GOT, 2021b). TERMPlus report set up national target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030 (GOT, 2021b).

4.3.2.2.5 Ambition for Technology Readiness Level

According to the Tonga Energy Efficiency Master Plan, it is estimated that a reduction of 50% a year by 2030 is possible using 2020 as the reference year. That represents a reduction from the BAU emissions of 210,000 metric tonnes of CO2e. Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e),

4.3.2.2.6 Policy Actions for Technology Implementation

renewable electricity is responsible for 40% (43,500 metric tonnes CO2e), and EE in the electric sector is responsible for 29.6% of the reduction (32,500 metric tonnes CO2e) (GOT, 2021c).

4.3.2.2.7 Proposed Policies to Enhance Technology Implementation

It is important to identify policies and regulatory tools that are necessary for operation of the hybrid vehicles in in Tonga. It is essential to establish dedicated legislation or policies for hybrid vehicles that emphasize the use and production of renewable energy sources in preference to traditional energy. This strategy would promote a nationwide transition to sustainable energy.

4.3.2.2.8 Cost Related to the Implementation of Policies

The projected costs for executing this TAP are estimated to be between US\$10 million and US\$20 million.

4.3.2.3 : Grd-Connected EVs

4.3.2.3.1 Technical Description

EV Technology is the recognized authority in the UK on the impact of EV on the electricity network. We're a pioneer of smart solutions designed to mitigate the demands the increasing adoption of EV places on the grid.

4.3.2.3.2 Climate Rationale of the Technology

TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030.

4.3.2.3.3 Scale for Implementation of the Timeline

Tonga Energy Road Map Plus (TERMPlus) set out target to limit growth in oil consumption for road transport to an average of 1.4% per year and overall to limit growth to 25% increase by 2035(GOT, 2021b).

4.3.2.3.4 Expected Impacts of the Technology

Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e)

4.3.2.3.5 Ambition for Technology Readiness Level

4.3.2.3.6 Policy Actions for Technology Implementation

According to the Tonga Energy Efficiency Master Plan, it is estimated that a reduction of 50% a year by 2030 is possible using 2020 as the reference year. That represents a reduction from the BAU emissions of 210,000 metric tonnes of CO2e. Renewable electricity is responsible for 40% (43,500 metric tonnes CO2e), and EE in the electric sector is responsible for 29.6% of the reduction (32,500 metric tonnes CO2e) (GOT, 2021c).

4.3.2.3.7 Proposed Policies to Enhance Technology Implementation

Tonga currently lacks adequate local infrastructure for grid-connected electric vehicles. Therefore, it is in the best interest of this project to concentrate on the assessment, evaluation, and design of appropriate policies, legislation, and regulatory frameworks that will facilitate the future integration of grid-connected electric vehicles in Tonga

4.3.2.3.8 Cost Related to the Implementation of Policies

The projected costs for executing this TAP are estimated to be between US\$10 million and US\$20 million. Electricity Networks need novel approaches to manage the increase in demand and complex, un-predictable network flow patterns resulting from the uptake of d electric vehicles (EV).

4.3.3 On-Grid Network Upgrade

In support of on-grid PV development, AusAID has pledged a grant of 15 million AUD, equivalent to 22,800,000 TOP (TPL, 2024), which is already an available co-financing financial resources to the TAP, and such available co-financing funding will finance the following initiatives:

Phase 1: Upgrade Project for Conventional Power Generation

Phase 2: High Voltage 33kV Wiring for Grid Strengthening

Phase 3: Network Enhancement for Area-4 in Nukualofa

4.4 Formulation of Technology Action Plan

For each technology, six distinct actions have been identified for incorporation into the Technology Action Plan (TAP). In the energy and transportation sectors, the chosen actions include: a) Improving the economic and financial viability of the selected technology, with a particular focus on policy, legal, and regulatory enforcement; b) Enhancing the financial accessibility and profitability of the selected technology; c) Identifying and promoting policy incentives for technology imports; d) Increasing public awareness among technology users, as well as in the e) design, procurement, and f) management, maintenance, and testing of pilot projects.

The action plan also outlines a timeline, a preliminary budget, and identifies key stakeholders essential for the planning and execution phases. Most activities are scheduled for implementation over a 10-year period, with primary responsibilities resting on government ministries, non-governmental organizations, and the private sector. The key ministries involved include the MEIDECC's Office – Division of Energy, Climate Change, Environment, the Ministry of Infrastructure, the Tonga Power Limited Board, and the Ministry of Natural Resources and Management. Potential funding sources have been identified, including the Government of Tonga and various development partners such as JICA, China, AusAID, MFAT, EU, ADB, and the World Bank.

Capacity building requirements have been delineated for each technology and subsequently associated with specific activities of selected initiatives. Additionally, the TAP has sought to outline potential implementation risks related to these actions while emphasizing essential contingency measures. The identified risks encompass financial constraints, scheduling challenges, insufficient political commitment, and poverty. Furthermore, the TAP has articulated immediate prerequisites for advancement and critical actions necessary for success, which will facilitate the allocation of resources towards the realization of the three technologies.

In this framework, project concepts have been formulated for each of the three technologies. The aim of the concept for the Energy Sector is to enhance the profitability of energy sector initiatives. In contrast, the goal of the concept for the Transport sector is to mitigate existing disincentives and showcase the advantages of electric vehicles (EVs). The Hybrid Vehicle and EV on-grid project concept is designed to promote sustainable

energy development and improve the livelihoods of the populace. These project concepts have been refined into six distinct project ideas—one for each of the three technologies across the two sectors.

The dissemination of the three technologies will be achieved through public awareness initiatives, financial support, technical design, assessment and analysis; enhanced enforcement of laws and regulations, the harmonization of conflicting and overlapping legal frameworks, and the removal of disincentives.

4.5 Energy Sector

In the energy sector, the actions comprise a) the institutional strengthening and enhancing the policy, legal, and regulatory framework, b) assessment, identifying financial policy incentives and implementation of economic feasibility of adopting the technology c) create public awareness and communication strategies for promotion of technological investment; d) Enhance accessibility for investment opportunities e) design, procure and installation, monitoring and maintenance of the technology; f) assessment and improvements of national infrastructure . Each action is accompanied by a detailed set of activities aimed at achieving the technology objectives.

Sector	Energy			
Sub-sector	Electricity			
Technology	On-Grid PV for Electricity Generation			
Technological Output	The On-grid photovoltaic system for TAP is engineered to generate around 20 MW of solar energy and provide 50 MWh of battery storage capacity. This initiative supports the objective of achieving 70% renewable energy by 2025, with a long-term goal of transitioning to a full 100% renewable energy share by 2045 (TPL, 2024).			
	Furthermore, to facilitate this transition to 100% share of RE, a solar rooftop study has been conducted to inform the decisions of the Kingdom's Electricity Boards. We are targeting 10MW of solar farm and 25MWh of BESS.			
	The TAP seeks to promote socio-economic growth by supplying around 10 MW of on-grid electricity to households and communities on isolated islands experiencing energy poverty, thus encouraging the full utilization of renewable energy resources			
	The total cost for TAP is approximately 50m USD for on-grid PV and 30m USD for PV on-grid Rooftop and 20m USD for remote islands individual on-grid networks			
Mitigation Output	The Tonga Energy Efficiency Master Plan indicates that a 50% reduction in emissions by 2030 is achievable, using 2020 as the baseline year (UNCTCN, 2020; GOT, 2020c). This translates to a decrease from the business-as-usual (BAU) emissions of 210,000 metric tonnes of CO2 equivalent per year (UNCTCN,2020). Renewable energy sources are expected to account for 40% of the reductions, or 43,500 metric tonnes of CO2e.			
	Tonga INDC report in 2015 reported a total of 69.1 Gigagrams of carbon emissions from electricity and 15.0 Gigagrams of GHG emissions from other energy sources compared to 120.2 Gigagrams of GHG from Transportation sector (GOT, 2020a). The Tonga Third National Communication in 2019 reported 40.2 Gigagrams of GHG from electricity and 7.8 Gigagrams of GHG from other energy compare to 72.3 Gigagrams of GHG emissions from the Transporation sector (GOT, 2020a).			

Toble 2: Summery	of Donignod	Technology Action	Plan for On Crid DV
Table 2. Summary	or Designed	Technology Action	

Actions	Activities	Funding	Timeframe	Budget
Establish a unit under MEIDEC to oversee the implementation of the TAP		GoT, Development partners	1-2 years	36,000
Action 1 : Process Recruitment of positions and improve legal	Activity 1.1: identify and Confirm positions to be recruited and conduct official process for recruitment.	GoT, Development partners	1-2 years	36,000
and regulatory policy and legislations for on- grid PV	Activity 1.2: Process approval and expenditures for all associated investment and budget for the recruitment	GoT, Development partners	1-2 years	36,000
investments	Activity 1.3: Identify policy, legislative and regulatory shortfalls and discuss both the shortfalls and improvement steps to implement with key stakeholders and prepare policy statements for Cabinet endorsement and approvals	GoT, Development partners	1-2 years	36,000
Action 2: Conduct the economic feasibility of on-grid PV applications.	Activity 2.1: Conduct economic feasibility assessment of the on-grid PV, including market assessment and analysis and conduct consultations and prepare meetings to endorse the economic feasibility model before submission to Cabinet for approval and implementation	GoT, Development partners	1-2 years	150,000
	Activity 2.2: Conduct full assessment of Government Tax and Subsidy Policies, putting emphasis on identifying viable options for government import policy, tariff policy and investment policy for on-grid PV technology.	GoT, Development partners	1-2 years	150,000
	Activity 2.3: Conduct grid- connectivity assessment and analysis of key technical and economic barriers for the existing on-grid PPA projects/investment.	GoT, Development partners	1-2 years	150,000
	Activity 2.4: Identify and conduct computer modelling and testing the most sustainable installed capacities of the specific applications for on-grid solar farm, rooftop PV and outer islands on-grid solar farm.	GoT, Development partners	1-2 years	100,000

	Activity 2.5: Conduct stakeholders consultations and prepare policy statements and recommendations for Cabinet Approval on stakeholders agreements	GoT, Development partners	1-2 years	100,000
Action 3: Create awareness of both developer, and users of the technology	Activity 3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, and Users) to better inform their decision makings on on-grid investment project	GoT, Development partners	1-2 years	30,000
	Activity 3.2: Develop a communication strategy Profile for the target stakeholders particularly PPA owners and possible private sector investors and well known businesses in both overseas and in Tonga.	GoT, Development partners	1-2 years	20,000
	Activity 3.3: Sign Memory of Understanding with key media agencies and companies on public campaign strategies on on-grid PV investments and benefits for public domains	GoT, Development partners	1-2 years	20,000
	Activity 3.3: Implement awareness campaign on regional and national on-grid PV PPA investors.	GoT, Development partners	1-2 years	20,000
Action 4: Enhance access to investment finances	Activity 4.1: identify, Develop and recommend all financial incentives to Cabinet to assist lowering the cost of on-grid PV PPA. Provide clear justifications for electricity tariffs	Government Development Partner	1-2 years	40,000
	Activity 4.2: Engage in dialogue with development partners to provide subsidies for the technology as it contributes to global benefit; Confirm possible ways and preferred conditions and methodology for supporting financing of on-grid PV in Tonga	Development Partner	2-4 years	40,000
	Activity 4.3: Confirm financing options with international, regional and bilateral donors and development partners	Development Partner	2-4 years	40,000
	Activity 4.4: Prepare Cabinet Approval for possible financing of on-grid PV in the country and its plan to achieve 100%	Development Partner	2-4 years	40,000

	share of RE in the existing electricity Grid.			
Action 5: Design Procure and Install and set up monitoring and	Activity 5.1: Design, procure install the on-grid solar PV	Government and Development Partner	5-10 years	50m USD
maintenance plan and model for all on-grid PV applications in the	Activity 5.2: Design, procure install the on-grid solar Roof Top on-grid solar PV	Government and Development Partner	5-10 years	30m USD
country	Activity 5.3: Design, procure install the on-grid solar applications for individual outer islands	Government and Development Partner	5-10 years	20m USD
	Activity 5.4: Design, Approve and Set up the Monitoring and Maintenance Model for the technology	Government and Development Partner	5-10 years	20m USD
Action 6 : Assess and Identify all the necessary improvement options and technologies for the	Activity 6.1: Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing on- grid PV through PPA investment in the grid	Government and Development Partner	5-10 years	20m USD
existing electricity grid in the country in order to meet 100% share of RE.	Activity 6.2: Conduct consultation and meetings on findings of the grid assessment and analysis.	Government and Development Partner	5-10 years	20m USD
	Activity 6.3: Prepare all Policy decisions for government approval	Government and Development Partner	5-10 years	Government and Development Partner
	Activity 6.4: Design, Procure and install all necessary grid improvements to cater for 100% share of RE in total electricity generations	Government and Development Partner	5-10 years	Government and Development Partner

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Sector	Energy
Sub-sector	Electricity
Technology	On-Grid Wind Power for Electricity Generation
Technological	TAP for on-grid wind power aims to establish more on-grid wind power projects in
Output	the main island of Tongatapu or other outer islands of Tonga after the installation
	of the China funded on-grid wind projects. Furthermore, these wind power
	projects are expected to help power utility lower their diesel power energy-related
	operational expenses by approximately 20%. The estimated funding required for
	this TAP is around US\$23 Millions for new 2.3MW on-grid wind power
	Furthermore, to facilitate this transition to 100% share of RE, a solar rooftop study
	has been conducted to inform the decisions of the Kingdom's Electricity Boards.
	We are targeting 2.3 MW of wind farm.
	The TAP aims to enhance socio-economic development by providing
	approximately 2 MW of on-grid wind electricity to outer island communities for
	Vavaú and Eua remote islands facing energy poverty, thereby further soliciting the

	complete 100% share of renewable energy.							
	The total cost for on-grid wind projects through TAP is approximately 23m USD for power and 20m USD for DV on grid wind power							
	projects for outer islands of Vav	nor new 2.5 MW on-grid wind power and 20m 05D for FV on-grid wind power						
Mitigation Output	The Tonga Energy Efficiency Master Plan indicates that a 50% reduction in							
magadon ouput	emissions by 2030 is achievable, using 2020 as the baseline year (UNCTC)							
	2020; GOT, 2020c). This trans	lates to a decrea	se from the b	usiness-as-usual				
	(BAU) emissions of 210,000	metric tonnes	of CO2 equi	valent per year				
	(UNCTCN,2020). Renewable en	ergy sources are	expected to ac	count for 40% of				
	the reductions, or 43,500 metric	c tonnes of CO2e	e. On-wind p	ower through				
	TAP aims to establish on-grid w	ind power projects	s, targeting a r	eduction of GHG				
	emissions by roughly 21,750 Me	tric Tonnes of CC	2 equivalent.					
	I longa INDC report in 2015 r	eported a total (of 69.1 Gigag	irams of carbon				
	emissions from electricity and	15.0 Gigagrams	or GHG entis	unication in 2010				
	reported 40.2 Gigagrams of GHC	from electricity a	nd 7 8 Gigagra	ams of GHG from				
	other energy (GOT, 2020a).							
Actions	Activities	Funding	Timeframe	Budget				
		.						
Establish a unit		GoT,	1-2 years	36,000				
under MEIDEC to		Development						
oversee the		partners						
the TAP for on grid								
wind power								
Action 1 : Process	Activity 1.1: identify and	GoT.	1-2 years	36.000				
Recruitment of	Confirm positions to be	Development	· _ ,	,				
positions	recruited and conduct official	partners						
and improve legal	process for recruitment.							
and regulatory	Activity 1.2: Process approval	GoT,	1-2 years	36,000				
policy and	and expenditures for all	Development						
legislations for on-	associated investment and	partners						
investments	Activity 1.3: Identify policy	GoT	1.2 voore	36.000				
Investments	legislative and regulatory	Development	1-2 years	30,000				
	shortfalls for on-grid wind	partners						
	power projects in Tonga and	paratoro						
	discuss both the shortfalls and							
	improvement steps with key							
	stakeholders for							
	implementation and prepare							
	policy statements for Cabinet							
Action 2: Conduct	Activity 2 1: Conduct economic	GoT	1-2 vears	150 000				
the economic	feasibility assessment of the	Development		100,000				
feasibility of on-grid	on-grid PV , including market	partners						
PV applications.	assessment and analysis and	•						
	implement consultations with							
	key stakeholders and prepare							
	meetings to endorse the							
	economic teasibility model for							
	before submission to Cobinet							
	for approval and							
	implementation							

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	Activity 2.2: Conduct full assessment of Government Tax and Subsidy Policies for energy supply and services, putting emphasis on identifying viable options for government import policy, tariff policy and investment policy for on-grid PV technology. Conduct consultation on findings and prepare Cabinet paper and recommendations for Cabinet	GoT, Development partners	1-2 years	150,000
	Activity 2.3: Conduct grid- connectivity assessment and analysis of key technical and economic barriers for automatic on-grid wind power penetration to the existing grid from the existing on-grid PPA projects/investment. Prepare submission and recommendation to the Cabinet and the Board	GoT, Development partners	1-2 years	150,000
	Activity 2.4: Identify and conduct computer modelling and testing the most sustainable installed capacities of the specific applications for on-grid wind farm for the capital and other outer islands on-grid wind farm.	GoT, Development partners	1-2 years	100,000
	Activity 2.5: Conduct stakeholders consultations and prepare policy statements and recommendations for Cabinet Approval on stakeholders agreements.	GoT, Development partners	1-2 years	100,000
Action 3: Create public awareness of both developer, and users of the wind-power technology	Activity 3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, and Users) to better inform their decision makings on investment and tariffs imposed on-grid wind power project	GoT, Development partners	1-2 years	30,000
	Activity 3.2: Develop a communication strategy Profile for the target stakeholders particularly PPA owners and possible private sector investors and well known businesses in both overseas and in Tonga.	GoT, Development partners	1-2 years	20,000
	Activity 3.3: Prepare, Agree and Sign Memory of	GoT, Development	1-2 years	20,000

	Understanding with key media agencies and companies on public campaign strategies on on-grid wind power investments and benefits for public domains	partners		
	Activity 3.3: Implement public awareness campaign on regional and national on-grid wind power PPA investments in the country.	GoT, Development partners	1-2 years	20,000
Action 4: Enhance access to investment finances	Activity 4.1: identify, Develop and recommend all financial policy incentives to Cabinet to assist lowering the cost of investment on on-grid wind PPA. Provide clear justifications for electricity wind power tariffs	Government Development Partner	1-2 years	40,000
	Activity 4.2: Engage in dialogue with development partners on suitable adoption of subsidies for the technology as it contributes to global benefit; Confirm possible ways and preferred conditions and methodology for supporting financing of on-grid wind power in Tonga	Development Partner	2-4 years	40,000
	Activity 4.3: Confirm potential financing options with international, regional and bilateral donors and development partners for on- grid wind power.	Development Partner	2-4 years	40,000
	Activity 4.4: Prepare Cabinet Approval for most sustainable financing options of on-grid wind power in the country and its plan to achieve 100% share of RE in the existing electricity Grid.	Development Partner	2-4 years	40,000
Action 5: Design, Procure, Install the monitoring and maintenance plan	Activity 5.1: Design, procure install the on-grid wind power installation in the capital.	Government and Development Partner	5-10 years	50m USD
model for all on- grid wind applications in the country	Activity 5.2: Design, procure install the on-grid wind power installation in the outer islands of Tonga	Government and Development Partner	5-10 years	30m USD
	Activity 5.4: Design, Approve and Set up the Monitoring and Maintenance Model for the technology	Government and Development Partner	5-10 years	20m USD
Action 6 : Assess and Identify all the	Activity 6.1: Assess and Identify the policy, legislative	Government and	5-10 years	20m USD

necessary	and regulatory shortfalls in the	Development		
improvement	implementation of existing on-	Partner		
options and	grid PV through PPA			
technologies for the	investment in the grid			
existing electricity	Activity 6.2: Conduct	Government	5-10 years	20m USD
grid in the country	consultation and meetings on	and		
in order to meet	findings of the grid assessment	Development		
100% share of RE.	and analysis.	Partner		
	Activity 6.3: Prepare all Policy	Government	5-10 years	Government
	decisions for government	and		and
	approval	Development		Development
		Partner		Partner
	Activity 6.4: Design, Procure	Government	5-10 years	Government
	and install all necessary grid	and		and
	improvements to cater for	Development		Development
	100% share of RE in total	Partner		Partner
			1	
	electricity generations			

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Sector	Energy						
Sub-sector	Electricity						
Technology	Energy Efficient Home Appliance	es					
Technological Output	The aim of the initiative involving LED lights and high-efficient freezers, refrigerators, and air conditioners is to reduce electricity consumption by 20%. The estimated funding required for this initiative is around US\$ 30 million.						
	According to Tonga''s Progress on the SDGs Report, Tonga has just passed the energy intensity rate of 4MJ/USD of GDP in 2018 (GOT, 2020b), so we can target the national energy intensity to 3MJ/USD of GDP by 2030, and through this Technology Action Plan, appropriate energy efficient action are essential to reduce from 4MJ/USD in 2018 to 3MJ/USD by 2030. Tonga Energy Road Map Plus Report set up our national energy targets for 2021-2035 is to improve demand side energy efficiency by reducing the total energy consumption from 65GWh in 2021 to 40GWh by 2035 (GOT, 2021b).						
Mitigation Output	This program seeks to potentially lower CO2 equivalent emissions by approximately 20% from the use of high-efficiency freezers, refrigerators, and air conditioners, in addition to an expected 15% reduction from lighting. Furthermore, it is projected that energy-related operational costs for both the power utility and energy consumers could decrease by 20%-30%.						
	The TERMPlus report also set up target to maintain electricity network under 8% by 2035 (GOT, 2021B). According to the Tonga Energy Eff Master Plan, it is estimated that a GHGs reduction of 50% a year by 2 possible using 2020 as the reference year. That represents a reduction fro BAU emissions of 210,000 metric tonnes of CO2e. Action taken in the EE electric sector is responsible for 29.6% of the reduction (32,500 metric CO2e) (COT 2021e)						
	Tonga INDC report in 2015 reported a total of 69.1 Gigagrams of carbon emissions from electricity and 15.0 Gigagrams of GHG emissions from other energy sources (GOT, 2020a). The Tonga Third National Communication in 2019 reported 40.2 Gigagrams of GHG from electricity and 7.8 Gigagrams of GHG from other energy (GOT, 2020a).						
Actions	Activities	Funding	Timeframe	Budget			
Establish a unit		GoT,	1-2 years	36,000			

under MEIDEC to		Development		
oversee the		partners		
implementation of		p		
the TAP for energy				
efficient home				
appliances- [50000				
led lights and high-				
[5000 freezers],				
refrigerators [5000				
freezers], and air				
conditioners[5000				
conditioners])				
Action 1 : Process	Activity 1.1: identify and	GoT,	1-2 years	36,000
Recruitment of	Confirm positions to be	Development	-	
positions	recruited and conduct official	partners		
and improve legal	process for recruitment.	F		
and regulatory	Activity 1.2: Process approval	GoT	1-2 years	36,000
policy and	and expenditures for all	Development	1 2 youro	00,000
legislations for	and experiate investment and	nartners		
operate officient	budget for the recruitment	partitiers		
home englighted		0-T	1.0	20.000
nome appliances	Activity 1.3: Identify policy,		1-2 years	36,000
investments	legislative and regulatory	Development		
	shortfalls for implementation of	partners		
	the energy efficient home			
	appliances pilot projects in			
	Tonga and discuss both the			
	shortfalls and improvement			
	steps with key stakeholders for			
	implementation and prepare			
	policy statements for Cabinet			
	endorsement and approvals			
Action 2. Conduct	Activity 2 1: Conduct economic	GoT	1-2 years	150 000
the economic	feasibility assessment of the	Development	1 Z youro	100,000
feasibility of on grid	on arid DV including market	partners		
	on-grid FV, including market	partitiers		
FV applications.	implement concultations with			
	Implement consultations with			
	key stakeholders and prepare			
	meetings to endorse the			
	economic feasibility model for			
	on-grid wind power technology			
	before submission to Cabinet			
	for approval and			
	implementation			
	Activity 2.2: Conduct full	GoT,	1-2 years	150,000
	assessment of Government	Development		
	Tax and Subsidv Policies for	partners		
	energy supply and services.	F		
	putting emphasis on identifying			
	viable options for government			
	import policy tariff policy and			
	investment policy for on grid			
	DV technology Conduct			
	r v technology. Conduct			
	propers Cobinet server and			
	prepare Cabinet paper and			
	recommendations for Cabinet			

				450.000
	Activity 2.3. Conduct grid-	GOI, Development	1-2 years	150,000
	connectivity assessment and	Development		
	analysis of key technical and	partners		
	economic pamers ion			
	automatic on-grid wind power			
	penetration to the existing grid			
	from the existing on-grid PPA			
	projects/investment. Prepare			
	submission and			
	recommendation to the			
			1.0	400.000
	ACTIVITY 2.4: Identity and	GOI,	1-2 years	100,000
	conduct computer modelling	Development		
	and testing the most	parmers		
	sustainable installed capacities			
	of the specific applications for			
	conital and other outer islands			
	capital and other outer islands			
	Activity 2.5: Conduct	Cot	1.2 years	100.000
	stakeholders consultations and	Development	1-2 years	100,000
	prepare policy statements and	nartnere		
	recommendations for Cabinet	partitions		
	Approval on stakeholders			
	agreements			
Action 3: Create	Activity 3.1 Develop	GoT	1-2 years	30,000
public awareness	awareness material targeting	Development		00,000
of both developer.	different stakeholders (i.e.	partners		
and users of the	Private Sector, Decision	F		
technology	Makers, and Users) to better			
	inform their decision makings			
	on investment imposed on			
	energy efficient appliances			
	Activity 3.2: Develop a	GoT,	1-2 years	20,000
	communication strategy Profile	Development		,
	for the target stakeholders	partners		
	particularly PPA owners and			
	possible private sector			
	investors and well known			
	businesses in both overseas			
	and in Tonga.			
	Activity 3.3: Prepare, Agree	GoT,	1-2 years	20,000
	and Sign Memory of	Development		
	Understanding with key media	partners		
	agencies and companies on			
	public campaign strategies on			
	energy efficient appliances			
	investments and benefits			
	residential users			
	Activity 3.3: Implement public	GoT,	1-2 years	20,000
	awareness campaign on	Development		
	regional and national energy	partners		
	efficient home appliances			
	Investments in the country.	0	1.0	40.000
Action 4: Ennance	Activity 4.1: Identify, Develop	Government	1-2 years	40,000
auuuu 10		Development		

investment	policy incentives to Cabinet to	Partner		
finances	assist lowering the cost of			
manoes	investment on energy efficient			
	home appliances Provide clear			
	iustifications for adoption of the			
	pustifications for adoption of the			
	Appliances.	Development	0.4	40.000
	Activity 4.2: Engage in	Development	2-4 years	40,000
	dialogue with development	Partner		
	partners on suitable adoption			
	of subsidies for the technology			
	as it contributes to global			
	benefit; Confirm possible ways			
	and preferred conditions and			
	methodology for supporting			
	financing of energy efficient			
	home appliances in Tonga			
	Activity 4.3: Confirm potential	Development	2-4 years	40,000
	financing options with	Partner		
	international, regional and			
	bilateral donors and			
	development partners for			
	energy efficient home			
	appliances			
	Activity 4.4: Prepare Cabinet	Development	2-4 years	40,000
	Approval for most sustainable	Partner		
	financing options of LED			
	lights[50000 led lights] and			
	high-efficient freezers [5000			
	freezers], refrigerators [5000			
	freezers], and air			
	conditioners[5000			
	conditioners) in the country			
	and its plan to achieve 100%			
	share of RE in the existing			
	electricity Grid.			
Action 5: Design.	Activity 5.1: Design, procure	Government	5-10 years	50m USD
Procure. Install the	install the energy efficient	and	· · · · · · · · · ·	
monitoring and	home led lights [50000 led	Development		
maintenance plan	lights] installation in the	Partner		
model for the	country			
technology	Activity 5.2: Design procure	Government	5-10 years	30m USD
applications in the	install the high-efficient	and	o roycaro	
country	freezers [5000 freezers]	Development		
oounny	refrigerators [5000 freezers]	Partner		
	and air conditioners[5000			
	conditioners) installation in the			
	country			
	Activity 5.4: Design Approve	Government	5-10 years	20m 19D
	and Set up the Monitoring and	and	J-10 years	2011 030
	Maintonance Medel for the	Dovelopment		
		Development		
	lod lights) and high officiant	raiulei		
	refrigerators [5000 freezers]			
	and air conditionare [5000			
	and all conditioners[5000	1		

	conditioners])			
Action 6 : Assess and Identify all the necessary improvement options and technologies for the existing electricity	Activity 6.1: Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	Government and Development Partner	5-10 years	20m USD
grid in the country in order to meet 100% share of RE.	Activity 6.2: Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	Government and Development Partner	5-10 years	20m USD
	Activity 6.3: Prepare all Policy decisions for government approval	Government and Development Partner	5-10 years	Government and Development Partner
	Activity 6.4: Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.	Government and Development Partner	5-10 years	Government and Development Partner

4.6 Transportation Sector

In the transportation sector, the actions comprise a) the institutional strengthening and enhancing the policy, legal, and regulatory framework, b) assessment, identifying financial policy incentives and implementation of economic feasibility of adopting the technology c) create public awareness and communication strategies for promotion of technological investment; d) Enhance accessibility for investment opportunities e) design, procure and installation, monitoring and maintenance of the technology; f) assessment and improvements of national infrastructure . Each action is accompanied by a detailed set of activities aimed at achieving the technology objectives.

Sector	Energy
Sub-sector	Transportation Sector
Technology	EVs Battery Charged
Technological	Additionally, research will be undertaken to evaluate the economic feasibility of
Output	battery powered electric vehicles, along with recommendations for incentives to
	facilitate their growth. The projected costs for executing this action plan are
	estimated to be between US\$4 million and US\$5 million. The plan culminates in a
	project proposal centered on electric vehicles, named the Tonga Integrated PV
	Systems and EV Plug-in Demonstration Project (TIPVEV Project).

Table 5 : Summary of Technology Action Plan for Battery Charged Electric Vehicles.

Mitigation Output	Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e)(UNCTCN,2020). Tonga Energy Road Map Plus (TERMPlus) set out target to limit growth in oil consumption for road transport to an average of 1.4% per year and overall to limit growth to 25% increase by 2035(GOT, 2021b). TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030 (GOT, 2021b). The Electric Vehicle Technology Action Plan (EV TAP) has the capacity to reduce carbon dioxide emissions by approximately 10 kilotons each year. This initiative will build on the findings from the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) research conducted in 2020 and aims to achieve a 10% decrease in greenhouse gas emissions across the Pacific Island Countries. Action taken in the ground transportation field is responsible for 30.4%					
	(UNCTCN,2020) Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e), renewable electricity is responsible for 40% (43,500 metric tonnes CO2e), and EE in the electric sector is responsible for 29.6% of the reduction (32,500 metric tonnes CO2e) (GOT, 2021c).					
Actions	Activities	Funding	Timeframe	Budget		
Establish a unit under MEIDEC to oversee the implementation of the TAP for Battery Charged EVs		GoT, Development partners	1-2 years	36,000		
Action 1 : Process Recruitment of positions and improve legal and regulatory policy and legislations for Battery Charged EVs	Activity 1.1: identify and Confirm positions to be recruited and conduct/complete official process for recruitment.	GoT, Development partners	1-2 years	36,000		
	Activity 1.2: Process approval and expenditures for all associated investment and budget for the recruitment	GoT, Development partners	1-2 years	36,000		
	Activity 1.3: Identify policy, legislative and regulatory shortfalls for implementation of the Battery Charged EVs pilot projects in Tonga and discuss both the shortfalls and improvement steps with key stakeholders for implementation and prepare policy statements for Cabinet endorsement and approvals	GoT, Development partners	1-2 years	36,000		
Action 2: Conduct the economic feasibility of on-grid PV applications.	Activity 2.1: Conduct economic feasibility assessment of the Battery Charged EVs, including market assessment and analysis and implement	GoT, Development partners	1-2 years	150,000		

	consultations with key stakeholders and prepare meetings to endorse the economic feasibility model for Battery Charged EVs technology before submission to Cabinet for approval and implementation			
	Activity 2.2: Conduct full assessment of Government Tax and Subsidy Policies for energy supply and services, putting emphasis on identifying viable options for government import policy, and investment policy for Battery Charged EVs. Conduct consultation on findings and prepare Cabinet paper and recommendations for Cabinet	GoT, Development partners	1-2 years	150,000
	Activity 2.3: Conduct road infrastructure connectivity assessment and analysis of key technical and economic barriers for Battery Charged EVs to the existing road infrastructure in the capital. Prepare submission and recommendation to the Cabinet and the Board	f	1-2 years	150,000
	Activity 2.4: Conduct road infrastructure connectivity assessment and analysis of key technical and economic barriers for Battery Charged EVs to the existing road infrastructure in the main outer islands or other capital districts. Prepare submission and recommendation to the Cabinet and the Board.	GoT, Development partners	1-2 years	100,000
	Activity 2.5: Conduct stakeholders consultations on Tonga Integrated PV Systems and EV Plug-in Demonstration Project (TIPVEV Project). and prepare policy statements and recommendations for Cabinet Approval on stakeholders agreements and implementation procedure of the project	GoT, Development partners	1-2 years	100,000
Action 3: Create public awareness of both developer, and users of the	Activity 3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision	GoT, Development partners	1-2 years	30,000
battery charged	Makers, and Users) to better			
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EVs. technology	inform their decision makings			
57	on Tonga Integrated PV			
	Systems and EV Plug-in			
	Demonstration Project			
	(TIPVEV Project) and other			
	policy review and investments			
	associated with the project			
	Activity 2.2: Dovelop 2	CoT	1.2 years	20.000
	Activity 5.2. Develop a	GUI, Development	1-2 years	20,000
	for the terret stakeholders	Development		
	norticularly DDA surpore and	partitiers		
	particularly PPA owners and			
	possible private sector			
	Investors and well known			
	businesses on battery charged			
	EVs in both overseas and in			
	Ionga.	~ -		
	Activity 3.3: Prepare, Agree	Gol,	1-2 years	20,000
	and Sign Memory of	Development		
	Understanding with key media	partners		
	agencies and companies on			
	public campaign strategies on			
	battery charged EVs			
	investments and benefits for			
	users			
	Activity 3.3: Implement public	GoT,	1-2 years	20,000
	awareness campaign on	Development		
	regional and national battery	partners		
	charged EVs investments in			
	the country.			
Action 4: Enhance	Activity 4.1: identify, Develop	Government	1-2 years	40,000
access to	and recommend all financial	Development		
investment	policy incentives to Cabinet to	Partner		
finances	assist lowering the cost of			
	investment on battery charged			
	EVs . Provide clear			
	iustifications for adoption of the			
	battery charged EVs.			
	Activity 4.2: Engage in	Development	2-4 vears	40.000
	dialogue with development	Partner		,
	partners on suitable adoption			
	of subsidies for the technology			
	as it contributes to global			
	benefit: Confirm possible ways			
	and preferred conditions and			
	methodology for supporting			
	financing of battery charged			
	Fl/s in Tonga			
	Activity 1 3: Confirm potential	Development	2-1 years	40.000
	financing options with	Development	2-4 years	+0,000
	international regional and	гашы		
	hiletaral dapara and			
	better (charged 5)			
	ballery charged EVS	Development	0.4.46.575	40.000
	Activity 4.4: Prepare Cabinet	Development	∠-4 years	40,000
	Approval for most sustainable	Faither	1	

	financing options battery charged EVs and			
Action 5: Design, Procure, Install the monitoring and maintenance plan model for Tonga	Activity 5.1: Design, procure install the Tonga Integrated PV Systems and EV Plug-in Demonstration Project in the country	Government and Development Partner	5-10 years	50m USD
Integrated PV Systems and EV Plug-in Demonstration	Activity 5.2: Design, procure install the Tonga Integrated PV Systems and EV Plug-in Demonstration Project	Government and Development Partner	5-10 years	30m USD
Project in the country	Activity 5.4: Design, Approve and Set up the Monitoring and Maintenance Model for the Tonga Integrated PV Systems and EV Plug-in Demonstration Project	Government and Development Partner	5-10 years	20m USD
Action 6 : Assess and Identify all the necessary improvement options and technologies for the existing road	Activity 6.1: Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	Government and Development Partner	5-10 years	20m USD
infrastructure and laws in the country	Activity 6.2: Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	Government and Development Partner	5-10 years	20m USD
	Activity 6.3: Prepare all Policy decisions for government approval	Government and Development Partner	5-10 years	Government and Development Partner
	Activity 6.4: Design, Procure and install all necessary road infrstructure improvements to cater for reducing demand in the electricity grid.	Government and Development Partner	5-10 years	Government and Development Partner

Table 6 : Summary of Technology Action Plan for On Grid Electric Vehicle

Sector	Energy
Sub-sector	Transportation Sector
Technology	On-Grid Electric Vehicles
Technological Output	The projected costs for executing this TAP are estimated to be between US\$10 million and US\$20 million. The TAP culminates in a project proposal centered on On-Grid EVs, titled: Tonga On-grid EVs. (TONGREVs Project).
	Tonga Energy Road Map Plus (TERMPlus) set out target to limit growth in oil consumption for road transport to an average of 1.4% per year and overall to limit growth to 25% increase by 2035(GOT, 2021b). TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030.
Mitigation Output	Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e) (GOT, 2021c).

Actions	Activities	Funding	Timeframe	Budget
Establish a unit under MEIDEC to oversee the implementation of the TAP for on-grid electric vehicle		GoT, Development partners	1-2 years	36,000
Action 1 : Process Recruitment of positions and improve legal	Activity 1.1: identify and Confirm positions to be recruited and conduct official process for recruitment.	GoT, Development partners	1-2 years	36,000
and regulatory policy and legislations for on- grid EVs	Activity 1.2: Process approval and expenditures for all associated investment and budget for the recruitment	GoT, Development partners	1-2 years	36,000
investments	Activity 1.3: Identify policy, legislative and regulatory shortfalls for implementation of the on-grid EVs pilot projects in Tonga and discuss both the shortfalls and improvement steps with key stakeholders for implementation and prepare policy statements for Cabinet endorsement and approvals	GoT, Development partners	1-2 years	36,000
Action 2: Conduct the economic feasibility of on-grid EVs applications.	Activity 2.1: Conduct economic feasibility assessment of the on-grid PV, including market assessment and analysis and implement consultations with key stakeholders and prepare meetings to endorse the economic feasibility model for on-grid EVs technology before submission to Cabinet for approval and implementation	GoT, Development partners	1-2 years	150,000
	Activity 2.2: Conduct full assessment of Government Tax and Subsidy Policies for energy supply and services, putting emphasis on identifying viable options for government import policy, tariff policy and investment policy for on-grid EVs technology. Conduct consultation on findings and prepare Cabinet paper and recommendations for Cabinet	GoT, Development partners	1-2 years	150,000
	Activity 2.3: Conduct grid- connectivity assessment and analysis of key technical and economic barriers for automatic on-grid EVs penetration to the existing grid projects/investment. Prepare	GoT, Development partners	1-2 years	150,000

	submission and			
	Cabinet and the Board			
	Activity 2.4: Identify and conduct computer modelling and testing the most sustainable applications for on- grid EVs for the capital and other outer islands	GoT, Development partners	1-2 years	100,000
	Activity 2.5: Conduct stakeholders consultations and prepare policy statements and recommendations for Cabinet Approval on stakeholders agreements.	GoT, Development partners	1-2 years	100,000
Action 3: Create public awareness of both developer, and users of the wind-power technology	Activity 3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, and Users) to better inform their decision makings on investment imposed on on- grid EVs	GoT, Development partners	1-2 years	30,000
	Activity 3.2: Develop a communication strategy Profile for the target stakeholders particularly PPA owners and possible private sector investors and well known businesses in both overseas and in Tonga.	GoT, Development partners	1-2 years	20,000
	Activity 3.3: Prepare, Agree and Sign Memory of Understanding with key media agencies and companies on public campaign strategies on on-grid EVs investments and benefits residential users	GoT, Development partners	1-2 years	20,000
	Activity 3.3: Implement public awareness campaign on regional and national on-grid EVs investments in the country.	GoT, Development partners	1-2 years	20,000
Action 4: Enhance access to investment finances	Activity 4.1: identify, Develop and recommend all financial policy incentives to Cabinet to assist lowering the cost of investment on energy efficient home appliances Provide clear justifications for adoption of the on-grid EVs.	Government Development Partner	1-2 years	40,000
	Activity 4.2: Engage in dialogue with development partners on suitable adoption of subsidies for the technology as it contributes to global	Development Partner	2-4 years	40,000

	benefit; Confirm possible ways and preferred conditions and methodology for supporting financing of on-grid EVs in Tonga Activity 4.3: Confirm potential financing options with international, regional and	Development Partner	2-4 years	40,000
	bilateral donors and development partners for on- grid EVs			
	Activity 4.4: Prepare Cabinet Approval for most sustainable financing options of on-grid EVs in the country and its plan to achieve 100% share of RE in the existing electricity Grid.	Development Partner	2-4 years	40,000
Action 5: Design, Procure, Install the monitoring and maintenance plan	Activity 5.1: Design, procure install the on–grid EVs in the country	Government and Development Partner	5-10 years	50m USD
model for all on- grid wind applications in the country	Activity 5.2: Design, procure install the on-grid EVs project and investment in the country	Government and Development Partner	5-10 years	30m USD
	Activity 5.4: Design, Approve and Set up the Monitoring and Maintenance Model for the technology	Government and Development Partner	5-10 years	20m USD
Action 6 : Assess and Identify all the necessary improvement options and	Activity 6.1: Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of EVs investments in the country	Government and Development Partner	5-10 years	20m USD
technologies for the existing electricity grid in the country in order to meet the EVs investment needs	Activity 6.2: Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	Government and Development Partner	5-10 years	20m USD
	Activity 6.3: Prepare all Policy decisions for government approval	Government and Development Partner	5-10 years	Government and Development Partner
	Activity 6.4: Design, Procure and install all necessary grid improvements to cater for on- grdi EVs and reducing demand in the electricity grid.	Government and Development Partner	5-10 years	Government and Development Partner

Table 7 : Summary of Technology Action Plan for Hybrid Vehicle

Sector	Energy
Sub-sector	Transportation Sector
Technology	Hybrid Vehicle

Technological Output	The projected costs for executing this TAP are estimated to be between US\$10 million and US\$20 million. The TAP culminates in a project proposal centered on Hybrid Vehicles, titled: Tonga Hybrid Vehicle. (TONGAHV Project).			
Mitigation Output	Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e)(UNCTCN,2020). Tonga Energy Road Map Plus (TERMPlus) set out target to limit growth in oil consumption for road transport to an average of 1.4% per year and overall to limit growth to 25% increase by 2035(GOT, 2021b). TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030 (GOT, 2021b).The Hybrid Vehicle Technology Action Plan (HV TAP) has the capacity to reduce carbon dioxide emissions by approximately 10 kilotons each year.			
Actions	Activities	Funding	Timeframe	Budget
Establish a unit under MEIDEC to oversee the implementation of the TAP for HYBRID		GoT, Development partners	1-2 years	36,000
Action 1 : Process Recruitment of positions and improve legal	Activity 1.1: identify and Confirm positions to be recruited and conduct official process for recruitment.	GoT, Development partners	1-2 years	36,000
and regulatory policy and legislations for HYBRID VEHICLE	Activity 1.2: Process approval and expenditures for all associated investment and budget for the recruitment	GoT, Development partners	1-2 years	36,000
investments	Activity 1.3: Identify policy, legislative and regulatory shortfalls for implementation of the Hybrid Vehicle pilot projects in Tonga and discuss both the shortfalls and improvement steps with key stakeholders for implementation and prepare policy statements for Cabinet endorsement and approvals	GoT, Development partners	1-2 years	36,000
Action 2: Conduct the economic feasibility of hybrid vehicle.	Activity 2.1: Conduct economic feasibility assessment of the on-grid PV, including market assessment and analysis and implement consultations with key stakeholders and prepare meetings to endorse the economic feasibility model for hybrid vehicle technology before submission to Cabinet for approval and implementation. Submit stakeholders recommendations for Cabinet Approval	GoT, Development partners	1-2 years	150,000

	Activity 2.2: Conduct full assessment of Government Tax and Subsidy Policies for energy supply and services, putting emphasis on identifying viable options for government import policy, tariff policy and investment policy for hybrid vehicle. Conduct consultation on findings and prepare Cabinet paper and way forward recommendations for Cabinet approval	GoT, Development partners	1-2 years	150,000
	Activity 2.3: Conduct grid- connectivity assessment and analysis of key technical and economic barriers for automatic adoption of hybrid vehicle projects/investment. Prepare submission and recommendation to the Cabinet and the Board	GoT, Development partners	1-2 years	150,000
	Activity 2.4: Identify and conduct computer modelling and testing the most sustainable policy options for adoption of electric vehicle for the capital and other outer islands on-grid wind farm.	GoT, Development partners	1-2 years	100,000
	Activity 2.5: Conduct stakeholders consultations and prepare policy statements and recommendations for Cabinet Approval on stakeholders agreements.	GoT, Development partners	1-2 years	100,000
Action 3: Create public awareness of both developer, and users of the Hybrid Vehicle	Activity 3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, and Users) to better inform their decision makings on investment imposed on hybrid vehicle	GoT, Development partners	1-2 years	30,000
	Activity 3.2: Develop a communication strategy Profile for the target stakeholders particularly PPA owners and possible private sector investors and well known businesses in both overseas and in Tonga.	GoT, Development partners	1-2 years	20,000
	Activity 3.3: Prepare, Agree and Sign Memory of Understanding with key media agencies and companies on public campaign strategies on	GoT, Development partners	1-2 years	20,000

	hybrid vehicle investments and			
	hepefits users			
	Activity 3.3: Implement public awareness campaign on regional and national hybrid	GoT, Development	1-2 years	20,000
	vehicle investments in the country.	paratoro		
Action 4: Enhance access to investment finances	Activity 4.1: identify, Develop and recommend all financial policy incentives to Cabinet to assist lowering the cost of investment on energy efficient home appliances Provide clear justifications for adoption of the hybrid vehicle.	Government Development Partner	1-2 years	40,000
	Activity 4.2: Engage in dialogue with development partners on suitable adoption of subsidies for the technology as it contributes to global benefit; Confirm possible ways and preferred conditions and methodology for supporting financing of hybrid vehicle in Tonga	Development Partner	2-4 years	40,000
	Activity 4.3: Confirm potential financing options with international, regional and bilateral donors and development partners for adoption of hybrid vehicle in the country	Development Partner	2-4 years	40,000
	Activity 4.4: Prepare Cabinet Approval for most sustainable financing options of hybrid vehicle in the country and its plan to achieve share of carbon emission reduction in the transport sector.	Development Partner	2-4 years	40,000
Action 5: Design, Procure, Install the monitoring and maintenance plan	Activity 5.1: Design, procure install the Hybrid vehicle promotion and investment initiative in the country	Government and Development Partner	5-10 years	50m USD
model for hybrid vehicle applications in the country	Activity 5.2: Design, Approve and Set up the Monitoring and Maintenance Model for the technology	Government and Development Partner	5-10 years	20m USD
Action 6 : Assess and Identify all the necessary improvement options and technologies for the existing road	Activity 6.1: Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	Government and Development Partner	5-10 years	20m USD
Intrastructure in order to meet the	Activity 6.2: Conduct consultation and meetings on	Government and	5-10 years	20m USD

share of carbon emission reductions from this	findings of the policy and regulatory assessment and analysis.	Development Partner		
technology	Activity 6.3: Prepare all Policy decisions for government approval	Government and Development Partner	5-10 years	Government and Development Partner
	Activity 6.4: Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.	Government and Development Partner	5-10 years	Government and Development Partner

5 TECHNOLOGY ACTION PLAN AND PROJECT IDEAS FOR ENERGY

5.1 TAP for Energy Sector

The third deliverable is the Technology Action Plans (TAPs) Report, which also encompasses the Project Ideas that detail the essential activities required for the broad dissemination of the chosen technologies. This TAP report is largely based on the insights provided in the second deliverable known as Barrier Analysis report.

5.1.1 : Overview of Energy Sector

The role of the energy sector in reducing/addressing adverse impacts of GHG emissions has already been assessed and documented in various studies and assessments in Tonga. The Tonga NDC Implementation Roadmap and Investment Plan indicated the cumulative GHG emissions reduction by 2030 and investment need are shown below

Sector	Cumulative GHG emissions reduction by 2030 (GgCO _{2 e})	Indicative Investment Need to 2030 (US\$)
Energy	579.8	60,000,000
AFOLU	1025.16	5,695,000
Waste	25.53	11,560,000
Marine	40.58	12,902,000

Table 8: Sequenced Cumulative GHG emissions reduction by 2030 and indicative investment need to 2030 for priority sectors.

Source: (MEIDECC, 2021)

These policy measures and frameworks include the Tonga Energy Efficiency Master Plan (TEEMP) 2018, the Sustainable Development Goal (SDG) 7 Roadmap 2021, the Tonga Climate Change Policy (TCCP) 2016, the Joint National Action Plan 2 on Climate Change and Disaster Risk Management (JNAP 2) 2018-2028, the Tonga Power Limited (TPL) Business Plan, and the forthcoming Fourth National Communication (4NC). In addition to these, the 'key sector pathway actions over time' encapsulated in the Tonga Low Emission Development Strategy (Tonga LEDS) 2021-2050, and Technology Needs

Assessment (currently in development) will also contribute to execution of GHG mitigation initiatives in the energy sector.

The process of developing the INDC and NDC involved identifying key sectors for mitigation by reviewing a range of documents related to climate change and economic development. The most recent Tonga's third national communication for UNFCCC highlighted the priority sectors for mitigation as Energy, Transport, and (AFOLU), as well as Waste Management as per shown in Table 8. These findings were shared with TNA stakeholders during a sector prioritization workshop conducted in 2023. Energy, Transport, and AFOLU were selected for further focus and development.

5.1.2 : Existing Regulatory Policies

Table 9 : The Existing Policies and Laws for the Mitigation of Emissions

Existing National Policy	Effective Time	Content/Objectives	Priority Actions
National Environmental Policy and Tonga Biodiversity Framework (TBF), National Biodiversity Strategy and Action Plan (NBSAP)	Signed in 1996 ; Adopted in 2006	Tonga's goal for biodiversity conservation has at its heart on the quality of life and well-being of Tonga's people. The revised TBF focuses on nine thematic areas: i. Forestry Ecosystems ii. Agro Biodiversity iv. Species Conservation v. Invasive Alien Species vi. Local Community and Civil Society vii. Access and Benefit Sharing from the genetic resources viii. Mainstreaming biodiversity Conservation ix. Financial Resource Mechanisms	 i. Waste Management Strategy / Beautification and landscaping – Marine Plastic Pollution; Land- based Pollution; strengthen the no plastic campaign and promote the use of recyclable and cloth bags rather than single use plastic bags for shopping. ii. Pollution free environment – which encompasses human wellbeing iii. Marine Spatial Planning Framework (Sustainable Ocean Policy, Marine Spatial Plan and its legislation); iv. The Tonga Biodiversity Framework (TBF); v. The Fanga'uta Stewardship Action Plan; vi. Community engagement in conservation work - from land to ocean which leads to Livelihood Securities; vii. the National Environment Management Strategy (NEMS) viii. the Nagoya Protocol Programme of Work; ix. the Convention on International Trade of Endangered Species (CITES) Programme of Work; x. Institutional strengthening of EIA processes; xi. Sustainable Development processes – to guide development. xii. Ongoing awareness program - holistic approach that is inclusive of all priority areas i.e. policy and regulations, Ocean management, etc.; focus on increasing outreach to schools on environmental awareness programs from primary to high school level through activities, short videos themed on terrestrial and marine conservation, waste and pollution control etc. xiii. Increased awareness of SDGs

				relevant to SDG3, SDG6, SDG13,
National Olimata Ohanna	2010	The nelicy laws out a strategic hybrid of	:	SDG 14 and SDG 15.
Policy and INAP II	2016	I ne policy lays out a strategic whole of Tonga' approach where it recognizes that	Ι.	Change Fund Bill:
		climate change is the single biggest issue	ii.	Commitment and contributions of
		that will determine the future of Tonga over		Government of Tonga to the
		the coming decades.		Climate Change Trust Fund;
		The policy objectives become the	iii.	Establishment of climate change
		objectives of the JNAP 2 which are –		staff in the outer islands (Vava'u,
		I. Mainstreaming for a resilient	iv	Ha apai, Eua and the Niuas);
		ii Implement a coordinated	IV.	Policy Implementation towards
		approach to research,		achievement of resilience targets;
		monitoring, and management of	ν.	Government of Tonga as co-
		data & information		financier future Green Climate
		iii. Resilience-building actions		Find (GCF) and Adaptation Fund
		IV. Finance	vi	(AF) Projects;
		v. Regional and international Cooperation	VI.	Assessment Monitoring and
		cooporation		Reporting:
			vii.	ODS Legislation amendment and
				HFCF Plan implementation;
			viii.	Tonga- Nationally Determined
				Contributions (NDCs) Update to
				Paris Agreement under the
				UNFCCC:
			ix.	Endorsement of the Tonga Long
				term-Low Emission Development
				Strategy (LT-LEDS) in fulfilment of
				its obligations under the Paris
			v	Agreement;
			۸.	sustainable management of
				climate change data and
				information; and
			xi.	Establishment of climate change
				project staff for sustainability
				Teasons.
National Energy Policy/	2010 and	The objective of the TERM is to lay out a	i.	Achieving 50% share of
Tonga Energy Road Map	reviewed	least-cost approach and implementation		renewable energy generation as
AND Tonga Energy Road	in 2021	plan to reduce Tonga's vulnerability to oil		first energy to be achieved in 2020
Map Plus		price shocks and achieve an increase in		and the second target of reducing
		in a financially and environmentally		to the share of 9% loss in the total
		sustainable manner. Specific objectives	ii.	Launching of TERM Plus (2021-
		involve renewable energy, energy		2025) of which included the
				2035), of which included the
		efficiency, equitable access and		targets of 70% share of RE by
		efficiency, equitable access and affordability, institutional reform and		targets of 70% share of RE by 2025 and 100% share of RE in
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum.		targets of 70% share of RE by 2025 and 100% share of RE in 2030.
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional	iii. iv	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps:
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal	iii. iv. v.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework	iii. iv. v. vi.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept	iii. iv. v. vi. vii.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects	iii. iv. v. vi. vii.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii Phase 2: Private Sector	iii. iv. v. vi. vii. vii.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and	iii. iv. v. vi. vii. vii.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented;
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments,	iii. iv. v. vi. vii. vii. ix.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable	iii. iv. v. vi. vii. vii.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. v. vi. vii. vii. ix.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE technologies and application;
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. vi. vii. vii. ix.	targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE technologies and application; SDG 7 Master Plan 2020 Developing of DI MARPACE
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. vi. vii. viii. ix. x. xi.	2035) , of which included the targets of 70% share of RE by 2025 and 100% share of RE in 2030. Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development SDG 7 Master Plan 2020 Developing of new RE technologies and application; SDG 7 Master Plan 2020 Developing of DUMARRAGE Project proposal for 10% loss in
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. vi. vii. viii. ix. x.	2035), of which included the targets of 70% share of RE by 2025 and 100% share of RE in 2030.Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE technologies and application; SDG 7 Master Plan 2020 Developing of DUMARRAGE Project proposal for 10% loss in price of petrol; and
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. v. vi. vii. ix. x. xi.	2035), of which included the targets of 70% share of RE by 2025 and 100% share of RE in 2030.Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE technologies and application; SDG 7 Master Plan 2020 Developing of DUMARRAGE Project proposal for 10% loss in price of petrol; and Extension of existing office space
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. v. vi. vii. ix. x. xi. xi.	2035), of which included the targets of 70% share of RE by 2025 and 100% share of RE in 2030.Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE technologies and application; SDG 7 Master Plan 2020 Developing of DUMARRAGE Project proposal for 10% loss in price of petrol; and Extension of existing office space for Energy Department to cater for
		efficiency, equitable access and affordability, institutional reform and affordability and safety of petroleum. TERM encompasses three phases: i. Phase 0: Institutional Strengthening and the Legal Framework ii. Phase 1: Proof of Concept Renewable Energy Projects Implementation iii. Phase 2: Private Sector Participation, Efficiency and Renewable Energy Investments, Institutionalizing Renewable Energy	iii. iv. v. vi. vii. ix. x. xi.	2035), of which included the targets of 70% share of RE by 2025 and 100% share of RE in 2030.Solar Street Lights; Solar Water Pumps; Tonga Energy Act 2023 Rural Electrification Policy Tonga Energy Efficiency Master Plan 2021 TERM and NDC climate technologies and mitigation options implemented; Improved research and development of new RE technologies and application; SDG 7 Master Plan 2020 Developing of DUMARRAGE Project proposal for 10% loss in price of petrol; and Extension of existing office space for Energy Department to cater for institutionalization of the Energy

5.1.3 Current Electricity Mix

Tonga has a total installed capacity of power generation of about 34MW, including diesel, solar, wind power as well as Battery Energy System Storage. Table 10 indicates the total electricity generation mix in Tonga

Fuel Mix for	Fuel Mix for Power Generation Installed Capacity (MW)			% Contribution
Fossil Fuel	Diesel	23.047		
	Tongatapu		18.730	65
	Vavau		2.872	8
	Haapai		0.672	2
	Eua		0.772	1
Renewable	Solar	9.6		
	Tongatapu Maama Mai		2300	3.64
	Maama Mai BESS		7.2MW/23.9MWh	1.73
	IPP Matatoa		2000	3.76
	Matatoa BESS		9MW/5,3MWh	
	IPP Fualu		2000	4.73
	IPP Masilamea		2000	3.83
	IPP Liukava		2000	1.80
	Vavau Laá Lahi		0.400	0.32
	VavauTREP		O.250	0.61
	Solar/BESS			
	Haapai/BESS		0.500	0.47
	Eua Huelo Óe Laá		0,200	0.29
	TREP/Solar /BESS		0.5	0.75
	Wind			
	I Manumataongo	1	1000	3.81
TOTAL DIES	SEL POWER		23.047	76%
TOTAL RE			10.6	24%
TOTAL			33.647	100%

Table 10: Current Electricity Mix profile

5.1.4 Prioritized Technologies for Tonga

The prioritized technologies for the energy sector are (1) On-grid solar (2) On-grid wind (3) Energy Efficient Home Appliances. Therefore these technologies are included in this TAP. The barrier analysis indicated that all three technologies are implemented in Tonga and possess economic viability, as they have played a role in meeting national energy objectives by enhancing the proportion of renewables in the electricity sector and significantly lowering carbon emissions. Consequently, these technologies are included in this TAP.

5.1.4.1 On-Grid PV Solar

On-Grid PV or On-Grid Solar has been adopted in Tonga through government/donor financial assistances and partnerships. The implementation of on-grid solar energy by power utilities and independent power producers (IPP/PPA) is designed to assist in partially replacing the imported diesel utilized for electricity generation within the country. This transition to on-grid solar will also contribute to a reduction in carbon emissions associated with diesel usage, thereby alleviating the strain on fossil fuel reserves. Consequently, this approach will help preserve the carbon dioxide sink and to achieve our national energy targets by increasing share of renewable energy in the electricity grid to reach 100% by 2030. Large electricity consumers in urban areas could benefit from an IPP/PPA on-grid solar farm, allowing them to decrease their reliance on grid electricity. As of the present, the cumulative capacity of on-grid solar power installations in Tonga stands at approximately 9.6 MW, in contrast to the total installed power generation capacity of 33.65 MW within the nation. The Department of Energy (DOE) is presently collaborating in the funding of the establishment of five mini-grids that incorporate diesel generators, alongside an additional nine mini-grids that operate without diesel generators, specifically targeting the remote islands of Tonga. The implementation of mini and micro solar power systems is deemed appropriate for rural regions lacking access to the national grid, where a significant portion of the population relies on wood fuel for cooking, utilizing inefficient traditional stoves.

5.1.4.2 On-Grid Wind Power

Wind energy development in the country remains in its early phases. Of the estimated total installed power generation capacity of 33.65 MW in Tonga, less than 1 MW has been utilized at existing power plants. The Department of Energy (DOE), in collaboration with the People Republic of China, has been financing the research and installation of specific model of wind power in Tonga. Currently, Under this project, Tonga has initiated at least 2 MW of on-grid wind projects, supported by funding from the Chinese Government, result in a total combined wind power capacity of more than 3 MW for wind energy.

5.1.4.3 Energy Efficient Home Appliances

The Department of Energy (DOE), in collaboration with various donors, has been financing research initiatives aimed at enhancing energy efficiency services in Tonga. In 2010, the Government of Tonga established a national energy target to limit electricity losses within the network to 9%, a goal that was successfully met in 2019. The Department of Energy has been conducting feasibility studies on demand-side energy efficiency in Tonga since the 1990s; however, private sector companies have not yet recognized energy efficiency services and technical auditing as viable business opportunities. In partnership with the Department of Energy, the SPC has developed Minimum Energy Performance Standards and Labelling for common household appliances in the country, although implementation is still pending. The government has incorporated energy efficiency objectives into the Tonga Energy Road Map Plus for the period 2021-2035, and a national Renewable Energy and Energy Efficiency Master Plan (TREEEMP) has also been formulated, yet both initiatives await execution. Additionally, UNESCO has assisted the Department of Energy in creating the Tonga SDG 7 Master

Plan, which emphasizes a renewable energy and energy efficiency action plan, but this too has not yet been implemented. While electricity consumers in Tonga have begun to adopt more energy-efficient appliances, many families are still evaluating the cost-benefit ratio of these technologies. The adoption of energy-efficient home appliances is particularly advantageous in areas of the country served by the national grid or mini-grids/micro-grids, where a significant number of households continue to utilize less efficient appliances.

5.1.5 Action Plan for On-Grid PV Power

5.1.5.1 Introduction

The predominant source of renewable energy within the country's electricity portfolio is derived from on-grid solar power. In the initial half of 2024, the overall generation from on-grid photovoltaic (PV) systems accounted for approximately 10% to 15% of the nation's total power output (TPL, 2024a, b, c). The monthly contributions from on-grid PV are detailed in Table 11 below.

Time	Total	Total On-	% of On-grid PV
	Power	Grid PV	_
	Generated	Generated	
	(kWh)	(kWh)	
January	7,741,305	1,183,894	15.29
February	7,477,061	1,094,267	14.63
March	8,232,013	1,011,11`9	12.28
April	7,208,097	1,081,605	15.01
May	7,623,180	819,836	10.75
June	6,794,732	901,205	13.26

Table 11: % Contribution of On-Grid PV to Total Power Generation in 2024

The second most significant portion of renewable energy within the nation's electricity mix is derived from on-grid wind power. In the first half of 2024, the total on-grid wind generation accounted for approximately 1% to 2% of the overall power generation in the country (TPL, 2024a, b, c). The monthly contributions of on-grid wind to total power generation are detailed in Table 12 below.

Table 12: % Contribution of On-Grid Wind to Total Power Generation in 2024

Time	Total	Total On-	% of Wind Power
	Power	Grid Wind	in Total Power
	Generated	Generated	Generation
	kWh)	kWh)	
January	7,741305	198.560	2.56
February	7477061	211340	2.83
March	8232013	137790	1.67
April	7,208,097	125,330	1.74
May	7,623,180	195,360	2.56

June 6,794,732 195860 2	2.88
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The predominant source of electricity generation typically arises from diesel power. The specific monthly contribution of diesel-generated electricity to the overall power generation is presented in Table 13 below. Enhancing energy efficiency in residential settings can play a crucial role in decreasing total power demand, a significant portion of which is met by diesel power.

Table 13	% Contribution	of Diesel Power to	Total Power	Generation in 2024

Time	Total	Total On-	% of Diesel
	Power	Grid	Power in Total
	Generated	Diesel	Power
	kWh)	Generated	Generation
		kWh)	
January	7,741305	6,358,851	82.14
February	7477061	6,171,454	82.54
March	8232013	7,083,104	86.04
April	7,208,097	6,001,162	83.26
May	7,623,180	6,607,984	86.68
June	6,794,732	5,697,667	83.85

Tonga Power Limited (Power Utility) has observed a rise in electricity losses, attributed to both network inefficiencies and parasitic losses. Additionally, Tonga is experiencing substantial deforestation daily, driven by the escalating demand for agricultural land and fuelwood. The primary source of carbon emissions in Tonga stems from commercial activities related to agriculture and forestry.

5.1.5.2 Objective of the TAP for On-Grid PV

This action plan outlines the implementation of 10MW of solar energy alongside 20MWh of battery storage capacity. This project aligns with the national energy goal of attaining a 100% renewable energy share by 2035. The emphasis will be placed on the ongoing evaluation and analysis of current on-grid solar power initiatives to guarantee the most sustainable economic benefits and option from solar energy, thereby facilitating the achievement of the 100% renewable energy target by 2035.

5.1.5.3 Action and Activities selected for this TAP.

5.1.5.3.1 Summary of Barriers to On-Grid Solar Power Generation

The Barrier Analysis phase revealed multiple obstacles that could hinder the dissemination of the technology. These obstacles were categorized into financial and fiscal barriers, encompassing cost-related issues, tax impediments, challenges in accessing financing, and inadequate financial policies and regulations. The second category consists of non-financial barriers, which includes policy, regulatory, and legal challenges, institutional obstacles, technical difficulties, market constraints, as well as barriers related to information and public awareness.

5.1.5.3.2 Financial and Fiscal Barriers

5.1.5.3.2.1 Insufficient knowhow on economic and financial viability of the technology

On-grid solar power technology is relatively uncommon, resulting in limited awareness regarding its advantages among both investors and users. A significant challenge lies in attracting investors to this technology while simultaneously encouraging a substantial number of individuals to adopt it, as this could further entice potential investors. There remains a lack of comprehensive understanding and experience regarding the full cost recovery of Power Purchase Agreement (PPA) solar investments for private investors, as well as similar experiences related to government and donor-funded projects. Additionally, there exists a certain level of uncertainty concerning the demand for solar power produced by solar farm for the national grid. The fiscal challenges posed by inflation have exacerbated the rise in petroleum prices, while the electricity market continues to grapple with a shortage of expertise and labour, all amidst the ongoing recovery from cyclone impacts.

5.1.5.3.2.2 High Upfront capital cost technology

The initial investment required for an on-grid solar power plant exceeds that of a diesel power generation system, as the overall expense associated with purchasing and installing a 1 MW diesel power plant is significantly lower than that of a 1 MW on-grid solar power plant. Nevertheless, the operational expenses for a solar power plant are less than those for a diesel power plant, primarily due to reduced maintenance costs and the availability of free fuel of sunlight.

5.1.5.3.2.3 Insufficient Access for finance

The on-grid solar power plant represents a relatively novel technology when compared to diesel generators and other fossil fuel-based power generation methods. Consequently, commercial banks in Tonga exhibit a lack of enthusiasm for financing such projects, with the exception of multilateral banks and institutions. Additionally, the prevailing bank lending rates are excessively high, averaging over 50%, which poses significant challenges for private borrowers. As a result, commercial banks are disinclined to provide the necessary funding for local investors and solar initiatives, as lenders are reluctant to incur debt at such steep interest rates for projects that may become difficult to maintain.

5.1.5.3.3 Non-Financial Barriers

5.1.5.3.3.1 Policy, Regulatory and Legislative

The insufficient electricity tariff policy, along with regulatory and legislative measures, has overlooked the environmental costs, resulting in the externalities linked to fossil fuel combustion not being considered. As a result, the pricing of on-grid solar power does not reflect these environmental costs, making such prices unsustainable from an ecological standpoint, and affected revenue streams. Insufficient policy incentives and support mechanisms, along with ambiguous roles and responsibilities in policy and regulation for photovoltaic (PV) production within the grid, present significant challenges.

5.1.5.3.3.2 Institutional

The energy institutions currently face inadequate capacities, including deficiencies in both technical and managerial expertise, as well as a lack of information and training related

to business management. Additionally, there is insufficient capability to effectively regulate the electricity sector. The existing institutional framework and mandates are ambiguous, hindering the effective implementation of guidelines, milestones, and performance benchmarks necessary to meet our national energy objectives regarding the integration of renewable electricity into the grid. Consequently, this situation delays the establishment of mechanisms to combat the challenges posed by climate change.

5.1.5.3.3.3 Technical

The availability of land poses challenges for the integration of solar power plants with distribution lines and the overall network. Additionally, issues related to grid stability necessitate a thorough assessment of electricity grids. Furthermore, there is a lack of adequate technical expertise within the electricity sector.

5.1.5.3.3.4 Market

Solar energy projects face significant risks and limited profitability, compounded by a deficiency in expertise regarding the factors that affect supply and demand within the market. The pricing in Tonga's market is particularly susceptible to fluctuations in oil prices. Additionally, there is insufficient community engagement in renewable energy decision-making processes.

5.1.5.3.3.5 Information and Public Awareness

Private sector and potential users of technology are not informed of economic viability of this technology. There is also insufficient data to support fixed electricity tariff for all and insufficient data to support the level of tariff adopted. There is also lack of knowledge on renewable energy technologies.

5.1.5.3.4 Summary of Measures to Overcome the Barriers

The subsequent actions were recognized to alleviate obstacles.

5.1.5.3.5 Financial and Fiscal Measures

5.1.5.3.5.1 Insufficient knowhow on economic and financial viability of the technology

State institutions, including the University of the South Pacific, along with regional and international energy organizations, as well as bilateral and multilateral funding bodies, should be motivated to conduct financial feasibility assessments for on-grid solar power and disseminate the findings of these studies. Support in terms of technical and financial resources for these assessments can be pursued from donor agencies. The studies should encompass all pertinent external factors, such as the difficulties in attracting investors, the suitable economic framework for full cost recovery, the integration of maximum demand for on-grid solar into the national electricity grid, and effective strategies to manage inflation in electricity tariffs.

5.1.5.3.5.2 High Upfront Cost of the technology

In the short term, it is advisable to decrease or abolish government taxes on technology imports. Such tax reductions or exemptions would serve as an incentive to facilitate the widespread adoption of on-grid solar power. In the long term, efforts should be directed towards fostering local manufacturing and construction of this technology. Donor agencies tasked with promoting these technologies in developing nations should contemplate offering financial support to private sector entities, especially those engaged in local manufacturing, under favourable terms to enhance access to these technologies.

5.1.5.3.5.3 Insufficient Access for Finance

Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of renewable technologies, such as on-grid solar farms.

5.1.5.3.6 Non-financial Measures

5.1.5.3.6.1 Policy, Legal and Regulatory Measures

The externalities associated with fossil fuel combustion remain unaccounted for. These externalities encompass environmental impacts and the omission of environmental costs, particularly as diesel power generation continues to receive subsidies reflected in electricity tariffs. It is imperative that the on-grid power tariff incorporates these environmental costs alongside the subsidies for diesel fuel. The failure to account for these external costs renders the use of LPG and unsustainable charcoal significantly more economical compared to renewable energy sources. Establishing effective collaboration among all stakeholders is crucial to tackle the growing challenges related to licensing and the suitability of Power Purchase Agreements (PPAs). Additionally, it is vital to make informed decisions regarding policy incentives and support mechanisms that govern the regulation of on-grid photovoltaic (PV) generation.

5.1.5.3.6.2 Institutional Measures

Enhance the capabilities of institutions by providing technical and business management training, as well as facilitating professional attachments to international organizations. Strengthen the institutional framework to ensure the effective execution of guidelines, milestones, and performance benchmarks, thereby enabling the achievement of national energy objectives and targets

5.1.5.3.6.3 Technical Measures

The current state of technology for on-grid solar power has not yet reached a level of public acceptance. It is essential for relevant research and development institutions to conduct additional studies to overcome technical challenges, particularly those related to the integration of solar power into the electricity grid, especially concerning distribution lines. Enhancing the stability of the electricity grid and increasing the flexibility of diesel power generation to mitigate power interruptions are also critical. Moreover, the government should prioritize the enhancement of technical expertise in the field of on-grid solar power generation

5.1.5.3.6.4 Market Measures

International, regional, and local expertise should evaluate the viability of implementing on-grid photovoltaic systems by analyzing the elements that impact the supply and demand for on-grid solar energy production. Variations in oil prices have had a significant effect on electricity costs; therefore, it is crucial to examine and identify the determinants that influence electricity demand, with consultation from local communities being a vital component of this assessment.

5.1.5.3.6.5 Information and Public Awareness Measures

The convenience and acceptability of on-grid solar power generation among consumers have yet to be assessed. It is imperative for relevant government institutions to formulate a communication strategy, create awareness materials, and implement promotional initiatives to foster public acceptance of on-grid solar power generation. This can be achieved by demonstrating the economic viability of the technology and justifying the adoption of a fixed electricity tariff for all grid-connected customers in key districts. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

5.1.5.3.7 Actions Selected To Be Included in the TAP

1. Assess the feasibility of on-grid solar power generation: Currently, the market for compact on-grid solar power generation remains largely uncharted. Investors require confirmation of the business's viability before committing their resources. The studies should encompass all pertinent external factors, such as the difficulties in attracting investors, the suitable economic framework for full cost recovery, the integration of maximum demand for on-grid solar into the national electricity grid, and effective strategies to manage inflation in electricity tariffs. This analysis will not eliminate the need for investors to conduct their own feasibility assessments.

2. Raise awareness among both developers and users of on-grid solar power: It is crucial for both users and innovators to understand not only the potential of this technology but also the advantages it offers. This can be achieved by demonstrating the economic viability of the technology and justifying the adoption of a fixed electricity tariff for all grid-connected customers in key districts. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

3. Improve access to financing for on-grid solar power: The prevailing lending rates pose a significant obstacle for investors seeking to enter into long-term financing agreements with commercial banks. Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of renewable technologies, such as on-grid solar farms and timelines.

4. The design and installation of technology must be tailored to align with the institutional, technical, regulatory, and economic frameworks of the country.

5. Evaluation, Maintenance, and Oversight of Technology: The evaluation, maintenance and oversight of the installed technology shall be conducted in accordance with the regulatory, technical, economic and legislative framework of the country. While private investors, donors, and government entities are eager to achieve successful results, it is essential to acknowledge the challenges that may arise and the opportunities available to enhance the policy, legislative, institutional, technical, economic and regulatory environment to fulfil the technology's requirements. Table 14 presents the relevant activities necessary for diffusion of on-grid PV power.

Technology	Activities	Responsible
Action Plan		Stakeholder
1. Assess the	1.1 Conduct the economic, financial and	DoE, TPL. University
Feasibility of	fiscal feasibility of the full cost recovery	of Tonga, GCF, SPC
On-Grid	of On-Grid PV generation in Tonga	and Local Energy
Power		Consultants
Generation	1.2 Carry out Market Survey to ensure	DoE, TPL. University
	business viability of the technology to	of Tonga, GCF, SPC
	investors	and Local Business
		and Economic
		Consultants
	1.3 Conduct the economic feasibility of the	DoE, TPL. University
	adoption of fixed electricity tariffs in	of Tonga, GCF, SPC
	the country and impacts of inflation in	and Local Business
	the tariffs	and Economic
		Consultants
2. Create	2.1 Develop awareness material targeting	DoE, TPL. University
Awareness	different stakeholders (i.e. Private	of Tonga, GCF, SPC
of both	Sector, Decision Makers, Users of PV	and Local Business
Developer,	Technology, financial institutions of	and Economic
and users of	technology)	Consultants
the	2.2 Develop a communication strategy	DoE, TPL. University
technology	Profile for target stakeholders	of Tonga, GCF, SPC
	particularly the adopters of the	and Local Business
	technology	and Economic
		Consultants
	2.3 Implement awareness campaign on	DoE, TPL. University
	on-grid PV power generation,	of Tonga, GCF, SPC
	especially attract attentions of	and Local Business
	investors and users	and Economic
		Consultants
3. Enhance	3.1 Develop Financial Policy Incentives to	DoE, IPL. University
Access to	assist lowering the cost of On-Grid PV	of Ionga, GCF, SPC
Financing	technology	and Local Business
		and Economic
		Consultants
	3.2 Engage in dialogue with government	DoE, IPL. University
	development partners to provide	of Tonga, GCF, SPC
	incentives and subsidies for the	and Local Business
	technology as it contributes to global	and Economic
	3.3 Discuss and Justify the adoption of the	DOE, TPL. University
	most suitable model for PPA Contract	of Ionga, GCF, SPC
	for on-grid solar power investors and	and Local Business
	private sectors in Tonga	and Economic

Table 14: Activities to be implemented to enhance diffusion of on-grid PV solar

			Consultants
 Design, Procure, Install the monitoring and 		4.1 Design, procure install the on-grid PV investment initiative in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	maintenance plan model for on-grid PV applications in the country	4.2 Design, Approve and Set up the Monitoring and Maintenance Model for the technology	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
5.	5. Assess and Identify all the necessary improvement	5.1 Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing on-grid PV investment in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	options	5.2 Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
		5.3 Prepare all Policy decisions for government approval	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
		5.4 Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

5.1.5.4 Action To Be Implemented as Project Ideas

The aforementioned five actions, specifically the feasibility study, awareness raising, and improved access to financing, design and installation, and finally the assessment, maintenance, and monitoring will be evaluated for implementation as potential project ideas. These actions were identified during the barrier analysis and measures phase in accordance with the TAP preparation guidelines.

5.1.5.5 Stakeholders and Implementation Timelines for the TAP

Table 15 shows the list of stakeholders to implement the TAP

Table 15 List of Activities and Respective Stakeholders to Implement the TAP

Activities	Responsible Body	Timelines
Conduct the economic, financial	DoE, TPL. University	1-2 Months
and fiscal feasibility of the full	of Tonga, GCF, SPC	
cost recovery of On-Grid PV	and Local Energy	
generation in Longa	Consultants	4.0.14
Carry out Market Survey to	DoE, IPL. University	1-2 Months
ensure business viability of the	of longa, GCF, SPC	
lechnology to investors	and Local Business	
	Consultants	
Conduct the economic	DoF TPL University	2 Months
feasibility of the adoption of	of Tonga GCF SPC	
fixed electricity tariffs in the	and Local Business	
country and impacts of inflation	and Economic	
in the tariffs	Consultants	
Develop awareness material	DoE, TPL. University	6 Months
targeting different stakeholders	of Tonga, GCF, SPC	
(i.e. Private Sector, Decision	and Local Business	
Makers, Users of PV	and Economic	
Technology, financial	Consultants	
institutions of technology)		
Develop a communication	DoE, TPL. University	2 Months
strategy Profile for target	of Tonga, GCF, SPC	
stakeholders particularly the	and Local Business	
adopters of the technology	and Economic	
Implement		2 Montho
awareness compaign on on grid DV power	of Tonga CCE SPC	
campaign on on-gild F v power	and Local Rusiness	
attentions of investors and	and Eccal Dusiness	
users	Consultants	
Develop Financial Policy	DoE. TPL. University	3 Months
Incentives to assist lowering the	of Tonga, GCF, SPC	•
cost of On-Grid PV technology	and Local Business	
	and Economic	
	Consultants	
Engage in dialogue with	DoE, TPL. University	3 Months
government development	of Tonga, GCF, SPC	
partners to provide incentives	and Local Business	
and subsidies for the	and Economic	
technology as it contributes to	Consultants	
		1 O Maintha
Discuss and Justiliy the	of Tongo CCE SPC	I-2 WORTINS
model for PPA Contract for on	and Local Rusiness	
arid solar power investors and	and Economic	
private sectors in Tonga	Consultants	
	Activities Conduct the economic, financial and fiscal feasibility of the full cost recovery of On-Grid PV generation in Tonga Carry out Market Survey to ensure business viability of the echnology to investors Conduct the economic easibility of the adoption of ixed electricity tariffs in the country and impacts of inflation in the tariffs Develop awareness material argeting different stakeholders i.e. Private Sector, Decision Makers, Users of PV Technology, financial institutions of technology) Develop a communication trategy Profile for target stakeholders particularly the adopters of the technology Implement awareness campaign on on-grid PV power generation, especially attract attentions of investors and isers Develop Financial Policy ncentives to assist lowering the cost of On-Grid PV technology Engage in dialogue with povernment development partners to provide incentives and subsidies for the echnology as it contributes to global benefit Discuss and Justify the adoption of the most suitable nodel for PPA Contract for on- grid solar power investors and private scotter in Tonga	uctivitiesResponsible BodyConduct the economic, financial Ind fiscal feasibility of the full ost recovery of On-Grid PV generation in TongaDoE, TPL. University of Tonga, GCF, SPC and Local Energy ConsultantsCarry out Market Survey to ensure business viability of the easibility of the adoption of n the tariffsDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic ConsultantsConduct the economic easibility of the adoption of n the tariffsDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic ConsultantsDele pavareness consultantsDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic ConsultantsDevelop awareness rechnology, trategy Profile for target takeholders particularly the dopters of the technologyDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic ConsultantsImplement sersawareness ampaign on on-grid PV power generation, especially attract ttentons of investors and sersDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic ConsultantsDevelop Financial Policy ncentives to assist lowering the optermment development attres to provide incentives and subsidies for the echnology as it contributes to lobal benefitDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic ConsultantsEngage in dialogue with povernment deption of the most suitable nodel for PPA Contract for on- rive solar power investors and uspirate actors in TongaDoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants </td

Design, Procure, Install the monitoring and maintenance	Design, procure install the on- grid PV investment initiative in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants DoF TPL University	1-3 years
plan model for on-grid PV applications in the country	Monitoring and Maintenance Model for the technology	of Tonga, GCF, SPC and Local Business and Economic Consultants	
Assess and Identify all the necessary improvement options	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of on-grid PV investment in the country Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	3-5 years
	Prepare all Policy decisions for government approval	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	
	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	

5.1.5.6 : Roles of Stakeholders

The roles of stakeholders are shown in Table 16 below

Table 1	16	Roles (of On-	Grid PV	Stakeholders
I abic I	0	10163		Ghurv	Slakenoluers

1	Ministry of Energy	Plan and manage energy policies, energy targets, and
		assess energy goals and objectives
		Oversee energy projects including on-grid energy projects
		Identify and source funding to implement on-grid energy projects
		Formulate and present energy plan, strategies and programmes to government and seek Cabinet's approval
		Promote public awareness and informed decisions on on-

		grid PV technologies.
2	Department of Climate Change , MEIDECC	Focal Point of the United Nations Convention on Climate Change
		Sourcing funds from climate funds and Global Environmental Facility
		GCF focal point in Tonga
3	Department of Environment , MEIDECC	Responsible for environmental policies and environmental management
4	Ministry of Finance and Planning	Responsible for financial policies and policy incentives for businesses.
5	Ministry of Economic and Trade	Responsible for Business incentive policies
6	Ministry of Foreign Affairs	Responsible for foreign relations with donors and development partners.
7	Tonga Power Limited, TPL	Manage and Plan all grid connected solar power generation project and installations.
8	Tonga Electricity Commission	Responsible for regulatory policies and regulation of on- grid PV
9	University of Tonga and University of the South Pacific	Research and Development
10	Regional Energy Institutions	Responsible for regional energy coordination and general assessment and analysis of on-grid PV projects
11	Development Partners and Donors	Financing of on-grid solar power projects
12	Local NGOs and Consultants	Technical assessment and specific technical analysis of on-grid PV projects
13	Contractor and Subcontractor for technological installation of on- grid PV	Technical installation of the technology

5.1.5.7 : Scheduling of Activities

Table 17 describes the sequence and timing of specific activities and responsibilities

Table 17: Scheduling of Activities

Action	Activities	Planning		Implementation		Responsible Stakeholder
		Start	End	Start	End	
1. Assess the	1.1 Conduct the	2025	2025	2025	2025	DoE, TPL.

Feasibility of On-Grid Power Generation	economic, financial and fiscal feasibility of the full cost recovery of On- Grid PV generation in Tonga					University of Tonga, GCF, SPC and Local Energy Consultants
	1.2 Carry out Market Survey to ensure business viability of the technology to investors	2025	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	1.3 Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of inflation in the tariffs	2025	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
2. Create Awareness of both Developer, and users of the technology	2.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of PV Technology, financial institutions of technology)	2025	2026	2025	2026	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	2.2 Develop a communication strategy Profile for target stakeholders particularly the adopters of the	2025	2025	2026	2026	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

	technology					
	2.3 Implement awareness campaign on on-grid PV power generation, especially attract attentions of investors and users	2026	2026	2026	2027	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
3. Enhance Access to Financing	3.1 Develop Financial Policy Incentives to assist lowering the cost of On- Grid PV technology	2024	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	3.2 Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit	2025	2026	2025	2026	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	3.3 Discuss and Justify the adoption of the most suitable model for PPA Contract for on- grid solar power investors and private sectors in Tonga	2027	2027	2027	2027	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
Design, Procure, Install the monitoring and maintenance plan model for	Design, procure install the on- grid PV investment initiative in the country	2027	2031	2037	2032	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

on-grid PV applications in the country	Design, Approve and Set up the Monitoring and Maintenance Model for the technology					DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
Assess and Identify all the necessary improvement options	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing ON- GRID PV investment in the country	2032	2032	2032	2035	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.					DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	Prepare all Policy decisions for government approval					DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.					DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

5.1.5.8 : Estimation of Resources for Action and Activities

To achieve successful and sustained technology diffusion, it is essential to enhance the capabilities of local technology importers and bidders and installers, especially local suppliers, overseas and local contractors and bidders of the technology, installers, and

maintenance engineers. Furthermore, to facilitate accelerated diffusion, it is necessary to implement a train-the-trainers approach, enabling the replication of training programs across numerous regions.

The activities to be undertaken and their associated costs are presented in Table 18.

Action	Activities	Plan Start/ End	Imple ment ation Start/ End	Estima ted Cost (USD)	Source of Fund	Responsi ble Stakehol der	Justificatio n
1. Instituti onal Set Up	1.1 Establish an unit to oversee the implementati on of TAP	2025/ 2025	2025/ 2025	1,318,000	Donors	DOE, TPL, Donors	Recuited personnel and office furniture and office equipment
2.Assess the Feasibility of On-Grid Power Generation	2.1 Conduct the economic, financial and fiscal feasibility of the full cost recovery of On-Grid PV generation in Tonga	2025/ 2025	2025/ 2025	247,000	Donors	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consulta nts	Recruitme nt of researcher s and profession al assessors
	2.2 Carry out Market Survey to ensure business viability of the technology to investors	2025/ 2025	2025/ 2025		Donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	Recruitme nt of Assessors
	2.3 Conduct the economic feasibility of the adoption of fixed electricity	2025/ 2025	2025/ 2025		Donors	DoE, TPL. University of Tonga, GCF, SPC and	Recruitme nt of assessors and office equipment

Table 18 : Financial considerations associated with the execution of the identified activities.

	tariffs in the country and impacts of inflation in the tariffs					Local Business and Economic Consulta nts	
3.Create Awareness of both Developer, and users of the technology	3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of PV Technology, financial institutions of technology)	2025/ 2026	2025/ 2026	530,000	Donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	1.Consulta tion with stakeholde rs 2.Publish of public awareness materials
	3.2 Develop a communicatio n strategy Profile for target stakeholders particularly the adopters of the technology	2025/ 2025	2026/ 2026		Donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	Contact address and internet communic ation links
	3.3 Implement awareness campaign on on-grid PV power generation, especially attract attentions of investors and users	2026/ 2026	2026/ 2027		Donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	1.Conduct of Trainings 2.Distributi on of materials 3.Record and broadc ast of Radio and TV programs
4.Enhance Access to	4.1 Develop Financial	2024/ 2025	2025/ 2025	260,000	Donors	DoE, TPL.	1. Meetin g

Financing	Policy Incentives to assist lowering the cost of On- Grid PV technology					University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	 Consult ations Policy Decisio ns
	4.2 Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit	2025/ 2026	2025/ 2026		Donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	Consultatio n with stakeholde rs Formulatio n of Policies, Regulation s and Legislation
	4.3 Discuss and Justify the adoption of the most suitable model for PPA Contract for on-grid solar power investors and private sectors in Tonga	2027/ 2027	2027/ 2027		donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta nts	Agreed model of PPA supported by internation al power companies and multilateral donors
Action 5: Design, Procure, Install the monitoring and maintenan ce plan model for on-grid PV application	Design, procure install the on- grid PV investment initiative in the country	2027/ 2027	2027/ 2031	101 mil	donors	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consulta	Agreed model of PPA supported by internation al power companies and multilateral donors

s in the						nts	
country	Design,						
	Approve and						
	Set up the						
	Monitoring						
	Maintonanco						
	Model for the						
	technology						
Action 6 :	Assess and	2031/	2032/	1 mil	donors	DoE,	Agreed
Assess	Identify the	2032	2035			TPL.	model of
and	policy,					University	PPA
Identify all	legislative					of Tonga,	supported
the	and					GCF,	by
necessary	regulatory					SPC and	Internation
Improveme nt options	snortialis in					Local	al power
	implementati					and	and
	on of existing					Economic	multilateral
	on-grid PV					Consulta	donors
	investment in					nts	
	the country						
	Conduct						
	consultation						
	and meetings						
	the policy and						
	regulatory						
	assessment						
	and analysis.						
	Prepare all						
	Policy						
	decisions for						
	government						
	approval						
	Procure and						
	install all						
	necessarv						
	grid						
	improvement						
	s to cater for						
	reducing						
	demand in						
Total Reque	griu. sted Budget	1					104 355 000
i olai Neyue	sieu buuyei						104,000,000

5.1.5.9 : Stakeholders Timeline for Implementation of TAP

The Department of Energy (DoE), as the executing body for the TNA project, has convened a significant workshop for key stakeholders to discuss the project and the Technology Action Plan (TAP), with the aim of securing input from pertinent stakeholders. Additionally, the DoE is tasked with the development, implementation, and oversight of the six TAP within the Mitigation sector. Consequently, the Department of Energy will pursue financial assistance, facilitate coordination among relevant ministries with defined leadership in critical areas, delineate roles and policy responsibilities across various government ministries and agencies, and ensure that each technology action plan has approval from the government of Tonga. Furthermore, certain technologies will involve consultations and collaborations with other government ministries, which will aid in gathering information for each technology. During the development of specific activities, efforts will be made to actively involve women, ensuring the integration of genderinclusive practices. There is a pressing need to effectively address the diverse needs and priorities of all stakeholders, which will contribute to a more efficient and equitable strategy for mitigation technologies. All these initiatives are expected to be implemented between 2025 and 2027.

The actions outlined below have been selected to illustrate the essential steps involved in this TAP for consultation with key stakeholders. The initial step is to create an institutional framework to oversee the execution of this Technology Action Plan (TAP). Through barrier analysis and discussions with stakeholders regarding the enabling framework, the consultant and the Department of Energy have identified specific actions as significant obstacles to the dissemination of the technology. To facilitate the formulation of a robust on-grid photovoltaic strategy, all the following stated actions and activities will be considered and discussed by stakeholders.

Table 19 below shows the timeline set by stakeholders for implementation of action plan and activities for on-grid PV technology.

Actions	Activities	Yea	r (2025-:	2035)
1. Institutional	1.1. Confirm positions for recruitment and	2025	2026	2035
Set Up	advertisement of Positions			
	1.2. Confirm office space for the project			
	team in the Department of Energy			
	1.3. Allocate Budget for Salaries and			
	Recruitment			
	1.4. Meet Cost for office furniture/			
	equipment			
	1.5. Meet Other Cost for operation and			
	management of the office.			
2. Assess the	2.1. Identify and Confirm TOR and hire			

Table	19:	Scheduling and	Sequencing	of specific	Activities	Set by	Stakeholders	for On	-grid l	PV
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feasibility of On-grid power	consultant to conduct the assessment			
generation				
	2.2. Identify and Justify the economic, financial and fiscal feasibility of the Lifecycle Cost of On-Grid PV generation in Tonga.			
	2.3. Identify key barriers to the economic and financial feasibility of on-grid PV.			
	2.4. Identify the solutions to the economic and financial feasibility of the on-grid PV			
	2.5. Carry out Market Survey to ensure business viability of the technology to investors.			
	2.6. Identify and present the key factors for business viability of the on-grid PV			
	2.7. Identify policy improvements needed			
	2.8. Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of inflation in the tariffs			
	2.9. Identify barriers and solutions to the economic feasibility of the fixed-tariffs			
	 2.10. Identify policy improvements 2.10.1. On-grid PV Policy 2.10.2 On-grid PV Legislation 			
	2.10.3. On-Grid PV Regulation			
	2.11. Technical Feasibility			
3. Create	3.1. Identify awareness materials for			
Awareness	various different stakeholders.			
of both	3.1.1 Awareness materials for on-grid PV			
Developer,	developers			
and users	3.1.2 Awareness materials for on-grid PV			
Grid DV	Utalitis 313 Awareness materials for on-arid DV			
technology	Users			
	3.2 Develop awareness material targeting			
	different stakeholders (i.e. Private			
	Sector, Decision Makers, Users of PV			
	I echnology, financial institutions of			
	Lechnology)			
	developers			

		3.3. 3.3.1. 3.3.2.	Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology. Develop materials for on-grid PV developers Develop materials for on-grid PV dealers		
		3.3.3. 3.4.	Develop materials for on-grid PV users Implement awareness campaign on		
			on-grid PV power generation, especially attract attentions of investors and users		
		3.4.1.	Implement awareness campaign for PV developers		
		3.4.2.	Implement Awareness Campaign for PV Dealers		
		3.4.3.	Implement Awareness Campaign for on-grid PV users		
		3.5.	Gender Mainstreaming and Social Inclusion		
4.	Enhance Access to Financing	4.1.	Develop Financial Policy Incentives to assist lowering the cost of On-Grid PV technology		
		4.1.1.	Identify all possible policy incentives to assist lowering the cost of on-grid PV.		
		Τ. Ι. Ζ.	to assist lowering the cost of on-grid PV.		
		4.1.3.	Identify possible regulatory incentives to assist lowering the cost of on-grid PV		
		4.2.	Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit		
		4.2.1.	Consultation with government on policy incentives and subsidies.		
		4.2.2.	Consultation with donors on policy incentives and subsidies on donor funding projects.		
		4.2.3.	Consultation with dealers on policy incentives and subsides on imported PV components		
		4.3.	Discuss and Justify the adoption of the most suitable model for PPA Contract		

		for on-grid solar power investors and			
		private sectors in Tonga			
	4.3.1.	PPA Contract			
	4.3.2.	PPA Tariff on active power			
	4.3.3.	PPA improvement			
	4.3.4.	Electricity permits into grid			
	4.4.	identify, Develop and recommend all			
		financial policy incentives to Cabinet			
		to assist lowering the cost of			
		investment on energy efficient home			
		appliances Provide clear justifications			
		for adoption of the hybrid vehicle.			
	4.5.	Engage in dialogue with development			
		partners on suitable adoption of			
		subsidies for the technology as it			
		contributes to global benefit; Confirm			
		possible ways and preferred			
		conditions and methodology for			
		supporting financing of hybrid vehicle			
		in Tonga			
	4.6.	Confirm potential financing options			
		with international, regional and			
		bilateral donors and development			
		partners for adoption of hybrid vehicle			
		in the country			
	4.7.	Prepare Cabinet Approval for most			
		sustainable financing options of hybrid			
		vehicle in the country and its plan to			
		achieve share of carbon emission			
Δ - 4: Γ.		reduction in the transport sector.			
Action 5:	5.1.	Design, procure install the Hybrid			
Design,		venicle promotion and investment			
Procure, Install		Initiative in the country			
the monitoring					
and					
maintenance					
plan model lor					
the equations in					
	5.2	Decian Approve and Set up the			
	0. Z.	Monitoring and Maintonance Model			
		for the technology			
Action 6 ·	61	Assess and Identify the policy			
	0.1.	Assess and regulatory shortfolls in			
Identify all the		the implementation of existing on arid			
		solar investment in the country			
necessary		Solar investment in the country			

improvement options				
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
	6.3.	Prepare all Policy decisions for government approval		
	6.4.	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.		

Table 20 shows the stakeholders allocated budget for each activity

Table 20: Actions, Activities, Capacity Building Needs and Associated Costs

Actions	Activities	Capacity Needs	Cost USD
1. Institutional Set Up	1.1. Confirm positions for recruitment and Conduct advertisement	Consultation & Meeting Cost Advertisement Cost	18,000
	1.2. Confirm office space for the project team in the Department of Energy	Rent and Accommodation	200,000
	1.3. Allocate Budget for Salaries and Recruitment	Salaries	800,000
	1.4. Meet Cost for office furniture/ equipment	Office Furniture and Equipment	200,000
	1.5. Meet Other Cost for operation and management of the office.	Electricity and Telecommunication	100,000
2. Assess the feasibility of On-grid power generation	2.1. Identify and Confirm TOR and hire consultant to conduct the assessment	Meeting Cost and Consultant Fees	500,000
	2.2. Identify and Justify the economic,	Local Travel, Transportation Cost and Research Cost	150,000
	financial and fiscal feasibility of the Lifecycle Cost of On-Grid PV generation in Tonga.		
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2.3.	Identify/Confirm key barriers to the economic and financial feasibility of on- grid PV.	Workshop and Consultation Cost	50,000
2.4.	Identify the solutions to the economic and financial feasibility of the on-grid PV	Workshop and Consultation Cost	
2.5.	Carry out Market Survey to ensure business viability of the technology to investors.	Develop Survey Questionnaire, Survey workshops, Implementation of Survey	300,000
2.6.	Identify and present the key factors for business viability of the on-grid PV	Finalization and presentation of Survey Report	30,000
2.7.	Identify operation policy improvements needed	Consultation, Meetings and Cabinet Submissions	20,000
2.8.	Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of inflation in the tariffs	Consultation and Meeting Cost and Consultants Fee	500,000
2.9.	Identify barriers and solutions to	Workshop Cost	20,000

	the economic feasibility of the fixed-tariffs		
	2.10. Identify policy improvements 2.10.1. On-grid PV Policy 2.10.2. On-grid PV Legislation 2.10.3. On-Grid PV Regulation	Policy, Regulatory and Legal Review of existing policy and legal framework and documents	400,000
	2.11. Technical Feasibility	Assessment Study, of current grid.	500,000
3. Create Awareness of both Developer, and users of the On- Grid PV technology	 3.1. Identify awareness materials for various different stakeholders. 3.1.1. Awareness materials for on- grid PV developers 3.1.2. Awareness materials for on- grid PV dealers 3.1.3. Awareness materials for on- grid PV Users 	Consultation and Identification of public awareness materials.	30,000
	 3.2. Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of PV Technology, financial institutions of technology) 3.2.1. Develop materials for on- grid PV 	Consultancy Fees for development of public awareness materials	200,000

		developers		
	3.3.	Develop a	Consultancy Fees for	200,000
		communication	development of	
		strategy Profile	communication profile	
		for target		
		stakeholders		
		particularly the		
		adopters of the		
		technology.		
	3.3.1.	Develop		
		materials for on-		
		grid PV		
		developers		
	3.3.2.	Develop		
		materials for on-		
		grid PV dealers		
	3.3.3.	Develop		
		materials for on-		
		grid PV users		
	3.4.	Implement	Record of Radio and	100,000
		awareness	Television Programs,	
		campaign on		
		on-grid PV	Publication of	
		power	awareness materials	
		generation,		
		especially	Meetings with	
		attract	stakeholders	
		attentions of		
		investors and	Other public awareness	
		users	programs	
	3.4.1.	Implement		
		awareness		
		campaign for		
		PV developers		
	3.4.2.	Implement		
		Awareness		
		Campaign for		
		PV Dealers		
	3.4.3.	Implement		
		Awareness		
		Campaign for		
		on-gria PV		
1 Enhance	1 4		Deliev Diele sure	50.000
4. Ennance	4.1.	Tuentiny/Develop		50,000
ACCESS 10		rinancial Policy		
Financing		incentives to		
		assist lowering	stakenoiders	

	the cost of On-		
	Grid PV	Policy Incentives to	
	technoloav	reduce cost of imports	
411	Identify all	of technology	
	nossible policy	er teenneregy	
	incontivos to	Policy incontivos for	
	Incentives to		
	assist lowening	power purchase	
	the cost of on-	agreement (PPA)	
	grid PV.		
4.1.2.	Identify possible		
	legislative		
	incentives to		
	assist lowering		
	the cost of on-		
	arid PV		
413	Identify possible		
1.1.0.	regulatory		
	incontivos to		
	Incentives to		
	assist lowening		
	the cost of on-		
	grid PV		
4.2.	Engage in	Development partners	40,000
	dialogue with	meetings and	
	government	workshops on identifying	
	development	policy incentives and	
	partners to	subsidies for import of	
	provide	technology and	
	incentives and	equipment.	
	subsidies for	• •	
	the technology		
	as it contributes		
	to global banafit		
101	Concultation		
4.2.1.			
	with		
	government on		
	policy		
	incentives and		
	subsidies.		
4.2.2.	Consultation		
	with donors on		
	policy		
	incentives and		
	subsidies on		
	donor fundina		
	projects.		
4.2.3	Consultation		
	with dealers on		
1			

	policy incentives and subsides on imported PV components		
4.3.	Discuss and Justify the adoption of the most suitable model for PPA Contract for on- grid solar power investors and private sectors in Tonga	Stakeholders Consultation on PPA Policy and Regulation.	40,000
<u>4.3.1.</u> 4.3.2.	PPA Contract PPA Tariff on active power	Consultation and Meetings of PPA Tariff Policy and	20,000
4.3.3. improv	vement	Implementation	
4.3.4.	Electricity permits into grid	Consultation on Improvements of process of permits to the national electricity grid	30,000
4.4.	identify, Develop and recommend all financial policy incentives to Cabinet to assist lowering the cost of investment on on-grid PV Provide clear justifications for adoption of the on-grid PV	Workshops/Consultation with key stakeholders and development partners	40,000
4.6.	Engage in dialogue with development partners on suitable adoption of subsidies for the technology	Consultations and Workshops and Meetings	40,000

		as it contributes		
		benefit; Confirm		
		possible ways		
		and preferred		
		conditions and		
		supporting		
		financing of		
		technology in		
		Tonga		
	4.7.	Confirm		
		financing		
		options with		
		international,		
		regional and		
		bilateral donors		
		development		
		partners for		
		adoption of		
		hybrid vehicle in		
		the country on-		
	4.8.	Prepare		
	_	Cabinet		
		Approval for		
		most		
		financing		
		options of the		
		technology in		
		the country and		
		its plan to		
		of carbon		
		emission		
		reduction in the		
		transport		
Action 5:	<u> </u>	sector.	Conquitanta Fac	101 000 000
Design	5.1.	install the on-		101,000,000
Procure,		grid PV	Operation and Reporting	
Install the on-		promotion and		
grid PV pilot		investment		
project		initiative in the		

		country		
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
Action 6 : Maintenance Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing on- grid PV	Consultation Fees Assessment, Consultation and Reporting, Data recording	1,000,000
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
	6.3.	Prepare all Policy decisions for government approval		
	6.4.	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.		
I OTAL ESTIMATED	Budge	JE		104,355,000

5.1.6 On-Grid Wind Power

Wind energy development in the country remains in its early phases. Of the estimated total installed power generation capacity of 33.65 MW in Tonga, less than 1 MW has been utilized at existing power plants. The Department of Energy (DOE), in collaboration with the People Republic of China, has been financing the research and installation of specific model of wind power in Tonga. Currently, Under this project, Tonga has initiated at least

2 MW of on-grid wind projects, supported by funding from the Chinese Government, result in a total combined wind power capacity of more than 3 MW for wind energy.

5.1.6.1 Introduction

The second most significant portion of renewable energy within the nation's electricity mix is derived from on-grid wind power. In the first half of 2024, the total on-grid wind generation accounted for approximately 1% to 2% of the overall power generation in the country (TPL, 2024a, b, c). The monthly contributions of on-grid wind to total power generation are detailed in Table 21 below.

Time	Total	Total On-	% of Wind Power
	Power	Grid Wind	in Total Power
	Generated	Generated	Generation
	kWh)	kWh)	
January	7,741305	198.560	2.56
February	7477061	211340	2.83
March	8232013	137790	1.67
April	7,208,097	125,330	1.74
May	7,623,180	195,360	2.56
June	6,794,732	195860	2.88

Table 21: % Contribution of On-Grid Wind to Total Power Generation in 2024

5.1.6.2 Objective of the TAP for On-Grid Wind

This action plan details the deployment of 10 MW of on-grid wind energy in conjunction with 20MWh of battery storage capacity. This initiative is in line with the national objective of achieving a 100% renewable energy portfolio by the year 2035. A significant focus will be directed towards the continuous assessment and analysis of existing on-grid wind power projects to ensure the maximization of sustainable economic advantages and opportunities derived from wind energy, thus supporting the realization of the 100% renewable energy goal by 2035.

5.1.6.3 Action and Activities selected for this TAP.

5.1.6.3.1 Summary of Barriers to On-Grid Wind Power Generation

The Barrier Analysis phase identified several challenges that may impede the spread of the technology. These challenges were classified into two main categories: financial and fiscal barriers, which involve issues related to costs, tax obstacles, difficulties in securing financing, and insufficient financial policies and regulations. The second category encompasses non-financial barriers, including challenges related to policy, regulation, and legal frameworks, institutional hurdles, technical issues, market limitations, as well as barriers associated with information dissemination and public awareness.

5.1.6.3.2 Financial and Fiscal Barriers

5.1.6.3.2.1 Heavily reliance on donor funding and uncertainty on economics of tariffs

On-grid wind power technology is relatively new technology, resulting in limited awareness regarding its advantages among both investors and users. Reliance and Dependence on donor funding but unaffordable tariff rates and no showing of impacts of fuel saving through consumption of on-grid wind projects on tariffs; and insufficient private sector investment project Additionally, there exists a certain level of uncertainty concerning the economic feasibility of using wind power technology due to subsidized cost of electricity to the consumer /Social Equity Tariffs.

5.1.6.3.2.2 High Upfront capital cost technology

The upfront capital needed for an on-grid wind power facility is greater than that for a diesel power generation system, as the total costs involved in acquiring and setting up a 1 MW diesel power plant are considerably lower than those for a 1 MW on-grid solar power plant. However, the operational and maintenance costs associated with a wind power plant are lower than those of a diesel power plant, mainly due to decreased maintenance requirements and the fact that sunlight is a free energy source..

5.1.6.3.2.3 Lack of Full Cost Recovery Investment

The potential for complete cost recovery in wind projects remains highly uncertain. Consequently, commercial banks are hesitant to extend the required financing to local investors and solar initiatives, as technology is new and lenders are wary of taking on debt at elevated interest rates for projects that could prove challenging to sustain.

5.1.6.3.2.4 Uncertainty of Demand from the Grid

Insufficient and Uncertain Demand from the grid due to inability to maintain stability of the electricity grid.

5.1.6.3.2.5 Inflation due to Increasing fuel prices

Inflation due to increases petroleum prices and Labour Shortage and cyclone recovery

5.1.6.3.3 Non-Financial Barriers

5.1.6.3.3.1 Policy, Regulatory and Legislative

The inadequate electricity tariff policy, coupled with regulatory and legislative measures, has failed to account for environmental costs, leading to the neglect of externalities associated with fossil fuel combustion. The lack of sufficient tariffs and various forms of direct and indirect financial support significantly impacts the feasibility of technology deployment and influences revenue streams. There are inadequate incentives and support mechanisms to foster widespread adoption of these developments. Additionally, challenges in establishing Power Purchase Agreements (PPAs) arise from ambiguous regulatory policies concerning photovoltaic systems. The permitting process is sluggish, compounded by issues related to licensing and the formulation of PPA contracts. Furthermore, there is a deficiency in legislative and regulatory frameworks, as well as specific types of legislation.

5.1.6.3.3.2 Institutional

There are inadequate privatization arrangements by the power utility. There is a lack of sufficient grid connection agreements, particularly concerning the development of Power Purchase Agreements (PPAs) with Independent Power Producers (IPPs).

5.1.6.3.3.3 Technical

Challenges arise in the selection of sites for wind projects, particularly concerning the compatibility of existing infrastructure and distribution lines, as well as the lengthy process associated with wind installations. There is a notable lack of understanding regarding renewable energy wind power generation, compounded by a shortage of spare parts resulting from inadequate investment from the private sector. Additionally, insufficient battery storage capacity contributes to revenue losses during night-time hours.

5.1.6.3.3.4 Market

Limited feasibility studies to understand key requirements need for utility scale deployment and the efficiency gains of the technology in current climate. Insufficient understanding of key factors that influenced electricity supply and demand in Tonga.

5.1.6.3.3.5 Information and Public Awareness

Insufficient data to support fixed tariff for all and insufficient data to support a tariff level that is affordable for users and profitable

5.1.6.3.4 Summary of Measures to Overcome the Barriers

The subsequent actions were recognized to alleviate obstacles.

5.1.6.3.5 Financial and Fiscal Measures

5.1.6.3.5.1 Heavily reliance on donor funding and uncertainty on economics of tariffs

Government institutions, including local banks, should be encouraged to explore opportunities for establishing the Innovation Fund and Loaning Schemes in partnership with regional and international energy organizations, as well as bilateral and multilateral funding agencies. The Government of Tonga must enhance its subsidy policy and implement a commercial model to ensure the full recovery of investment costs. Additionally, financing for the private sector in renewable energy should be increased by refining the government subsidy policy and adopting a commercial approach to recover the total investment costs. Tariff policies can provide a funding source, as Tonga has integrated in-kind contributions to renewable energy projects within its electricity tariffs. Furthermore, donor financial support is essential to create fiscal space to mitigate inflationary pressures.

5.1.6.3.5.2 High Upfront Cost of the technology

It is recommended to reduce or eliminate government taxes on technology imports. Such tax alleviations would act as a catalyst to encourage the extensive adoption of on-grid solar power. Looking ahead, it is essential to focus on promoting local manufacturing and construction of this technology.

5.1.6.3.5.3 Insufficient Access for Finance

Encourage measures to lower borrowing expenses and loans in commercial banks. Donor organizations dedicated to advancing these technologies in developing countries should consider providing financial assistance to private sector companies, particularly those involved in local manufacturing, under advantageous conditions to improve access to these technologies.

5.1.6.3.6 Non-financial Measures

5.1.6.3.6.1 Policy, Legal and Regulatory Measures

Enhance the formulation of public policies to guarantee the prompt establishment and funding of essential infrastructure development. A supportive regulatory framework is crucial for drawing private sector investments into renewable energy. The acceleration of deployment can be achieved by fostering greater predictability and streamlining the permitting process.

5.1.6.3.6.2 Institutional Measures

Enhance the management and regulatory environment for the development of both existing and new renewable infrastructure.

5.1.6.3.6.3 Technical Measures

Ensuring grid stability amidst significant integration of renewable energy necessitates the modeling and assessment of electrical grids at various penetration levels. It is essential to establish standards and certifications for renewable energy technologies. Furthermore, the digitalization of permitting processes, along with providing technical support for grid upgrades and stability, is crucial. Additionally, it is important to enhance capabilities in the design, installation, and maintenance of renewable energy systems, while also developing both short-term and long-term training programs focused on wind power generation.

5.1.6.3.6.4 Market Measures

Enhancing the capacity to assess and interpret data is essential for conducting energy market and policy analysis, which in turn aids in the development of effective policies and scenarios. It is crucial to comprehend the elements that have impacted supply and demand in Tonga. Recent data and information have been gathered through MEIDECC's analysis in preparation for the forthcoming TERM, ensuring alignment with the objectives of SDG7 and the Nationally Determined Contributions (NDCs).

5.1.6.3.6.5 Information and Public Awareness Measures

Regional public information initiatives should be established to provide essential resources and conduct brief training sessions. It is vital for decision-makers in Tonga to be well-informed about suitable energy technologies, especially in the field of wind energy. Additionally, it is important to formalize collaborative efforts for data collection and to clarify the role of MEIDEC in the development of the database. The availability of indicators such as total final energy consumption and energy intensity, in accordance with international standards, can significantly improve evidence-based policy-making. Evidence-based decision-making for policy development relies on the use of relevant and current information, necessitating the institutionalization of data collection and the sharing of data.

5.1.6.4 Actions Selected To Be Included in the TAP

1. Assess the feasibility of on-grid wind power generation and tariff as source of funding. Currently, the market for compact on-grid wind power generation are heavily relying on donor funding without government quarantee on technologies. Private Investors require confirmation of the business's viability before committing their resources. The studies should encompass all pertinent external factors, such as the difficulties in attracting investors, the suitable economic framework for full cost recovery electricity tariff, the integration of maximum demand for on-grid wind into the national electricity grid, and effective strategies to manage inflation in electricity tariffs.

2. Raise awareness among both developers and users of on-grid wind power: It is crucial for both users and innovators to understand not only the potential of this technology but also the advantages it offers. This can be achieved by demonstrating the economic viability of the technology and justifying the adoption of a fixed electricity tariff for all grid-connected customers in key districts. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

3. Improve access to financing for on-grid wind power: The prevailing lending rates pose a significant obstacle for investors seeking to enter into long-term financing agreements with commercial banks. Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of wind technologies, such as on-grid wind farms and timelines.

Technology	Activities	Responsible
Action Plan		Stakeholder
1. Assess the Feasibility of On-Grid Wind Power Generation	 1.1 Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of On-Grid PV Wind power tariff in Tonga 1.1.1 Opportunities for Innovation Fund 1.1.2 Improve Government Subsidy 	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consultants
	1.2 Carry out Market Survey to ensure business viability and lack of government guarantees available for the technology 1.2.1 Commercial Model for full cost recovery investment	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	 1.3 Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of high upfront cost and inflation in the tariffs 1.3.1 Identify the appropriate tariff policy 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

Table 22: Activities to be implemented to enhance diffusion of on-grid Wind

2.	Create	2.1 Develop awareness material	DoE, TPL. University of
	Awareness	targeting different stakeholders	Tonga, GCF, SPC and
	of both	(i.e. Private Sector, Decision	Local Business and
	Developer,	Makers, Users of PV	Economic Consultants
	and users	Technology, financial institutions	
	of the	of technology)	
	technology	2.1.1 Donors financial opportunities	
		for private sectors	
		2.1.2 Public policy for national	
		energy infrastructure	
		development and national	
		energy targets	
		2.1.3 Improve capacity through	
		training on designing,	
		installing and maintenance of	
		wind power projects	
		2.1.4 Training on capacity to	
		evaluate and interpret wind	
		data in order to formulate	
		effective wind power policies	
		2.2 Develop a communication	DoE, TPL. University of
		strategy Profile for target	Tonga, GCF, SPC and
		stakeholders particularly the	Local Business and
		adopters of the technology	Economic Consultants
		2.2.1 Improvement needs for Wind	
		power policy, regulation and	
		2.2.2 Short Term Training materials	
		on on-site experiences as	
		snared regional sources of	
		Information and data	
		2.2.3 Institutionalization of Wind	
		data collection and analysis	
		and publication of data	
		analysis and indicators for	
		2.2 Implement awareness campaign	DoE TPL University of
		2.5 Implement awareness campaign	Topga CCE SPC and
		especially attract attentions of	Local Business and
		investors and users	Economic Consultants
		2.3.1 Enabling Legislation and	
		Regulatory Environment	
		2.3.2 Improvement on accessibility	
		and permitting process for	
		wind power to the electricity	
		arid	
		gila	

3. Enhance	3.1 Develop Financial Policy	DoE, TPL. University of
Access to	Incentives to assist lowering the	Tonga, GCF, SPC and
Financing	cost of On-Grid PV technology	Local Business and
	3.1.1 Improving grid stability policy	Economic Consultants
	and accessibility policy for	
	IPP producers	
	3.2Engage in dialogue with	DoE, TPL. University of
	government development	Tonga, GCF, SPC and
	partners to provide incentives	Local Business and
	and subsidies for the technology	Economic Consultants
	as it contributes to global benefit	
	3.2.1 Ensure accessibility and	
	availability of technical	
	standard and certification for	
	2 2 Discuss and Justify the edention	
	3.3 Discuss and Justily the adoption	DOE, TPL. University of
	DRA Contract for on grid wind	
	PPA Contract for on-grid wind	Economic Consultants
	sectors in Tonga	
	3 3 1 Availability of digitilization of	
	wind power permitting	
	process	
	3 3 2 Improvements of national	
	electricity grid	
Action 4: Design,	4.1. Design, procure install the on-grid	
Procure, Install	wind investment initiative in the country	
the monitoring	4.2. Design, Approve and Set up the	
and maintenance	Monitoring and Maintenance	
plan model for on-	Model for the technology	
grid PV		
applications in the		
country		
Action 5 : Assess	5.1. Assess and Identify the policy,	
and Identify all the	legislative and regulatory	
necessary	shortfalls in the implementation	
improvement	of existing on-grid wind	
options	investment in the country	
	5.2. Conduct consultation and	
	meetings on findings of the policy	
	and regulatory assessment and	
	analysis.	
	5.3. Prepare all Policy decisions for	
	government approval	
	5.4. Design, Procure and install all	
	necessary grid improvements to	
	cater for reducing demand in the	

	sistering given		electricity grid.	
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5.1.6.5 Action To Be Implemented as Project Ideas

The aforementioned three actions, specifically the feasibility study, awareness raising, and improved access to financing, will be evaluated for implementation as potential project ideas.

5.1.6.6 Stakeholders and Implementation Timelines for the TAP

Table 23 shows the list of stakeholders to implement the TAP

Number	Activities	Responsible	Timelines
1. Assess the Feasibility of On-Grid Power Generation	 1.1 Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of On-Grid PV Wind power tariff in Tonga 1.1.1 Opportunities Innovation Fund Improve Government Subsidy Policy 	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consultants	1-2 Months
	 1.2 Carry out Market Survey to ensure business viability and lack of government guarantees available for the technology 1.2.1 Commercial Model for full cost recovery investment 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	1-2Months
	 1.3 Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of high upfront cost and inflation in the tariffs 1.3.1 Identify the appropriate tariff policy 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	2 Months
2.Create Awareness of both Developer, and users of the	2.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users	DoE, TPL. University of Tonga, GCF, SPC and	6 Months

technology	of PV Technology financial	Local	
teennology	institutions of technology)	Business and	
	institutions of teermology)	Economic	
	2.1.1 Donors financial	Concultante	
	2.1.1 Donors infancial	Consultants	
	soctors		
	2 1 2 Public policy for national		
	2.1.2 Fublic policy for flational		
	development and		
	2 1 2 Improve capacity		
	2.1.5 Implove capacity		
	designing installing and		
	maintonance of wind		
	namenance of who		
	2 1 4 Training on canacity to		
	2.1.4 Maining on capacity to		
	wind data in order to		
	formulate effective wind		
	2.2 Develop a communication		2 Months
	strategy Profile for target	Liniversity of	
	stakeholders particularly	Tonga GCE	
	the adopters of the	SPC and	
	technology	Local	
	2.2.1 Improvement needs for	Business and	
	Wind power policy	Economic	
	regulation and legislation	Consultants	
	222 Short Term Training	Concultante	
	materials on on-site		
	experiences as shared		
	regional sources of		
	information and data		
	2.2.3 Institutionalization of		
	wind data collection and		
	analysis and publication		
	of data analysis and		
	indicators for evidenced		
	policy decision makings		
	2.3 Implement awareness	DoE, TPL.	2 Months
	campaign on on-grid PV	University of	
	power generation,	Tonga, GCF,	
	especially attract	SPC and	
	attentions of investors and	Local	
	users	Business and	
	2.3.1 Enabling Legislation and	Economic	
	Regulatory Environment	Consultants	

	2.3.2 Improvement on accessibility and		
	permitting process for		
	electricity arid		
3 Enhance Access to Financing	 3.1 Develop Financial Policy Incentives to assist lowering the cost of On-Grid PV technology 3.1.1 Improving grid stability policy and accessibility policy for IPP producers 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	3 Months
	 3.2 Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit 3.2.1 Ensure accessibility and availability of technical standard and certification for wind energy 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	2 Months
	 3.3 Discuss and Justify the adoption of the most suitable model for PPA Contract for on-grid wind power investors and private sectors in Tonga 5.4.1 Availability of digitilization of wind power permitting process 5.4.2 Improvements of national electricity grid 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	12 Months
Action 4: Design, Procure, Install the monitoring and maintenance plan model for on- grid PV applications in the country	3.4 Design, procure install the on-grid PV investment initiative in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	12 Months
	3.5 Design, Approve and Set up the Monitoring and Maintenance Model for the		

	technology		
Action 5 : Assess	3.6 Assess and Identify the	DoE, TPL.	12 Months
and Identify all the	policy, legislative and	University of	
necessary	regulatory shortfalls in the	Tonga, GCF,	
improvement	implementation of existing	SPC and	
options	on-grid wind investment in	Local	
	the country	Business and	
	3.7 Conduct consultation and	Economic	
	meetings on findings of the		
	policy and regulatory		
	assessment and analysis.		
	3.8 Prepare all Policy decisions		
	for government approval		
	3.9 Design, Procure and install		
	all necessary grid		
	improvements to cater for		
	reducing demand in the		
	electricity grid.		

5.1.6.7 : Roles of Stakeholders

The roles of stakeholders are shown in Table 24 below

Table 24: Roles of On- Grid Wind Power Stakeholders

1	Ministry of Energy	Plan and manage energy policies, energy targets, and assess energy goals and objectives
		Oversee energy projects including on-grid energy projects
		Identify and source funding to implement on-grid energy projects
		Formulate and present energy plan, strategies and programmes to government and seek Cabinet's approval
		Promote public awareness and informed decisions on on- grid PV technologies.
2	Department of Climate Change , MEIDECC	Focal Point of the United Nations Convention on Climate Change
		Sourcing funds from climate funds and Global Environmental Facility
		GCF focal point in Tonga
3	Department of Environment , MEIDECC	Responsible for environmental policies and environmental management
4	Ministry of Finance and Planning	Responsible for financial policies and policy incentives for businesses.
5	Ministry of	Responsible for Business incentive policies

	Economic and Trade	
6	Ministry of Foreign Affairs	Responsible for foreign relations with donors and development partners.
7	Tonga Power Limited, TPL	Manage and Plan all grid connected wind power generation project and installations.
8	Tonga Electricity Commission	Responsible for regulatory policies and regulation of on- grid wind
9	University of Tonga and University of the South Pacific	Research and Development
10	Regional Energy Institutions	Responsible for regional energy coordination and general assessment and analysis of on-grid PV projects
11	Development Partners and Donors	Financing of on-grid wind power projects
12	Local NGOs and Consultants	Technical assessment and specific technical analysis of on-grid PV projects
13	Contractor and Subcontractor for technological installation of on- grid Wind	Technical installation of the technology

5.1.6.8 : Scheduling of Activities

Table 25 below describes the sequence and timing of specific activities and responsibilities

Table 25: Scheduling of Activities

Action	Activities	Planning		Implementation		Responsible Stakeholder
		Start	End	Start	End	
1.Assess the Feasibility of On-Grid Power Generation	 1.1 Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of On-Grid Wind power tariff in Tonga 1.1.1 Opportunities Innovation Fund 1.1.2 Improve 	2025	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consultants

	Government Subsidy					
	1.2 Carry out Market Survey to ensure business viability and lack of government guarantees available for the technology 1.2.1 Commercial Model for full cost recovery investment	2025	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	1.3 Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of high upfront cost and inflation in the tariffs 1.3.1 Identify the appropriate tariff policy	2025	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
2.Create Awareness of both Developer, and users of the technology	 2.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of PV Technology, financial institutions of technology) 2.1.1 Donors financial opportunities for private sectors 2.1.2 Public policy for national energy infrastructure 	2025	2026	2025	2026	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

development					
and national					
energy					
targets					
2.1.3 Improve					
capacity					
through					
training on					
designing,					
installing and					
maintenance					
of wind					
power					
projects					
2.1.4 Training on					
capacity to					
evaluate and					
interpret wind					
data in order					
to formulate					
effective wind					
power					
policies	0005	0005			
2.2 Develop a	2025	2025	2026	2026	DOE, IPL.
					University of
strategy Profile					Tonga,
ior largel					GCF, SPC
stakenoiders					Business
adopters of the					and
technology					Economic
221 Improvement					Consultants
2.2.1 Improvement needs for					Consultants
Wind nower					
policy					
regulation					
and					
legislation					
2.2.2 Short Term					
Training					
materials on					
on-site					
experiences					
as shared					
regional					
sources of					
information					

		and data 2.2.3 Institutionaliz ation of wind data collection and analysis and publication of data analysis and indicators for evidenced policy decision makings					
		 2.3 Implement awareness campaign on on-grid PV power generation, especially attract attentions of investors and users 2.3.1 Enabling Legislation and Regulatory Environment 2.3.2 Improvement on accessibility and permitting process for wind power to the electricity grid 	2026	2026	2026	2027	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
3	Enhance Access to Financin g	3.1 Develop Financial Policy Incentives to assist lowering the cost of On- Grid PV technology	2024	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic

3.1.1 Improving grid stability policy and accessibility policy for IPP producers					Consultants
 3.2 Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit 3.2.1 Ensure accessibility and availability of technical standard and certification for wind energy 	2025	2026	2025	2026	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
 3.3 Discuss and Justify the adoption of the most suitable model for PPA Contract for on-grid wind power investors and private sectors in Tonga 3.3.1 Availability of digitilization of wind power permitting process 3.3.2 Improvement s of national electricity grid 	2027	2027	2027	2027	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

4. Action 4: Design, Procure, Install the monitorin g and maintena nce plan model for hybrid vehicle applicatio ns in the country	4.1 Design, procure install the on-grid wind promotion and investment initiative in the country	2025	2026	2026	2035	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	4.2 Design, Approve and Set up the Monitoring and Maintenance Model for the technology					
Action 5 : Assess and Identify all the necessary improvement options	5.1 Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	2025	2026	2026	2035	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	5.2 Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.					
	 5.3 Prepare all Policy decisions for government approval 5.4 Design, Procure and install all necessary grid 					
	improvements to					

cater for			
demand in the			
electricity grid.			

Stakeholders were met on 12th, December,2024 to discuss and set timeline for the ongrid wind power. The stakeholders timeline for activities are shown in Table 26 below.

Table 26: Scheduling and Sequencing of specific Activities Set by Stakeholders for On-grid Wind

Actions	Activities			Year (2025-2027)	
1. Institutional Set Up	1.1.	Confirm positions for recruitment and advertisement of Positions	2025 ▲	2026	2027
	1.2.	Confirm office space for the project			
		team in the Department of Energy			
	1.3.	Allocate Budget for Salaries and			
		Recruitment			
	1.4.	Meet Cost for office furniture/			
	equip	Meet Other Cest for exerction and	•		
	1.5.	management of the office.			
2. Assess the	2.1.	Identify and Confirm TOR and hire			
feasibility of		consultant to conduct the assessment			
Un-grid					
depending					
generation	22	Identify and Justify the economic			
	2.2.	financial and fiscal feasibility of the			
		Lifecycle Cost of On-Grid Wind			
		generation in Tonga.			
	2.3.	Identify key barriers to the economic			
		and financial feasibility of on-grid wind.			
	2.4.	Identify the solutions to the economic			
		and financial feasibility of the on-grid			
	0.5	wind			
	2.5.	Carry out Market Survey to ensure			
		investors			
	2.6	Identify and present the key factors for			
	2.0.	business viability of the on-grid wind			
	2.7.	Identify policy improvements needed			
	2.8.	Conduct the economic feasibility of the			
		adoption of fixed electricity tariffs in the			
		country and impacts of inflation in the			
		tariffs			
	2.9.	Identify barriers and solutions to the			
		economic feasibility of the fixed-tariffs			

		2.10.	Identify policy improvements		
		2.10.1	. On-grid Wind Policy		
		2.10.2	2. On-grid Wind Legislation		
		2.10.3	On-Grid Wind Regulation		
		2 11	Identify and Justify the Technical		
		2.11.	Eessibility of On-Grid wind generation		
			in Tongo		
		2 1 1 1	Identify key barriers to the		
		2.11.1	normination of electricity from wind to		
			the grid		
		2.11.2	ldentify key technical solutions		
			to the to the permission of electricity		
			from wind to the grid		
		2.11.3	. Implement and Test key		
		_	technical solutions		
3.	Create	3.1.	Identify awareness materials for		
•	Awareness	••••	various different stakeholders	_	
	of both	311	Awareness materials for on-grid wind		
	Developer	•••••	developers		
	and users	312	Awareness materials for on-grid wind		
	of the On-	0	dealers		
	Grid PV	313	Awareness materials for on-orid wind		
	technology	0.1.0.	Lisers		
	teenneregy				
		32	Develop awareness material targeting		
		0.2.	different stakeholders (i.e. Private	-	
			Sector Decision Makers Users of		
			wind Technology financial institutions		
			of technology)		
		321	Develop materials for on-grid wind		
		5.2.1.	developers		
		2.2	Develop a communication strategy		
		5.5.	Profile for target stakeholders		
			narticularly the adoptors of the		
			technology		
		221	Develop motorials for an grid wind		
		3.3.1.	develop materials for on-grid wind		
		222	Developers		
		3.3.Z.	declara		
			Quealers		
		3.3.3.	Develop materials for on-grid wind		
		2.4			
		3.4.	implement awareness campaign on		
			on-gria wina power generation,		
			especially allract attentions of		
			investors and users		
		3.4.1.	implement awareness campaign for		
			wind developers		

		3.4.2.	Implement Awareness Campaign for		
			wind Dealers		
		3.4.3.	Implement Awareness Campaign for		
			on-grid wind users		
		3.5.	Gender Mainstreaming and Social		
			Inclusion, training to include local		
			women to gain expertise		
4.	Enhance	4.1.	Develop Financial Policy Incentives to		
	Access to		assist lowering the cost of On-Grid		
	Financing		wind technology		
			. Identify all possible policy incentives		
			to assist lowering the cost of on-grid		
			wind		
		4.1.1.	Identify possible legislative incentives		
			to assist lowering the cost of on-grid		
			wind		
		4.1.2.	Identify possible regulatory incentives		
			to assist lowering the cost of on-grid		
			wind		
		4.2.	Engage in dialogue with government		
			development partners to provide		
			incentives and subsidies for the		
			technology as it contributes to global		
		101	Denenit		
		4.2.1.	consultation with government on		
		100	Consultation with denors on policy		
		4.2.2.	incentives and subsidies on donor		
			funding projects		
		123	Consultation with dealers on policy		
		4.2.3.	incentives and subsides on imported		
			PV components		
		43	Discuss and Justify the adoption of the		
		7.0.	most suitable model for PPA Contract	-	
			for on-orid solar power investors and		
			private sectors in Tonga		
		4.3.1	PPA Contract		
		4.3.2	PPA Tariff on active power		
		4.3.3.	PPA improvement		
		4.3.4.	Electricity permits into grid		
		4.4.	identify, Develop and recommend all		
			financial policy incentives to Cabinet		
			to assist lowering the cost of		
			investment on energy efficient home		
			appliances Provide clear justifications		
			for adoption of the on-grid wind.		
		4.5.	Engage in dialogue with development		

		partners on suitable adoption of		
		subsidies for the technology as it		
		contributes to global benefit; Confirm		
		conditions and methodology for		
		supporting financing of on grid wind in		
		Tonga		
	46	Confirm potential financing options		
	1.0.	with international regional and		
		bilateral donors and development		
		partners for adoption of on-grid wind		
		in the country		
	4.7.	Prepare Cabinet Approval for most		
		sustainable financing options of hybrid		
		vehicle in the country and its plan to		
		achieve share of carbon emission		
		reduction in the transport sector.		
Action 5:	5.1.	Design, procure install the on-grid		
Design,		wind promotion and investment		
Procure, Install		initiative in the country		
the monitoring				
maintonanco				
nlan model for				
on-arid wind				
applications in				
the country				
	5.2.	Design, Approve and Set up the		
	_	Monitoring and Maintenance Model		
		for the technology		
Action 6 :	6.1.	Assess and Identify the policy,		
Assess and		legislative and regulatory shortfalls in		
Identify all the		the implementation of on-grid wind		
necessary		investment in the country		
improvement				
options				
	6.2.	Conduct consultation and meetings on		
		indings of the policy and regulatory		
	63	assessment and analysis. Drepare all Doliov decisions for		
	0.5.	novernment approval		
	64	Design Procure and install all		
	0.4.	necessary grid improvements to cater		
		for reducing demand in the electricity		
		grid.		

Table 27: Actions, Activities, Capacity Building and Costs for on-grid wind

Actions	Activities		Capacity Needs	Cost USD
1. Institutional	1.1.	Confirm	Consultation & Meeting	18,000
Set Up		positions for	Cost	
		recruitment and	Advertisement Cost	
		Conduct		
		advertisement		
	1.2.	Confirm office	Rent and	200,000
		space for the	Accommodation	
		project team in		
		the Department		
		of Energy		
	1.3.	Allocate	Salaries	800,000
		Budget for		
		Salaries and		
		Recruitment		
	1.4.	Meet Cost for	Office Furniture and	200,000
		office furniture/	Equipment	
	4 5	equipment Most Other	Floatricity and	
	1.5.	Meet Other	Electricity and	
		Cost ion and	relecommunication	
		management of		
		the office		
2 Assess the	21	Identify and	Meeting Cost and	500 000
feasibility	2.1.	Confirm TOR	Consultant Fees	000,000
of On-arid		and hire		
power		consultant to		
generation		conduct the		
		assessment		
	2.2.	Identify and	Local Travel,	150,000
		Justify the	Transportation Cost and	
		economic,	Research Cost	
		financial and		
		fiscal feasibility		
		of the Lifecycle		
		Cost of On-Grid		
		wind generation		
		in Longa.		50.000
	2.3.	Identity/Confirm	Workshop and	50,000
		key barriers to	Consultation Cost	
		and Tinancial		
		reasibility of on-		
	0.4		Workshop and	4
	Z.4.	identity the	workshop and	1

	solutions to the economic and financial feasibility of the on-grid Wind	Consultation Cost	
2.5.	Carry out Market Survey to ensure business viability of the technology to investors.	Develop Survey Questionnaire, Survey workshops, Implementation of Survey	300,000
2.6.	Identify and present the key factors for business viability of the on-grid wind	Finalization and presentation of Survey Report	30,000
2.7.	Identify operation policy improvements needed	Consultation, Meetings and Cabinet Submissions	20,000
2.8.	Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of inflation in the tariffs	Consultation and Meeting Cost and Consultants Fee	500,000
2.9.	Identify barriers and solutions to the economic feasibility of the fixed-tariffs	Workshop Cost	20,000
2.10. 2.10.1 2.10.2 2.10.3	Identify policy improvements . On-grid wind Policy . On-grid wind Legislation . On-Grid wind	Policy, Regulatory and Legal Review of existing policy and legal framework and documents	400,000

		Regulation		
	2.11.	Technical Feasibility		100,000
 Create Awareness of both Developer, and users of the On- Grid PV technology 	3.1. 3.1.1. 3.1.2. 3.1.3.	Identify awareness materials for various different stakeholders. Awareness materials for on-grid wind developers Awareness materials for on-grid wind dealers Awareness materials for on-grid wind dealers	Consultation and Identification of public awareness materials.	30,000
	3.2. 3.2.1.	Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of wind Technology, financial institutions of technology) Develop materials for on-grid wind developers	Consultancy Fees for development of public awareness materials	200,000
	3.3.	Develop a communication strategy Profile for target stakeholders particularly the	Consultancy Fees for development of communication profile	

		adopters of the		
		technology		
	331	Develop		
	5.5.1.	matorials for		
		on grid wind		
		on-gria wina		
		developers		
	3.3.2.	Develop		
		materials for		
		on-grid wind		
		dealers		
	3.3.3.	Develop		
		materials for		
		on-grid wind		
		users		
	3.4.	Implement	Record of Radio and	100,000
		awareness	Television Programs,	
		campaign on		
		on-grid wind	Publication of	
		power	awareness materials	
		generation,		
		especially	Meetings with	
		attract	stakeholders	
		attentions of		
		investors and	Other public awareness	
		users	programs	
	341	Implement	programe	
	01111	awareness		
		campaign for		
		wind		
		developers		
	312	Implement		
	5.4.2.	Awareness		
		Awareness Compaign for		
		wind Declara		
	242	Implement		
	5.4.5.	Awaranaaa		
		Awareness Compaign for		
		Campaign ior		
		on-gria wina		
	2.5	<u>users</u>		20,000
	3.3.			∠0,000
		and Social		
4 F !				50.000
4. Enhance	4.1. Ide	entity/Develop	Policy Dialogue	50,000
Access to	Fir	ancial Policy		
Financing	Inc	entives to assist	consultation with key	
	lov	vering the cost of	stakeholders	

	On-Grid wind		
	technology	Policy Incentives to	
4.1.1.	Identify all possible	reduce cost of imports	
	policy incentives to	of technology	
	assist lowering the	0,	
	cost of on-arid	Policy incentives for	
	wind	power purchase	
412	Identify possible	agreement (PPA)	
<i>ч.</i> т. ∠ .			
	incentives to assist		
	lowering the cost of		
	on grid wind		
110	on-gnu winu. Identifi (
4.1.3.			
	regulatory		
	incentives to assist		
	lowering the cost of		
	on-grid wind		
4.2.	Engage in	Development partners	40,000
	dialogue with	meetings and	
	government	workshops on identifying	
	development	policy incentives and	
	partners to provide	subsidies for import of	
	incentives and	technology and	
	subsidies for the	equipment.	
	technology as it		
	contributes to		
	alobal benefit		
4.2.1.	Consultation with		
	government on		
	policy incentives		
	and subsidies		
422	Consultation with		
7.2.2.	donors on policy		
	incentives and		
	subsidios on donor		
	funding projects		
100	Consultation with		
4.2.3.	Consultation with		
	uealers on policy		
	incentives and		
	subsides on		
	imported wind		
	components		
4.3.	Discuss and Justify	Stakeholders	20,000
	the adoption of the	Consultation on PPA	
	most suitable	Policy and Regulation.	
	model for PPA		
	Contract for on-grid		

	wind power		
	investors and		
	private sectors in		
	Tonga		
4.3.1.	PPA Contract	Consultation and	20,000
4.3.3.	PPA Tariff on	Meetings of PPA Tariff	
	active power	Policy and	
4.3.3.	PPA improvement	Implementation	
4.8.4.	Electricity permits	Consultation on	30,000
	into grid	Improvements of	
		process of permits to	
		the national electricity	
		grid	
4.9.	identify, Develop	Workshops/Consultation	40,000
	and recommend	with key stakeholders	
	all financial policy	and development	
	Incentives to	partners	
	of investment on		
	on-arid wind		
4 10	Provide clear		
1.10.	iustifications for		
	adoption of the on-		
	grid wind		
4.11.	Engage in	Consultations and	40,000
	dialogue with	Workshops and	
	development	Meetings	
	partners on		
	suitable adoption		
	of subsidies for the		
	technology as it		
	contributes to		
	global benefit;		
	Confirm possible		
	ways and		
	preierreu		
	methodology for		
	supporting		
	financing of		
	technology in		
	Tonga		
4.12.	Confirm potential		
	financing options		
	with international.		
	regional and		

	4.13.	bilateral donors and development partners for adoption of hybrid vehicle in the country on-grid wind Prepare Cabinet		
f. Decim	5.4	Approval for most sustainable financing options of the technology in the country and its plan to achieve share of carbon emission reduction in the transport sector.	Osmanikanta Essa	5 000 000
5. Design, Procure, Install the on- grid PV pilot project	5.1.	Design, procure install the on-grid wind promotion and investment initiative in the country	Operation and Reporting	5,000,000
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
6. Maintenance Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing on-grid wind	Consultation Fees Assessment , Consultation and Reporting	1,000,000
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis. Prepare all Policy		

	decisions for government approval	
6.4.	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.	

5.1.6.9 : Estimation of Resources for Action and Activities

To achieve successful and sustained technology diffusion, it is essential to enhance the capabilities of local technology importers and bidders and installers, especially local suppliers, overseas and local contractors and bidders of the technology, installers, and maintenance engineers. Furthermore, to facilitate accelerated diffusion, it is necessary to implement a train-the-trainers approach, enabling the replication of training programs across numerous regions.

The activities to be undertaken and their associated costs are presented in Table 28 below.

Action	Activities	Plan Start/ End	Imple ment ation Start/ End	Estimat ed Cost (USD)	Source of Fund	Respon sible Stakeho Ider	Justified Actions
1.Instituti onal Set Up	1.1 Establish an unit to oversee the implementatio n of TAP	2025/ 2025	2025/ 2025	1,218,000	Donors	DOE, TPL, Donors	Recruited personnel and office furniture and office equipment
2.Feasibil ity Study on economic feasibility	2.1 Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of On-Grid PV Wind power	2025/ 2025	2025/ 2025	2,070,000	Donors	DOE, TPL, Donors	

Table 28: Financial considerations	associated with the e	execution of the identified activities.			
------------------------------------	-----------------------	---			
tariff in Tonga 2.1.1Opportuni ties Innovation Fund 2.1.2 Improve Government Subsidy Policy					
--	---------------	---------------	--------	---	--
2.2.Carry out Market Survey to ensure business viability and lack of government guarantees available for the technology 2.2.1. Commercial Model for full cost recovery investment	2025/ 2025	2025/ 2025	Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Energy Consult ants	Recruitme nt of researcher s and profession al assessors
2.3. Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of high upfront cost and inflation in the tariffs 2.3.1. Identify the appropriate tariff policy	2025/ 2025	2025/ 2025	Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines s and Econom ic Consult ants	Recruitme nt of Assessors
2.4. Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users	2025/ 2025	2025/ 2025	Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines	Recruitme nt of assessors and office equipment

				1			
	of PV Technology, financial institutions of technology) 2.4.1. Donors financial opportunities for private sectors. 2.4.2. Public policy for national energy infrastructure development and national					s and Econom ic Consult ants	
	energy targets 2.4.3. Improve capacity through						
	training on designing, installing and maintenance						
	of wind power projects 2.4.4. Training on capacity to evaluate and						
	interpret wind data in order to formulate effective wind power policies						
3.Create Awarene ss of both Develope r, and users of the technolog y	3.1. Develop a commu nication strategy Profile for target stakehol ders particul	2025/ 2026	2025/ 2026	350,000	Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines s and Econom	1.Consulta tion with stakeholde rs 2.Publish of public awareness materials

	arly the			ic	
	adopter			Consult	
	s of the			ants	
				anto	
	technol				
	ogy				
311	Improve				
0.1.1.	mont				
	needs				
	for Wind				
	power				
	policy				
	policy,				
	regulati				
	on and				
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	Training				
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	ion and				
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3.1.3.	Institutio				
	nalizatio				
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	wind				
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	analysis				
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	on of				
	data				
	analveie				
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	anu				
	indicato				
	rs for				
	evidenc				

3.2.	ed policy decision makings Implem ent awaren ess campai gn on on-grid PV power generati	2025/ 2025	2026/ 2026	Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines	Contact address and internet communic ation links
3.2.1.	on, especial ly attract attentio ns of investor s and users Enablin g Legislati on and Regulat				s and Econom ic Consult ants	
3.2.2.	ory Environ ment Improve ment on accessi bility and permitti ng process for wind power to the electricit y grid					
3.3.	Develop Financi	2026/ 2026	2026/ 2027	Donors	DoE, TPL.	1.Conduct of

	3.3.1.	al Policy Incentiv es to assist lowering the cost of On- Grid PV technol ogy Improvi ng grid stability policy and accessi bility policy for IPP produce rs					Universi ty of Tonga, GCF, SPC and Local Busines s and Econom ic Consult ants	Trainings 2.Distributi on of materials 3.Record and broadc ast of Radio and TV programs
4,Enhanc e Access to Financing	4.1.	Engage in dialogu e with govern ment develop ment partners to provide incentiv es and subsidie s for the technol ogy as it contribu tes to global benefit Ensure accessi bility and availabil	2024/ 2025	2025/ 2025	240,000	Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines s and Econom ic Consult ants	Meeting Consultatio ns Policy Decisions

	ity of technica l standar d and certificat ion for wind energy						
4.2.4.2.1.4.2.2.	Discuss and Justify the adoptio n of the most suitable model for PPA Contrac t for on- grid wind power investor s and private sectors in Tonga Availabil ity of digitiliza tion of wind power permitti ng process Improve ments of national electricit y grid	2025/ 2026	2025/ 2026		Donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines s and Econom ic Consult ants	Consultatio n with stakeholde rs Formulatio n of Policies, Regulation s and Legislation
4.3.	Conduct the	2027/ 2027	2027/ 2027		donors	DoE, TPL	Agreed model of
				1	1	· · · - ·	

	4.3.1. 4.3.2.	econom ic, financial and fiscal feasibilit y of the source of funding and full cost recover y of On- Grid PV Wind power tariff in Tonga Opportu nities Innovati on Fund Improve Govern ment Subsidy Policy				Universi ty of Tonga, GCF, SPC and Local Busines s and Econom ic Consult ants	PPA supported by internation al power companies and multilateral donors
Action 5: Design, Procure, Install the monitorin g and maintena nce plan model for hybrid vehicle applicatio ns in the country	5.1.	Design, procure install the EE Home applianc es promoti on and investm ent initiative in the country		23 mil	donors	DoE, TPL. Universi ty of Tonga, GCF, SPC and Local Busines s and Econom ic Consult ants	
	5.2.	Design, Approve and Set up the					

					-		
		Monitori					
		ng and					
		Mainten					
		ance					
		Model					
		for the					
		tecnnol					
		ogy					
Action 6 :	6.1.	Assess		1 mil	donors	DoE,	
Assess		and				TPL.	
and		Identify				Universi	
Identify		the				ty of	
all the		nolicy					
an uic		policy, logialati					
necessar							
У		ve and				SPC	
Improvem		regulato				and	
ent		ry				Local	
options		shortfall				Busines	
		s in the				s and	
		impleme				Econom	
		ntation				ic	
		of				Consult	
		ovicting				onto	
		existing				ants	
		energy					
		efficient					
		home					
		applianc					
		es					
		investm					
		ent in					
		the					
		country					
	6.0	Conduct					
	0.2.	Conduct					
		consulta					
		tion and					
		meeting					
		s on					
		findings					
		of the					
		policy					
		and					
		regulato					
		ny ny					
		1 y					
		assess					
		ment					
		and					
		analysis					

	6.3.	Prepare all Policy decision s for govern ment approva I			
	6.4.	Design, Procure and install all necessa ry grid improve ments to cater for reducin g demand in the electricit y grid.			
Total Estim	nated B	ludget			27,828,000

5.1.7 Energy Efficient Home Appliances

According to the report on Tonga's progress regarding the Sustainable Development Goals (SDGs), the nation achieved an energy intensity rate of 4 MJ/USD of GDP in 2018 (GOT, 2020b). Consequently, it is feasible to aim for a national energy intensity target of 3 MJ/USD of GDP by the year 2030. The implementation of this Technology Action Plan is crucial, as it outlines the necessary energy-efficient measures to decrease the energy intensity from 4 MJ/USD in 2018 to 3 MJ/USD by 2030. Furthermore, the Tonga Energy Road Map Plus Report establishes national energy objectives for the period of 2021 to 2035, which include enhancing demand-side energy efficiency by reducing total energy consumption from 65 GWh in 2021 to 40 GWh by 2035 (GOT, 2021b)..

5.1.7.1 Introduction

The TERMPlus report established a goal to keep electricity network losses below 8% by the year 2035 (GOT, 2021B). The Tonga Energy Efficiency Master Plan estimates that it is feasible to achieve a 50% reduction in greenhouse gas emissions annually by 2030, using 2020 as the baseline year. This equates to a decrease of 210,000 metric tonnes of

CO2 equivalent from business-as-usual emissions. Measures implemented in the energy efficiency sector of the electric industry account for 29.6% of this reduction, amounting to 32,500 metric tonnes of CO2 equivalent (GOT, 2021c).

5.1.7.2 Objective of the TAP for Energy Efficient Home Appliances

The objective of the initiative is to transition to LED lighting and high-efficiency freezers, refrigerators, and air conditioning units, with the goal of achieving a 20% reduction in electricity consumption. The estimated financial requirement for this initiative is approximately US\$ 30 million. This program aims to potentially decrease CO2 equivalent emissions by around 20% through the implementation of high-efficiency appliances, alongside an anticipated 15% reduction from improved lighting. Additionally, it is expected that energy-related operational expenses for both the utility provider and consumers could be reduced by 20% to 30%.

5.1.7.3 Action and Activities selected for this TAP.

5.1.7.3.1 Summary of Barriers to Energy Efficient Home Appliances

The Barrier Analysis phase revealed numerous obstacles that could hinder the adoption of the energy efficient home appliances technologies. These obstacles were categorized into two primary groups: financial and fiscal barriers, which pertain to challenges such as inadequate access to financing, the absence of de-risking guarantees, high initial costs for energy-efficient equipment, and local tax impediments. The second group consists of non-financial barriers, which include issues stemming from ineffective public policy, insufficient regulatory and legal frameworks, institutional challenges, technical difficulties, and market constraints related to the inadequate dissemination of information and public awareness. This includes a lack of understanding regarding supply and demand dynamics necessary to support energy-efficient initiatives, as well as barriers linked to the absence of energy efficiency data and stakeholder consultations to inform policy-making.

5.1.7.3.2 Financial and Fiscal Barriers

5.1.7.3.2.1 Insufficient access for finance and lack of De-risking Guarantee

Insufficient Access for Finance and lack of de-risking guarantees available for energy efficient home appliances, resulting in limited awareness regarding its advantages among both investors and users. Additionally, there exists a certain level of uncertainty concerning the economic feasibility of using energy efficient home appliances technology.

5.1.7.3.2.2 High upfront capital cost technology for energy efficient home appliances

The upfront capital needed for energy efficient home appliances facility is still expensive.

5.1.7.3.2.3 Local Tax Policy

Energy efficient home appliances projects offer duty free for government projects but not for private sector companies.

5.1.7.3.3 Non-Financial Barriers

5.1.7.3.3.1 Policy, Regulatory and Legislative

The shortcomings in public policy, combined with limited capabilities within energy institutions, have resulted in regulatory and legislative measures that do not adequately

consider environmental costs. Additionally, there exists a lack of comprehensive legislative and regulatory frameworks, along with certain essential types of legislation.

5.1.7.3.3.2 Institutional

There is a lack of technical and management capacities.

5.1.7.3.3.3 Technical

The design of buildings, the utilization of appliances, and the patterns of energy consumption are often centered on inexpensive and low-energy-efficiency devices. There exists a lack of adequate understanding concerning energy-efficient home appliances.

5.1.7.3.3.4 Market

Limited feasibility studies to understand key requirements need for utility scale deployment and the efficiency gains of the technology in current climate. Insufficient understanding of key factors that influenced electricity supply and demand in Tonga.

5.1.7.3.3.5 Information and Public Awareness

Lack of comprehensive coordination of data collection for policy developments, and minimum consultation with local stakeholders on energy efficient home appliances

5.1.7.3.4 Summary of Measures to Overcome the Barriers

The following subsequent actions were recognized to alleviate obstacles.

5.1.7.3.5 Financial and Fiscal Measures

5.1.7.3.5.1 Insufficient access for finance and lack of De-risking Guarantee

Government entities, such as local banks, ought to be motivated to seek avenues for enhancing financial support to the private sector. The Government of Tonga should refine its subsidy policy and implement a commercial strategy to recoup the full investment costs.

5.1.7.3.5.2 High Upfront Cost of the technology

It is advisable to establish an appropriate regional procurement strategy for energyefficient (EE) equipment tailored to small island nations, along with a responsible regional transportation system for delivering the procured EE materials to these countries. Additionally, it is essential to implement tariff policies that can provide funding for longterm on-grid solar power initiatives, similar to Tonga's approach of incorporating in-kind contributions into the development of electricity tariffs for EE projects. Furthermore, it is important to eliminate obstacles that hinder private sector participation in EE projects to enhance competition.

Improve financing alternatives for private sector businesses involved in EE projects. Remove barriers that restrict private sector participation in energy efficiency projects to promote greater competition.

5.1.7.3.5.3 Local Tax Policy

Revise tax regulations related to import duties and could possibly improve the government procurement policies for EE equipment.

5.1.7.3.6 Non-financial Measures

5.1.7.3.6.1 Policy, Legislative and Regulatory Measures

Improve public policy development to ensure the timely installation and investment in supporting infrastructure development A regulatory reform and a donor-supported risk reduction facility are essential to facilitate EE investments. An enabling regulatory environment is necessary to attract private sector investments in EE, and a formulation of EE legislation is an obligation for Tonga.

5.1.7.3.6.2 Institutional Measures

Training on innovative approaches to designing and procuring EE projects. Establish a single regulating body, such as a "Ministry of Energy to effectively regulate and enable utilities to operate EE investments independently. Enhancing skills related to the integration and reporting of energy efficient home appliances

5.1.7.3.6.3 Technical Measures

Incorporate energy auditing and energy efficiency standards into the national building code. Establish energy efficiency initiatives that adopt a comprehensive strategy for evaluating energy efficiency capacity development. With significant integration of renewable energy, energy efficiency initiatives can be crucial in supplying energy to island communities. Strengthen the capability to design, install, and maintain energy-efficient household appliances.

5.1.7.3.6.4 Market Measures

The enhancement of skills through regional training initiatives focused on the management of energy service enterprises is essential. It is imperative to gather new data and insights based on the analysis conducted by MEIDECC in preparation for the forthcoming TERM, ensuring alignment with the objectives of SDG7 and the Nationally Determined Contributions (NDCs). Professionals should possess the capability to assess and analyze data, applying it to the evaluation of energy markets and policy frameworks to develop effective strategies and scenarios. Additionally, there is a need to delegate specific responsibilities to the private sector to facilitate infrastructure development.

5.1.7.3.6.5 Information and Public Awareness Measures

Decision makers in Tonga should be provided with comprehensive information on appropriate energy-efficient technologies. It is essential to establish regional public information initiatives that can supply the required resources and facilitate short-term training opportunities.

5.1.7.4 Actions Selected To Be Included in the TAP

1. Assess the feasibility of EE projects and tariff as source of funding. Currently, the market for EE are heavily relying on private projects without government quarantee on technologies. EE users require confirmation of the business's viability before committing their resources. The studies should encompass all pertinent external factors, such as the

difficulties in attracting investors, the suitable economic framework for full cost recovery electricity tariff, the integration of maximum demand for on-grid wind into the national electricity grid, and effective strategies to manage inflation in electricity tariffs.

2. Raise awareness among both developers and users of on-grid wind power: It is crucial for both users and innovators to understand not only the potential of this technology but also the advantages it offers. This can be achieved by demonstrating the economic viability of the technology and justifying the adoption of EE home appliances. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

3. Improve access to financing for EE investments: The cost of appliances pose a significant obstacle for investors seeking to enter into long-term financing agreements with financiers. Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of EE Home appliances technologies, such as major home appliances.

Technolo	ogy	Activities	Responsible
Action PI	an		Stakeholder
1. Estab appro institu	olish opriate utional	1.1 Long Term Institutional Set Up1.1.1 Long Term Government Institutional set up and Policy set Up	Cabinet, MEIDECC, DoE, SPC GCF, and NGOs and
set up the T	o for AP	 1.1.2 Development of Ministry of Energy. 1.1.3 Encourage or establish EE design, installation and maintenance companies. 1.1.4 Promote the establishment of energy auditing and opergy officient 	Local Energy Consultants.
		appliances import companies.	
2. Asses econo feasib of invest on EE Home applia	ss the omic oility tment E ances	 2.1 Conduct the economic, financial and fisca feasibility of the source of funding and full cost recovery of EE projects in Tonga 2.1.1 Opportunities for access financing opportunities. 2.1.2 Feasibility of government de-risking guarantee. 2.1.3 Identify any regulatory and legislative obstacles 2.1.4 Donors supported risk reduction methodology and financial options. 	DoE, TPL, University of Tonga, GCF, SPC and Local Energy Consultants
		2.2 Carry out market survey to ensure business viability of government guarantees available for the technology	DoE, TPL. University of Tonga, GCF, SPC and

Table 29: Activities to be implemented to enhance diffusion of EE home appliances.

	2.2.1	Feasible public policy reform options to	Local Business and
		reduce cost of adoption of EE in Tonga	Economic
	2.2.2	Commercial model for full cost	Consultants
		recovery EE investment	
	2.3C	onduct the economic feasibility of the	DoE, TPL.
	ac	loption of EE home appliances in the	University of Tonga,
	cc	untry and impacts of high upfront cost	GCF, SPC and
	ar	id inflation in the adoption process	Local Business and
	2.3.1	Identify the appropriate EE policy	Economic
		incentives.	Consultants
	2.3.2	Identify the most appropriate source of	
		financing for residential users to	
		address high cost EE investment	
		needs.	
	2.3.3	EE policy improvements	
	2.3.4	EE regulatory improvements	
	2.3.5	EE legislative improvements	
3. Create	3.1 D	evelop awareness material targeting	DoE, TPL.
Awaren	ess di	ferent stakeholders (i.e. Private Sector,	University of Tonga,
of both	De	ecision Makers, Users of PV	GCF, SPC and
Develop	per, Te	echnology, financial institutions of	Local Business and
and use	rs te	chnology)	Economic
of the	3.1.1	Donors financial opportunities for EE	Consultants
technolo	pgy	development for private sectors	
	3.1.2	Donors financing options for home	
		appliances energy efficient programs	
		and capacity building programs for	
		designing, installing and maintaining of	
		EE home appliances	
	3.1.3	public policy improvements for EE	
		project installation to support national	
	0.4.4	energy targets on EE	
	3.1.4	Improve capacity through training on	
		of E projecto	
	215	OFEE projects	
	3.1.5	interpret EE data in order to formulate	
		effective EE offective and improvement	
	216	policies. Encourado training program	
	5.1.0		
		approaches for EE appliances	
		officient business convice delivery	
	220	evelon a communication strategy Profile	
	5.2 D	r target stakeholders particularly the	Liniversity of Tonga
	01 20	Inters of the technology	GCF SPC and
	321	Short Term Training materials on on-	Local Business and

			site experiences as shared regional	Economic
			sources of information and data	Consultants
			analysis.	
		3.2.2	Training on innovative approaches for	
			designing, procuring, installation and	
			maintenance of EE projects.	
		3.2.3	Encourage private sectors EE services	
			and auditing business opportunities.	
		3.2.4	Institutionalization of EE project data	
			collection and analysis and publication	
			of data analysis and indicators for	
			evidenced policy decision makings	
		325	Formulation of FF database and	
		0.2.0	analysis of EE data to guide energy	
			efficient service delivery development	
			and business opportunities	
		2 2 In	and business opportunities	
		0.0 m	sidential EE projects deperation	DOL, TEL. University of Tonga
			necially attract attentions of investors	CCE SPC and
			dusors	
		221	Enabling logislation and regulatory	Economic
		5.5.1	environment	Concultanta
		222	Improvement on accessibility and	Consultants
		3.3.Z	normitting process for wind power to	
			the electricity grid	
1	Fabaaa	1100	the electricity grid	
4.		4. I De	evelop Government infancial policy	DOE, IFL.
	Access to	tor		CCE SPC and
	Financing		Identify and improve commercial banks	GCF, SFC and
		4.1.1	financing policy and accessibility of	Local Business and
			intancing policy and accessibility of	Concultanta
			acheme fer EE projects	Consultants
		405		
		4.ZEI	igage in dialogue with government	DOE, IPL.
		ae	velopment partners to identify possible	University of Tonga,
		go	Vernment incentives and subsidies for	GCF, SPC and
		une	E E lechnologies as il contributes to	
		gio		
		4.2.1	Ensure accessibility and availability of	Consultants
			technical standard and minimum	
			labelling certification for import of EE	
			home appliances to Tonga	
		4.3Di	scuss and Justify the adoption of the	DoE, TPL.
		mo	ost suitable adoption model for EE	University of Tonga,
		ap	pliances investors and home owners in	GCF, SPC and
		То	nga	Local Business and
		4.3.1	Availability of most feasible financing	Economic
			options for EE projects	Consultants

	4.3.2	Improvements of the national electricity grid for EE projects	
Action5:Design,Procure,Installthemonitoring andmaintenanceplan model forhybridvehicleapplications inthe country	5.1.	Design, procure install the EE Home appliances promotion and investment initiative in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
Action 6 : Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	6.3.	Prepare all Policy decisions for government approval	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	6.4.	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

5.1.7.5 Action To Be Implemented as Project Ideas

The aforementioned three actions, specifically the feasibility study, awareness raising, and improved access to financing, will be evaluated for implementation as potential project ideas.

5.1.7.6 Stakeholders and Implementation Timelines for the TAP Table 30 shows the list of stakeholders to implement the TAP

Table 20: List of	Activition and	Docnoctivo	Stakaholdara	to Im	alomont the	TAD
TADIE SU. LISU UI	Activities and	Respective	Stakerioluers	10 mp		IAF

Number	Activities	Responsible Body	Timelines
 Establish appropriate institutional set up for the TAP 	 1.1 Long Term Institutional Set Up Long Term Government Institutional set up and Policy set Up 1.1.1 Development of Ministry of Energy. 1.1.2 Promote the establishment of energy auditing and energy efficient appliances import companies. 	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consultants	1-3 Months
2. Assess the economic feasibility of investment on EE Home appliances	 2.1 Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of EE projects in Tonga 2.1.1 Opportunities for access financing opportunities. 2.1.2 Feasibility of government de-risking guarantee. 2.1.3 Identify any regulatory and legislative obstacles 2.1.4 Donors supported risk reduction methodology and financial options. 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	2-2Months
	 2.2 Carry out market survey to ensure business viability of government guarantees available for the technology 2.2.1 Feasible public policy reform options to reduce cost of adoption of EE in Tonga 2.2.2 Commercial model for full cost recovery EE investment 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	3 Months
3. Create Awareness of both Developer, and users of the technology	3.1 Conduct the economic feasibility of the adoption of EE home appliances in the country and impacts of high upfront cost and inflation in the adoption process	DoE, TPL. University of Tonga, GCF, SPC and Local Business	6 Months

311	Identify the appropriate FF	and	
•••••	policy incentives.	Economic	
312	Identify the most	Consultants	
0.1.2	appropriate source of	Concultanto	
	financing for residential		
	usors to address high cost		
	EE invostment needs		
212	EE noliov improvemente		
J.I.J	EE policy improvements		
3.1.4			
<u></u>	Improvements		
3.3.2.	EE legislative improvements		0 M (I
3.2 D	evelop awareness material	DOE, IPL.	2 Months
tar	geting different stakeholders	University of	
(1.6	e. Private Sector, Decision	Tonga, GCF,	
Ma	akers, Users of PV	SPC and	
Те	chnology, financial	Local	
ins	stitutions of technology)	Business	
3.2.1	Donors financial	and	
	opportunities for EE	Economic	
	development for private	Consultants	
	sectors		
3.2.2	Donors financing options for		
	home appliances energy		
	efficient programs and		
	capacity building programs		
	for designing, installing and		
	maintaining of EE home		
	appliances		
3.2.3	public policy improvements		
••	for FF project installation to		
	support national energy		
	targets on FF		
324	Improve capacity through		
0.2.4	training on designing		
	installing and maintenance		
	of EE projects		
2 2 5	Training on conceity to		
J.Z.J	avaluate and interpret EE		
	dete in order to formulate		
	enective EE enective and		
0 0 0	Improvement policies.		
3.2.6	Encourage training program		
	approacnes for EE		
	appliances business		
	opportunities and energy		
	efficient business service		
	delivery.		

	 3.3 Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology 3.3.1 Short Term Training materials on on-site experiences as shared regional sources of information and data analysis. 3.3.2 Training on innovative approaches for designing, procuring, installation and maintenance of EE projects. 3.3.3 Encourage private sectors EE services and auditing business opportunities. 3.3.4 Institutionalization of EE project data collection and analysis and publication of data analysis and publication of data analysis and publication of analysis and publication of analysis and publication of analysis and publication of analysis and indicators for evidenced policy decision makings. 3.3.3. Formulation of EE database and analysis of EE data to 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	2 Months
	service delivery development and business opportunities		
4. Enhance Access to Financing	 4.1 Implement awareness campaign on residential EE projects generation, especially attract attentions of investors and users 4.1.1 Enabling legislation and regulatory environment 4.1.2 Improvement on accessibility and permitting process for wind power to the electricity grid 	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	4. Months
	 4.2 Develop Government financial policy incentives to assist lowering the cost of EE technology 4.2.1 Identify and improve commercial banks financing 	DoE, TPL. University of Tonga, GCF, SPC and Local Business	4 Months

		policy and accessibility of residential energy users to EE loaning scheme for EE projects	and Economic Consultants	
	4.3 Er gc gc su teo to 4.3.1	ngage in dialogue with overnment development inters to identify possible overnment incentives and bsidies for the EE chnologies as it contributes global benefit Ensure accessibility and availability of technical standard and minimum labelling certification for import of EE home appliances to Tonga	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	12 Months
Action 5: Design, Procure, Install the monitoring and maintenance plan model for hybrid vehicle applications in the country	5.1.	Design, procure install the EE Home appliances promotion and investment initiative in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	1-3 years
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
Action 6 : Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	1-3 Years
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
	6.3.	Prepare all Policy decisions for government approval		
	6.4.	Design, Procure and install all necessary grid		

improvements to cater for	
reducing demand in the	
electricity grid.	

5.1.7.7 : Roles of Stakeholders

The roles of stakeholders are shown in Table 31 below

Table 31: Roles of EE Home Appliances Power Stakeholders

1	Ministry of Energy	Plan and manage energy policies, energy targets, and					
		Oversee energy goals and objectives					
		energy projects including LL nome appliances					
		Identify and source funding to implement EE projects					
		Formulate and present energy plan strategies and					
		programmes to government and seek Cabinet's approval					
		Promote public awareness and informed decisions on on-					
		EE technologies					
2	Department of	Focal Point of the United Nations Convention on Climate					
-	Climate Change .	Change					
	MEIDECC						
		Sourcing funds from climate funds and Global					
		Environmental Facility					
		GCF focal point in Tonga					
3	Department of	Responsible for environmental policies and					
	Environment,	environmental management					
	MEIDECC						
4	Ministry of Finance	Responsible for financial policies and policy incentives for					
-	and Planning	Dusinesses.					
5	IVIINISTRY OF	Responsible for Business incentive policies					
6	Ministry of Foreign	Responsible for foreign relations with donors and					
0	Affairs	development partners					
7	Tonga Power	Manage and Plan the national electricity grids and					
	Limited, TPL	monitor all projects that has capacity to influence the					
		electricity generation and distribution and transmissions.					
8	Tonga Electricity	Responsible for regulatory policies and regulation of the					
	Commission	national electricity grid.					
9	University of Tonga	Research and Development.					
	and University of the						
	South Pacific and						
	National consultants						
10	Regional Energy	Responsible for regional energy coordination and general					
	Institutions	assessment and analysis of on-grid PV projects.					
11	Development	Financing of EE Home appliances projects					

	Partners and	
12	Local NGOs and Consultants	Technical assessment and specific technical analysis of EE projects
13	Contractor and Subcontractor for technological installation of on- grid PV	Technical installation of the technology

Action	Activities	Planning		Implemen tation		Responsible Stakeholder
		Start	End	Star	En	
 Establish appropriate institutional set up for the TAP 	 1.1 Long Term Institutional Set Up Long Term Government Institutional set up and Policy set Up 1.1.1 Development of Ministry of Energy. 1.1.2 Promote the establishment of energy auditing and energy efficient appliances import companies. 	2025	2025	202 5	20 25	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consultants
	 1.2 Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of EE projects in Tonga 1.2.1 Opportunities for access financing opportunities. 1.2.2 Feasibility of government de-risking guarantee. 1.2.3 Identify any regulatory and legislative obstacles 1.2.4 Donors supported risk reduction methodology and financial options. 	2025	2025	202	20 25	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

2. Assess the economic feasibility of investment on EE Home appliances	 2.1 Carry out market survey to ensure business viability of government guarantees available for the technology 2.1.1 Feasible public policy reform options to reduce cost of adoption of EE in Tonga 2.1.2 Commercial model for full cost recovery EE investment 	2025	2025	202 5	20 25	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
	 2.2 Conduct the economic feasibility of the adoption of EE home appliances in the country and impacts of high upfront cost and inflation in the adoption process 2.2.1 Identify the appropriate EE policy incentives. 2.2.2 Identify the most appropriate source of financing for residential users to address high cost EE investment needs. 2.2.3 EE policy improvements 	2024	2025	202 5	20 25	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

		2.2.4 EE regulatory						
		improvement						
		2.2.5 EE legislative						
			improvement					
3.	Create	3.1 D	evelop	2024	2025	202	20	DoE. TPL.
	Awareness	aw	areness			5	25	University of
	of both	ma	aterial targeting					Tonga GCF
	Developer	dif	ferent					SPC and Local
	and users	sta	akeholders (i e					Business and
	of the	Pr	ivate Sector					Economic
	technology	De	cision Makers					Consultants
	teennelegy	Us	sers of PV					Concuration
		Te	chnology.					
		fin	ancial					
		ins	stitutions of					
		teo	chnology)					
		3.1.1	Donors					
		•••••	financial					
			opportunities					
			for EE					
			development					
			for private					
			sectors					
		3.1.2	Donors					
			financing					
			options for					
			home					
			appliances					
			energy					
			efficient					
			programs and					
			capacity					
			building					
			programs for					
			designing,					
			installing and					
			maintaining of					
			EE home					
			appliances					
		3.1.3	public policy					
			improvements					
			for EE project					
			installation to					
			support					
			national					
			energy					
			targets on EE					

	1				1		1
	3.1.4	Improve					
		capacity					
		through					
		training on					
		designing,					
		installing and					
		maintenance					
		of EE projects					
	3.1.5	Training on					
		capacity to					
		evaluate and					
		interpret EE					
		data in order					
		to formulate					
		effective EE					
		effective and					
		improvement					
		policies.					
	3.1.6	Encourage					
		training					
		program					
		approaches					
		for EE					
		appliances					
		business					
		opportunities					
		and energy					
		efficient					
		business					
		service					
		delivery.					
4. Enhance	4.1 D	evelop a	2024	2025	202	20	DoE, TPL.
Access to	со	mmunication			5	25	University of
Financing	str	ategy Profile					Tonga, GCF,
	foi	r target					SPC and Local
	sta	akeholders					Business and
	pa	rticularly the					Economic
	ad	lopters of the					Consultants
	teo	chnology					
	4.1.1	Short Term					
		Training					
		materials on					
		on-site					
		experiences					
		as shared					
		regional					
		sources of					

	information					
	and data					
	analysis.					
4.1.2	Training on					
	innovative					
	approaches					
	for designing					
	nor designing,					
	procuring,					
	Installation					
	and					
	maintenance					
	of EE					
	projects					
113	Encourade					
4.1.0	privoto					
	Sectors EE					
	services and					
	auditing					
	business					
	opportunities.					
414	Institutionaliz					
	ation of EE					
	auon or LL					
	collection and					
	analysis and					
	publication of					
	data analvsis					
	and indicators					
	for evidenced					
	policy					
	decision					
	makings.					
4.1.5	Formulation					
	of EE					
	database and					
	analysis of					
	EE data to					
	guide energy					
	efficient					
	service					
	delivery					
	development					
	and business					
	onnortunities					
100-		2025	2026	202	20	
4.2De	, veiop	2023	2020	202	20	
Go	overnment			5	26	University of
fina	ancial policy					Tonga, GCF,

	incentives to assist lowering the cost of EE technology 4.2.1. Identify and improve commercial banks financing policy and accessibility of residential energy users to EE loaning scheme for EE projects					SPC and Local Business and Economic Consultants
	 4.3 Engage in dialogue with government development partners to identify possible government incentives and subsidies for the EE technologies as it contributes to global benefit 4.3.1. Ensure accessibility and availability of technical standard and minimum labelling certification for import of EE home appliances to Tonga 	2027	2027	202 7	20 27	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
Action 5: Design, Procure, Install the monitoring and maintenance	5.1. Design, procure install the EE Home appliances promotion and					

plan model for		investment			
hybrid vehicle		initiative in			
applications in		the country			
the country		,			
	5.2.	Design,			
		Approve and			
		Set up the			
		Monitoring			
		and			
		Maintenance			
		Model for the			
		technology			
Action 6 :	6.1.	Assess and			
Assess and		Identify the			
Identify all the		policy,			
necessary		legislative			
improvement		and			
options		regulatory			
		shortfalls in			
		the			
		implementatio			
		n of existing			
		energy			
		efficient home			
		appliances			
		investment in			
		the country			
	6.2.	Conduct			
		consultation			
		and meetings			
		on findings of			
		the policy and			
		regulatory			
		assessment			
		and analysis.			
	6.3.	Prepare all			
		Policy			
		decisions for			
		government			
		approval			
	6.4.	Design,			
		Procure and			
		install all			
		necessary			
		grid			
		improvements			
		to cater for			

reducing demand in the electricity			
grid.			

5.1.7.8 : Scheduling of Activities

Stakeholders met on 12th December , 2024 to set and confirm the timelines and consider the effectiveness and efficiency of implemented activities. The outcomes of the meeting is the below. Table 32 describes the sequence and timing of specific activities and responsibilities

Table 32: Scheduling	and Sequencing of	specific Activities	Timelines for Energy	Efficient Home	Appliances
Tuble 02. Ourieduning	and ocquerioning or	Specific Activities	Throwing the chergy		Applialiees

Actions	Activi	ties	Yea	Year (2025-2027)		
1. Institutional Set Up	1.1.	Confirm positions for recruitment and advertisement of Positions				
	1.2.	Confirm office space for the project team in the Department of Energy				
	1.3.	Allocate Budget for Salaries and Recruitment				
	1.4.	Meet Cost for office furniture/ equipment				
	1.5.	Meet Other Cost for operation and management of the office.				
2. Assess the feasibility of EE Home applainces	2.1.	Identify and Confirm TOR and hire consultant to conduct the assessment				
	2.2.	Identify and Justify the economic, financial and fiscal feasibility of the Lifecycle Cost of selected EE Home appliances.				
	2.3.	Identify key barriers to the economic and financial feasibility of the selected EE Home appliances				
	2.4.	Identify the solutions to the economic and financial feasibility of the selected EE Home appliances				
	2.5.	Carry out Market Survey to ensure business viability of the technology to investors.				
	2.6.	Identify and present the key factors for business viability of the selected EE Home appliances				
	2.7.	Identify policy improvements needed				
	2.8.	Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of inflation in the				

			tariffs		
		2.9.	Identify barriers and solutions to the		
			economic feasibility of the fixed-tariffs		
		2.10.	Identify policy improvements		
		2.10.1	. EE Home appliances Policy		
		2.10.2	2. EE Home Appliance Legislation		
		2.10.3	B. EE Home appliance Regulation		
		2.11.	Technical Feasibility		
3.	Create	3.1.	Identify awareness materials for		
	Awareness		various different stakeholders.		
	of both	3.1.1.	Awareness materials for EE Home		
	Developer,		appliances developers		
	and users of	3.1.2.	Awareness materials for EE		
	the On-Grid		appliances dealers		
	PV	3.1.3.	Awareness materials for EE		
	technoloav		appliances Users		
	leenneregy				
		32	Develop awareness material targeting		
		0.2.	different stakeholders (i.e. Private	_	
			Sector, Decision Makers, Users of EE		
			Appliances Technology financial		
			institutions of technology)		
		321	Develop materials for FF appliances		
		0.2.1.	developers		
		36	Develop a communication strategy		
		0.0.	Profile for target stakeholders	_	
			particularly the adopters of the		
			technology		
		361	Develop materials for FE Appliances		
		0.0.1.	developers		
		362	Develop materials for EE Appliances		
		0.0.2.	dealers		
		363	Develop materials for EE appliances		
		0.0.0.			
		37	Implement awareness campaign on		
		0.7.	FE annlainces especially attract		
			attentions of investors and users		
		371	Implement awareness campaign for		
		0.7.1.	EF Annliances developers		
		372	Implement Awareness Campaign for		
		0.7.2.	EF annlikances Dealers		
		373	Implement Awareness Campaign for		
		0.7.0.	FF appliances users		
		38	Gender Mainstreaming and Social		
		0.0.	Inclusion		
Δ	Enhance	41	Develop Financial Policy Incentives to		
	Access to		assist lowering the cost of EE		
	700033 10		assist lowering the cost of EE		

Financing		technology			
	4.1.1.	Identify all possible policy incentives to			
		assist lowering the cost of EE Home			
		appliances			
	4.1.2.	Identify possible legislative incentives			
		to assist lowering the cost of EE			
		appliances			
	4.1.3.	Identify possible regulatory incentives			
		to assist lowering the cost of FF			
		appliances			
	42	Engage in dialogue with government			
		development partners to provide		—	
		incentives and subsidies for the			
		technology as it contributes to global			
		henefit			
	421	Consultation with government on			
	7.2.1.	policy incentives and subsidies			
	422	Consultation with donors on policy			
	7.2.2.	incentives and subsidies on donor			
		funding projects			
	123	Consultation with dealers on policy			
	7.2.0.	incentives and subsides on imported			
		FE appliances components			
	13	Discuss and Justify the adoption of the			
	4.3.	most suitable model for PPA Contract			
		for EE investors and private sectors in			
	1 1	identify Develop and recommand all		•	
	4.4.	financial policy incentives to Cohinet			
		inancial policy incentives to Cabinet			
		to assist lowering the cost of			
		investment on energy efficient nome			
		appliances Provide clear justifications			
	4 5	for adoption of the on-grid wind.			
	4.5.	Engage in dialogue with			
		development partners on suitable			
		adoption of subsidies for the			
		technology as it contributes to global			
		benefit; Confirm possible ways and			
		preferred conditions and methodology			
		for supporting financing of EE			
		appliances in Longa	<u> </u>		
	4.6.	Contirm potential financing options			
		with international, regional and			
		bilateral donors and development			
		partners for adoption of EE in the			
		country			
	4.7.	Prepare Cabinet Approval for most			

			sustainable financing options of hybrid vehicle in the country and its plan to achieve share of carbon emission reduction in the energy sector.		
5.	Design, Procure, Install the monitoring and maintenance plan model for on-grid wind applications in the country	5.1.	Design, procure install the EE appliances promotion and investment initiative in the country		
		5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
6.	Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of EE appliances investment in the country		
		6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
		6.3.	Prepare all Policy decisions for government approval		
		6.4.	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.		

Table 33: Actions, Activities, Capacity Building and Costs for EE Home Appliances

Actions	Activities		Capacity Needs	Cost USD
1. Institutional	1.1.	Confirm	Consultation & Meeting	18,000
Secup		positions for	Cost	
		recruitment and	Advertisement Cost	
		Conduct		
		advertisement		
	1.2.	Confirm office	Rent and	200,000
		space for the	Accommodation	

		project team in the Department		
	1.3.	of Energy Allocate Budget for	Salaries	800,000
		Salaries and Recruitment		
	1.4.	Meet Cost for office furniture/ equipment	Office Furniture and Equipment	200,000
	1.5.	Meet Other Cost for operation and management of the office.	Electricity and Telecommunication	10,000
2. Assess the feasibility of selected EE Home appliances	2.1.	IdentifyandConfirmTORandhireconsultanttoconducttheassessment	Meeting Cost and Consultant Fees	500,000
	2.2.	Identify and Justify the economic, financial and fiscal feasibility of the Lifecycle Cost of EE appliances in Tonga.	Local Travel, Transportation Cost and Research Cost	150,000
	2.3.	Identify/Confirm key barriers to the economic and financial feasibility of EE	Workshop and Consultation Cost	50,000
	2.4.	Identify the solutions to the economic and financial feasibility of the EE	Workshop and Consultation Cost	
	2.5.	Carry out Market Survey to ensure business viability of the technology to	Develop Survey Questionnaire, Survey workshops, Implementation of Survey	300,000

		investors.		
	2.6.	Identify and	Finalization and	30,000
		present the key	presentation of Survey	
		factors for	Report	
		business		
		viability of the		
		FF		
	27	Identify	Consultation Meetings	20.000
	2.1.	operation	and Cabinet	20,000
		nolicy	Submissions	
		improvements	Gubinissions	
		noodod		
	2.0	Canduat the	Concultation	E00.000
	2.8.	Conduct the	Consultation and	500,000
		economic	Meeting Cost and	
		teasibility of the	Consultants Fee	
		adoption of		
		fixed electricity		
		tariffs in the		
		country and		
		impacts of		
		inflation in the		
		tariffs		
	2.9.	Identify barriers	Workshop Cost	20,000
		and solutions to		
		the economic		
		feasibility of the		
		fixed-tariffs		
	2.10.	Identify policy	Policy, Regulatory and	400,000
		improvements	Legal Review of existing	,
	2.10.1	EE Policy	policy and legal	
	2 10 2	FF	framework and	
	2	l eqislation	documents	
	2 10 3	FF		
	2.10.0	Regulation		
	2 11	Technical	<u> </u>	10.000
	۲.۱۱.	Feasibility		10,000
3 Create	3.1	Identify	Consultation and	30.000
	0.1.	awareness	Identification of public	00,000
of both		materials for	awareness materials	
		varioue		
and users		different		
of the On		stakeholdore		
	211			
tochnology	J.I.I.	matarials for EE		
technology				
	240	Awaranaaa		
	3.1.2.	Awareness		
		materials for EE		

3.1.3.	dealers Awareness materials for EE Users		
3.2. 3.2.1.	Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of wind Technology, financial institutions of technology) Develop materials for EE	Consultancy Fees for development of public awareness materials	200,000
	developers		
3.3. 3.3.1. 3.3.2. 3.3.3.	Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology. Develop materials for EE developers Develop materials for EE dealers Develop materials for EE users	Consultancy Fees for development of communication profile	40,000
3.4.	Implement awareness campaign on EE projects, especially attract attentions	Record of Radio and Television Programs, Publication of awareness materials	100,000
	investors and	stakeholders	
------------	------------------------------	--------------------------	--------
	3.4.1. Implement	Other public awareness	
	awareness	programs	
	campaign EE	- 5	
	developers		
	3.4.2. Implement		
	Awareness		
	Campaign for		
	EE Dealers		
	3.4.3. Implement		
	Awareness		
	Campaign for		
	EE users		
	3.5. Gender		
	Mainstreaming		10,000
	and Social		
· - ·	Inclusion		
4. Enhance	4.1. Identify/Develop	Policy Dialogue	50,000
Access to	Financial Policy	Meetings and	
Financing	Incentives to assist	consultation with key	
		stakenoiders	
	4 1 1 Identify all possible	Policy Incontivos to	
	4.1.1. Identity all possible	reduce cost of imports	
	assist lowering the	of technology	
		orteenhology	
	4 1 2 Identify possible	Policy incentives for	
	legislative	power purchase	
	incentives to assist	agreement (PPA)	
	lowering the cost of		
	EE.		
	4.1.3. Identify possible		
	regulatory		
	incentives to assist		
	lowering the cost of		
	EE		
	4.2. Engage in	Development partners	40,000
	dialogue with	meetings and	
	government	workshops on identifying	
	aevelopment	policy incentives and	
	partners to provide	subsidies for import of	
	incentives and	and and and	
		equipment.	
	contributes to		
	alobal benefit		

4.2.1. 4.2.2. 4.2.3.	Consultation with government on policy incentives and subsidies. Consultation with donors on policy incentives and subsidies on donor funding projects. Consultation with dealers on policy incentives and subsides on imported EE		
4.3.	components Discuss and Justify the adoption of the model for PPA Contract for EE power investors and private sectors in Tonga	Stakeholders Consultation on PPA Policy and Regulation.	40,000
4.14.	identify, Develop and recommend all financial policy incentives to Cabinet to assist lowering the cost of investment EE Provide clear justifications for adoption of the FF	Workshops/Consultation with key stakeholders and development partners	40,000
4.16.	Engage in dialogue with development partners on suitable adoption of subsidies for the technology as it contributes to global benefit; Confirm possible ways and preferred conditions and methodology for	Consultations and Workshops and Meetings	40,000

-					1
			supporting financing of technology in Tonga		
		4.17.	Confirm potential financing options with international, regional and bilateral donors and development partners for adoption of hybrid vehicle in the country EE		
		4.18.	Prepare Cabinet Approval for most sustainable financing options of the technology in the country and its plan to achieve share of carbon emission reduction in the energy sector.		
5.	Design, Procure, Install the on- grid PV pilot project	5.1.	Design, procure install the EE promotion and investment initiative in the country	Consultants Fee Operation and Reporting	5,000,000
		5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
6.	Maintenance Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing EE	Consultation Fees Assessment , Consultation and Reporting	1,000,000
		6.2.	Conduct consultation and meetings on		

	findings of the policy and regulatory assessment and analysis.
6.3.	Prepare all Policy decisions for government approval
6.4.	Design, Procure and install all necessary grid improvements to cater for EE projects.

5.1.7.9 : Estimation of Resources for Action and Activities

To achieve successful and sustained technology diffusion, it is essential to enhance the capabilities of local technology importers and bidders and installers, especially local suppliers, overseas and local contractors and bidders of the technology, installers, and maintenance engineers. Furthermore, to facilitate accelerated diffusion, it is necessary to implement a train-the-trainers approach, enabling the replication of training programs across numerous regions.

The activities to be undertaken and their associated costs are presented in Table 34.

Action	Activities	Plan	Impleme ntation	Estimated Cost	Sour ce of	Responsibl e	Justified Actions
		Start/E nd	Start/En d	(USD)	Fund	Stakeholde r	
1.Establish appropriate institutional set up for the TAP	 1.1 Long Term Institutional Set Up Long Term 1.1.1 Government Institutional set up and Policy set Up 1.1.2 Development of Ministry of Energy. 1.1.3 Promote the establishment of energy auditing and energy efficient appliances import companies. 	2025/ 2025	2025/20 25	1,280,000	Dono rs	DOE, TPL, Donors	Recruited personnel and office furniture and office equipment
2. Feasibility Study for economic feasibility	2.1 Conduct the economic , financial and fiscal feasibility of the source of funding and full cost recovery of EE	2025/ 2025	2025/ 2025	1,930,000	Dono rs	DOE, TPL, Donors	175 *2 125*2 75*4

Table 34 : Financial considerations associated with the execution of the identified activities.

projects in Tonga 2.1.1 Opportunities for access financing opportunities. 2.1.2 Feasibility of government de- risking guarantee. 2.1.3 Identify any regulatory and legislative obstacles Donors supported risk reduction methodology and financial options.					
2.2 Carry out market survey to ensure business viability of government guarantees available for the technology 2.2.1 Feasible public policy reform options to reduce cost of adoption of EE in Tonga 2.2.2 Commercial model for full cost recovery EE investment	2025/2 025	2025/ 2025	Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Energy Consultants	Recruitmen t of researchers and professiona I assessors
2.3 Conduct the economic feasibility of the adoption of EE home appliances in the country and impacts of high upfront cost and inflation in the adoption process 2.3.1. Identify the appropriate EE policy incentives.	2025/ 2025	2025/ 2025	Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	Recruitmen t of Assessors
2.3.2. Identify the most appropriate source of financing for residential users to address high cost EE	2025/2 025	2025/20 25	Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	Recruitmen t of assessors and office equipment

	investment needs. 2.3.3. EE policy improveme nts 2.3.4. EE regulatory improveme nts 2.3.5. EE legislative improveme nts						
3.Create Awareness of both Developer, and users of the	3.1. Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of PV Technology, financial institutions of technology)	2025/2 026	2025/22 6	380,000	Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	1.Consultati on with stakeholder s 2.Publish of public awareness materials
	3.1.1 Donors financial opportunities for EE development for private sectors 3.1.2.Donors financing options for home appliances energy efficient programs and capacity building programs for designing, technology 3.1.3,installing and maintaining of EE home appliances 3.1.4. public policy improveme nts for EE project installation to support national energy targets on EE 3.1.5. Improve capacity through training on designing.	2025/2 025	2026/20 26		Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	Contact address and internet communica tion links

	installing					
	and					
	maintonana					
	projects					
3.1.6.	Training on					
	capacity to					
	evaluate					
	and					
	interpret					
	EE data in					
	order to					
	formulate					
	effective					
	EE					
	effective					
	and					
	improveme					
	nt policies					
2 1 7	Fragurada					
3.1.7.	Encourage					
	training					
	program					
	approaches					
	for EE					
	appliances					
	business					
	opportunitie					
	sand					
	enerav					
	officient					
	business					
	business					
	service					
	delivery.					
3.2.	Develop a	2026/2	2026/20	Dono	DoE, TPL.	1.Conduct
	communicatio	026	27	rs	University	of Trainings
	n strategy				of Tonga.	2.Distributio
	Profile for				GCF SPC	n of
	target				and Local	materials
	atakabaldara				Business	2 Depard
	stakenoluers				DUSINESS	
	particulariy				and	and broadc
	the adopters				Economic	ast of
	of the				Consultants	Radio and
	technology					TV
3.2.1.	Short Term					programs
Traini	ng materials					
on on	-site					
exper	iences as					
share	d regional					
sourc	es of					
inform	ation and					
	analysis. Tasiala					
3.2.2.	i raining on					
Innov	ative					
appro	aches for					
desig	ning,					
procu	ring,					

	installation and maintenance of EE projects. 3.2.3. Encourage private sectors EE services and auditing business opportunities. 3.2.4.Institutionaliza tion of EE project data collection and analysis and publication of data analysis and publicators for evidenced policy decision makings. 3.2.5. Formulation of EE database and analysis of EE data to guide energy efficient service delivery development and business opportunities						
4, Enhance Access to Financing	 4.1. Develop Government financial policy incentives to assist lowering the cost of EE technology 4.1.1. Identify and improve commercial banks financing policy and 4.1.2. accessibilit y of residential energy users to EE loaning scheme for EE projects 	2024/2 025	2025/20 25	210,000	Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	Meeting Consultatio ns Policy Decisions
	4.2. Engage in dialogue with government development partners to identify possible	2025/2 026	2025/20 26		Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and	Consultatio n with stakeholder s Formulation of Policies,

	government incentives and subsidies for the EE technologies as it contributes to global benefit 4.2.1. Ensure accessibilit y and availability of technical standard and minimum labelling certification for import of EE home appliances to Tonga					Economic Consultants	Regulations and Legislation
	 4.3. Long Term Institutional Set Up Long Term Government Institutional set up and Policy set Up 4.3.1. Developme nt of Ministry of Energy. 4.3.2. Promote the establishm ent of energy auditing and energy efficient appliances import companies. 	2027/2 027	2027/20 27		dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	Agreed model of PPA supported by internationa I power companies and multilateral donors
Action 5: Design, Procure, Install the monitorin g and maintena nce plan model for	5.1. Design, procure install the EE appliances promotion and investment initiative in	2024/2 025	2025/20 25	30 mil	dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	

hybrid vehicle	the country						
applicatio ns in the							
ocurray	5.2. Design, Approve and Set up the Monitoring and Maintenanc e Model for						
	the technology						
Action 6 : Assess and Identify all the necessar y improvem ent options	6.1. Assess and Identify the policy, legislative and regulatory shortfalls in the implementati on of existing energy efficient home appliances investment in the country	2024/2 025	2025/20 25	1 mil	dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	
	6.2. Conduct consultation and meetings on findings of						
	the policy and regulatory assessment and analysis.						
	6.3. Prepare all Policy decisions for government						

	approval			
	6.4. Design, Procure and install all necessary grid improvemen ts to cater for reducing demand in the electricity grid.			
TOTAL ESTI	MATED COST			34,800,000

5.1.7.10 : Management Planning Risks

Table 35 outlines the potential risks associated with the implementation of technology, along with possible measures to mitigate these risks and ensure that the process remains on track.

Table 35:	Management	Risks	and	Possible	Contingencies
1 4010 00.	managomon	1 10/10	ana	0000000	Containgenteree

Risk Categories	Current Situation	Contingency Plan	
1. Cost of Technology	major cost risk due to	Government plan for	
	increasing cost of EE	increasing cost of	
	technology over time	technology	
2. Scheduling Risks	There may be delays in implementing policies designed to promote the dissemination of technology, including those related to incentives for EE technologies. Additionally, there may be setbacks in carrying out the feasibility study.	Initiate strategic dialogues with the government of Tonga to enable the necessary intervention. Enhance awareness within the Department of Environment, Climate Change, and the Parliamentary Committee on Energy to promote these policies. Formulate a Memorandum of Understanding with pertinent Research and Development organizations to ensure the timely execution of the feasibility	
		study.	
3. Implementation and	A technology may fail to	Formulate an agreement	
Production Risks	operate as intended; for	with the technology	
	Instance, it might not	provider to offer after-sales	

	perform as expected due to meet the national energy target.	assistance. Develop a mechanism for collecting feedback related to the technology to guarantee that all concerns are resolved in a timely manner.
4. Immediate Requirement Risks	Delay on financing from donors	A project manager ought to be appointed within the MEIDECC Office, with sufficient funding allocated for this role. This individual should be engaged on a full-time basis and provided with the necessary tools and resources, which include access to a financial analyst and proficiency in cost estimation, as well as the requisite hardware and software for planning, scheduling, and project management, in addition to any other immediate tasks that may arise.
5. Changing habits of using technology	Changing to un-efficient energy appliances due to increasing cost of EE technologies	Increasing awareness is crucial, as changing people's habits from using more EE to less efficient could hinder the swift adoption of this technology. More policy incentives on EE technologies.

6 TECHNOLOGY ACTION PLAN AND PROJECT IDEAS FOR TRANSPORT

6.1 TAP for Transport Sector

6.1.1 Battery Charged Electric Vehicles

The TERMPlus report also establishes a goal for the adoption of Low Emission Vehicles, projecting a cumulative reduction of greenhouse gas emissions amounting to 165 GgCO2e by 2030 (GOT, 2021b). Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e), renewable electricity is responsible for 40% (43,500 metric tonnes CO2e), and

EE in the electric sector is responsible for 29.6% of the reduction (32,500 metric tonnes CO2e) (GOT, 2021c. The anticipated expenses for implementing this action plan are estimated to range from US\$4 million to US\$5 million. This initiative culminates in a project proposal focused on electric vehicles, referred to as the Tonga Integrated PV Systems and EV Plug-in Demonstration Project (TIPVEV Project).

6.1.1.1 Introduction

TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030 (GOT, 2021b). The Electric Vehicle Technology Action Plan (EV TAP) has the capacity to reduce carbon dioxide emissions by approximately 10 kilotons each year.

This initiative will build on the findings from the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) research conducted in 2020 and aims to achieve a 10% decrease in greenhouse gas emissions across the Pacific Island Countries. Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e) (UNCTCN, 2020)

6.1.1.2 Objective of the TAP for Battery Powered Electric Vehicle

Tonga Energy Road Map Plus (TERMPlus) aims to restrict the annual growth of oil consumption in road transport to an average of 1.4%, with an overall target of limiting the increase to 25% by the year 2035 (GOT, 2021b). A study should be conducted to assess the economic viability of battery-powered electric vehicles, accompanied by suggestions for incentives to promote their development.

6.1.1.3 Action and Activities selected for this TAP.

6.1.1.3.1 Summary of Barriers to Battery Powered Electric Vehicle.

The barrier analysis phase revealed numerous obstacles that could hinder the adoption of the battery powered electric vehicles technologies. These obstacles were categorized into two primary groups: financial and fiscal barriers, which pertain to challenges such as high upfront costs due to the expensive manufacturing process, no new financial policy interventions are currently in place, EVs are not economically viable in most Pacific Island Countries due to their higher upfront costs and limited environmental benefit. The second group consists of non-financial barriers, which include issues stemming from current uncertainties in policies have been identified as significant constraints in the market, lack of planning, policy work, and policy actions for electric vehicles, potential conflict between the adoption of EVs and certain NDC targets, policies such as reduced import taxes on EVs, policy, regulatory, and legal obstacles stemming from the necessity to enforce existing regulations, lack of charging infrastructure, limited EV financing options and subsidies, absence of EV regulations and standards, and the absence of endorsed regional or national e-mobility strategies, institutional capacity and insufficient knowledge production, reliance on charging infrastructure availability, scarcity of charging points, lengthy charging times can further impact the reliability of charging, inadequate maintenance of transportation infrastructure contributes to high emissions . new technology and limited expertise in service centres, safety of electric vehicles (EVs) and charging infrastructure, lack of expert assistance when encountering technical issues,

necessity of decentralizing services, the lack of a comprehensive review of motivators and barriers in decision-making processes, novelty of electric vehicle (EV) technology in several nations and its limited adoption among certain demographics, insufficient knowledge and familiarity, potential explosions in extreme circumstances or the potential risks associated with the unique components of EV batteries.

6.1.1.3.2 Financial and Fiscal Barriers

6.1.1.3.2.1 High Upfront Cost

High upfront costs due to the expensive manufacturing process. Additionally, acquisition costs have been identified as major market restraints, which also including fuel charging costs, maintenance costs and environmental costs.

6.1.1.3.2.2 Lack of Financial Policy Interventions

There is no new financial policy interventions currently in place.

6.1.1.3.2.3 Not an economically viable technology

EVs are not economically viable in most Pacific Island Countries due to their higher upfront costs and limited environmental benefit.

6.1.1.3.2.4 Insufficient Existing Government Financial Policies.

The high up front cost technology is also constraint by insufficient government financial policies necessary to support customers in buying the technology.

6.1.1.3.3 Non-Financial Barriers

6.1.1.3.3.1 Lack of Policy Work and Policy Actions

There is lack of planning, policy work, and policy actions for electric vehicles.

6.1.1.3.3.2 Conflict between the adoption of EVs and certain NDC targets.

There is potential conflict between the adoption of EVs and certain NDC targets.

6.1.1.3.3.3 Insufficient policy, and regulatory framework

Policies such as reduced import taxes on EVs, and policies that aim to reduce GHG emissions by improving vehicle fuel economy, diversifying transportation modes, and developing an EV market. Furthermore, policies that ensure that EVs and charging facility are safe, accessible, and affordable.

6.1.1.3.3.4 Lack of Charging Infrastructure

There is lack of charging infrastructure, limited EV financing options and subsidies, absence of EV regulations and standards, and the absence of endorsed regional or national e-mobility strategies.

6.1.1.3.3.5 Lack of Institutional capacity and knowledge

Lack of institutional capacity and insufficient knowledge. Furthermore, the scarcity of charging points can deter consumers from considering purchasing an EV. There is lengthy charging times, which further impact the reliability of charging EV.

6.1.1.3.3.6 Institutional

There is a lack of technical and management capacities, and limited availability of fast charging stations for public use. There is also still insufficient institutional capacity on incorporating renewable energy-based transport systems into the long-term planning of EV battery charging stations.

6.1.1.3.3.7 Absence of EV regulation and Standard

The inadequate maintenance of transportation infrastructure contributes to high emissions. There are still issues on safety of electric vehicles (EVs) and charging infrastructure. There are more concerns about EV models and battery safety. There is lack of expert assistance when encountering technical issues. Limited charging infrastructure in the country are also cited as significant market restraints

6.1.1.3.3.8 Insufficient institutional capacity and knowledge for EV

Limited feasibility studies to understand key requirements need for utility scale deployment and the efficiency gains of the technology in current climate. Insufficient understanding of key factors that influenced electricity supply and demand in Tonga.

6.1.1.3.3.9 Lack of EV Information and Public Awareness

There is new technology and limited expertise in service centres. Novelty of electric vehicle (EV) technology in several nations and its limited adoption among certain demographics. There is insufficient knowledge and familiarity concerning the safety and performance of EVs. Potential explosions in extreme circumstances or the potential risks associated with the unique components of EV batteries.

6.1.1.3.4 Summary of Measures to Overcome the Barriers

The following subsequent actions were recognized to alleviate obstacles.

6.1.1.3.5 Financial and Fiscal Measures

6.1.1.3.5.1 High Upfront Cost of the technology

Enhancing Financial Risk Management to Overcome Fiscal and Financial Obstacles. Incentives primarily come in the form of tax reductions or exemptions. Countries apply various incentives such as import duties, customs taxes, excise taxes, and other tariffs related to international trade to make. EV import should be more affordable and attractive. The exemption of vehicle registration or import fees is suggested as a targeted policy for particular groups that would derive the most benefit from a reduction in vehicle prices. Offering incentives to reduce upfront costs is crucial and furthermore, offering incentives or subsidies for charging stations in specific areas.

6.1.1.3.5.2 Lack of Financial Policy Interventions

Formalize the financial policy package for charging station locations in an official strategic document.

6.1.1.3.5.3 Not an economically viable technology

Reduced or free EV charging at public charging stations, including battery swap stations if applicable, to encourage early EV adoption and investment in public charging infrastructure.

6.1.1.3.5.4 Insufficient Existing Government Financial Policies.

Countries apply various incentives such as import duties, customs taxes, excise taxes, and other tariffs related to international trade to make EV imports more affordable and attractive. The exemption of vehicle registration or import fees is suggested as a targeted policy for particular groups that would derive the most benefit from a reduction in vehicle prices.

6.1.1.3.6 Non-Financial Measures

6.1.1.3.6.1 Lack of Policy Work and Policy Actions

Setting targets and mandates for EV uptake, as well as developing a national policy on implemented EVs actions.

6.1.1.3.6.2 Conflict between the adoption of EVs and certain NDC targets.

Promoting non-motorized and cycling transport options, along with encouraging public adoption of 50% EVs, can contribute to sustainable transportation targets.

6.1.1.3.6.3 Insufficient policy, and regulatory framework

Policies such as reduced import taxes on EVs, and policies that aim to reduce GHG emissions by improving vehicle fuel economy, diversifying transportation modes, and developing an EV market. Furthermore, policies that ensure that EVs and charging facility are safe, accessible, and affordable.

6.1.1.3.6.4 Lack of Institutional capacity and knowledge

Lack of institutional capacity and insufficient knowledge. Furthermore, the scarcity of charging points can deter consumers from considering purchasing an EV. There is lengthy charging times, which further impact the reliability of charging EV. Limited feasibility studies to understand key requirements need for utility scale deployment and the efficiency gains of the technology in current climate. Insufficient understanding of key factors that influenced electricity supply and demand in Tonga

6.1.1.3.6.5 Technical Capacities

There is a lack of technical and management capacities, and limited availability of fast charging stations for public use. There is also still insufficient institutional capacity on incorporating renewable energy-based transport systems into the long-term planning of EV battery charging stations

6.1.1.3.6.6 Market Measures

Experts must have the ability to evaluate and interpret data, utilizing it to assess energy markets and policy frameworks in order to formulate effective strategies and scenarios. Furthermore, it is necessary to assign particular responsibilities to the private sector to promote infrastructure development.

6.1.1.3.6.7 Lack of Charging Infrastructure

There is lack of charging infrastructure, limited EV financing options and subsidies, absence of EV regulations and standards, and the absence of endorsed regional or national e-mobility strategies.

6.1.1.3.6.8 Absence of EV regulation and Standard

The inadequate maintenance of transportation infrastructure contributes to high emissions. There are still issues on safety of electric vehicles (EVs) and charging infrastructure. There are more concerns about EV models and battery safety. There is lack of expert assistance when encountering technical issues. Limited charging infrastructure in the country are also cited as significant market restraints

6.1.1.3.6.9 Lack of EV Information and Public Awareness

There is new technology and limited expertise in service centres. Novelty of electric vehicle (EV) technology in several nations and its limited adoption among certain demographics. There is insufficient knowledge and familiarity concerning the safety and performance of EVs. Potential explosions in extreme circumstances or the potential risks associated with the unique components of EV batteries.

6.1.1.4 Actions Selected To Be Included in the TAP

1. Assess the feasibility of Battery Charged EV projects. Currently, the market for EVs are relying on private use without government quarantee on technologies. EVs users require confirmation of the business's viability before committing their resources. The studies should encompass all pertinent external factors, such as the difficulties in attracting investors, the suitable economic framework for full cost recovery of high upfront cost EVs, and failure to impose right policies, regulation and legislation.

2. Raise awareness among both developers and users of EVs: It is crucial for both users and innovators to understand not only the potential of this technology but also the advantages it offers. This can be achieved by demonstrating the economic viability of the technology and justifying the use of EVs. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

3. Improve access to financing for EVs investments: The cost of EVs pose a significant obstacle for investors seeking to enter into long-term financing agreements with financiers. Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of EVs in Tonga. Table 36 shows the activities for diffusion of EVs technologies.

Technology	Activities	Responsible
Action Plan		Stakeholder
1. Establish	1.1 Long Term Institutional Set Up	DoE(MEIDECC),
appropriate	1.1.1 Long Term Government Institutional	DoCC (MEIDECC)
institutional	set up and Policy set Up for Financial	Ministry of
set up for	Risk Management Team to discuss	Infrastructure,
the TAP	and confirm tax incentives and tax	Ministry of Police and
	exemptions policy.	Traffic TPL.
	1.1.2 EVs import duties	University of Tonga,

Table 36: Activities to be implemented to enhance diffusion of Battery Charged EVs.

	1.1.3 Tax incentives Policy	GCF. SPC.NGOs and
	1.1.4 Other Incentives to reduced Cost of	Local Energy
	EVs such as reduced import taxes	Consultants
	1 1 5 Development of Ministry of Energy	
	and other institutional set up of the	
	project	
	1 1 5 1 Financial and Institutional Policy	
	for installation of EVs charging	
	stations	
	1152 Tax Exemption Policies	
	1.1.6 Encourage or establish EVs retailers	
	and maintenance companies	
	1 1 6 1 Establish policy actions for EVs	
	emissions reduction targets to	
	support the national energy	
	targets and mandates	
	1 1 6 2 Promote non-motorized cycling	
	transport options along with	
	adoption of EVs	
	1 1 7 Promote the establishment of EV/s	
	import companies	
	1 1 7 1 Promote safe accessible and	
	affordable charging facility	
	1 1 7 2 Promote the adoption of fast	
	battery charging stations and	
	renewable integrated PV charging	
	stations	
2. Assess the	2.1 Conduct the economic, financial and	DoE(MEIDECC).
economic	fiscal feasibility of the source of funding	DoCC (MEIDECC)
feasibility	and full cost recovery of EVs projects in	Ministry of
of	Tonga	Infrastructure.
investment	2.1.1 Opportunities for access financing	Ministry of Police and
on EVs	opportunities.	Traffic TPL.
	2.1.2 Feasibility of government de-risking	University of Tonga.
	guarantee.	GCF. SPC.NGOs and
	2.1.3 Identify and address any regulatory	Local Energy
	and legislative obstacles	Consultants
	2.1.4 Donors supported risk reduction	
	methodology and financial options.	
	2.2 Carry out market survey to ensure	DoE(MEIDECC),
	business viability of government	DoCC (MEIDECC)
	guarantees available for the technology.	Ministry of
	2.2.1 Feasible public policy reform options	Infrastructure,
	to reduce cost of adoption of EVs in	Ministry of Police and
	Tonga	Traffic TPL.
	2.2.2 Commercial model for EVs private	University of Tonga.
	sector investment	GCF, SPC,NGOs and

		Local Energy
3. Create Awareness of both Developer, and users of the technology	 2.3 Conduct the economic feasibility of the adoption of EVs in the country and impacts of high upfront cost and inflation in the adoption process. 2.3.1 Identify the appropriate EE policy incentives. 2.3.2 Identify the most appropriate source of financing to address high cost EVs investment needs. 2.3.3 EE policy improvements 2.3.4 EE regulatory improvements 2.3.5 EE legislative improvements 3.1 Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs Technology, financial institutions of technology) 3.1.1 Donors financial opportunities for EV development for private sectors 3.1.2 Donors financing options for EVs and capacity building programs for purchasing and maintaining of EVs. 3.1.2.1 EVs Maintenance Services Enterprises. 3.1.3 public policy improvements for EVs groject installation to support national energy targets on EVs 3.1.4 Improve capacity through training on designing, installing and maintenance of EVs projects 3.1.5 Training on capacity to evaluate and interpret EVs data in order to formulate effective EV improvement policies. 3.1.6 Encourage training program approaches for EVs business opportunities and business service 	Consultants DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
	delivery. 3.2 Develop a communication strategy	DoE(MEIDECC).
	Profile for target stakeholders particularly the adopters of the technology	DoCC (MEIDECC) Ministry of
	3.2.1 Short Term Training materials on on- site experiences as shared regional sources of information and data analysis.	Infrastructure, Ministry of Police and Traffic TPL. University of Tonga,

	 3.2.2 Training on innovative approaches for designing, procuring, installation and maintenance of EVs projects. 3.2.3 Encourage private sectors EVs services and business opportunities. 3.2.4 Institutionalization of EVs project data collection and analysis and publication of data analysis and indicators for evidenced policy decision makings. 3.2.5 Formulation of EVs database and analysis of EVs data to guide service delivery development and business opportunities 	GCF, SPC,NGOs and Local Energy Consultants
	 3.3 Implement awareness campaign on residential EVs generation, especially attract attentions of investors and users 3.3.1 Enabling legislation and regulatory environment 3.3.2 Improvement on accessibility and permitting process for EVs 	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
4. Enhance Access to Financing	 4.1 Develop Government financial policy incentives to assist lowering the cost of EVs technology 4.1.1 Identify and improve commercial banks financing policy and accessibility of users to EVs loaning scheme. 	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
	 4.2 Engage in dialogue with government development partners to identify possible government incentives and subsidies for the EVs technologies as it contributes to global benefit 4.2.1 Ensure accessibility and availability of technical standard for EVs projects. 	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
	4.3Discuss and Justify the adoption of the most suitable adoption model for EVs investors and home owners in Tonga	DoE(MEIDECC), DoCC (MEIDECC) Ministry of

	4.3.1	Availability of most feasible financing options for EVs projects	Infrastructure, Ministry of Police and
	4.3.2	Improvements of the national road infrastructure and policies for EVs projects	Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy
Action 5: Design, Procure, Install the monitoring and maintenance plan model for hybrid vehicle applications in the country	5.1.	Design, procure install the Battery Charged Electric vehicle promotion and investment initiative in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
Action 6 : Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing Battery Charged Electric vehicle investment in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants

6.3.	Prepare all Policy decisions for government approval	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants
6.4.	Design, Procure and install all necessary road infrastructure improvements to cater for EVs	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants

6.1.1.5 Action To Be Implemented as Project Ideas

The aforementioned three actions, specifically the feasibility study, awareness raising, and improved access to financing, will be evaluated for implementation as potential project ideas.

6.1.1.6 Stakeholders and Implementation Timelines for the TAP

Table 37 shows the list of stakeholders to implement the TAP

Number	Activities	Responsible	Timelines
		Body	
 Establish 	1.1. Long Term Institutional	DoE(MEIDECC),	1-4 Months
appropriate	Set Up	Ministry of	
institutional	1.1.1. Long Term Government	Infrastructure,	
set up for	Institutional set up and	Ministry of Police	
the TAP	Policy set Up for	and Traffic TPL.	
	Financial Risk	University of	
	Management Team to	Tonga, GCF,	
	discuss and confirm tax	SPC and Local	
	incentives and tax	Energy	
	exemptions policy.	Consultants	
	1.1.1.1. EVs import duties		
	1.1.1.2. Tax incentives Policy		
	1.1.1.3. Other Incentives to		
	reduced Cost of EVs		
	such as reduced		
	import taxes.		

		112 De	evelopment of Ministry		
		of	Energy and other		
		ins	stitutional set up of the		
		nre	niect		
		1121	Financial and		
		1.1.2.1.	Institutional Policy for		
			installation of EVs		
			charging stations		
		1122	Tax Exemption		
		1.1.2.2.			
		112 En	Fullcles.		
		I.I.J. EI	lourage of establish		
		EVS retailers and			
			manice		
			Establish ralisy		
		1.1.3.1.	Establish policy		
			emissions reduction		
			targets to support the		
			national energy		
			targets and		
		4 4 0 0	mandates.		
		1.1.3.2.	Promote non-		
			motorized cycling		
			transport options		
			along with adoption		
			of EVs.		
		1.1.4. Pr	omote the		
		es	tablishment of EVs		
		im	port companies.		
		1.1.4.1.	Promote safe		
			accessible and		
			affordable charging		
			facility.		
		1.1.4.2.	Promote the		
			adoption of fast		
			battery charging		
			stations and		
			renewable integrated		
			PV charging stations		
2.	Assess the	2.1. Co	onduct the economic,	DoE(MEIDECC),	4-2Months
	economic	fin	ancial and fiscal	DoCC	
	feasibility of	fea	asibility of the source	(MEIDECC)	
	investment on	of	funding and full cost	Ministry of	
	EVs	ree	covery of EVs projects	Infrastructure,	
		in	Tonga	Ministry of Police	
		2.1.1. Op	oportunities for access	and Traffic TPL.	
		fin	ancing opportunities.	University of	

	2.1.2.2.1.3.2.1.4.	Feasibility of government de-risking guarantee. Identify and address any regulatory and legislative obstacles Donors supported risk reduction methodology and financial options.	Tonga, GCF, SPC,NGOs and Local Energy Consultants	
	2.2. 2.2.1. 2.2.2.	Carry out market survey to ensure business viability of government guarantees available for the technology. Feasible public policy reform options to reduce cost of adoption of EVs in Tonga Commercial model for EVs private sector investment	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	5 Months
3. Create Awareness of both Developer, and users of the technology	 3.1. 3.1.1. 3.1.2. 3.1.3. 3.1.4. 3.1.5. 	Conduct the economic feasibility of the adoption of EVs in the country and impacts of high upfront cost and inflation in the adoption process. Identify the appropriate EE policy incentives. Identify the most appropriate source of financing to address high cost EVs investment needs. EE policy improvements EE regulatory improvements EE legislative improvements	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	6 Months
	3.2.	Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs Technology, financial institutions of	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL.	2 Months

 3.2.1. 3.2.2. 3.2.2. 3.2.3. 3.2.4. 3.2.5. 3.2.6. 	technology) Donors financial opportunities for EV development for private sectors Donors financing options for EVs and capacity building programs for purchasing and maintaining of EVs. 1. EVs Maintenance Services Enterprises. public policy improvements for EVs project installation to support national energy targets on EVs Improve capacity through training on designing, installing and maintenance of EVs projects Training on capacity to evaluate and interpret EVs data in order to formulate effective EV improvement policies. Encourage training program approaches for EVs business opportunities and business service	University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	
	delivery.		
3.3. 3.3.1. 3.3.2.	Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology Short Term Training materials on on-site experiences as shared regional sources of information and data analysis. Training on innovative	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	2 Months
 3.2.5. 3.2.6. 3.3. 3.3.1. 3.3.2. 	designing, installing and maintenance of EVs projects Training on capacity to evaluate and interpret EVs data in order to formulate effective EV improvement policies. Encourage training program approaches for EVs business opportunities and business service delivery. Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology Short Term Training materials on on-site experiences as shared regional sources of information and data analysis. Training on innovative approaches for	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	2 Months

		3.3.3. 3.3.4. 3.3.5.	designing, procuring, installation and maintenance of EVs projects. Encourage private sectors EVs services and business opportunities. Institutionalization of EVs project data collection and analysis and publication of data analysis and indicators for evidenced policy decision makings. Formulation of EVs database and analysis of EVs data to guide service delivery development and business opportunities		
4.	Enhance Access to Financing	4.1. 4.1.1. 4.1.2.	Implement awareness campaign on residential EVs generation, especially attract attentions of investors and users Enabling legislation and regulatory environment Improvement on accessibility and permitting process for EVs	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	7. Months
		4.2.	Develop Government financial policy incentives to assist lowering the cost of EVs technology Identify and improve commercial banks financing policy and accessibility of users to EVs loaning scheme.	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	6 Months
		4.3.	Engage in dialogue with government	DoE(MEIDECC), DoCC	12 Months

	4.3.1.	development partners to identify possible government incentives and subsidies for the EVs technologies as it contributes to global benefit Ensure accessibility and availability of technical standard for EVs projects.	(MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	
Action 5: Design, Procure, Install the monitoring and maintenance plan model EVs vehicle applications in the country	5.1.	Design, procure install the Battery Charged Electric vehicle promotion and investment initiative in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	3 years
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	
Action 6 : Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing Battery Charged Electric vehicle investment in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants	1-3Years

62	Conduct consultation	DoF(MEIDECC)	
0.2.	and meetings on	D_0CC	
	findings of the policy		
	and regulatory	Ministry of	
	and regulatory		
		Ministry of Delige	
	analysis.		
		and frame TPL.	
		University of	
		Tonga, GCF,	
		SPC,NGOs and	
		Local Energy	
		Consultants	
6.3.	Prepare all Policy	DoE(MEIDECC),	
	decisions for	DoCC	
	government approval	(MEIDECC)	
		Ministry of	
		Infrastructure,	
		Ministry of Police	
		and Traffic TPL.	
		University of	
		Tonga, GCF,	
		SPC,NGOs and	
		Local Energy	
		Consultants	
6.4.	Design, Procure and	DoE(MEIDECC),	
	install all necessary road	DoCC	
	infrastructure	(MEIDECC)	
	improvements to cater	Ministry of	
	for EVs	Infrastructure,	
		Ministry of Police	
		and Traffic TPL.	
		University of	
		Tonga, GCF.	
		SPC.NGOs and	
		Local Energy	
		Consultants	

6.1.1.7 : Roles of Stakeholders

The roles of stakeholders are shown in Table 38 below

Table 38: Roles of EVs Stakeholders

1	Ministry of Energy,	Plan and manage energy policies, energy targets, and
	Ministry of	assess energy goals and objectives
	Infrastructure,	Oversee energy projects including EVs projects
	Traffic Department	Identify and source funding to implement EVs projects

		Formulate and present energy plan strategies and
		programmes to government and seek Cabinet's approval
		Promote public awareness and informed decisions on on-
		EVs technologies.
2	Department of	Focal Point of the United Nations Convention on Climate
	Climate Change .	Change
	MEIDECC	
		Sourcing funds from climate funds and Global
		Environmental Facility
		GCF focal point in Tonga
3	Department of	Responsible for environmental policies and
	Environment,	environmental management
	MEIDECC	
4	Ministry of Finance	Responsible for financial policies and policy incentives for
	and Planning	businesses.
5	Ministry of	Responsible for Business incentive policies
	Economic and	
	Trade	
6	Ministry of Foreign	Responsible for foreign relations with donors and
	Affairs	development partners.
7	Tonga Power	Manage and Plan the national electricity grids and
	Limited, TPL	monitor all projects that has capacity to influence the
		electricity generation and distribution and transmissions.
8	I onga Electricity	Responsible for regulatory policies and regulation of the
	Commission	national electricity grid.
9	University of Tonga	Research and Development.
	and University of the	
	South Pacific and	
10		
10	Regional Energy	Responsible for regional energy coordination and general
44	Institutions Development	Since a series of milet EV a main at a
	Development	Financing of pilot EVS projects
	Partners and	
10		Technical approximent and energific technical analysis of
12	Local NGOS and	EV/s projects
12	Contractor and	Lvs projects
13	Subcontractor for	recrimeal operation and maintenance of the technology
	EVe operation and	
1	maintenance	

6.1.1.8 : Scheduling of Activities

Table 39 describes the sequence and timing of specific activities and responsibilities

Table 39: Scheduling of Activities

Action	Activities	Planning		Implementati		Responsible
			-	on		Stakeholder
		Start	End	Start	End	
1. appropriate institutional set up for the TAP	 1.1. Long Term Institutional Set Up 1.1.1. Long Term Government Institutional set up and Policy set Up for Financial Risk Management Team to discuss and confirm tax incentives and tax exemptions policy. 1.1.1.1. EVs import duties 1.1.1.2. Tax incentives Policy 1.1.1.3. Other Incentives to reduced Cost of EVs such as reduced import taxes. 1.1.2. Development of Ministry of Energy and other institutional set up of the project. 1.1.2.1. Financial and Institutional Policy for installation of EVs 	<u>Start</u> 2025	End 2025	<u>Start</u> 2025	End 2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business

	1		
charging			
stations.			
1122 Tax			
Exemption			
Policies.			
113 Encourage or			
establish E\/s			
establish EVS			
retailers and			
maintenance			
companies			
1 1 2 1 Establish			
policy			
actions for			
E\/s			
emissions			
reduction			
targets to			
support the			
support the			
national			
energy			
targets and			
mandates			
1.1.3.2. Promote			
non-			
motorized			
cycling			
cycling			
transport			
options			
along with			
adoption of			
EVS.			
1.1.4. Promote the			
establishment of			
EVs import			
companies.			
1.1.4.1. Promote			
safe			
accessible			
and			
attordable			
charging			
facility.			
11/2 Dromote the			
adoption of			
fast battery			
charging			
stations and			
stations and			

		renewable integrated PV charging stations					
	 2.1. 2.1.1. 2.1.2. 2.1.3. 2.1.4. 	Conduct the economic, financial and fiscal feasibility of the source of funding and full cost recovery of EVs projects in Tonga Opportunities for access financing opportunities. Feasibility of government de- risking guarantee. Identify and address any regulatory and legislative obstacles Donors supported risk reduction methodology and financial options.	2025	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
2. Asses s the econo mic feasibil ity of invest ment on EVs							

	2.2. 2.2.1. 2.2.2.	Carry out market survey to ensure business viability of government guarantees available for the technology. Feasible public policy reform options to reduce cost of adoption of EVs in Tonga Commercial model for EVs private sector investment	2025	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
3. Create Awarenes s of both Develope r, and users of the technolog y	 3.1. 3.1.1. 3.1.2. 3.1.3. 3.1.4. 	Conduct the economic feasibility of the adoption of EVs in the country and impacts of high upfront cost and inflation in the adoption process. Identify the appropriate EVs policy incentives. Identify the most appropriate source of financing to address high cost EVs investment needs. EVs policy improvements EVs regulatory	2024	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business

1.1.1	I. EVs legislative					
	improvements					
3.2.	Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs Technology, financial institutions of technology) Donors financial	2024	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy
0.0.	opportunities for EV development for private sectors					Consultants Local EVs Business
3.3.	I. Donors financing options for EVs and capacity building programs for purchasing and maintaining of EVs.					
3.3.2	2. EVs Maintenance Services Enterprises.					
3.3.3	 public policy improvements for EVs project installation to support national energy targets on EVs 					
3.3.4	 Improve capacity through training on designing, installing and 					

		3.3.5.	maintenance of EVs projects Training on capacity to evaluate and interpret EVs data in order to formulate effective EV improvement policies. Encourage training program approaches for EVs business opportunities and business service delivery.	0004	0005	0005	0005	
4.	Enhance Access to Financing	4.1. 4.1.1. 4.1.2.	service delivery. Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology Short Term Training materials on on- site experiences as shared regional sources of information and data analysis. Training on innovative approaches for designing,	2024	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
		4.1.3.	procuring, installation and maintenance of EVs projects. Encourage private sectors EVs services and business					

4.1.4.	opportunities. Institutionalizati on of EVs project data collection and analysis and publication of data analysis and indicators for evidenced policy decision makings. Formulation of EVs database and analysis of EVs data to guide service delivery development and business opportunities						
4.2. 4.2.1. 4.2.2.	Implement awareness campaign on residential EVs generation, especially attract attentions of investors and users Enabling legislation and regulatory environment Improvement on accessibility and permitting process for EVs	2025	2026	2025	2026	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	
4.3.	Develop Government financial policy incentives to assist lowering the cost of EVs technology Identify and	2027	2027	2027	2027	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic	
		improve commercial banks financing policy and accessibility of users to EVs loaning scheme.					TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
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Action 5: Design, Procure, Install the monitoring and maintenance plan model EVs vehicle applications in the country	4.4.	Design, procure install the Battery Charged Electric vehicle promotion and investment initiative in the country	2027	2027	2028	2031	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
	4.5.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology					
Action 6 : Assess and Identify all the necessary improvement options	4.6.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing Battery Charged Electric vehicle investment in the country	2027	2027	2032	2035	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF,

				SPC,NGOs and Local Energy Consultants Local EVs Business
4.7.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.			
4.8.	Prepare all Policy decisions for government approval			
4.9.	Design, Procure and install all necessary road infrastructure improvements to cater for EVs			
4.10.				
4.11.				
4.12.				
4.13.				
 4.14.				
4.15.				

Transport Stakeholders were met on 12th December , 2024 for workshop to discuss and confirm timelines for the transport technologies. Table 40 shows the set timelines for actions and activities.

Table 40 : Scheduling and Sequencing of specific Activities Timelines set by stakeholders for Battery Charged EVs

Actions	Activities		Yea	r (2025-2	2027)
1. Long Term	1.1.	Confirm positions for recruitment			
Institutional		and advertisement of Positions			
Set Up	1.2.	Confirm office space for the			
		project team in the Department of			
		Energy			
	1.3.	Allocate Budget for Salaries and			
		Recruitment			
	1.4.	Meet Cost for office furniture/			

		equipment			
	1.5.	Meet Other Cost for operation and			
		management of the office.			
2. Assess the	2.1.	Identify and Confirm TOR and hire			
feasibility		consultant to conduct the			
of Battery		assessment			
Charged					
EVs					
	2.2.	Identify and Justify the economic,			
		Tinancial and fiscal feasibility of the			
	23	LVS. Identify key barriers to the			
	2.3.	economic and financial feasibility			
		of the selected Battery Charged			
		EVs			
	2.4.	Identify the solutions to the			
		economic and financial feasibility			
		of the selected Battery Charged			
		EVs			
	2.5.	Carry out Market Survey to ensure			
		business viability of the			
		technology to investors.			
	2.6.	Identify and present the key			
		factors for business viability of the			
		Battery Charged EVs			
	2.7.	Identify policy improvements			
	2.0	Conduct the cooperation for sibility	•		
	2.8.	conduct the economic reasibility			
		charging stations and renewable			
		integrated PV charging stations			
	29	Identify barriers and solutions to			
	2.0.	the economic feasibility Battery			
		Charged EVs			
	2.10.	Identify policy improvements			
	2.10.1	Battery Charged EVs Policy			
	2.10.2	. Battery Charged EVs			
		Legislation			
	2.10.3	. Battery Charged EVs			
		Regulation			
	2.11.	I echnical Feasibility			
3. Create	3.1.	Identify awareness materials for			
Awareness	044	various different stakeholders.			
	3.1.1.	Awareness materials for Battery			
Developer,	240	Unargeo Evs developers			
anu users	3.1.Z.	Awareness materials IOI EVS	l i i i i i i i i i i i i i i i i i i i	1	

of the Battery Charged EVs	dealers 3.1.3. Awareness materials for EVs Users		
technology	 3.2. Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs Technology, financial institutions of technology) 3.2.1. Develop materials for EVs developers 		
	 3.9. Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology. 3.9.1. Develop materials for EVs developers 3.9.2. Develop materials for EVs dealers 3.9.3. Develop materials for EVs users 		
	 3.10. Implement awareness campaign on EVs, especially attract attentions of investors and users 3.10.1. Implement awareness campaign for EVs developers 3.10.2. Implement Awareness Campaign for EVs appliances Dealers 3.10.3. Implement Awareness Campaign for EVs users 		
	3.11. Gender Mainstreaming and Social Inclusion		
4. Enhance Access to Financing	 4.1. Develop Financial Policy Incentives to assist lowering the cost of EVs technology 4.1.1. Identify all possible policy incentives to assist lowering the cost of EVs 4.1.2. Identify possible legislative incentives to assist lowering the cost of EVs appliances 4.1.3. Identify possible regulatory incentives to assist lowering the cost of EVs appliances 		
	4.2. Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit		

		4.2.1.	Consultation with government on			
		400	policy incentives and subsidies.			
		4.2.2.	Consultation with donors on policy			
			incentives and subsidies on donor			
			funding projects.			
		4.2.3.	Consultation with dealers on policy			
			incentives and subsides on imported			
			EVs components			
		4.3.	Discuss and Justify the adoption of			
			the most suitable model for PPA			
			Contract for EVs investors and private			
			sectors in Tonga			
		4.4.	identify, Develop and recommend all			
			financial policy incentives to Cabinet			
			to assist lowering the cost of			
			investment on EVs			
		4.5.	Provide clear justifications for			
			adoption of the EVs			
		4.6.	Engage in dialogue with			
			development partners on suitable			
			adoption of subsidies for the			
			technology as it contributes to global			
			benefit; Confirm possible ways and			
			preferred conditions and			
			methodology for supporting financing			
			of EVs in Tonga			
		4.7.	Confirm potential financing options			
			with international, regional and			
			bilateral donors and development			
			partners for adoption of EVs in the			
			country	<u> </u>		
		4.8.	Prepare Cabinet Approval for most			
			sustainable financing options of			
			hybrid vehicle in the country and its			
			plan to achieve share of carbon			
			emission reduction in the energy			
		-	sector.			
5.	Design,	5.1.	Design, procure install the EVs			
	Procure,		appliances promotion and			
	Install the		investment initiative in the country			
	monitoring					
	and					
	maintenance					
	plan model for					
	EVs in the					
	country					
		5.2.	Design, Approve and Set up the			

			Monitoring and Maintenance Model for the technology		
6.	Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of EVs investment in the country		
		6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
		6.3.	Prepare all Policy decisions for government approval		

		-			-			
Table 11. Actions	Activition	Conocity	Ruilding and	Accordated	Conto	cot by	stakabaldare	for EV/c
TADIE 41. AUDITS.	AUTAUES.	Capacity	Dullullu allu	ASSOCIALEU	CUSIS	SELDV	SIGNEITOILLEIS	
	,		0					

Actions	Activities		Capacity Needs	Cost USD
1. Institutional	1.1.	Confirm positions for	Consultation &	18,000
Set Op		Conduct	Advertisement	
		advertisement	Cost	
	1.2.	Confirm office space	Rent and	200,000
		for the project team	Accommodation	
		In the Department of		
	13	Allocate Budget for	Salaries	800 000
		Salaries and		
		Recruitment		
	1.4.	Meet Cost for office	Office Furniture	200,000
		furniture/ equipment	and Equipment	
	1.5.	Meet Other Cost for	Electricity and	50,000
		management of the	n	
		office.		
2. Assess the	2.1.	Identify and Confirm	Meeting Cost and	500,000
feasibility		TOR and hire	Consultant Fees	
of Battery		consultant to		
EVs		assessment		
200	2.2.	Identify and Justify	Local Travel,	150,000
		the economic,	Transportation	
		financial and fiscal	Cost and Research	
		feasibility of the	Cost	
		LITECYCLE COST OF EVS		
	23	Identify/Confirm key	Workshop and	50 000
	2.0.	barriers to the	Consultation Cost	

		economic and financial feasibility of EVs		
	2.4.	Identify the solutions to the economic and financial feasibility of the EVs	Workshop and Consultation Cost	
	2.5.	Carry out Market Survey to ensure business viability of the technology to investors.	Develop Survey Questionnaire, Survey workshops, Implementation of Survey	300,000
	2.6.	Identify and present the key factors for business viability of the EVs	Finalization and presentation of Survey Report	30,000
	2.7.	Identify operation policy improvements needed	Consultation, Meetings and Cabinet Submissions	20,000
	2.8.	Conduct the economic feasibility of the fast battery charging stations and renewable integrated PV charging stations	Consultation and Meeting Cost and Consultants Fee	500,000
	2.9.	Identify barriers and solutions to the economic feasibility of the integrated PV Charging stations	Workshop Cost	20,000
	2.10. 2.10.1 2.10.2 2.10.3	Identify policy improvements . EVs Policy . EVs Legislation . EVs Regulation	Policy, Regulatory and Legal Review of existing policy and legal framework and documents	400,000
	2.11.	Technical Feasibility		20,000
3. Create Awareness of both Developer, and users of the On- Grid EE technology	3.1. 3.1.1. 3.1.2.	Identify awareness materials for various different stakeholders. Awareness materials for EVs developers Awareness materials for EVs dealers	Consultation and Identification of public awareness materials.	30,000

3.1.3.	Awareness materials for EVs Users		
3.2.	Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs Technology, financial institutions of technology) Develop materials for EVs developers	Consultancy Fees for development of public awareness materials	200,000
3.3.	Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology.	Consultancy Fees for development of communication profile	200,000
3.3.2. 3.3.3.	for EVs developers Develop materials for EVs dealers Develop materials for EVs users		
3.4.	Implement awareness campaign on EVs projects, especially attract attentions of investors and users	Record of Radio and Television Programs, Publication of awareness	100,000
3.4.1.	Implement awareness campaign EVs developers	materials Meetings with	
3.4.2.	Implement Awareness Campaign for EVs Dealers	Other public awareness programs	
3.4.3.	Implement Awareness Campaign for EVs users	. .	
3.5.	Gender		10,000

		Mainstreaming and Social Inclusion		
4. Enhance Access to Financing	4.1. 4.1.1. 4.1.2. 4.1.3.	Identify/Develop Financial Policy Incentives to assist Iowering the cost of EVs technology Identify all possible policy incentives to assist Iowering the cost of EVs Identify possible legislative incentives to assist Iowering the cost of EVs Identify possible regulatory incentives to assist Iowering the cost of EVs	Policy Dialogue Meetings and consultation with key stakeholders Policy Incentives to reduce cost of imports of technology Policy incentives for power purchase agreement (PPA)	50,000
	4.2.	Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit	Development partners meetings and workshops on identifying policy incentives and subsidies for import of technology and equipment.	40,000
	4.2.1.	Consultation with government on policy incentives and subsidies.		
	4.2.2.	Consultation with donors on policy incentives and subsidies on donor funding projects		
	4.2.3.	Consultation with dealers on policy incentives and subsides on imported EVs components		
	4. 3 .	Discuss and Justify the adoption of the most suitable model for EVs investors	Stakeholders Consultation on PPA Policy and Regulation.	30,000

		and private sectors		
	4.0.4	in Ionga		40.000
	4.3.1.	identify, Develop	vvorksnops/Consul	40,000
		and recommend all	tation with key	
		financial policy	stakenoiders and	
		Cohinet to acciet	development	
		lowering the cost of	partiters	
		investment EV/s		
	432	Provide clear		
	7.0.2.	iustifications for		
		adoption of the FVs		
	4.4.	Engage in dialogue	Consultations and	40.000
		with development	Workshops and	,
		partners on suitable	Meetings	
		adoption of	U U	
		subsidies for the		
		technology as it		
		contributes to global		
		benefit; Confirm		
		possible ways and		
		preferred conditions		
		and methodology for		
		supporting financing		
		of technology in		
	4 5	Tonga Confirme restantial		
	4.5.	financing options		
		with international		
		regional and		
		hilateral donors and		
		development		
		partners for adoption		
		of hybrid vehicle		
		EVs in the country		
	4.6.	Prepare Cabinet		
		Approval for most		
		sustainable		
		financing options of		
		the technology in the		
		country and its plan		
		to achieve share of		
		carbon emission		
		reduction in the		
E Desision		energy sector.	Concultanta E	E00.000
5. Design,	D.1. De	sign, procure install		500,000
Procure,	ine ine			

Install the Battery Charged EVs pilot project		investment initiative in the country	Operation and Reporting	
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
6. Maintenance Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing EVs	Consultation Fees Assessment , Consultation and Reporting	500,000
	6.2.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
	6.3.	Prepare all Policy decisions for government approval		
	6.4.	Design, Procure and install all necessary grid improvements to cater for EE projects.		
Total Estimated Co	st			4,898,000

6.1.1.9 : Estimation of Resources for Action and Activities

To achieve successful and sustained technology diffusion, it is essential to enhance the capabilities of local technology importers and bidders and installers, especially local suppliers, overseas and local contractors and bidders of the technology, installers, and maintenance engineers. Furthermore, to facilitate accelerated diffusion, it is necessary to implement a train-the-trainers approach, enabling the replication of training programs across numerous regions.

The activities to be undertaken and their associated costs are presented in Table 42.

Action	Activities	Plan	Imple ment ation	Estimated Cost (USD)	Sour ce of Fund	Responsi ble Stakehold	Justified Actions
		Start/	Start/			er	
		End	End				

1. appropriate	1.1 Long Term	2025	2025	1,268,000	Dono	DoE(MEI	Recruited
institutional	Institutional	1	/202		rs	DECC),	personnel
set up for	Set Up	2025	5				and office
the TAP	1.1.1 Long Term						iurniture
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	nt					Infrastruct	t
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	and Policy					Police	
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	ent Team					GCF,	
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2.	Assess the	2.1 Conduct the	2025	2025	1,890,000	Dono	DoE(MEI	
	economic	economic,	/	/		rs	DECC),	
	feasibility of	financial and	2025	2025				
	investment	fiscal						
	on EVs	feasibility of					Ministry of	
		the source of					Infrastruct	
		funding and					ure,	
		full cost					Ministry of	
		recovery of					and	
		EVs projects					Traffic	
		in Tonga					TPL.	
		2.1.1 Opportuniti					University	
		es for					of Tonga,	
		access					SPC NG	
		financing					Os and	
		opportuniti					Local	
		es.					Energy	
		2.1.2 Feasibility					Consultan	
		of					EVs	
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		nt de-						
		risking						
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		2.1.3 Identify						
		and						
		address						
		any						
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		legislative						
		obstacles						
		Donors supported						
		risk reduction						
		methodology and						
		financial options.						
		3.1 Carry out	2025	2025	540,000	Dono	DoE(MEI	Recruitme
3.	Create	market survey	/202	/		rs	DECC),	nt of
	Awareness	to ensure	5	2025				researche
	of both	business						professio
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		technology.					Traffic	
		3.1.1 Feasible					TPL.	
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Technology,				University	
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institutions of				SPC.NG	
technology)				Os and	
3.4 Donors				Local	
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3.4.3 Improve	
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and	
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ce of EVs	
projects	
3.4.4 Training	
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capacity to	
Interpret	
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in order to	
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345 Encourage	
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4. Enhance 4.1 Develop a 2025 2025 200,000 Dono DoE(MEI	1.Consult
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	projects.				
4.1.3	Encourage				
	private				
	sectors				
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	services				
	and				
	business				
	opportuniti				
	es.				
4.1.4	Institutiona				
	lization of				
	EVs				
	project				
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	collection				
	and				
	analysis				

and publication of data analysis and indicators for evidenced policy decision makings. 4.1.5 Formulatio n of EVs database and analysis of EVs data to guide service delivery developme nt and business opportuniti es					
 4.2 Implement awareness campaign on residential EVs generation, especially attract attentions of investors and users 4.2.1 Enabling legislation and regulatory environme nt 4.2.2 Improvem ent on accessibilit y and permitting 	2025 /202 5	2026 /202 6	Dono rs	DoE(MEI DECC), DoCC (MEIDEC C) Ministry of Infrastruct ure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NG Os and Local Energy Consultan ts Local EVs Business	Contact address and internet communic ation links

	process for EVs						
	 4.3 Develop Government financial policy incentives to assist lowering the cost of EVs technology 4.4 Identify and improve commercial banks financing policy and accessibility of users to EVs loaning scheme. 	2026 /202 6	2026 /202 7		Dono rs	DoE(MEI DECC), DoCC (MEIDEC C) Ministry of Infrastruct ure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NG Os and Local Energy Consultan ts Local EVs Business	1.Conduct of Trainings 2.Distribut ion of materials 3.Record and broadc ast of Radio and TV programs
Design, Procure, Install the Battery Charged EVs pilot project	4.5 Design, procure install the EVs promotion and investment initiative in the country			500,000			
	4.6 Design, Approve and Set up the Monitoring and Maintenance Model for the technology						
Maintenance Assess and Identify all the necessary improvement options	4.7 Assess and Identify the policy, legislative and regulatory shortfalls in the implementatio n of existing EVs			500,000			

	4.8Conduct			
	consultation			
	and meetings			
	on findings of			
	the policy and			
	regulatory			
	assessment			
	and analysis			
	4 9 Prepare all			
	Policy			
	decisions for			
	government			
	approval			
	1 10 Design			
	Procure and			
	install all			
	necessary			
	gria			
	Improvements			
	to cater for EE			
	projects.			
Total Estimated Bud	dget			4,898,000

6.1.2 Hybrid Vehicles

The Hybrid Vehicle Technology Action Plan (HV TAP) has the capacity to reduce carbon dioxide emissions by approximately 10 kilotons each year. TERMPlus report set up target for intake of Low Emission Vehicles to have cumulative GHG emissions reduction of 165 GgCO2e by 2030 (GOT, 2021b).

6.1.2.1 Introduction

The projected costs for executing this TAP are estimated to be between US\$10 million and US\$20 million. The TAP culminates in a project proposal centered on Hybrid Vehicles, titled: Tonga Hybrid Vehicle. (TONGAHV Project)

This Hybrid Vehicle initiative will build on the findings from the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) research conducted in 2020 and aims to achieve a 10% decrease in greenhouse gas emissions across the Pacific Island Countries.

6.1.2.2 Objective of the TAP for Hybrid Vehicle

Tonga Energy Road Map Plus (TERMPlus) aims to restrict the annual growth of oil consumption in road transport to an average of 1.4%, with an overall target of limiting the increase to 25% by the year 2035 (GOT, 2021b). Action taken in the ground transportation field is responsible for 30.4% of the projected emissions reductions (33,400) metric tonnes CO2e) (UNCTCN,2020).

6.1.2.3 Action and Activities selected for this TAP.6.1.2.3.1 Summary of Barriers to Hybrid Vehicles

The Barrier Analysis phase revealed numerous obstacles that could hinder the adoption of the hybrid vehicles. These obstacles were categorized into two primary groups: financial and fiscal barriers, which pertain to challenges such as high upfront costs due to the expensive manufacturing process, and lack of new financial policy interventions that are currently in place. The second group consists of non-financial barriers, which include issues like current uncertainties in policies, regulation and legislation, which have been identified as significant constraints in the market, lack of planning, policy work, and policy actions for hybrid vehicles, absence of hybrid vehicle regulation and standard and insufficient regional hybrid vehicle strategies, lack of institutional capacity and knowledge, lack of maintenance knowledge for technicians and private companies, lack of expert assistances, limited availability of hybrid models, underdeveloped hybrid industry, lack of knowledge on safety and performances of hybrid vehicles, lack of capacity to establish evidenced based data collection on hybrid vehicles and lack of consultation with local stakeholders.

6.1.2.3.2 Financial and Fiscal Barrier

6.1.2.3.2.1 High upfront capital cost

The upfront capital needed for hybrid vehicle is still expensive but better than EVs.

6.1.2.3.2.2 Lack of financial policy interventions

Insufficient access for finance and lack of de-risking guarantees available for hybrid vehicles, resulting in limited awareness regarding its advantages among both investors and users. Additionally, there exists a certain level of uncertainty concerning the economic feasibility of hybrid vehicle technology.

6.1.2.3.2.3 Uncertainties of Hybrid Vehicle Policies, legislations and regulations

Duty free for government vehicles but not for private sector companies.

6.1.2.3.3 Non-Financial Barriers

6.1.2.3.3.1 Lack of Policy Work and Policy Actions

The shortcomings in public policy, combined with limited capabilities within energy institutions, have resulted in regulatory and legislative measures that do not adequately consider environmental costs.

6.1.2.3.3.2 Lack of Institutional framework

There is a lack of technical and management capacities.

6.1.2.3.3.3 Lack of Technical Standard and Regulation

There are lack suitable technical standard. There exists a lack of adequate understanding concerning the operation and regulatory roles to be played by government.

6.1.2.3.3.4 Lack of Planning and Policy Work in the Market

Limited feasibility studies to understand key requirements need for utility scale deployment and the efficiency gains of the technology in current climate. Insufficient understanding of key factors that influenced hybrid vehicle in Tonga.

6.1.2.3.3.5 Insufficient knowledge regarding performances and safety

Lack of comprehensive coordination of data collection for policy developments, and minimum consultation with local stakeholders on energy efficient home appliances

6.1.2.3.4 Summary of Measures to Overcome the Barriers

The following subsequent actions were recognized to alleviate obstacles.

6.1.2.3.5 Financial and Fiscal Measures

6.1.2.3.5.1 High Upfront Cost of the technology

Enhancing Financial Risk Management to Overcome Fiscal and Financial Obstacles. Financial incentives primarily come in the form of tax reductions or exemptions.

6.1.2.3.5.2 Lack of financial policies interventions

Government entities, such as local banks, ought to be motivated to seek avenues for enhancing financial support to the private sector. The Government of Tonga should refine its subsidy policy and implement a commercial strategy for investment on hybrid vehicles.

6.1.2.3.2.3 Uncertainties of Hybrid Vehicle Policies, legislations and regulations

Develop coordinated policies, legislations and regulation on hybrid vehicles.

6.1.2.3.6 Non-financial Measures

6.1.2.3.6.1 Policy, Legislative and Regulatory Measures

Setting targets and mandates for hybrid vehicle uptake, as well as developing a national policy on implemented hybrid vehicle actions. Incentivize the adoption of economically hybrid vehicle that offer societal and environmental benefits, such as providing tax incentives

6.1.2.3.6.2 Institutional Measures

In order to accelerate industry growth and hybrid vehicle infrastructure development, a decisive policy push is necessary. Introduction of Hybrid Vehicles in the municipal government fleet can help reduce institutional barriers. Education programs focused on developing maintenance capabilities for Hybrid Vehicle in Tonga should be coordinated by stakeholders.

6.1.2.3.6.3 Technical Measures

On-site training on sustainable maintenance of all vehicles. Ensuring sustainable maintenance of all vehicles. Add services of hybrid vehicles to the core services of the existing service stations. The concept of a private companies delivery service" for hybrid vehicle dealers would likely entail that the ownership and operation of hybrid vehicle services would be under the jurisdiction of the well-known vehicle dealers companies.

6.1.2.3.6.4 Market Measures

By commencing with adoption of hybrid vehicle at government facilities. Tonga's ministries can familiarize themselves with the hybrid vehicle infrastructure and capitalize on their investment. Consider policy incentive for private enterprises engaged. There should be specific percentage of hybrid vehicle tax imports based on the available resources of the Ministry of Revenue and Ministry of Infrastructure to assess Hybrid Vehicle import according to technical standard.

6.1.2.3.6.5 Information and Public Awareness Measures

Raising consumer awareness through a public information campaign to promote hybrid vehicle, and increasing developer awareness by establishing construction requirements for Hybrid vehicle operations and maintenance. Enhancing the collection and management of energy data to support the development of comprehensive energy information, particularly for the transport sector. Public Talk and Involvement on hybrid vehicle maintenance services and operations. Institutionalization of data collection and analysis

6.1.2.4 Actions Selected To Be Included in the TAP

1. Assess the feasibility of Hybrid projects and tariff as source of funding. Currently, the market for hybrid vehicle are heavily relying on private projects without government guarantee on technologies. Hybrid vehicle users require confirmation of the business's viability before committing their resources. The studies should encompass all pertinent external factors, such as the difficulties in attracting investors, the suitable economic framework for investment cost, and effective strategies to manage inflation in electricity tariffs.

2. Raise awareness among both developers and users of hybrid vehicle: It is crucial for both users and innovators to understand not only the potential of this technology but also the advantages it offers. This can be achieved by demonstrating the economic viability of the technology and justifying the adoption of Hybrid vehicle. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

3. Improve access to financing for Hybrid vehicle investments: The cost of appliances pose a significant obstacle for investors seeking to enter into long-term financing agreements with financiers. Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of hybrid vehicle.

- · ·	A (1.1(1	
lechnology	Activities	Responsible
Action Plan		Stakeholder
1. Establish	1.1 Long Term Institutional Set Up Long	DoE(MEIDECC), DoCC
appropriate	Term Government Institutional set up	(MEIDECC) Ministry of
institutional	and Policy set Up	Infrastructure, Ministry
set up for the	1.1.1 Development of Ministry of	of Police and Traffic
TAP	Energy.and Project Team together with	TPL. University of
	other stakeholders	Tonga, GCF,
	1.1.2. Encourage or establish hybrid	SPC,NGOs and Local
	vehicle purchase and maintenance	Energy Consultants
	companies.	Local EVs Business .
	1.1.3. Promote the establishment of	
	hybrid vehicle import companies.	

Table 43: Activities to be implemented to enhance diffusion of Hybrid Vehicle.

2. Assess the	2.1 Conduct the economic, financial	DoE(MEIDECC), DoCC
economic	and fiscal feasibility of the source	(MEIDECC) Ministry of
feasibility of	of funding and economics of	Infrastructure, Ministry
investment on	hybrid vehicle purchase and	of Police and Traffic
hybrid vehicle.	operation in Tonga	TPL. University of
-	2.1.1 Opportunities for access	Tonga, GCF,
	financing opportunities	SPC,NGOs and Local
	2.1.2 Feasibility of government de-	Energy Consultants
	risking guarantee.	Local EVs Business
	2.1.3 Identify any regulatory and	
	legislative obstacles	
	2.1.4 Donors supported risk	
	reduction methodology and	
	financial options.	
	2.2 Carry out market survey to	DoE(MEIDECC), DoCC
	ensure business viability of	(MEIDECC) Ministry of
	government guarantees	Infrastructure, Ministry
	available for the hybrid	of Police and Traffic
	technology	TPL. University of
	2.2.1 Feasible public policy reform	Tonga, GCF,
	options to reduce cost of	SPC,NGOs and Local
	adoption of hybrid vehicle in	Energy Consultants
	Tonga	Local EVs Business
	2.2.2 Commercial model for full	
	cost recovery hybrid vehicle	
	investment	
	2.3 Conduct the economic feasibility	DoE(MEIDECC), DoCC
	of the adoption of hybrid vehicle	(MEIDECC) Ministry of
	in the country and impacts of	Infrastructure, Ministry
	high upfront cost and inflation in	of Police and Traffic
	the adoption process	TPL. University of
	2.3.1 Identify the appropriate hybrid	Tonga, GCF,
	vehicle Financing Risk	SPC,NGOs and Local
	Management Policy and	Energy Consultants
	Incentives	Local EVs Business
	2.3.2 Identify the most appropriate	
	source of financing for private	
	sector companies from local	
	commercial banks	
	2.3.3 Subsidy policy for hybrid	
	vehicle investment	
	2.3.4 Hybrid vehicle policy and	
	regulatory improvements	
	2.3.5 Hybrid policy legislative	
	improvements	
	2.3.6 Develop coordinated policies,	
	regulation and legislation for	

	hybrid vehicles	
3. Create	3.1 Develop awareness material for	DoE(MEIDECC), DoCC
Awareness	hybrid vehicle targeting different	(MEIDECC) Ministry of
of both	stakeholders (i.e. Private Sector,	Infrastructure, Ministry
Developer,	Decision Makers, Users of PV	of Police and Traffic
and users	Technology, financial institutions	TPL. University of
of the	of technology)	Tonga, GCF,
technology	3.1.1 Setting targets and mandates	SPC,NGOs and Local
	and national policy for hybrid	Energy Consultants
	vehicles	Local EVs Business
	3.1.2 Coordinate donors financial	
	opportunities for hybrid	
	vehicles for private sectors	
	3.1.3 Donors financing options for	
	hybrid vehicles programs and	
	capacity building programs	
	for designing, installing and	
	2.1.4 public policy improvements	
	5.1.4 public policy improvements	
	operation and maintenance	
	to support national energy	
	targets on hybrid vehicle	
	emission reductions	
	3 1 5 Improve capacity through	
	training on designing.	
	purchasing and maintenance	
	of hybrid vehciles	
	3.1.6 Training on capacity to	
	evaluate and interpret hybrid	
	vehicles performance and	
	maintenance data in order to	
	formulate effective	
	improvement policies for	
	adoption of hybrid vehicles.	
	3.1.7 Encourage training program	
	approaches for hybrid	
	vehicles business	
	opportunities and business	
	Service delivery.	
	3.2 Develop a communication	
	strategy Profile for target	(IVIEIDECC) IVIINISTRY OF
	stakenoluers particularly the	of Police and Troffic
	3.2.1 Short Term Training materials	
	on on-site experiences as	Tonga GCE
	shared regional sources of	SPC NGOs and Local
	shared regional sources of	SPC,NGOs and Local

	information and data	Enorgy Consultants
		Energy Consultants
		LOCALEVS BUSINESS IS
3.2	.2 I raining on innovative	
	approaches for designing,	
	procuring, and maintenance	
	of hybrid vehicles.	
3.2	.3 Encourage private sectors	
	hybrid vehicles services and	
	business opportunities.	
3.2	.4 Institutionalization of hybrid	
	vehicles proiects data	
	collection and analysis and	
	publication of data analysis	
	and indicators for evidenced	
	policy decision makings	
2.2	5 Formulation of hybrid	
3.2	.5 Formulation of hypric	
	venicies database and	
	analysis of hybrid vehicles to	
	guide evidences based	
	decision making on service	
	delivery development and	
	business opportunities	
3.3	Implement awareness campaign	DoE(MEIDECC), DoCC
	on hybrid vehicle performances	(MEIDECC) Ministry of
	especially attract attentions of	Infrastructure, Ministry
	investors and users	of Police and Traffic
3.3	.1 Enabling legislation and	TPL. University of
	regulatory environment	Tonga, GCF.
33	2 Improvement on accessibility	SPC NGOs and Local
	and permitting process for	Energy Consultants
	hybrid vehicle infrastructures	Local EVs Business
1 Enhance 11	Develop Covernment financial	
	policy incontivos to assist	(MEIDECC), DOCC
Access to	policy incentives to assist	(IVIEIDECC) IVIIIISU y OI
Financing		of Delige and Troffie
	4 Identify and improve	
4.1	i Identity and Improve	TPL. University of
	commercial banks financing	Tonga, GCF,
	policy and accessibility to	SPC,NGOs and Local
	hybrid vehicles loaning	Energy Consultants
	scheme	Local EVs Business
4.2	Engage in dialogue with	DoE(MEIDECC), DoCC
	government development	(MEIDECC) Ministry of
	partners to identify possible	Infrastructure, Ministry
	government incentives and	of Police and Traffic
	subsidies for the hybrid vehicles	TPL. University of
4.2		/
	.1 Ensure accessibility and	Tonga, GCF,

	standard and certification for import of hybrid vehicles to Tonga	Energy Consultants Local EVs Business
	 4.3 Discuss and Justify the adoption of the most suitable adoption model for hybrid vehicles investors and home owners in Tonga 4.3.1 Availability of most feasible financing options for hybrid vehicles 4.3.2 Improvements of the national electricity grid for hybrid vehicles 	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
Action 5: Design, Procure, Install the monitoring and maintenance plan model for hybrid vehicle applications in the country	5.1. Design, procure install the Hybrid vehicle promotion and investment initiative in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
	5.2. Design, Approve and Set up the Monitoring and Maintenance Model for the technology	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
Action 6 : Assess and Identify all the necessary improvement options	6.1. Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
	6.2. Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF,

		SPC,NGOs and Local Energy Consultants
0.0	Duanana all Dalian da sisiana far	
6.3.	government approval	DOE(MEIDECC), DOCC (MEIDECC) Ministry of Infrastructure, Ministry
		of Police and Traffic
		TPL. University of
		Tonga, GCF,
		SPC,NGOs and Local
		Energy Consultants
		Local EVs Business
6.4.	Design, Procure and install all	DoE(MEIDECC), DoCC
	necessary grid improvements to	(MEIDECC) Ministry of
	cater for reducing demand in the	Infrastructure, Ministry
	electricity grid.	of Police and Traffic
		TPL. University of
		Tonga, GCF,
		SPC,NGOs and Local
		Energy Consultants
		Local EVs Business

6.1.2.5 Action To Be Implemented as Project Ideas

The aforementioned three actions, specifically the feasibility study, awareness raising, and improved access to financing, will be evaluated for implementation as potential project ideas.

6.1.2.6 Stakeholders and Implementation Timelines for the TAP

Table 44 shows the list of stakeholders to implement the TAP

Table 44 : List of Activities and Respective	Stakeholders to Implement the TAP
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Number	Activities	Responsible	Timelines
		Body	
1. Establish	1.1 Long Term Institutional Set	DoE(MEIDECC),	1-5 Months
appropriate	Up Long Term Government	DoCC	
institutional	Institutional set up and Policy	(MEIDECC)	
set up for the	set Up	Ministry of	
TAP	1.1.1 Development of Ministry	Infrastructure,	
	of Energy and Project Team	Ministry of Police	
	together with other	and Traffic TPL.	
	stakeholders	University of	
	1.1.2. Encourage or establish	Tonga, GCF,	
	hybrid vehicle purchase and	SPC,NGOs and	
	maintenance companies.	Local Energy	
	1.1.1. Promote the	Consultants	
	establishment of hybrid	Local EVs	
	vehicle import	Business .	
	companies.		

2.	Assess the	2.1 Conduct the economic,	DoE(MEIDECC),	1-6 Months
	economic	financial and fiscal	DoCC	
	feasibility of	feasibility of the source of	(MEIDECC)	
	investment	funding and economics of	Ministry of	
	on hybrid	hybrid vehicle purchase	Infrastructure,	
	vehicle.	and operation in Tonga	Ministry of Police	
		2.1.1. Opportunities for access	and Traffic TPL.	
		financing opportunities	University of	
		2.1.2. Feasibility of	Tonga, GCF,	
		government de-risking	SPC,NGOs and	
		guarantee.	Local Energy	
		2.1.3. Identify any regulatory	Consultants	
		and legislative	Local EVs	
		obstacles	Business	
		2.1.4. Donors supported risk		
		reduction methodology		
		and financial options.		
		2.2. Carry out market survey	DoE(MEIDECC),	2 Months
		to ensure business	DoCC	
		viability of government	(MEIDECC)	
		guarantees available for	Ministry of	
		the hybrid technology	Infrastructure,	
		2.2.1. Feasible public policy	Ministry of Police	
		reform options to	and traffic TPL.	
		reduce cost of adoption	University of	
		of hybrid vehicle in	Tonga, GCF,	
		I onga	SPC, NGOS and	
		2.2.2. Commercial model for	Local Ellergy	
		vobiolo invostment		
		venicie investment	Business	
3	Create	3.1 Conduct the economic		6 Months
0.		feasibility of the		0 10011113
	of both	adoption of hybrid	(MEIDECC)	
	Developer	vehicle in the country	Ministry of	
	and users	and impacts of high	Infrastructure	
	of the	unfront cost and	Ministry of Police	
	technology	inflation in the adoption	and Traffic TPI	
	teenneregy	process	University of	
		3.1.1. Identify the appropriate	Tonga. GCF.	
		hybrid vehicle Financing	SPC,NGOs and	
		Risk Management	Local Energy	
		Policy and Incentives	Consultants	
		3.1.2. Identify the most	Local EVs	
		appropriate source of	Business	
		financing for private		
		sector companies from		

	local commercial banks		
240	Suboidy policy for		
3.1.3.	Subsidy policy for		
	investment		
314	Hybrid vehicle policy		
0.1.4.	and regulatory		
	improvements		
3.1.5.	Hybrid policy legislative		
	improvements		
3.1.6.	Develop coordinated		
	policies, regulation and		
	legislation for hybrid		
	vehicles		
3.2.	Develop awareness	DoE(MEIDECC),	2 Months
	material for hybrid	DoCC	
	vehicle targeting	(MEIDECC)	
	different stakeholders	Ministry of	
	(I.e. Private Sector,	Miniastructure,	
	of DV Tochnology	and Traffic TPI	
	financial institutions of	Iniversity of	
	technology)	Tonga GCE	
321	Setting targets and	SPC NGOs and	
0.2	mandates and national	Local Energy	
	policy for hybrid	Consultants	
	vehicles	Local EVs	
3.2.2.	Coordinate donors	Business	
	financial opportunities		
	for hybrid vehicles for		
	private sectors		
3.2.3.	Donors financing		
	options for hybrid		
	vehicles programs and		
	capacity building		
	programs for designing,		
	maintaining and		
	vehicles		
3.24	public policy		
J	improvements for hybrid		
	vehicles purchase.		
	operation, and		
	maintenance to support		
	national energy targets		
	on hybrid vehicle		
	emission reductions		

3.2.5. 3.2.6. 3.2.7.	Improve capacity through training on designing, purchasing and maintenance of hybrid vehciles Training on capacity to evaluate and interpret hybrid vehicles performance and maintenance data in order to formulate effective improvement policies for adoption of hybrid vehicles. Encourage training program approaches for hybrid vehicles business opportunities and business service delivery.		
3.3. 3.3.1.	Develop a communication strategy Profile for target stakeholders particularly the adopters of the hybrid vehicles Short Term Training materials on on-site experiences as shared regional sources of information and data	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy	2 Months
3.3.2.	analysis. Training on innovative approaches for designing, procuring, and maintenance of hybrid vehicles.	Consultants Local EVs Business ts	
3.3.3.	Encourage private sectors hybrid vehicles services and business opportunities.		
3.3.4.	Institutionalization of hybrid vehicles projects data collection and analysis and publication of data analysis and indicators for evidenced		

	3.3.5.	policy decision makings. Formulation of hybrid vehicles database and analysis of hybrid vehicles to guide evidences based decision making on service delivery development and business opportunities		
4. Enhance Access to Financing	4.1. 4.1.1. 4.1.2.	Implement awareness campaign on hybrid vehicle performances especially attract attentions of investors and users Enabling legislation and regulatory environment Improvement on accessibility and permitting process for hybrid vehicle infrastructures	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	8. Months
	4.2.	Develop Government financial policy incentives to assist lowering the cost of hybrid vehicles technology Identify and improve commercial banks financing policy and accessibility to hybrid vehicles loaning scheme	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	3 Months
	4.3. 4.3.1.	Engage in dialogue with government development partners to identify possible government incentives and subsidies for the hybrid vehicles Ensure accessibility and availability of technical	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF,	12 Months

		standard and certification for import of hybrid vehicles to Tonga	SPC,NGOs and Local Energy Consultants Local EVs Business	
Action 5: Design, Procure, Install the monitoring and maintenance plan model for hybrid vehicle applications in the country	5.1.	Design, procure install the Hybrid vehicle promotion and investment initiative in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	12 Months
	5.2.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	12 Months
Action 6 : Assess and Identify all the necessary improvement options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	12 Months

6.2.	Conduct consultation	DoE(MEIDECC),	1-2 Months
	and meetings on	DoCC	
	findings of the policy	(MEIDECC)	
	and regulatory	Ministry of	
	assessment and	Infrastructure,	
	analysis.	Ministry of Police	
		and Traffic TPL.	
		University of	
		Tonga, GCF,	
		SPC,NGOs and	
		Local Energy	
		Consultants	
		Local EVs	
		Business	
6.3.	Prepare all Policy	DoE(MEIDECC),	3 Months
	decisions for	DoCC	
	government approval	(MEIDECC)	
		Ministry of	
		Infrastructure,	
		Ministry of Police	
		and Traffic TPL.	
		University of	
		Tonga, GCF,	
		SPC,NGOs and	
		Local Energy	
		Consultants	
		Local EVs	
		Business	
6.4.	Design, Procure and	DoE(MEIDECC),	1-5 Months
	install all necessary grid	DoCC	-
	improvements to cater	(MEIDECC)	
	for reducing demand in	Ministry of	
	the electricity arid.	Infrastructure.	
		Ministry of Police	
		and Traffic TPL.	
		University of	
		Tonga, GCF	
		SPC.NGOs and	
		Local Fnerov	
		Consultants	
		Local FVs	
		Business	

6.1.2.7 : Roles of Stakeholders

The roles of stakeholders are shown in Table 45 below
Table 45: Roles of Hybrid Vehicles Stakeholders

1	Ministry of Energy	Plan and manage energy policies, energy targets, and assess energy goals and objectives
		Oversee energy projects including hybrid vehicles
		projects Identify and source funding to implement hybrid vehicles
		Formulate and present energy plan strategies and
		programmes to government and seek Cabinet's approval
		Promote public awareness and informed decisions on
		hybrid vehicles technologies.
2	Department of	Focal Point of the United Nations Convention on Climate
	Climate Change ,	Change
		Sourcing funds from climate funds and Global
		Environmental Facility
		GCF focal point in Tonga
3	Department of	Responsible for environmental policies and
	Environment,	environmental management
4	MEIDECC Ministry of Finance	Deepensible for financial policies and policy incentives for
4	and Planning	Responsible for inflaticial policies and policy incentives for
5	Ministry of	Responsible for Business incentive policies
Ū	Economic and	
	Trade	
6	Ministry of Foreign	Responsible for foreign relations with donors and
	Affairs	development partners.
7	Tonga Power	Manage and Plan the national electricity grids and
	Limited, TPL	monitor all projects that has capacity to influence the
0	Tanana Electricity	electricity generation and distribution and transmissions.
ð		Responsible for regulatory policies and regulation of the
9	University of Tonga	Research and Development
Ŭ	and University of the	
	South Pacific and	
	National consultants	
10	Regional Energy	Responsible for regional energy coordination and general
	Institutions	assessment and analysis of hybrid vehicles projects.
11	Development	Financing of hybrid vehicles projects
	Partners and	
10		Technical approximent and approxime technical analysis of
12	Consultants	hybrid vehicles
13	Contractor and	Technical installation of the hybrid vehicles
	dealers for hybrid	
	vehicles	

6.1.2.8 : Scheduling of Activities

Table 46 describes the sequence and timing of specific activities and responsibilities

Table 46: Scheduling of Activities

Action	Activities	Plannir	ng	Implen	nentation	Responsible Stakeholder
		Start	Fnd	Start	End	
1. Establish appropriate institutional set up for the TAP Assess the economic feasibility of investment on hybrid vehicle.	 1.1 Long Term Institutional Set Up Long Term Government Institutional set up and Policy set Up 1.1.1 Development of Ministry of Energy.and Project Team together with other stakeholders 1.1.2 Encourage or establish hybrid vehicle purchase and maintenance companies. 1.1.3 Promote the establishmen t of hybrid vehicle import companies. 	2025	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
	 5.1. Conduct the economic, financial and fiscal feasibility of the source of funding and economics of hybrid vehicle purchase and operation in Tonga 1.2.1 Opportunities for access 	2025	2025	2025	DoE(ME IDECC), DoCC (MEIDE CC) Ministry of Infrastru cture, Ministry of Police and Traffic	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants

		financing opportunities 1.2.2 Feasibility of government de-risking guarantee. 1.2.3 Identify any regulatory and legislative obstacles 1.2.4 Donors supported risk reduction methodology and financial options.				TPL. Universi ty of Tonga, GCF, SPC,N GOs and Local Energy Consult ants Local EVs Busines s	
6.	Assess the economic feasibility of investme nt on EE Home appliance s	 2.1 Carry out market survey to ensure business viability of government guarantees available for the hybrid technology 2.1.1. Feasible public policy reform options to reduce cost of adoption of hybrid vehicle in Tonga 2.1.2. Commercial model for full cost recovery hybrid vehicle investment 	2025	2025	2025	2025	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants
		2.2 Conduct the economic feasibility of the adoption of hybrid vehicle in the country and impacts of high upfront cost and inflation in the	2024	2025	2025	2025	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL.

		adoption process	5				University of
		2.2.1 Identify the					Tonga.
	appropriate						GCF.
		hybrid vehicle	2				SPC NGOs
		Financing					and Local
		Rick					Energy
		Management					Consultants
							Lucal LVS
		222 Identify the					Dusiness
		z.z.z identity the					
		appropriato					
		appropriate					
		financing for					
		nnancing ior					
		from local					
		nonnocal					
		commerciai					
		Danks .					
		2.2.3 Subsidy					
		pulicy ioi					
			;				
		Z.Z.4 Hydrid					
		venicie policy					
		and					
		regulatory					
		Improvement					
		S S					
		2.2.5 Hybrid policy					
		legislative					
		improvement					
		2.2.6 Develop					
		coordinated					
		policies,					
		regulation					
		and					
		legislation for					
		hybrid					
	• •	vehicles					
3.	Create	3.1 Develop	2024	2025	2025	2025	DoE(MEIDE
	Awaren	awareness					CC), DoCC
	ess of	material for					(MEIDECC)
	both	hybrid vehicle					Ministry of
	Develo	targeting					Infrastructur
	per, and	different					e, Ministry
	users of	stakeholders (i.e	.				of Police

the	Private Sector.		and Traffic
technol	Decision		TPL.
oav	Makers. Users of		University of
55	PV Technology.		Tonga.
	financial		GCF.
	institutions of		SPC NGOs
	technology)		and Local
	3 1 1 Setting		Energy
	targets and		Consultants
	mandates		Local EVs
	and national		Business
	policy for		
	hvbrid		
	vehicles		
	3.1.2 Coordinate		
	donors		
	financial		
	opportunities		
	for hybrid		
	vehicles for		
	private		
	sectors		
	3.1.3 Donors		
	financing		
	options for		
	hybrid		
	vehicles		
	programs		
	and capacity		
	building		
	programs for		
	designing,		
	installing and		
	maintaining		
	of hybrid		
	vehicles		
	3.1.4 public policy		
	Improvement		
	s for hybrid		
	Venicies		
	purchase,		
	operation,		
	and		
	to ourport		
	to support		
	епегду		

r								
		targets	on					
		nybrid	venicie					
		reducti	ons					
		315 Improv						
		capaci	tv					
		throug	h					
		training	n on					
		design	ing,					
		purcha	ising					
		and						
		mainte	nance					
		of hybr	id					
		vehcile	es					
		3.1.6 Trainin	ig on					
		capaci	te and					
		interpr	et					
		hvbrid						
		vehicle	es					
		perforr	nance					
		and						
		mainte	nance					
		data in	order					
		to form	ulate					
		effectiv	/e					
		Improv						
		adopti	s ioi					
		hybrid						
		vehicle	es.					
		3.1.7 Encou	rage					
		training	j					
		progra	m					
		approa	iches					
		for hyb	orid					
		vehicle	es					
		busine	SS					
		opport	unities					
		and bu	siness					
		deliver	, V					
4.	Enhanc	4.1 Develop a	<u>y</u> .	2024	2025	2025	2025	DoE(MEIDF
	е	communic	ation					CC), DoCC
	Access	strategy P	rofile					(MÉIDECC)
	to	for target						Ministry of
	Financi	stakehold	ers					Infrastructur

na	particularly the		e. Ministry
	adopters of the		of Police
	hybrid vehicles		and Traffic
	4 1 1 Short Term		TPI
	Training		Liniversity of
	materials on		Tonga
	on site		CCE
	OIT-Sile		
	experiences		SFC, NGUS
	as snared		and Local
	regional		Energy
	sources of		Consultants
	Information		Local EVs
	and data		Business
	analysis.		
	4.1.2 Training on		
	innovative		
	approaches		
	for designing,		
	procuring,		
	and		
	maintenance		
	of hybrid		
	vehicles.		
	4.1.3 Encourage		
	private		
	sectors		
	hybrid		
	vehicles		
	services and		
	business		
	opportunities.		
	4 1 4 Institutionaliz		
	ation of		
	hybrid		
	vehicles		
	nroiects data		
	collection and		
	analysis and		
	analysis and		
	dete enelveie		
	uala analysis		
	anu indiaatara far		
	inuicators for		
	evidenced		
	policy		
	decision		
	makings.		
	4.1.5 Formulation		

of hybrid vehicles database and analysis of hybrid vehicles to guide evidences based decision making on service delivery development and business opportunities					
 4.2 Implement awareness campaign on hybrid vehicle performances especially attract attentions of investors and users 4.2.1 Enabling legislation and regulatory environment 4.2.3. Improvement on accessibility and permitting process for hybrid vehicle infrastructure s 	2025	2026	2025	2026	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
4.3 Develop Government financial policy incentives to assist lowering the cost of hybrid vehicles technology	2027	2027	2027	2027	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic

	4.3.1 Identify and improve commercial banks financing policy and accessibility to hybrid vehicles loaning scheme					TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
Action 5: Design, Procure, Install the monitoring and maintenance plan model for hybrid vehicle applications in the country	4.4 Design, procure install the Hybrid vehicle promotion and investment initiative in the country	2027	2027	2027	2027	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
	4.5Design, Approve and Set up the Monitoring and Maintenance Model for the technology					
Action 6 : Assess and Identify all the necessary improvement options	4.6 Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country	2027	2027	2027	2027	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructur e, Ministry of Police and Traffic TPL. University of Tonga, GCF.

			SPC,NGOs and Local Energy Consultants Local EVs Business
4.7 Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.			
4.8 Prepare all Policy decisions for government approval			
4.9 Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.			

Stakeholders Timelines and Costs for Hybrid Vehicles.

Table 47 : Scheduling and	d Sequencing of specific	Activities for Hybrid Vehicles
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Actions	Activities		Yea	r (2025-2027)
1. Long Term Institutional	1.1.	Confirm positions for recruitment and advertisement of Positions		
Set Up	1.2.	Confirm office space for the project team in the Department of Energy		
	1.3.	Allocate Budget for Salaries and Recruitment		
	1.4.	Meet Cost for office furniture/ equipment		
	1.5.	Meet Other Cost for operation and management of the office.		
2. Assess the feasibility of Hybrid Vehicles	2.1.	Identify and Confirm TOR and hire consultant to conduct the assessment		

(円//오)				
	2.2	Identify and Justify the economic	•	
	Z.Z.	identify and Justify the economic,		
		financial and fiscal feasibility of the		
		Lifecycle Cost of Hybrid		
	2.3.	Identify key barriers to the		
		economic and financial feasibility		
		of the selected Hybrid Vehicles		
	24	Identify the solutions to the		
	2.1.	economic and financial feasibility	-	
		of the polosted Hybrid Vehicles		
	0.5		•	
	2.5.	Carry out Market Survey to ensure		
		business viability of the		
		technology to investors.		
	2.6.	Identify and present the key		
		factors for business viability of the		
		Hvbrid Vehicles		
	27	Identify policy improvements		
		needed	_	
	2.8	Conduct the economic feasibility		
	2.0.	of the adoption of Hybrid Vehicles		
	0.0	of the adoption of Hybrid vehicles	•	
	2.9.	Identify barriers and solutions to		
		the economic feasibility Hybrid		
		Vehicles		
	2.10.	Identify policy improvements		
	2.10.1	. Hybrid Vehicles Policy		
	2.10.2	. HVs Legislation		
	2.10.3	. HVs Regulation		
	2 11	Technical Feasibility		
3 Create	3.1	Identify awareness materials for		
	5.1.	various different stakeholders		
Awareness	244	Autors different stakenolders.		
	3.1.1.	Awareness materials for HVS		
Developer,		developers		
and users	3.1.2.	Awareness materials for HVs		
of the		dealers		
Battery	3.1.3.	Awareness materials for HVs		
Charged		Users		
EVs				
technology	3.2.	Develop awareness material		
		targeting different stakeholders		
		(i.e. Private Sector Decision		
		Makers Users of HVs		
		Technology financial institutions		
		of toobpology		
		Development to find the		
	3.2.1.	Develop materials for HVs		
		developers		
	3.12. De	velop a communication strategy		
	Pro	ofile for target stakeholders		

	particularly the adopters of the			
	technology.			
	3.12.1. Develop materials for HVs			
	developers			
	3.12.2. Develop materials for HVS			
	3 12 3 Develop materials for HVs			
	users			
	3.13. Implement awareness campaign on			
	HVs, especially attract attentions of			
	investors and users			
	3.13.1. Implement awareness			
	campaign for HVs developers			
	3.13.2. Implement Awareness			
	Campaign for HVs appliances			
	Dealers			
	Campaign for HV/s users			
	3 14 Gender Mainstreaming and Social			
	Inclusion	-		
4. Enhance	4.1. Develop Financial Policy Incentives to			
Access to	assist lowering the cost of HVs			
Financing	technology			
	4.1.1. Identify all possible policy incentives			
	to assist lowering the cost of HVs			
	4.1.2. Identify possible legislative incentives			
	to assist lowering the cost of HVs			
	4.1.3 Identify possible regulatory incentives			
	to assist lowering the cost of HVs			
	appliances			
	4.2. Engage in dialogue with government			
	development partners to provide		_	
	incentives and subsidies for the			
	technology as it contributes to global			
	benefit			
	4.2.1. Consultation with government on			
	policy incentives and subsidies.			
	4.2.2. Consultation with donors on policy			
	funding projects			
	4.2.3 Consultation with dealers on policy			
	incentives and subsides on imported			
	HVs components			
	4.3. Discuss and Justify the adoption of			
	the most suitable model for PPA			
	Contract for HVs investors and			

			private sectors in Tonga		
		4.4.	identify, Develop and recommend all		
			financial policy incentives to Cabinet		
			to assist lowering the cost of		
			investment on HVs		
		45	Provide clear justifications for		
			adoption of the HV/s		
		4.6	Engage in dialogue with		
		7.0.	development partners on suitable	-	
			adoption of subsidies for the		
			technology as it contributes to global		
			bonofit: Confirm possible wave and		
			proferred conditions and		
			methodology for supporting financing		
			of LIV a in Tanga		
		47	OF TVS III TOTINA		
		4./.	with international radianal and		
			with international, regional and		
			bilateral donors and development		
			partners for adoption of HVs in the		
			country		
		4.8.	Prepare Cabinet Approval for most		
			sustainable financing options of		
			hybrid vehicle in the country and its		
			plan to achieve share of carbon		
			emission reduction in the energy		
			sector.		
5.	Design,	5.1.	Design, procure install the HVs		
	Procure,		appliances promotion and		
	Install the		investment initiative in the country		
	monitoring				
	and				
	maintenance				
	plan model for				
	HVs in the				
	country				
		52	Design Approve and Set up the		
		0.2.	Monitoring and Maintenance Model		_
			for the technology		
6	Assess and	61	Assess and Identify the policy		
0.	Identify all the	0.1.	legislative and regulatory shortfalls in		
			the implementation of $\Box 1/c$		
	improvement		invostment in the country		
	ontions		nivesument in the country		
	οριιοτισ	6.2	Conduct concultation and mactings		
		0.2.	on findings of the reliev and		
			on indings of the policy and		
<u> </u>			regulatory assessment and analysis.		
		6.3.	Prepare all Policy decisions for		

government approval

Table 48 : Actions, Activit	ies, Capacity Buildin	ng and Costs for HVs
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Actions	Activities		Capacity Needs	Cost USD
1. Institutional	1.1.	Confirm positions for	Consultation &	18,000
Set Up		recruitment and	Meeting Cost	
		Conduct	Advertisement	
		advertisement	Cost	
	1.2.	Confirm office space	Rent and	200,000
		for the project team	Accommodation	
		in the Department of		
	4.0	Energy	Coloriae	000.000
	1.3.	Allocate Budget for	Salaries	800,000
		Salaries and Decruitment		
	1 /	Moot Cost for office	Offico Eurpituro	200.000
	1.4.	furniture/ equinment	and Equipment	200,000
	1.5	Meet Other Cost for	Electricity and	300.000
	1.0.	operation and	Telecommunicatio	000,000
		management of the	n. Equipment and	
		office.	Maintenance fee,	
			Administrative	
			costs	
2. Assess the	2.1.	Identify and Confirm	Meeting Cost and	500,000
feasibility		TOR and hire	Consultant Fees	
of HVs		consultant to		
		conduct the		
		assessment		
	2.2.	Identify and Justify	Local Travel,	150,000
		the economic,	Transportation	
		financial and fiscal	Cost and Research	
		feasibility of the	Cost	
		Lifecycle Cost of		
	0.0	HVS IN TONGA.	Markahan and	50.000
	2.3.	harriora to the	Consultation Cost	50,000
			Consultation Cost	
		financial feasibility of		
		H\/s		
	24	Identify the solutions	Workshop and	
		to the economic and	Consultation Cost	
		financial feasibility of		
		the HVs		
	2.5.	Carry out Market	Develop Survey	300,000
		Survey to ensure	Questionnaire,	
		business viability of	Survey workshops,	

		the technology to	Implementation of	
	2.6	Invesions.	Survey	30,000
	2.0.	the key factors for	nresentation of	30,000
		husiness viability of	Survey Peport	
		the HVs	Survey Report	
	2.7.	Identify operation	Consultation,	20,000
		policy improvements	Meetings and	
		needed	Cabinet	
			Submissions	
	2.8.	Conduct the	Consultation and	500,000
		economic feasibility	Meeting Cost and	
		of the Hybrid	Consultants Fee	
	0.0	Vehicles	Markahan Caat	20,000
	2.9.	adutiona to the	workshop Cost	20,000
		economic feasibility		
		of the integrated HVs		
	2.10.	Identify policy	Policy, Regulatory	400,000
		improvements	and Legal Review	,
	2.10.1	. HVs Policy	of existing policy	
	2.10.2	HVs Legislation	and legal	
	2.10.3	. HVs Regulation	framework and	
			documents	
	2.11.	Technical Feasibility		20,000
3. Create	3.1.	Identify awareness	Consultation and	30,000
Awareness		different	Identification of	
Developer		stakeholders	public awareness	
and users	311	Awareness materials		
of the HVs	0.1.1.	for HVs developers		
technology	3.1.2.	Awareness materials		
57		for HVs dealers		
	3.1.3.	Awareness materials		
		for HVs Users		
		for HVs Users		
	3.2.	for HVs Users Develop awareness	Consultancy Fees	200,000
	3.2.	for HVs Users Develop awareness material targeting	Consultancy Fees for development of	200,000
	3.2.	for HVs Users Develop awareness material targeting different	Consultancy Fees for development of public awareness	200,000
	3.2.	for HVs Users Develop awareness material targeting different stakeholders (i.e. Private Sector	Consultancy Fees for development of public awareness materials	200,000
	3.2.	for HVs Users Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers	Consultancy Fees for development of public awareness materials	200,000
	3.2.	for HVs Users Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of HVs	Consultancy Fees for development of public awareness materials	200,000
	3.2.	for HVs Users Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of HVs Technology.	Consultancy Fees for development of public awareness materials	200,000
	3.2.	for HVs Users Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of HVs Technology, financial institutions	Consultancy Fees for development of public awareness materials	200,000
	3.2.	for HVs Users Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of HVs Technology, financial institutions of technology)	Consultancy Fees for development of public awareness materials	200,000

		for HVs developers		
	3.3.	Develop a	Consultancy Fees	40,000
		strategy Profile for	communication	
		target stakeholders	profile	
		particularly the	P	
		adopters of the		
		technology.		
	3.3.1.	Develop materials		
		for HVs developers		
	3.3.2.	Develop materials		
		for HVs dealers		
	3.3.3.	Develop materials		
		for HVs users		
	3.4.	Implement	Record of Radio	100,000
		awareness	and Television	
		campaign on HVs	Programs,	
		projects, especially		
		attract attentions of	Publication of	
	0.4.4	investors and users	awareness	
	3.4.1.	Implement	materials	
		awareness		
		developere	weelings with	
	212	Implement	stakenoiders	
	J.4.Z.	Awareness	Other public	
		Campaign for HVs		
		Dealers	nrograms	
	343	Implement	programo	
		Awareness	Disseminate and	
		Campaign for HVs	Distribution.	
		users	Translation	
4. Enhance	4.1.	Identify/Develop	Policy Dialogue	50,000
Access to		Financial Policy	Meetings and	
Financing		Incentives to assist	consultation with	
		lowering the cost of	key stakeholders	
		HVs technology		
	4.1.1.	Identify all possible	Policy Incentives to	
		policy incentives to	reduce cost of	
		assist lowering the	imports of	
	4.4.0	COST OF HVS	technology	
	4.1.2.	Identify possible	Delievinesstives	
		to oppint lowering the	Folicy incentives	
		cost of HV/c	areement (DDA)	
	412	Identify noesible	ayıcemeni (FFA)	
	т. т.J.	regulatory incentives		

	to assist lowering the		
4.2.	Engage in dialogue	Development	40,000
	with government	partners meetings	
	development	and workshops on	
	partners to provide	identifying policy	
	incentives and	incentives and	
	subsidies for the	subsidies for import	
	technology as it	of technology and	
	contributes to global	equipment.	
	benefit		
4.2.1.	Consultation with		
	government on		
	policy incentives and		
	subsidies.		
4.2.2.	Consultation with		
	donors on policy		
	incentives and		
	subsidies on donor		
123	Consultation with		
4.2.3.	dealers on policy		
	incentives and		
	subsides on		
	imported HVs		
	components		
4.3.	Discuss and Justify	Stakeholders	20,000
	the adoption of the	Consultation on	
	most suitable model	PPA Policy and	
	for HVs investors	Regulation.	
	and private sectors		
	in Tonga		
4.3.1.	identify, Develop	Workshops/Consul	40,000
	and recommend all	tation with key	
	Tinancial policy	stakenoiders and	
	Incentives to	development	
	Capinel to assist	partners	
	investment HVs		
422	Provide clear		
т .J.Z.	iustifications for		
	adoption of the HVs		
4.4.	Engage in dialogue	Consultations and	40.000
	with development	Workshops and	
	partners on suitable	Meetings	
	adoption of		
	subsidies for the		

	4 5	technology as it contributes to global benefit; Confirm possible ways and preferred conditions and methodology for supporting financing of technology in Tonga		
	ч.о.	financing options with international, regional and bilateral donors and development partners for adoption of hybrid vehicle HVs in the country		
	4.6.	Prepare Cabinet Approval for most sustainable financing options of the technology in the country and its plan to achieve share of carbon emission reduction in the energy sector.		
5. Design, Procure, Install the HVs pilot project	5.1.	Design, procure install the EVs promotion and investment initiative in the country Design, Approve	Consultants Fee Operation and Reporting	10,000,000
		and Set up the Monitoring and Maintenance Model for the technology		
6. Maintenan ce Assess and Identify all the necessary improveme nt options	6.1.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing HVs	Consultation Fees Assessment , Consultation and Reporting	1,000,000
	0.Z.	Conduct		

		consultation and meetings on findings of the policy and regulatory assessment and analysis.	
	6.3.	Prepare all Policy	
		decisions for	
		government	
		approval	
	6.4.	Design, Procure and	
		instal all necessary	
		HVs projects.	
Total Estimated Bu	dget		14,968,000

6.1.2.9 : Estimation of Resources for Action and Activities

To achieve successful and sustained technology diffusion, it is essential to enhance the capabilities of local technology importers and bidders and installers, especially local suppliers, overseas and local contractors and bidders of the technology, installers, and maintenance engineers. Furthermore, to facilitate accelerated diffusion, it is necessary to implement a train-the-trainers approach, enabling the replication of training programs across numerous regions.

The activities to be undertaken and their associated costs are presented in Table 49.

Action	Activities	Plan	Impleme ntation	Estimated Cost	Sour ce of	Responsibl e	Justified Actions
		Start/E	Start/En	(USD)	Fund	Stakeholde	
1.Establish appropriat e institutiona I set up for the TAP	1.1 Long Term Institutional Set Up Long Term Government Institutional set up and Policy set Up 1.1.1 Development of Ministry of Energy.and Project Team together with other stakeholders	2025/ 2025	2025/20 25	1,518,000	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Recruited personnel and office furniture and office equipment

Table 49: Financial considerations associated with the execution of the identified activities.

	1.1.2. Encou estab hybric purch maint comp Prom estab of hyt vehic comp	urage or lish d vehicle ase and enance anies. ote the lishment orid le import anies.						
2.Assess the economic feasibility of investment on hybrid vehicle.	2.1.2.2.2.3.	Conduct the econom ic, financial and fiscal feasibilit y of the source of funding and econom ics of hybrid vehicle purchas e and operatio n in Tonga Opportu nities for access financin g opportu nities Feasibili ty of govern ment de-	2025/ 2025	2025/ 2025	1,990,000	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	1,990,000

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Energy
Consultants
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3.2 Feasibl
reform
options

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3.2.1.	cost of adoptio n of hybrid vehicle in Tonga Comme rcial model for full cost recover y hybrid vehicle investm ent					
3.3.	Conduct the econom ic feasibilit y of the adoptio n of hybrid vehicle in the country and impacts of high upfront cost and inflation in the adoptio n process Identify the appropri ate hybrid vehicle Financi	2025/ 2025	2025/ 2025	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Recruitmen t of Assessors

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312	Subsidy			
J.4.Z.	Subsidy			
	policy			
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	hybrid			
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3.4.3.	Hybrid			
	vehicle			
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344	Hybrid			
U . T . T .	nolior			
	policy			
	legislati			
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	improve			
	ments			
345	Develop			
5.4.0.				
	coordin			

	ated policies, regulati on and legislati on for hybrid vehicles					
3.5. 3.5.1. 3.5.2.	Develop awaren ess material for hybrid vehicle targetin g different stakehol ders (i.e. Private Sector, Decisio n Makers, Users of PV Technol ogy, financial institutio ns of technol ogy) Setting targets and mandat es and national policy for hybrid vehicles Coordin ate	2025/2 025	2025/20 25	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Recruitmen t of assessors and office equipment

	donors			
	financial			
	opportu			
	nities			
	for			
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	hybrid			
	vehicles			
	for			
	private			
	sectors			
252	Donoro			
3.5.5.				
	tinancin			
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	options			
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	hvbrid			
	vehicles			
	vernetes			
	program			
	s and			
	capacity			
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	ning of			
	hybrid			
	vehicles			
354	nublic			
0.0.4.	public			
	policy			
	Improve			
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	for			
	hybrid			
	vehicles			
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	effective			
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	policies			
	for			
	adoptio			
	n of			
	hybrid			

	vehicles 3.5.7. Encoura ge training program approac hes for hybrid vehicles busines s opportu nities and busines s service delivery.						
4. Creat e Aware ness of both Devel oper, and users of the techn ology	4.1. Develop a communication strategy Profile for target stakeholders particularly the adopters of the hybrid vehicles 4.1.1. Short Term Training materials on on-site experiences as shared regional sources of information and data analysis. 4.1.2. Training on innovative approaches for designing, procuring, and maintenance of hybrid vehicles. 4.1.3.Encoura ge private	2025/2 026	2025/22	190,000	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	1

					1
sectors hybrid	l t				
vehicles					
services and	d l				
business					
opportunities.					
4.2.					
Institutionalizat	t				
ion of hybrid	t				
vehicles					
projects data	9				
collection and	4				
analysis and	4				
publication o	f				
data analysis					
and indicators					
for evidence	4				
nolicy decision					
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121 Formula					
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4.3.	2025/2	2026/20	Dono	DoE(MEID	Contact
Implem	025	26	rs	ECC),	address
ent				(MEIDECC)	
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4.3.1.	awaren ess campai gn on hybrid vehicle perform ances especial ly attract attentio ns of investor s and users Enablin g legislati on and regulato ry environ ment Improve ment on accessi bility and permitti ng process for hybrid vehicle infrastru				Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	tion links
4.4.	ctures Develop Govern ment financial policy incentiv es to assist lowering the cost of	2026/2 026	2026/20 27	Dono rs	DoE, TPL. University of Tonga, GCF, SPC and Local Business and Economic Consultants	1.Conduct of Trainings 2.Distributio n of materials 3.Record and broadc ast of Radio and TV programs

4.4.1.	hybrid vehicles technol ogy Identify and improve commer cial banks financin g policy and accessi bility to hybrid vehicles					
4.5	scheme	2024/2	2025/20	Dana		Meeting
4.5.	Engage in dialogu e with govern ment develop ment partners to identify possible govern ment incentiv es and subsidie s for the hybrid vehicles Ensure accessi bility and availabil ity of technica I	2024/2 025	2025/20 25	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Meeting Consultatio ns Policy Decisions

	standar d and certificat ion for import of hybrid vehicles to Tonga					
4.6. 4.6.1. 4.6.2.	Discuss and Justify the adoptio n of the most suitable adoptio n model for hybrid vehicles investor s and home owners in Tonga Availabil ity of most feasible financin g options for hybrid vehicles Improve ments of the national electricit y grid for hybrid	2025/2 026	2025/20 26	Dono rs	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Consultatio n with stakeholder s Formulation of Policies, Regulations and Legislation

		vehicles				
Action 5 [.]	51	Design		10 mil		
Design	0	procure				
Procure		install				
Install the		the				
monitoring		Hybrid				
and		vehicle				
maintenan		promoti				
		on and				
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application		In the				
s in the		country				
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	5.2.	Design,				
		Approve				
		and Set				
		up the				
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Action 6 :	6.1.	Assess		1 mil		
Assess		and				
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	6.3.	Prepare			Ì			
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	6.4.	Design,						
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		reducin						
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		y demand						
		in the						
Tatal Cathorne		y gria.						44,000,00
I otal Estimated Budget								14,968,00

6.1.3 Grid Connected Electric Vehicles

The anticipated expenses for implementing this TAP are estimated to range from US\$10 million to US\$20 million. This TAP concludes with a project proposal focused on On-Grid Electric Vehicles, named the Tonga On-grid EVs (TONGREVs Project).

6.1.3.1 Introduction

Tonga Energy Road Map Plus (TERMPlus) established a goal to restrict the increase in oil consumption for road transportation to an average of 1.4% annually, with an overall aim to cap the growth at a 25% increase by the year 2035 (GOT, 2021b).

6.1.3.2 Objective of the TAP for Grid Connected Electric Vehicle

The TERMPlus report also set a target for the adoption of Low Emission Vehicles, aiming for a cumulative reduction of greenhouse gas emissions amounting to 165 GgCO2e by 2030.

6.1.3.3 Action and Activities selected for this TAP.

6.1.3.3.1 Summary of Barriers to Grid Connected Electric Vehicles

The Barrier Analysis phase revealed numerous obstacles that could hinder the adoption of the On-grid electric vehicles technologies. These obstacles were categorized into two primary groups: financial and fiscal barriers, which pertain to challenges such as policies to ensure that on-grid EV and charging facility are safe, accessible and affordable with minimal impacts on national electricity grid. Additionally, the acquisition cost, high upfront cost and absence of policy interventions are major cost-related barriers. The second group consists of non-financial barriers, which include issues stemming from uncertainties in public policies, lack of policy work and actions such as reduced import taxes, reliance on availability of appropriate charging infrastructure, availability of fast charging facility, insufficient institutional capacity and knowledge, absence of vehicles standard and regulation or regional e-mobility strategies, inadequate maintenance of infrastructure, new technology and limited expertise, insufficient review of motivators and barriers in the decision making processes, limited availability of on-grid models, undeveloped industry, limited adoption of on-grid EVs, insufficient knowledge on safety and performance of ongrid EVs, capacity to have evidenced based data collection and limited consultation with local stakeholders, and lack of coordination on data collection for policy development.

6.1.3.3.2 Financial and Fiscal Barriers

6.1.3.3.2.1 Insufficient Policies to ensure safe , accessible and affordable on-grid EVs

Policies that ensure that On-Grid EVs and charging are safe, accessible, affordable, and have positive impacts on the electricity grid.

6.1.3.3.2.2 High upfront cost, Acquisition cost and Absence of policy interventions

High upfront costs due to new infrastructures. Acquisition costs have been identified as major market restraints

6.1.3.3.2.3 Lack of Policy Work and Actions on Import Taxes

No policy interventions in place on on-grid EVs.

6.1.3.3.3 Non-Financial Barriers

6.1.3.3.3.1 Uncertainties in public policies on appropriate on-grid EVs charging infrastructure The shortcomings in public policy, combined with limited capabilities within energy institutions, have resulted in regulatory and legislative are major market constraint. Additionally, there exists a lack of comprehensive policies and regulatory frameworks, along with certain essential types of legislation..

6.1.3.3.3.2 Institutional

Full reliance on availability of appropriate grid connected infrastructure for grid-connected EVs. Limited availability of infrastructures for public use. Insufficient institutional capacity and knowledge production.

6.1.3.3.3.3 Technical

Absence of vehicles regulation and standards, and the absence of endorsed regional or national e-mobility strategies. Inadequate maintenance of transportation infrastructure which contribute to high emissions. Additionally, this is new technology and we have limited expertise in service centres.

6.1.3.3.3.4 Market

The lack of a comprehensive review of motivators and barriers in decision-making processes. The limited availability of on-grid models and designs further hinders adoption. Furthermore, underdeveloped industry is also cited as significant market restraints.

6.1.3.3.3.5 Information and Public Awareness

The novelty of On-Grid electric vehicle (EV) technology and its limited adoption among certain demographics, and insufficient knowledge and familiarity concerning the safety and performance of on-grid electric vehicles. There is also lack of capacity to establish an evidenced based data collection and analysis and also there is minimum consultation with local stakeholders on on-grid EVs. There is also lack of comprehensive coordination of data collection for policy developments.

6.1.3.3.4 Summary of Measures to Overcome the Barriers

The following subsequent actions were recognized to alleviate obstacles.

6.1.3.3.5 Financial and Fiscal Measures

6.1.3.3.5.1 Insufficient Policies to ensure safe, accessible and affordable on-grid EVs.

Design and formulate the financial policy framework for On-grid EVs. Design and offering incentives to reduce upfront costs is crucial, as there are price differences between electric vehicles. Policy incentives primarily come in the form of tax reductions or exemptions.

6.1.3.3.5.2 High upfront cost, Acquisition cost and Absence of policy interventions

Enhancing financial risk management to overcome fiscal and financial obstacles, with incentives primarily come in the form of tax reductions or exemptions. Countries apply various incentives such as import duties, customs taxes, excise taxes, and other tariffs related to international trade to make on-grid electric vehicles infrastructure imports more affordable and attractive. The exemption of vehicle registration or import fees is

suggested as a targeted policy for particular groups that would derive the most benefit from a reduction in vehicle prices. Offering incentives to reduce upfront costs is crucial, as the price difference between electric vehicles

6.1.3.3.5.3 Lack of Policy Work and Actions such as Import Taxes Policy

Revise tax regulations related to import duties and could possibly improve the government procurement policies for on-grid EVs.

6.1.3.3.6 Non-financial Measures

6.1.3.3.6.1 Uncertainties in public policies on appropriate on-grid EVs charging infrastructure

Develop coordinated policies. Setting targets and mandates for on-grid EV uptake, as well as developing a national policy on implemented on-grid EVs actions. Incentivize the adoption of economically viable EV types that offer societal and environmental benefits, such as providing tax breaks. There is need for implementation of an EV insurance policy 6.1.3.3.6.2 Institutional Measures

Advantage of on-grid charging facility and introduction of Electric Vehicles (EVs) in the municipal government fleet can help reduce institutional barriers and modelling of these simpler systems, especially in the early stages of vehicle-to-grid development as 24 hours services on-grid EV.

6.1.3.3.6.3 Technical Measures

Develop Standard for on-Grid Electric Vehicle. Ensuring sustainable maintenance of all vehicles maintenance course development for technicians, and Independent companies invest in solar generation and promote daytime EV charging through incentives like time-of-use tariffs and workplace charging infrastructure. Government of Tonga and Private Companies to formally adopt the right model of on-grid vehicle. Tonga could benefit from using the EV Charging and Grid Integration Tool developed by the IEA to assess the grid impacts of EVs and implement strategies to mitigate these impacts. Promotion and Encouraging the adoption of on-grid Electric Vehicles

6.1.3.3.6.4 Market Measures

Government review of market barriers and existing decision making processes for on-grid vehicle. Government Ministries and Private Sector Companies to jointly discuss the issues and come up with solutions. Multi-stakeholders decision making processes on the issue

6.1.3.3.6.5 Information and Public Awareness Measures

Promoting awareness and adoption of EVs and associated measures, while monitoring international advancements and staying updated on relevant global technologies. Raising consumer awareness through a public information campaign to promote electro-mobility, and increasing developer awareness by establishing construction requirements for EV charging stations. Enhancing the collection and management of energy data to support the development of comprehensive energy information, particularly for the transport sector. Institutionalization of data collection and analysis of data and enhancing transport data collection and management. Public Awareness Programs on on-grid EVs and
involvement of key stakeholders in data collection and analysis as well as production of evidenced based decision making.

6.1.3.4 Actions Selected To Be Included in the TAP

1. Assess the feasibility of on-grid EVs as source of funding. Currently, the market for ongrid EVs are heavily relying on private projects without government guarantee on technologies. On-grid EV users require confirmation of the business's viability before committing their resources. The studies should encompass all pertinent external factors, such as the difficulties in attracting investors, the suitable economic framework for full cost recovery electricity tariff, the integration of maximum demand for on-grid wind into the national electricity grid, and effective strategies to manage inflation in electricity tariffs.

2. Raise awareness among both developers and users of on-grid EVs. It is crucial for both users and innovators to understand not only the potential of this technology but also the advantages it offers. This can be achieved by demonstrating the economic viability of the technology and justifying the adoption of on-grid EVs. Additionally, the government must enhance essential data collection efforts and address the current lack of expertise in this area.

3. Improve access to financing for on-grid EVs investments: The cost of on-grid EVs pose a significant obstacle for investors seeking to enter into long-term financing agreements with financiers. Encourage measures to lower borrowing expenses and loans in commercial banks. The Department of Energy ought to collaborate with the Ministry of Finance and the Ministry of Revenue to pinpoint legislative interventions that could facilitate the imports and adoption of on-grid EVs technologies.

Technology	Activities	Responsible
Action Plan		Stakeholder
1.Establish appropriate institutional set	1.1. Long Term Institutional Set Up 1.1.1. Long Term Government Institutional set up and financial Policy incentives to	DoE (MEIDECC), DoCC (MEIDECC) Ministry of
up for the TAP	address high cost of on-grid EVs, through tax incentives. 1.1.2. Establish the financial risk management policy to address financial and fiscal issues.	Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC NGOs and Local
	 1.2. Development of Ministry of Energy to assess and address Lack of Policy Work and Actions 1.2.1. Encourage on-grid EVs design, operation and maintenance services. 	Energy Consultants Local EVs Business.
	1.2.2. Promote the establishment of EVs infrastructure and dealers and EVs services.	

Table 50: Activities to be implemented to enhance diffusion of on-grid EVs.

2. Assess the	2.1.	Conduct the economic, financial	DoE(MEIDECC),
economic		and fiscal feasibility of the	DoCC (MEIDECC)
feasibility of		purchase and operation of On-grid	Ministry of
investment		EVs in Tonga.	Infrastructure, Ministry
on on-grid	2.1.1.	Assess possible financing	of Police and Traffic
EVs		opportunities for EVs in Tonga,	TPL. University of
		considering lack of policy work and	Tonga, GCF,
		actions, and high upfront cost and	SPC,NGOs and Local
		acquisition cost.	Energy Consultants
	2.1.2.	Assess the suitability of	Local EVs Business
		government de-risking guarantee	
		for the technology.	
	2.1.3.	Identify all the insufficient policy,	
		legislative and regulatory obstacles	
		such as import tax policies, tax	
		policy incentives, exemption of	
		vehicle registration and so on.	
	2.1.4.	Identify all possible donors	
		supported risk reduction	
		methodology and financial options.	
	2.2.	Carry out market survey to ensure	DoE(MEIDECC),
		business viability of government	DoCC (MEIDECC)
		taxes regulation and import duties	Ministry of
		to improve procurement policy for	Infrastructure, Ministry
		on-grid EVs	of Police and Traffic
	2.2.1.	Identify the uncertainties of public	TPL. University of
		policies and policy options to	Tonga, GCF,
		reduce cost of on-grid EVs in	SPC,NGOs and Local
		Tonga	Energy Consultants
	2.2.2.	Commercial model for full cost	Local EVs Business
		recovery of the on-grid EVs	
	2.3.	Conduct the economic feasibility of	DoE(MEIDECC),
		the adoption of on-grid EVs in the	DoCC (MEIDECC)
		country and impacts of high upfront	Ministry of
		cost and inflation in the adoption	Infrastructure, Ministry
		process	of Police and Traffic
	2.3.1.	Identify the appropriate on-grid	TPL. University of
		EVs policy incentives, and	Tonga, GCF,
		institutional improvements.	SPC,NGOs and Local
	2.3.2.	Identify the most appropriate	Energy Consultants
		source of financing for on-grid EVs	Local EVs Business
		investment needs.	
	2.3.3.	On-grid EVs coordinated policy	
		improvements for government	
		vehicle fleet	
	2.3.4.	On-grid EVs regulatory	
		improvements for electricity grid	

		1		
			operations and assessment of the	
		235	On-arid EVs legislative	
		2.0.0.	improvements for EV charging and	
			arid integration tools	
3	Create	31	Develop awareness material	
0.	Awareness	0.1.	targeting different stakeholders (i e	DoCC (MEIDECC)
	of both		Private Sector Decision Makers	Ministry of
	Developer		Users of EVs local institutions of	Infrastructure Ministry
	and users of		technology)	of Police and Traffic
	the	3.1.1.	Donors financial opportunities for	TPL. University of
	technology	•••••	EVs development for joint	Tonga, GCF.
			government/private sector model.	SPC.NGOs and Local
		3.1.2.	Donors financing options for EVs	Energy Consultants
			designing, installing and operation	Local EVs Business
			maintenance standards of the	
			technology	
		3.1.3.	public policy improvements for EVs	
			purchase to support national	
			energy targets on EVs	
		3.1.4.	Improve capacity through training	
			on designing, installing and	
			maintenance of EVs	
		3.1.5.	Training on capacity to evaluate	
			and interpret EVs data in order to	
			formulate effective EVs effective	
		040	and improvement policies.	
		3.1.6.	Encourage training program	
			approaches for EVS business	
			delivery	
		3.2	Develop a communication strategy	
		J.Z.	Develop a continuitication strategy Profile for target stakeholders	
			particularly the adopters of the	Ministry of
			technology	Infrastructure Ministry
		321	Short Term Training materials on	of Police and Traffic
		0.2	on-site experiences as shared	TPL. University of
			regional sources of information and	Tonga, GCF.
			data analysis.	SPC,NGOs and Local
		3.2.2.	Training on innovative approaches	Energy Consultants
			for designing, procuring,	Local EVs Business
			installation and maintenance of	
			EVs.	
		3.2.3.	Encourage private sectors EVs	
			services and auditing business	
			opportunities.	
		3.2.4.	Institutionalization of EVs data	

		1		
		3.2.5.	collection and analysis and publication of data analysis and indicators for evidenced policy decision makings. Formulation of EVs database and analysis of EVs data to guide EVs service delivery development and business opportunities	
		5.5.	on EVs projects , especially attract attentions of investors and users	DoCC (MEIDECC) Ministry of
		3.3.1.	Enabling legislation and regulatory environment	Infrastructure, Ministry of Police and Traffic
		3.3.2.	Improvement on accessibility and permitting process on-grid EVs infrastructure.	TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
4.	Enhance Access to Financing	4.1.	Develop Government financial policy incentives to assist lowering the cost of EVs technology	DoE(MEIDECC), DoCC (MEIDECC) Ministry of
		4.1.1.	Identify and improve commercial banks financing policy and accessibility to EVs loaning scheme projects	Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business
		4.2.	Engage in dialogue with government development partners to identify possible government incentives and subsidies for the EVs technologies as it contributes to global benefit Ensure accessibility and availability	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCE
		ч. 2 .1.	of technical standard and minimum labelling certification for import of EVs to Tonga	SPC,NGOs and Local Energy Consultants Local EVs Business
		4.3.	Discuss and Justify the adoption of the EVs for investors and users in Tonga	DoE(MEIDECC), DoCC (MEIDECC) Ministry of
		4.3.1.	Availability of most feasible financing options for EVs projects	Infrastructure, Ministry of Police and Traffic
		4.3.2.	Improvements of the national electricity grid for EVs projects	TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants

	Local EVs Business

6.1.3.5 Action To Be Implemented as Project Ideas

The aforementioned three actions, specifically the feasibility study, awareness raising, and improved access to financing, will be evaluated for implementation as potential project ideas.

6.1.3.6 Stakeholders and Implementation Timelines for the TAP

Table 51 shows the list of stakeholders to implement the TAP

Table 51: List of Activities and Respective Stakeholders to Implement the TAP

Number	Activities	Responsible Body	Timelines
1. Establish appropriate institutional set up for the TAP	Activities1.1. Long Term Institutional Set Up1.1.1. Long Term Government Institutional set up and financial Policy incentives to address high cost of on-grid EVs, through tax incentives.1.1.2. Establish the financial risk management policy to address financial and fiscal issues.1.2. Development of Ministry of Energy to assess and address Lack of Policy Work and Actions1.2.1. Encourage on-grid 	Responsible Body DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	3-2 Months
2. Assess the economic feasibility of investment on on-grid EVs	 2.1. Conduct the economic, financial and fiscal feasibility of the purchase and operation of On-grid EVs in Tonga. 2.1.1. Assess possible financing opportunities for EVs in Tonga, considering lack of policy work 	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local	3-3Months

		2.1.2. 2.1.3. 2.1.4. 2.2. 2.2.	and actions, and high upfront cost and acquisition cost. Assess the suitability of government de- risking guarantee for the technology. Identify all the insufficient policy, legislative and regulatory obstacles such as import tax policies, tax policy incentives, exemption of vehicle registration and so on. Identify all possible donors supported risk reduction methodology and financial options. Carry out market survey to ensure business viability of government taxes regulation and import duties to improve procurement policy for on-grid EVs Identify the uncertainties of public policies and policy options to reduce cost of on-grid EVs in	EVs Business DoE(MEIDECC), DoCC (MEIDECC) DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	4 Months
		2.2.2.	Tonga Commercial model for full cost recovery of the on-grid EVs		
3.	Create Awareness of both Developer, and users of the technology	3.1.	Conduct the economic feasibility of the adoption of on- grid EVs in the country and impacts of high upfront cost and inflation in the adoption process Identify the	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy	6 Months

	appropriate on-grid EVs policy incentives, and institutional improvements. 3.1.2. Identify the most appropriate source of financing for on-grid EVs investment needs. 3.1.3. On-grid EVs coordinated policy improvements for government vehicle fleet 3.1.4. On-grid EVs regulatory improvements for electricity grid operations and assessment of the grid 3.1.5. On-grid EVs legislative improvements for EVs	Consultants Local EVs Business	
4. Create Awareness of both Developer, and users of the technology	 charging and grid integration tools 4.1. Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs, local institutions of technology). 4.1.1. Donors financial opportunities for EVs development for joint government/private sector model. 4.1.2. Donors financing options for EVs designing, installing and operation maintenance standards of the technology 4.1.3. public policy 	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	2 Months

	improvements for		
	EVS purchase to		
	Energy targets on		
	EVS		
4.1.4.	Improve capacity		
	through training on		
	designing, installing		
	and maintenance of		
445			
4.1.5.	I raining on capacity		
	to evaluate and		
	Interpret EVS data in		
	order to formulate		
110	Encourage training		
4.1.0.	Encourage training		
	for EVa business		
	opportunition and		
	delivery		
12	Develop 2		2 Months
T.Z .	communication	DoCC (MEIDECC),	
	strategy Profile for	Ministry of	
	target stakeholders	Infrastructure	
	particularly the	Ministry of Police	
	adopters of the	and Traffic TPI	
	technology	University of Tonga.	
421	Short Term Training	GCF SPC NGOs	
	materials on on-site	and Local Energy	
	experiences as	Consultants Local	
	shared regional	EVs Business	
	sources of		
	information and data		
	analysis.		
4.2.2.	Training on		
	innovative		
	approaches for		
	designing, procuring,		
	installation and		
	maintenance of EVs.		
4.2.3.	Encourage private		
	sectors EVs services		
	and auditing business		
	-		

	4.2.4.	Institutionalization of EVs data collection and analysis and publication of data analysis and indicators for evidenced policy decision makings. Formulation of EVs database and analysis of EVs data to guide EVs service delivery development and business opportunities		
5. Enhance Access t Financing	5.1. 5.1.1. 5.1.2.	Implement awareness campaign on EVs projects , especially attract attentions of investors and users Enabling legislation and regulatory environment Improvement on accessibility and permitting process on-grid EVs	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	6. Months
	5.2.	Develop Government financial policy incentives to assist lowering the cost of EVs technology Identify and improve commercial banks financing policy and accessibility to EVs loaning scheme projects	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	5 Months
	5.3.	Engage in dialogue with government development partners to identify possible government incentives and subsidies for the EVs	DoE(MEIDECC), DoCC (MEIDECC) Ministry of Infrastructure, Ministry of Police and Traffic TPL. University of Tonga,	12 Months

technologies as it contributes to global benefit 5.3.1. Ensure accessibility and availability of technical standard and minimum labelling certification for import of EVs to Tonga	GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	
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6.1.3.7 : Roles of Stakeholders

The roles of stakeholders are shown in Table 52 below

1	Ministry of Energy	Plan and manage energy policies, energy targets, and assess energy goals and objectives						
		Oversee energy projects including on-grid EVs energy projects						
		Identify and source funding to implement on-grid EVs						
		Formulate and present energy plan, strategies and programmes to government and seek Cabinet's approval						
		Promote public awareness and informed decisions on on- on-grid EVs.						
2	Department of	Focal Point of the United Nations Convention on Climate						
	Climate Change , MEIDECC	Change						
		Sourcing funds from climate funds and Global Environmental Facility						
		GCF focal point in Tonga						
3	Department of Environment , MEIDECC	Responsible for environmental policies and environmental management						
4	Ministry of Finance and Planning	Responsible for financial policies and policy incentives for businesses.						
5	Ministry of Economic and Trade	Responsible for Business incentive policies						
6	Ministry of Foreign Affairs	Responsible for foreign relations with donors and development partners.						
7	Tonga Power Limited, TPL	Manage and Plan the national electricity grids and monitor all projects that has capacity to influence the electricity generation and distribution and transmissions.						
8	Tonga Electricity Commission	Responsible for regulatory policies and regulation of the national electricity grid.						

9	University of Tonga and University of the South Pacific and National consultants	Research and Development.
10	Regional Energy Institutions	Responsible for regional energy coordination and general assessment and analysis of on-grid projects.
11	Development Partners and Donors	Financing of on-grid EVs projects
12	Local NGOs and Consultants	Technical assessment and specific technical analysis of on-grid EVs
13	Contractor and Subcontractor for technological installation of on- grid PV	Technical installation of the technology

6.1.3.8 : Scheduling of Activities

Table 53 describes the sequence and timing of specific activities and responsibilities

Table 53: Scheduling of Activities

Action	Activities	Planning		Imple ion	mentat	Responsibl e Stakeholde r
		Star t	End	Star t	End	
 Establish appropriate institutional set up for the TAP 	1.1. Long TermInstitutional Set Up1.1.1. Long TermGovernmentInstitutional set up andfinancial Policyincentives to addresshigh cost of on-grid EVs,through tax incentives.1.1.2. Establish thefinancial riskmanagement policy toaddress financial andfiscal issues.1.2. Development ofMinistry of Energy toassess and addressLack of Policy Workand Actions1.2.1. Encourage on-	202 5	2025	202 5	2025	DoE(MEID ECC), DoCC (MEIDECC)) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGO s and Local Energy Consultant s Local

		grid EVs design, operation and maintenance services. 1.2.2. Promote the establishment of EVs infrastructure and dealers and EVs services.					EVs Business
2. Assess economic feasibility investment on-grid EVs	of on	 2.1. Conduct the economic, financial and fiscal feasibility of the purchase and operation of On-grid EVs in Tonga. 2.1.1. Assess possible financing opportunities for EVs in Tonga, considering lack of policy work and actions, and high upfront cost and acquisition cost. 2.1.2. Assess the suitability of government derisking guarantee for the technology. 2.1.3. Identify all the insufficient policy, legislative and regulatory obstacles such as import tax policies, tax policies, tax policy incentives, exemption of vehicle registration and so on. 2.1.4. Identify all possible donors supported risk 	5	2025	5	2025	DOE(MEID ECC), DoCC (MEIDECC)) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGO s and Local Energy Consultant s Local EVs Business

			reduction methodology and financial options					
		2.2.	Carry out market survey to ensure business viability of government taxes regulation and import duties to improve procurement policy for on-grid EVs Identify the uncertainties of public policies and policy options to reduce cost of on-grid EVs in Tonga i. Comm ercial model for full cost recove ry of the on- grid EVs	202 5	2025	202 5	2025	DoE(MEID ECC), DoCC (MEIDECC)) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGO s and Local Energy Consultant s Local EVS Business
3.	Create Awareness of both Developer, and users of the technology	3.1. 3.1.1. 3.1.2.	Conduct the economic feasibility of the adoption of on- grid EVs in the country and impacts of high upfront cost and inflation in the adoption process Identify the appropriate on- grid EVs policy incentives, and institutional improvements. Identify the most	202	2025	202	2025	DoE(MEID ECC), DoCC (MEIDECC)) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGO s and Local

1					1		
	3.1.3. 3.1.4. 3.1.5.	appropriate source of financing for on- grid EVs investment needs. On-grid EVs coordinated policy improvements for government vehicle fleet On-grid EVs regulatory improvements for electricity grid operations and assessment of the grid On-grid EVs legislative improvements for EV charging ond grid					Energy Consultant s Local EVs Business
		and grid					
		integration tools		000-	000	0007	D E (1)==5
	3.2. 3.2.1. 3.2.2.	Develop awareness material targeting different stakeholders (i.e. Private Sector, Decision Makers, Users of EVs, local institutions of technology). Donors financial opportunities for EVs development for joint government/priv ate sector model. Donors financing options for EVs designing, installing and	202	2025	202	2025	DoE(MEID ECC), DoCC (MEIDECC) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGO s and Local Energy Consultant s Local EVs Business

		 3.2.3. 3.2.4. 3.2.5. 3.2.6. 	operation maintenance standards of the technology public policy improvements for EVs purchase to support national energy targets on EVs Improve capacity through training on designing, installing and maintenance of EVs Training on capacity to evaluate and interpret EVs data in order to formulate effective EVs effective and improvement policies. Encourage raining program approaches for EVs business opportunities and business service					
4.	Enhance Access to Financing	4.1.	delivery. Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology Short Term Training materials on on- site experiences as shared regional sources	202	2025	202 5	2025	DoE(MEID ECC), DoCC (MEIDECC)) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF,

	of information					SPC,NGO
	and data					s and
	analysis.					Local
4.1.2.	Training on					Energy
	innovative					Consultant
	approaches for					s Local
	designing,					EVs
	procuring,					Business
	installation and					
	maintenance of					
	EVs.					
4.1.3.	Encourage					
	private sectors					
	EVs services					
	and auditing					
	business					
	opportunities.					
4.1.4.	Institutionalizatio					
	n of EVs data					
	collection and					
	analvsis and					
	publication of					
	data analysis					
	and indicators for					
	evidenced policy					
	decision					
	makings					
415	Formulation of					
1.1.0.	FVs database					
	and analysis of					
	EVs data to					
	auide EVs					
	service deliverv					
	development and					
	husiness					
	onnortunities					
12	Implement	202	2026	202	2026	
Τ. Ζ.	awareness	5	2020	202 5	2020	
	campaign on	0		5		D_0CC
	EVs projecte					
	especially attract					(MEIDECC)
	attentions of) Ministry
	investors and					Infrastructu
	HINGOLOIS ALLU					ro Ministry
121	users Enabling					of Polico
4.2.1.						and Traffic
	rogulatory					
	regulatory					IFL.

4.2.2.	environment Improvement on accessibility and permitting process on-grid EVs infrastructure.					University of Tonga, GCF, SPC,NGO s and Local Energy Consultant s Local EVs Business
4.3.	Develop Government financial policy incentives to assist lowering the cost of EVs technology Identify and improve commercial banks financing policy and accessibility to EVs loaning scheme projects	202	2027	202 7	2027	DoE(MEID ECC), DoCC (MEIDECC)) Ministry of Infrastructu re, Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGO s and Local Energy Consultant s Local EVs Business

Stakeholders Timelines and Budget Estimate for Activities.

Table 54: Scheduling and Sequencing of specific Activities for On-Grid EVs

Actions	Activities		Yea	r (2025-2027)
1. Long Term	1.1.	Confirm positions for recruitment		
Institutional		and advertisement of Positions		
Set Up	1.2.	Confirm office space for the		
		project team in the Department of		
		Energy		
	1.3.	Allocate Budget for Salaries and		
		Recruitment		
	1.4.	Meet Cost for office furniture/		

		equipment		
	1.5.	Meet Other Cost for operation and		
		management of the office.		
2. Assess the	2.1.	Identify and Confirm TOR and hire		
feasibility		consultant to conduct the		
of Grid EVs		assessment		
(HVS)				
	2.2.	Identify and Justify the economic,		
		financial and fiscal feasibility of the		
		Lifecycle Cost of GRID EVs		
	2.3.	Identify key barriers to the		
		economic and financial feasibility		
		of the Grid EVs		
	2.4.	Identify the solutions to the		
		economic and financial feasibility		
		of the Grid EVs		
	2.5.	Carry out Market Survey to ensure		
		business viability of the		
		technology to investors.		
	2.6.	Identify and present the key		
		factors for business viability of the		
		Grid EVs		
	2.7.	Identify policy improvements		
	0.0	needed		
	2.8.	conduct the economic feasibility		
	2.0	dentify barriers and colutions to	•	
	2.9.	the economic feasibility Grid EVe		
	2 10	Identify policy improvements		
	2.10.	Grid EVs Policy		
	2.10.1	Grid EVs Legislation		
	2.10.2	Grid EVs Regulation		
	2.10.0	Technical Feasibility		
3 Create	3.1	Identify awareness materials for		
Awareness	0.1.	various different stakeholders	_	
of both	311	Awareness materials for Grid EVs		
Developer		developers		
and users	3.1.2.	Awareness materials for Grid EVs		
of the Grid		dealers		
EVs	3.1.3.	Awareness materials for Grid EVs		
technology		Users		
	3.2.	Develop awareness material		
		targeting different stakeholders		
		(i.e. Private Sector, Decision		
		Makers, Users of Grid EVs		

			1	
	Technology, financial institutions			
	of technology)			
	3.2.1. Develop materials for Grid EVS			
	2.2 Developers			
	5.5. Develop a communication			
	stakeholders particularly the			
	adopters of the technology			
	3.3.1 Develop materials for Grid EVs			
	developers			
	3.3.2 Develop materials for Grid EVs			
	dealers			
	3.3.3. Develop materials for Grid EVs			
	users			
	3.4. Implement awareness campaign			
	on HVs, especially attract			
	attentions of investors and users			
	3.4.1. Implement awareness campaign			
	for Grid EVs developers			
	3.4.2. Implement Awareness Campaign			
	for Grid EVs appliances Dealers			
	3.4.3. Implement Awareness Campaign			
	10r Grid EVS users	•		
	3.5. Gender Mainstreaming and Social			
1 Enhance	1 1 Develop Einancial Policy Incentives to			
Access to	assist lowering the cost of Grid EVs			
Financing	technology			
. marienig	4.1.1. Identify all possible policy incentives			
	to assist lowering the cost of Grid EVs			
	4.1.2. Identify possible legislative incentives			
	to assist lowering the cost of Grid EVs			
	appliances			
	4.1.3. Identify possible regulatory incentives			
	to assist lowering the cost of Grid EVs			
	appliances			
	4.2. Engage in dialogue with government			
	development partners to provide			
	Incentives and subsidies for the			
	bonofit			
	4.2.1 Consultation with government on			
	nolicy incentives and subsidies			
	4.2.2 Consultation with donors on policy			
	incentives and subsidies on donor			
	funding projects.			
	4.2.3. Consultation with dealers on policy			

	incentives and subsides on imported Grid EVs components		
4.3.	Discuss and Justify the adoption of the most suitable model for Grid EVs investors and private sectors in Tonga		
4.4. 4.5.	identify, Develop and recommend all financial policy incentives to Cabinet to assist lowering the cost of investment on Grid EVs Provide clear justifications for adoption of the Grid EVs		
4.6.	Engage in dialogue with development partners on suitable adoption of subsidies for the technology as it contributes to global benefit; Confirm possible ways and preferred conditions and methodology for supporting financing of Grid EVs in Tonga		
4.7.	Confirm potential financing options with international, regional and bilateral donors and development partners for adoption of Grid EVs in the country		
4.8.	Prepare Cabinet Approval for most sustainable financing options of hybrid vehicle in the country and its plan to achieve share of carbon emission reduction in the energy sector.		

Table 55: Actions, Activities, Capacity Building and Costs for Grid EVs.

Actions	Activities		Capacity Needs	Cost USD
1. Institutional	1.1.	Confirm positions for	Consultation &	18,000
Set Up		recruitment and	Meeting Cost	
		Conduct	Advertisement	
		advertisement	Cost	
	1.2.	Confirm office space	Rent and	200,000
		for the project team	Accommodation	
		in the Department of		
		Energy		
	1.3.	Allocate Budget for	Salaries	800,000
		Salaries and		
		Recruitment		
	1.4.	Meet Cost for office	Office Furniture	200,000

		furniture/ equipment	and Equipment	
	1.5.	Meet Other Cost for	Electricity and	
		operation and	Telecommunicati	
		management of the	on	
		office.		
2. Assess the	2.1.	Identify and Confirm	Meeting Cost and	500,000
feasibility		TOR and hire	Consultant Fees	
of Grid		consultant to		
EVs		conduct the		
	0.0	assessment		450.000
	Ζ.Ζ.	the economic	Local Travel,	150,000
		financial and ficcal	Cost and	
		feasibility of the	Research Cost	
		Lifecycle Cost of	Research Cost	
		Grid FVs in Tonga		
	2.3	Identify/Confirm kev	Workshop and	50.000
		barriers to the	Consultation Cost	
		economic and		
		financial feasibility of		
		Grid EVs		
	2.4.	Identify the solutions	Workshop and	
		to the economic and	Consultation Cost	
		financial feasibility of		
	~ -	the Grid EVs		000.000
	2.5.	Carry out Market	Develop Survey	300,000
		Survey to ensure	Questionnaire,	
		the technology to	workshops	
		investors	Implementation of	
			Survey	
	2.6.	Identify and present	Finalization and	30,000
		the key factors for	presentation of	
		business viability of	Survey Report	
		the Grid EVs		
	2.7.	Identify operation	Consultation,	20,000
		policy improvements	Meetings and	
		needed	Cabinet	
		• • • • •	Submissions	
	2.8.	Conduct the	Consultation and	500,000
		economic Teasibility	Neeting Cost and	
	2.0	Unite GIUEVS	Workshop Cost	20.000
	2.9.	solutions to the	workshop Cost	20,000
		economic feasibility		
		of the integrated Grid		
		EVs		

	2.10.Identify improvementspolicy Policy, Regulatory and Legal Review of existing policy and legal2.10.1.Grid EVs Policy LegislationLegal Review of existing policy and legal2.10.3.GridEVs framework and documents	400,000
 Create Awareness of both Developer, and users of the HVs technology 	 3.1. Identify awareness materials for various different stakeholders. 3.1.1. Awareness materials for Grid EVs developers 3.1.2. Awareness materials for Grid EVs dealers 3.1.3. Awareness materials for Grid EVs Users 	30,000
	 3.2. Develop awareness material targeting different of public stakeholders (i.e. Private Sector, Decision Makers, Users of Grid EVs Technology, financial institutions of technology) 3.2.1. Develop materials for Grid EVs developers 	200,000
	 3.3. Develop a communication strategy Profile for target stakeholders particularly the adopters of the technology. 3.3.1. Develop materials for Grid EVs developers 3.3.2. Develop materials for Grid EVs dealers 3.3.3. Develop materials for Grid EVs users 	40,000
		100,000

		awareness	and Television	
		campaign on Grid	Programs,	
		EVs projects.		
		especially attract	Publication of	
		attentions of	awareness	
		investors and users	materials	
	341	Implement		
	•••••	awareness	Meetings with	
		campaign Grid FVs	stakeholders	
		developers		
	342	Implement	Other public	
	••••=•	Awareness	awareness	
		Campaign for Grid	programs	
		EVs Dealers	programo	
	343	Implement		
	0.1.0.	Awareness		
		Campaign for Grid		
		EVs users		
	3.5	Gender		20.000
	0.01	Mainstreaming and		20,000
		Social Inclusion		
4 Enhance	4 1	Identify/Develop	Policy Dialogue	50 000
Access to		Financial Policy	Meetings and	00,000
Financing		Incentives to assist	consultation with	
r manon g		lowering the cost of	kev stakeholders	
		Grid EVs technology		
	4.1.1.	Identify all possible	Policy Incentives	
		policy incentives to	to reduce cost of	
		assist lowering the	imports of	
		cost of Grid EVs	technology	
	4.1.2.	Identify possible	55	
		legislative incentives	Policy incentives	
		to assist lowering the	for power	
		cost of Grid EVs	purchase	
	4.1.3.	Identify possible	, agreement (PPA)	
		regulatory incentives	0 ()	
		to assist lowering the		
		cost of Grid EVs		
	4.2.	Engage in dialogue	Development	40,000
		with government	partners meetings	
		development	and workshops	
		partners to provide	on identifying	
		incentives and	policy incentives	
		subsidies for the	and subsidies for	
		technology as it	import of	
		contributes to global	technology and	
		benefit	equipment.	

4.2.1.	Consultation with		
	government on		
	policy incentives and		
	subsidies.		
4.2.2.	Consultation with		
	donors on policy		
	incentives and		
	subsidies on donor		
4.0.0	funding projects.		
4.2.3.	Consultation with		
	incentives and		
	incentives and		
	imported Grid EVa		
	Vs components		
13	Discuss and Justify	Stakeholders	20.000
4.5.	the adoption of the	Consultation on	20,000
	most suitable model	Grid Policy and	
	for Grid EVs	Regulation	
	investors and private	regulation	
	sectors in Tonga		
4.3.1.	identify. Develop	Workshops/Cons	40.000
	and recommend all	ultation with key	,
	financial policy	stakeholders and	
	incentives to	development	
	Cabinet to assist	partners	
	lowering the cost of		
	investment Grid EVs		
4.3.2.	Provide clear		
	justifications for		
	adoption of the Grid		
	EVs	_	
4.4.	Engage in dialogue	Consultations	40,000
	with development	and Workshops	
	partners on suitable	and Meetings	
	adoption of		
	subsidies for the		
	technology as it		
	contributes to global		
	penelit, Conlinn		
	preferred conditions		
	and methodology for		
	supporting financing		
	of technology in		
	Tonga		
4.5	Confirm potential		

	T		
		financing options	
		with international,	
		regional and	
		bilateral donors and	
		development	
		partners for adoption	
		of Grid EV s in the	
		countrv	
	4.6.	Prepare Cabinet	
		Approval for most	
		sustainable	
		financing options of	
		the technology in the	
		country and its plan	
		to achieve chare of	
		reduction in the	
		energy sector.	
Total Requested B	udget		4,378

6.1.3.9 : Estimation of Resources for Action and Activities

To achieve successful and sustained technology diffusion, it is essential to enhance the capabilities of local technology importers and bidders and installers, especially local suppliers, overseas and local contractors and bidders of the technology, installers, and maintenance engineers. Furthermore, to facilitate accelerated diffusion, it is necessary to implement a train-the-trainers approach, enabling the replication of training programs across numerous regions.

The activities to be undertaken and their associated costs are presented in Table 56.

Table 56 : Financial considerations associated with the execution of the identified activities

Action	Activities	Plan	Imple mentat ion	Estima ted Cost	Source of Fund	Responsible Stakeholder	Justified Actions
		Start/ End	Start/E nd	(USD)			
1. Establi sh appropr iate instituti onal set up for the TAP	1.1. Long Term Institutional Set Up1.1.1. Long Term GovernmentInstitutional set up andandfinancial Policy incentives to address high cost of on-grid EVs, through tax incentives.1.1.2.Establish the financial risk management policy to address financial and fiscal issues.1.2.Development of Ministry of Energy to assess and address Lack of Policy Work and Actions1.2.1.Encourage on-grid EVs design, operation and maintenan ce services.1.2.2.Promote the establishm ent of EVs infrastructu re and dealers and EVs	End 2025 / 2025	nd 2025/2 025	1,318, 000	Donor s	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructure , Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Recruited personnel and office equipment
2. Assess	2.1. Conduct the	2025	2025/	2,320,	Donor	DoE(MEIDE	

the	economic,	/	2025	000	S	CC), DoCC
economic	financial and	2025				(MEIDECC)
feasibility	fiscal feasibility of					Ministry of
of	the purchase and					Ministry of
investment	operation of On-					Police and
on on-arid	arid EVs in					Traffic TPL.
EVs	Tonga.					University of
	2.1.1. Assess					Tonga, GCF,
	possible					and Local
	financing					Energy
	opportuniti					Consultants
	es for EVs					Local EVs
	in Tonga,					Business
	considerin					
	g lack of					
	policy work					
	and					
	actions,					
	and high					
	upfront					
	cost and					
	acquisition					
	COSL.					
	Z.I.Z. ASSess life					
	of					
	dovernme					
	nt de-					
	risking					
	quarantee					
	for the					
	technology					
	2.1.3. Identify all					
	the					
	insufficient					
	policy,					
	legislative					
	and					
	regulatory					
	obstacles					
	such as					
	import tax					
	policies,					
	tax policy					
	incentives,					
	exemption					

		2.1.4.	of vehicle registration and so on. Identify all possible donors supported risk reduction methodolo gy and financial options.						
3.	Creat e Awar enes s of both Deve loper , and users of the techn ology	3.1. 3.1.1. 3.1.2.	Carry out market survey to ensure business viability of governme nt taxes regulation and import duties to improve procureme nt policy for on-grid EVs Identify the uncertainti es of public policies and policy options to reduce cost of on- grid EVs in Tonga Commerci al model for full cost recovery of the on-grid EVs	2025 /202 5	2025/ 2025	530,00	Donor s	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructure , Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Recruitmen t of researchers and professiona I assessors
		3.2.	Conduct	2025	2025/		Donor	DoE(MEIDE	Recruitmen

	the	/	2025	S	CC), DoCC	t of
	economic	2025			(MEIDECC)	Assessors
	feasibility				Ministry of	
	of the				Infrastructure	
	adoption of				, Ministry Or Police and	
	on-arid				Traffic TPL.	
	EV/s in the				University of	
					Tonga, GCF,	
	and				SPC,NGOs	
	impacts of				and Local	
	high				Consultants	
	unfront				Local EVs	
	cost and				Business	
	inflation in					
	the					
	adontion					
	process					
321	Identify the					
5.2.1.	appropriat					
	appropriat					
	EVs policy					
	incentives					
	and					
	institutiona					
	improveme					
	nts					
322	Identify the					
0.2.2.	most					
	appropriat					
	e source of					
	financing					
	for on-grid					
	EVs					
	investment					
	needs.					
3.2.3.	On-grid					
	EVs					
	coordinate					
	d policy					
	improveme					
	nts for					
	governme					
	nt vehicle					
	fleet					
3.2.4.	On-grid					
	EVs					

3.2.5.	regulatory improveme nts for electricity grid operations and assessme nt of the grid On-grid EVs legislative improveme nts for EV charging and grid integration tools	2025	2025/2	Donor		Recruitmen
3.3.	Develop awareness material targeting different stakeholde rs (i.e. Private Sector, Decision Makers, Users of EVs, local institutions of technology). Donors financial opportuniti es for EVs developme nt for joint governme	2025 /202 5	2025/2 025	Donor s	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructure , Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	Recruitmen t of assessors and office equipment
3.3.2.	model. Donors					

	financing			
	ontions for			
	EVS			
	designing,			
	installing			
	and			
	operation			
	maintenan			
	ce			
	standards			
	Stanuarus			
	or the			
	technology			
333	public			
0.0.01	policy			
	Policy			
	Improveme			
	nts for EVs			
	purchase			
	to support			
	national			
	energy			
	targets on			
	F\/s			
004				
3.3.4.	Improve			
	capacity			
	through			
	training on			
	de a i encire e			
	aesigning,			
	installing			
	and			
	maintenan			
3.3.5.	Training			
	on			
	canacity to			
	oupdoity to			
	evaluate			
	and			
	interpret			
	FVs data			
	in order to			
	tormulate			
	effective			
	EVs			
	effective			
	ano			
	improveme			
	nt policies.			
336	Encourage			
0.0.0.	Encourage			

			raining program approache s for EVs business opportuniti es and business service delivery.						
4.	Enha nce Acce ss to Fina ncing	4.1. 4.1.1. 4.1.2.	Develop a communic ation strategy Profile for target stakeholde rs particularly the adopters of the technology Short Term Training materials on on-site experience s as shared regional sources of information and data analysis. Training on innovative approache s for designing, procuring, installation and maintenan ce of EVs.	2025 /202 6	2025/2	210,00	Donor s	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructure , Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	1.Consultati on with stakeholder s 2.Publish of public awareness materials

112	Encourage					
4.1.3.	Encourage					
	private					
	sectors					
	EVs					
	services					
	and					
	and					
	auditing					
	business					
	opportuniti					
	es.					
4.1.4.	Institutiona					
	lization of					
	EV/c data					
	collection					
	and					
	analysis					
	and					
	nublication					
	of data					
	anaiysis					
	and					
	indicators					
	for					
	evidenced					
	policy					
	decision					
	makings.					
4.1.5.	Formulatio					
	n of EVs					
	database					
	and					
	analysis of					
	EVs data					
	to guide					
	EVs					
	service					
	dolivory					
	uevelopme					
	nt and					
	business					
	opportuniti					
	es					
42	Implement	2025	2026/2	Donor	DoE(MEIDE	Contact
Ŧ.∠.	awaranaaa	/202	026	S	CC), DoCC	address
	awareness	5		-	(MEIDECC)	and internet
	campaign	-			Ministry of	communica
	on EVs				Infrastructure	tion links
	projects ,				, Ministry of	

4.2.1.	Enabling legislation and regulatory environme nt Improvem ent on accessibilit y and permitting process on-grid EVs infrastructu re.	2026	2026/2	Donor	Energy Consultants Local EVs Business	1 Conduct
4.3. 3.3.1.	Develop Governme nt financial policy incentives to assist lowering the cost of EVs technology Identify and improve commercia I banks financing policy and accessibilit y to EVs loaning scheme projects	2026 /202 6	2026/2 027	Donor s	DoE(MEIDE CC), DoCC (MEIDECC) Ministry of Infrastructure , Ministry of Police and Traffic TPL. University of Tonga, GCF, SPC,NGOs and Local Energy Consultants Local EVs Business	1.Conduct of Trainings 2.Distributio n of materials 3.Record and broadc ast of Radio and TV programs

6.1.3.10 : Management Planning Risks

Table 57 outlines the potential risks associated with the implementation of technology, along with possible measures to mitigate these risks and ensure that the process remains on track.

Risk Categories	Current Situation	Contingency Plan		
1. Cost of Technology	major cost risk due to	Government plan for		
	increasing cost of on-grid	increasing cost of		
	EVs over time	technology		
2. Scheduling Risks	There may be delays in implementing policies designed to promote the dissemination of technology, including those related to incentives for on- grid EVs. Additionally, there may be setbacks in carrying out the feasibility study.	Initiate strategic dialogues with the government of Tonga to enable the necessary intervention. Enhance awareness within the Department of Environment, Climate Change, and the Parliamentary Committee on Energy to promote these policies. Formulate a Memorandum of Understanding with pertinent Research and Development organizations		
		to ensure the timely		
		study.		
3. Implementation and Production Risks	A technology may fail to operate as intended; for instance, it might not perform as expected due to meet the national energy target.	Formulate an agreement with the technology provider to offer after-sales assistance. Develop a mechanism for collecting feedback related to the technology to guarantee that all concerns are resolved in a timely manner.		
4. Immediate Requirement Risks	Delay on financing from donors	A project manager ought to be appointed within the MEIDECC Office, with sufficient funding allocated for this role. This individual should be engaged on a full-time basis and provided with the		

Table 57: Management Risks and Possible Contingencies
		necessary tools and resources, which include access to a financial analyst and proficiency in cost estimation, as well as the requisite hardware and software for planning, scheduling, and project management, in addition to any other immediate tasks that may arise.
5. Changing habits of using technology	Changing to other vehicles due to increasing cost of on-grid EVs	Increasing awareness is crucial, as changing people's habits from using on-grid EVs. More policy incentives on on-grid EVs technologies.

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8 Annexes

8.1 : List of Workshop Participants

Technology Needs Assessment (TNA) Stakeholder Consultations. TAP Mitigation Participants. 12th December 2024.

1	Name	Filimone Fiftz
	Gender	Male
	Organization	Dept therein TNP condictor
	Email	more fifthe equail. com
	Signature	there
2	Name	Heta latricely
	Gender	Female
	Organization	Spare-Party Zone Tonge US
	Email	hetaco spere partizane - 6
	Signature	de
3	Name	TEVITA PALAVI
	Gender	MALE
	Organization	TOTAL ENERGIES
	Email	tevila. pakevietotalenergies.com
	Signature	- Chlar
4	Name	MATICA LETTA
	Gender	MALE
	Organization	ASCO MOTORS
	Email	Micha@asco.com.to
	Signature	noo
5	Name	Asela Tarfa
	Gender	Female
	Organization	MEIDECC
	Email	selaafuhia@quail.com
	Signature	det-

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6 Name	Sources tapon
Gender	Male
Organization	MEDDE - Climate Charge
Email	Equipering and the second second
Signature	
7 Name	KIPOLA SOUTANGA.
Gender	MALS
Organization	MEDECC - DEPARTMENT OF ENGRAY
Email	kip a sootanga a gurail. com
Signature	alling a series
8 Name	MASSFRED TRUTAL
Gender	MALE
Organization	Kits - E. E. S. 3
Email	tentauleognath com.
Signature	Hada
9 Name	Akesu tot
Gender	Femalo
Organization	ADDELDECC
Email	alogintengemail. com
Signature	alle a
10 Name	Selate Guete
Gender	Female
Organization	MEIDECC
Email	lote lilo squate @ quail- com
Signature	51-

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11	Name	GATTON TONGA
	Gender	MALE
Organization MEIDECC		MEIDECC
	Email	KStonga @ gmail. com
	Signature	Grap
12	Name	Mais Lupe McLeast
	Gender	Fenale
,	Organization	Energy Department
	Email	melotype, meteodaly Deprovit. com
	Signature	- A1 -
13	Name	
	Gender	E
	Organization	MEIDESS
	Email	Seassiming @ usalise - com.
	Signature	
14	Name	Katalong Lui
	Gender	F
	Organization	MEDECL
	Email	Intuitzeragness com
	Signature	Had
15	Name	Opeti Moala
	Gender	Male
	Organization	MEIDECC
	Email	opetimoala32agmail.com
	Signature	13-to

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16	Name	tora Tarcai
	Gender	MALE
•	Organization	METDECC
	Email	Sa taken on taken con
	Signature	a training
17	Name	LOUVENT MALDIO
	Gender	FEMALE
•	Organization	MADIOECO
	Email	11 lateration and in Com
	Signature	Kelaldo.
18	Name	DARY FISH HIST
	Gender	Tende
•	Organization	MEIDECC
	Email	theleparities
	Signature	Ale
19	Name	Annie Marie Malilo
	Gender	temale
•	Organization	PCREEE
	Email	maldeanniquarie Panailion.
	Signature	Orcalsto.
20	Name	TEVITA TURNORA
	Gender	M
•	Organization	MEDECC
	Email	Atukan & Qana la um
	Signature	on so maria

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Actions	Activities	Yea	r (2025-	2027)
2. Institutional	2.1. Confirm positions for recruitment and	2025	2026	2027
Set Up	advertisement of Positions			
	2.2. Confirm office space for the project			
	team in the Department of Energy			
	2.3. Allocate Budget for Salaries and			
	Recruitment			
	1.4. Meet Cost for office furniture/			
	equipment			
	2.5. Meet Other Cost for operation and			
	management of the office.			
3. Assess the	3.2. Identify and Confirm TOR and hire			
feasibility of	consultant to conduct the assessment			
On-grid				
power				
generation				
	3.3. Identify and Justify the economic,			
	financial and fiscal feasibility of the			
	Lifecycle Cost of On-Grid PV			
	generation in Longa.			
	3.4. Identity key barriers to the economic			
	2.5 Identify the solutions to the economic			
	5.5. Identity the solutions to the economic and financial feasibility of the on grid			
	3.6 Carry out Market Survey to ensure			
	business viability of the technology to			
	investors			
	3.7 Identify and present the key factors for			
	business viability of the on-grid PV			
	3.8. Identify policy improvements needed		_	
	3.9. Conduct the economic feasibility of the			
	adoption of fixed electricity tariffs in the			
	country and impacts of inflation in the			
	tariffs			
	3.10. Identify barriers and solutions to the			
	economic feasibility of the fixed-tariffs			
	3.11. Identify policy improvements			
	3.11.1. On-grid PV Policy			
	3.11.2. On-grid PV Legislation			
	3.11.3. On-Grid PV Regulation			
	3.12. Technical Feasibility			
4. Create	4.1. Identify awareness materials for			

8.2 : Stakeholders Work Template for Activities Timeline

Awareness	various different stakeholders.		
of both	3.2.1 Awareness materials for on-grid PV		
Developer,	developers		
and users	3.2.2 Awareness materials for on-grid PV		
of the On-	dealers		
Grid PV	3.2.3 Awareness materials for on-grid PV		
technology	Users		
57			
	3.3 Develop awareness material targeting		
	different stakeholders (i.e. Private		
	Sector, Decision Makers, Users of PV		
	Technology, financial institutions of		
	technology)		
	3.3.3. Develop materials for on-grid PV		
	developers		
	3.4. Develop a communication strategy		
	Profile for target stakeholders		
	particularly the adopters of the		
	technology.		
	3.4.1. Develop materials for on-grid PV		
	developers		
	3.4.2. Develop materials for on-grid PV		
	dealers		
	3.3.3. Develop materials for on-grid PV users		
	4.4. Implement awareness campaign on		
	on-grid PV power generation,		
	especially attract attentions of		
	investors and users		
	4.4.1. Implement awareness campaign for		
	PV developers		
	4.4.2. Implement Awareness Campaign for		
	PV Dealers		
	4.4.3. Implement Awareness Campaign for		
	on-grid PV users		
	4.5. Gender Mainstreaming and Social		
	Inclusion		
5. Enhance	4.8. Develop Financial Policy Incentives to		
Access to	assist lowering the cost of On-Grid PV		
Financing	technology		
	4.8.1. Identify all possible policy incentives to		
	assist lowering the cost of on-grid PV.		
	4.8.2. Identify possible legislative incentives		
	to assist lowering the cost of on-grid		
	PV.		
	4.8.3. Identity possible regulatory incentives		
	to assist lowering the cost of on-grid		
	PV		

	4.9.	Engage in dialogue with government		
		development partners to provide		
		incentives and subsidies for the		
		technology as it contributes to global		
		benefit		
	101	Consultation with government on		
	т .3.1.	policy incontives and subsidies		
	100	Consultation with denorm on nolicy		
	4.9.Z.	Consultation with donors on policy		
		incentives and subsidies on donor		
		funding projects.		
	4.9.3.	Consultation with dealers on policy		
		incentives and subsides on imported		
		PV components		
	4.10.	Discuss and Justify the adoption of the		
		most suitable model for PPA Contract		
		for on-grid solar power investors and		
		private sectors in Tonga		
	131	PPA Contract		
	422	PDA Tariff on active newor		
	4.3.2.	PPA faill of active power		
	4.3.3.	PPA Improvement		
	4.3.4.	Electricity permits into grid		
	4.11.	identify, Develop and recommend all		
		financial policy incentives to Cabinet		
		to assist lowering the cost of		
		investment on energy efficient home		
		appliances Provide clear justifications		
		for adoption of the hybrid vehicle.		
	4.12.	Engage in dialogue with development		
		partners on suitable adoption of	_	
		subsidies for the technology as it		
		contributes to global benefit: Confirm		
		contributes to global benefit, Continu		
		possible ways and preferred		
		conditions and methodology for		
	4.4-	in ionga		
	4.13.	Confirm potential financing options		
		with international, regional and		
		bilateral donors and development		
		partners for adoption of hybrid vehicle		
		in the country		
	4.14.	Prepare Cabinet Approval for most		
		sustainable financing options of hybrid		
		vehicle in the country and its plan to		
		achieve share of carbon emission		
		reduction in the transport spotor		
Action 5:	5.2	Design produce install the United		•
ACUON 5:	ວ.ວ.	Design, procure install the Hyprid		
Design,		venicle promotion and investment		

Procure, Install the monitoring and maintenance plan model for hybrid vehicle applications in the country		initiative in the country		
	5.4.	Design, Approve and Set up the Monitoring and Maintenance Model for the technology		
Action 6 : Assess and Identify all the necessary improvement options	6.5.	Assess and Identify the policy, legislative and regulatory shortfalls in the implementation of existing energy efficient home appliances investment in the country		
	6.6.	Conduct consultation and meetings on findings of the policy and regulatory assessment and analysis.		
	6.7.	Prepare all Policy decisions for government approval		
	6.8.	Design, Procure and install all necessary grid improvements to cater for reducing demand in the electricity grid.		

8.3 : Stakeholders Worksheet for Cost/Budget

Actions	Activities	Capacity Needs	Cost USD
4. Institutional	4.1. Confirm	Consultation & Meeting	18,000
Set Up	positions for	Cost	
	recruitment and	Advertisement Cost	
	Conduct		
	advertisement		
	4.2. Confirm office	Rent and	200,000
	space for the	Accommodation	
	project team ir		
	the Departmen		
	of Energy		
	4.3. Allocate Budget	Salaries	800,000
	for Salaries and		
	Recruitment		
	4.4. Meet Cost for	Office Furniture and	200,000
	office furniture	Equipment	

		equipment		
	4.5.	Meet Other	Electricity and	100,000
		Cost for	Telecommunication	
		operation and		
		management of		
		the office.		
5. Assess the	5.1.	Identify and	Meeting Cost and	500,000
feasibility		Confirm TOR	Consultant Fees	
of On-grid		and hire		
power		consultant to		
generation				
	5.2	Idoptify and		150,000
	J.Z.	lustify the	Transportation Cost and	150,000
		Aconomic	Research Cost	
		financial and		
		fiscal feasibility		
		of the Lifecvcle		
		Cost of On-Grid		
		PV generation in		
		Tonga.		
	5.3.	Identify/Confirm	Workshop and	50,000
		key barriers to	Consultation Cost	
		the economic		
		and financial		
		feasibility of on-		
	5 4	grid PV.		
	5.4.	Identify the	Vvorkshop and	
		solutions to the	Consultation Cost	
		financial		
		fessibility of the		
		on-arid PV		
	5.5	Carry out	Develop Survev	300.000
		Market Survey	Questionnaire. Survev	222,000
		to ensure	workshops,	
		business	Implementation of	
		viability of the	Survey	
		technology to		
		investors.		
	5.6.	Identify and	Finalization and	30,000
		present the key	presentation of Survey	
		factors for	Report	
		business		
		viability of the		
				00.000
	5.1.	identify	Consultation, Meetings	20,000

		operation policy improvements	and Cabinet Submissions	
	5.8.	Conduct the economic feasibility of the adoption of fixed electricity tariffs in the country and impacts of inflation in the tariffs	Consultation and Meeting Cost and Consultants Fee	500,000
	5.9.	Identify barriers and solutions to the economic feasibility of the fixed-tariffs	Workshop Cost	20,000
	5.10. 5.10.1 5.10.2 5.10.3	Identify policy improvements On-grid PV Policy On-grid PV Legislation On-Grid PV Regulation	Policy, Regulatory and Legal Review of existing policy and legal framework and documents	400,000
	5.11.	Technical Feasibility	Assessment Study, of current arid.	500,000
6. Create Awareness of both Developer, and users of the On- Grid PV technology	6.1.6.1.1.6.1.2.6.1.3.	Identify awareness materials for various different stakeholders. Awareness materials for on- grid PV developers Awareness materials for on- grid PV dealers Awareness materials for on- grid PV Users	Consultation and Identification of public awareness materials.	30,000
	6.2.	Develop awareness material targeting	Consultancy Fees for development of public awareness materials	200,000

	different			
	stakeholders			
	(i.e. Privat	е		
	Sector, Decisio	n		
	Makers, User	s		
	of P'	V		
	Technology,			
	financial			
	institutions of	of		
	technoloav)			
6.2.1.	Develop			
-	materials for on	ו-ו		
	arid P	V		
	developers	•		
63	Develop a		Consultancy Fees for	200 000
0.0.	communication		development of	200,000
	strategy Profile		communication profile	
	for target			
	stakeholders			
	particularly the			
	adopters of the			
	technology			
631	Develop			
010111	materials for on	ו–		
	arid P	V		
	developers	•		
632	Develop			
••••	materials for on	ו–		
	arid PV dealers			
633	Develop	, 		
0.0.0.	materials for on	۱ <u>–</u>		
	arid PV users			
64	Implement		Record of Radio and	100 000
0.1.	awareness		Television Programs	100,000
	campaign o	n	relevielent regrame,	
	on-arid P	V	Publication of	
	power	•	awareness materials	
	generation			
	especially		Meetings with	
	attract		stakeholders	
	attentions of	of		
	investors an	d	Other public awareness	
	users	-	programs	
6.4 1	Implement		P 9. 4	
	awareness			
	campaign for P	v		
	developers	-		

	6.4.2.	Implement Awareness Campaign for		
	6.4.3.	Implement Awareness Campaign for on-grid PV users		
5. Enhance Access to Financing	5.1.1. 5.1.2. 5.1.3.	Identify/Develop Financial Policy Incentives to assist lowering the cost of On- Grid PV technology Identify all possible policy incentives to assist lowering the cost of on- grid PV. Identify possible legislative incentives to assist lowering the cost of on- grid PV. Identify possible regulatory incentives to assist lowering the cost of on- grid PV.	Policy Dialogue Meetings and consultation with key stakeholders Policy Incentives to reduce cost of imports of technology Policy incentives for power purchase agreement (PPA)	50,000
	5.2.	Engage in dialogue with government development partners to provide incentives and subsidies for the technology as it contributes to global benefit Consultation with government	Development partners meetings and workshops on identifying policy incentives and subsidies for import of technology and equipment.	40,000

	on policy		
	incentives and		
E 0 0	Subsidies.		
J.Z.Z.			
	with donors on		
	policy incentives		
	and subsidies		
	on donor		
	funding projects.		
5.2.3.	Consultation		
	with dealers on		
	policy incentives		
	and subsides on		
	imported PV		
	components		
5.3.	Discuss and	Stakeholders	40,000
	Justify the	Consultation on PPA	
	adoption of the	Policy and Regulation.	
	most suitable		
	model for PPA		
	Contract for on-		
	grid solar power		
	investors and		
	private sectors		
	In Longa		
4.3.1.	PPA Contract	Consultation and	20,000
4.3.4.	PPA larith on	Meetings of PPA Tariff	
100		Folicy and Implementation	
4.3.3. improv	rrA vement	Implementation	
1 1 2 1	Electricity	Consultation on	30,000
4.10.4	normits into grid	Improvements of	30,000
	permits into griu	process of permits to	
		the national electricity	
		arid	
<u>/</u> 10	identify	Workshops/Consultation	40.000
т .13.	Develon and	with key stakeholders	40,000
	recommend all	and development	
	financial policy	nartners	
	incentives to	partitors	
	Cabinet to		
	assist lowering		
	the cost of		
	investment on		
	on-arid PV		
4 20	Provide clear		
Ŧ. ∠ ∪.	iustifications for		
	Jastinoutorio ior		

	adoption of the		
 4.04		Corrections and	40.000
4.21.	Engage in		40,000
	dialogue with	Workshops and	
	development	Meetings	
	partners on		
	suitable		
	adoption of		
	subsidies for		
	the technology		
	as it contributes		
	to global		
	benefit; Confirm		
	possible ways		
	and preferred		
	conditions and		
	methodology for		
	supporting		
	financing of		
	technology in		
 	Tonga		
4.22.	Confirm		
	potential		
	financing		
	options with		
	international,		
	regional and		
	bilateral donors		
	and		
	development		
	partners for		
	adoption of		
	hybrid vehicle in		
	the country on-		
4.05	grid PV		
4.23.	Prepare		
	Cabinet		
	Approval for		
	most		
	sustainable		
	tinancing		
	options of the		
	technology in		
	the country and		
	its plan to		
	achieve share		
	of carbon		

		emission reduction in the transport sector.		
Action 5: Design,	5.3.	Design, procure install the on-	Consultants Fee	5,000,000
Procure,		grid PV	Operation and Reporting	
Install the on-		promotion and investment		
project		initiative in the		
		country		
	5.4.	Design,		
		Approve and		
		Monitoring and		
		Maintenance		
		Model for the		
		technology		4 000 000
Action 6 : Maintenance	5.5.	Assess and Identify the	Consultation Fees	1,000,000
Assess and			Assessment	
Identify all the		legislative and	Consultation and	
necessary		regulatory	Reporting,	
improvement		shortfalls in the	Data recording	
options		implementation		
		of existing on-		
	5.6.	Conduct		
	0.01	consultation		
		and meetings		
		on findings of		
		the policy and		
		regulatory		
		assessment		
	5.7.	Prepare all		
		Policy decisions		
		for government		
	- 0	approval		
	5.8.	Design, Procure		
		anu instali all necessary arid		
		improvements		
		to cater for		
		reducing		
		demand in the		
		electricity grid.		