THE GOVERNMENT OF THE INDEPENDENT STATE OF PAPUA NEW GUINEA

Technology Action Plan

MITIGATION

July 2025

Supported by

TECHNOLOGY ACTION PLAN (TAP)

Authored by: Paul Hasagama, Mitigation Expert

National TNA Coordinator: Mr. Jason Paniu, Manager, Measurement, Reporting and Verification, Climate Change and Development Authority, Ministry of Environment, Conservation, and Climate Change

Foreword

The impacts of climate change are becoming increasingly evident worldwide, and Papua New Guinea (PNG), like other Pacific island nations, is among the most vulnerable. With its rich biodiversity, extensive coastlines, and heavy reliance on agriculture, PNG faces complex and interconnected challenges that threaten its environment, economy, and communities. However, despite these challenges, PNG remains steadfast in its commitment to addressing climate change through a proactive, multi-faceted approach. The country places a strong emphasis on both adaptation and mitigation strategies, ensuring alignment with its Nationally Determined Contributions (NDCs) under the Paris Agreement to build resilience and reduce greenhouse gas emissions.

The Government of Papua New Guinea (GoPNG) has demonstrated its commitment to international climate obligations under the United Nations Framework Convention on Climate Change (UNFCCC) by integrating climate action into its national development agenda. Climate change has been mainstreamed across key policy frameworks, including Vision 2050, the National Development Strategic Plan 2010-2030, the National Strategy for Responsible Sustainable Development (StaRS), and the Medium-Term Development Plan III. These strategic initiatives aim to not only strengthen and diversify PNG's economic foundations but also enhance the country's resilience to climate change and support efforts to mitigate carbon emissions. By embedding climate considerations into its broader development goals, PNG is taking decisive steps towards a sustainable and climate-resilient future.

The most recent steps taken by the Climate Change and Development Authority (CCDA) to act on climate change have been the development of PNG's SDG 13 Climate Action Roadmap (2020), PNG Enhanced NDC (2020), PNG Revised Enhanced NDC 2020 Implementation Plan (2021-2030), PNG NDC Implementation Roadmap for AFOLU and Energy sectors (2021-2030), PNG Second Biennial Update Report with REDD+ Technical Annex (2022), National Inventory Report (2022), and National Adaptation Plan 2022-2023. These efforts show PNG's dedication to integrating climate action into national development strategies, aiming to build a resilient and sustainable future.

This Technology Needs Assessment (TNA) Report is a key component of PNG's efforts to strengthen its climate action initiatives. It assesses the country's technological requirements for effective climate change mitigation, identifying priority technologies that can significantly reduce greenhouse gas emissions and enhance resilience. As the world transitions to a low-carbon future, technology plays a pivotal role in enabling countries like PNG to meet their climate goals. Through the adoption of appropriate and innovative technologies, PNG can transform its energy systems, improve land-use practices, and enhance sustainable livelihoods, all while contributing to global climate change mitigation efforts.

The successful implementation of PNG's NDCs depends, in large part, on the development, transfer, and diffusion of suitable technologies. These technologies are not only essential for reducing emissions but also for ensuring that PNG can adapt to a rapidly changing climate. This report identifies key areas where technological innovation, coupled with capacity building and financial support, will drive transformative change. It emphasizes the importance of ensuring that such technologies are locally appropriate, affordable, and accessible to all sectors of society.

In the face of climate change, the opportunities to build a sustainable, resilient, and equitable future for PNG depend on our collective ability to embrace and harness technology. This report lays the groundwork for PNG's continued progress in climate change mitigation, contributing to the global climate agenda while safeguarding the future of its people and ecosystems.

It is our hope that this report will serve as a vital tool for decision-makers, policymakers, and stakeholders across PNG, catalysing action and fostering collaboration in the pursuit of a sustainable, climate-resilient nation.

Debra Sungi
Acting Managing Director, Climate Change and Development Authority

Acknowledgement

This Technology Action Plan (TAP) report has been made possible through the collaborative efforts of numerous individuals and institutions dedicated to supporting climate change mitigation in Papua New Guinea through the identification and deployment of appropriate technologies.

We express our sincere appreciation to the Climate Change and Development Authority (CCDA) for its leadership and coordination of the Technology Needs Assessment (TNA) process. CCDA's guidance has been instrumental in driving this important national effort, particularly in facilitating cross-sectoral dialogue and stakeholder engagement throughout the TAP phase.

We gratefully acknowledge the support from the Global Environment Facility (GEF) and the United Nations Environment Programme (UNEP), particularly through the UNEP Copenhagen Climate Centre (UNEP-CCC) and the Asian Institute of Technology (AIT). Their ongoing commitment to enabling low-carbon development and technology transfer has been vital in the successful completion of this report.

We would also like to recognise the valuable contributions from stakeholders in the Energy, Transport, and Land Use, Land Use Change and Forestry (LULUCF) sectors. Special thanks go to the PNG Forest Authority (PNGFA), Department of Lands and Physical Planning (DLPP), Department of Agriculture and Livestock (DAL), Department of Transport (DOT), PNG Power Limited, and the National Energy Authority (NEA). Their inputs, data, and technical expertise played a key role in identifying sector-specific barriers and formulating actionable measures for the prioritised mitigation technologies.

Lastly, we extend our deep appreciation to all the stakeholders, experts, and institutional partners who participated in consultations, workshops, and reviews throughout the TAP process. Their engagement has been critical in ensuring that the recommendations of this report are context-specific, feasible, and aligned with Papua New Guinea's sustainable development and climate mitigation priorities.

Together, these contributions have strengthened the foundation for implementing the TAP and advancing Papua New Guinea's efforts to accelerate the uptake of environmentally sound technologies for a low-emission and climate-resilient future.

Table of Contents

List of Tables

List of Figures

Acronyms and Abbreviations

AFOLU	**Agriculture, Forest, and Other Land Use**
BAEF	Barrier Analysis and Enabling Framework
CCDA	Climate Change and Development Authority
CO_2e	Carbon Dioxide Equivalent
EV	Electric Vehicle
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
kt	Kilotonnes
LULUCF	Land Use, Land-Use Change, and Forestry
MCA	Multi-Criteria Analysis
Mt	Megatonnes
MTDP	Medium Term Development Plan
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
PES	Payment for Ecosystem Services
PNG	Papua New Guinea
PNGFA	Papua New Guinea Forest Authority
REDD+	Reducing Emissions from Deforestation and Forest Degradation (plus conservation, sustainable management of forests, and enhancement of forest carbon stocks)
SDGs	Sustainable Development Goals
TNA	Technology Needs Assessment
TAP	Technology Action Plan
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

I. Introduction and Context

Papua New Guinea (PNG) stands at a critical juncture in its development, balancing economic growth with environmental stewardship and climate action. This multi-sectoral Technology Action Plan (TAP) for Mitigation outlines an integrated and coordinated approach to promoting clean technologies, enhancing climate resilience, and fostering inclusive, sustainable development. Developed through national consultations, expert input, and multi-criteria analysis, this plan focuses on three key sectors: energy, transport, and land use, land-use change, and forestry (LULUCF). The overarching goal is to reduce greenhouse gas (GHG) emissions, improve livelihoods, and strengthen institutional capacity, aligning with PNG's Enhanced Nationally Determined Contribution (NDC 2020) target of achieving 50% carbon neutrality by 2030.

II. Sectoral Action Plans and Project Ideas

The TAP is structured around five interconnected pillars, featuring detailed actions and project ideas for each priority technology.

A. Biomass Gasification Cook Stoves (Energy Sector)

PNG's energy sector heavily relies on hydropower and diesel generators, with GHG emissions increasing significantly between 2000 and 2017. Traditional biomass fuels for cooking contribute substantially to indoor air pollution, deforestation, and health risks. Biomass gasification cook stoves offer a cleaner, more efficient alternative, capable of reducing CO_2 emissions by 50% or more. The ambition is to achieve 20% penetration of these stoves in rural and peri-urban areas by 2040, aiming to replace inefficient cooking methods, lower household emissions, and reduce pressure on forest resources. Key barriers include the high upfront cost of stoves, making them prohibitive for low-income households without microfinance or subsidies. The absence of specific policy direction, coupled with a lack of legal and regulatory frameworks for standards, safety, and emissions, hinders market development. Limited Public-Private Partnerships (PPPs) and insufficient government capacity also pose challenges, as weak collaboration and a lack of technical expertise impede promotion and regulation.

Strategic actions for 2026-2028, with a total budget of USD 970,000, include implementing targeted subsidies or micro-financing schemes, developing a specific national policy direction, facilitating the creation of Public-Private Partnerships, and establishing a dedicated unit within the relevant Ministry/Agency. These actions involve designing financial models, crafting comprehensive national strategies, fostering collaboration between the government and private sector, and building institutional capacity for effective promotion and implementation. A project idea of a pilot project, the Pilot Dissemination of Biomass Gasification Cookstoves in Eastern Highlands Province, with a total budget of USD 148,500, aims to demonstrate technical and social viability in 500 rural households, reduce fuelwood consumption and particulate emissions, build a community-based supply and maintenance ecosystem with trained micro-entrepreneurs, and generate verifiable data. This project will benefit rural households, women and children, local entrepreneurs, and contribute to the national climate agenda.

B. Electric Vehicle (EV) Adoption and Policy Development (Transport Sector)

Transport GHG emissions in PNG increased dramatically between 2000 and 2017 due to rising demand for fossil fuel-powered vehicles. PNG's NDC 2020 emphasizes sustainable transportation solutions, though EV penetration is currently less than 1%. The ambition is to achieve 5% EV penetration in urban centers by 2040, a target that acknowledges current constraints while laying groundwork for broader transformation and catalyzing public acceptance. Key barriers hindering EV adoption include the high cost of importing EVs, even with tariff repeals, due to freight, insurance, and taxes. The absence of a dedicated legal and regulatory framework for EV safety, charging infrastructure, battery disposal, and

vehicle classification also poses a significant challenge. Limited Public-Private Partnerships impede investment in crucial infrastructure, and limited government capacity, coupled with a lack of a skilled workforce for EV management, service, and maintenance, further hinders widespread adoption.

Strategic actions for 2026-2028, with a total budget of USD 252,000, focus on creating a mechanism to evaluate the high cost of importing EVs, developing a legal and regulatory framework, establishing a dedicated EV Public-Private Partnerships Task Force or Coordination Unit, establishing a dedicated EV Unit within the relevant Ministry/Agency, and launching a National EV Training and Certification Program. These actions involve comprehensive cost analysis, drafting EV-specific laws and standards, fostering public-private collaboration, building institutional expertise, and developing a skilled workforce. A project idea of a pilot project, the Pilot Introduction of Electric Vehicles in the Car Hire Sector, with a total budget of USD 400,950, seeks to demonstrate the viability of EVs in commercial hire fleets in Port Moresby, assess operational performance and customer satisfaction, build internal company capacity, and generate data to inform policy development. This project will benefit the hire car company, drivers and mechanics, customers, Port Moresby residents through reduced air pollution, and contribute to PNG's NDC implementation.

C. Reduced Deforestation and Forest Degradation (LULUCF Sector)

PNG is home to the world's third-largest tropical rainforest, with 78% of its land under customary ownership. Deforestation, primarily for cropland conversion, and forest degradation, mainly from commercial logging, are significant issues contributing to substantial CO_2 emissions. The ambition is that by 2030, PNG aims to train 70 provincial forestry and environment officers, secure at least USD 50 million in REDD+ financing, and achieve a 25% reduction in national deforestation and forest degradation compared to the 2015 baseline. This aims to preserve biodiversity, empower local institutions, and deliver tangible climate action. Key barriers include heavy dependence on income from logging and subsistence agriculture, unclear land tenure and forest ownership rights, and insufficient implementation capacity at subnational and local levels. Gender inequalities in forest governance and inadequate exposure to successful sustainable forest management models also hinder progress.

Strategic actions for 2026-2030, with a total budget of USD 1,236,000, include providing financial incentives for forest conservation and sustainable land use (e.g., Payments for Ecosystem Services), recognizing customary land rights and integrating them into forest governance frameworks, establishing or improving forest monitoring systems and reporting structures, ensuring gender equality in decision-making processes and access to forest resources, and supporting education programs at all levels to instill environmental values and sustainable land practices. These actions involve designing incentive mechanisms, formally recognizing customary land tenure, enhancing monitoring capabilities, promoting equitable participation, and fostering environmental awareness. A project idea of a pilot project, the Community-Led Pilot to Reduce Deforestation & Forest Degradation in Manus Province, with a total budget of USD 94,500, aims to reduce annual forest loss, strengthen community governance, diversify livelihoods for 60 households, and establish a low-cost MRV system. This project will benefit local households, community monitors, schools, churches, provincial government, and contribute to global climate mitigation.

III. Cross-Cutting Pillars

Beyond sector-specific actions, the TAP emphasizes two crucial cross-cutting pillars. Gender Equality and Social Inclusion explicitly integrates gender equity and social inclusion, ensuring that women, youth, and local communities are actively involved in shaping and benefiting from environmental initiatives. This includes promoting women's participation in forest governance, ensuring equitable access to resources, and tailoring education programs to diverse community needs. Environmental Education and Awareness places a strong emphasis on building national capacity through inclusive education and outreach. This involves incorporating forest and climate change education into

curricula at all levels, training educators, and launching community awareness campaigns to instill values of sustainability across generations.

IV. Funding, Oversight, and Risk Management

The total estimated budget for the strategic actions across the three sectors is USD 2,458,000, with additional budgets for the pilot projects (USD 148,500 for cook stoves, USD 400,950 for EVs, and USD 94,500 for LULUCF). Funding is anticipated from the Government of PNG (GoPNG), bilateral, and multilateral sources. The National Energy Authority, Department of Transport, and PNG Forest Authority will lead implementation in their respective sectors, with the Climate Change and Development Authority (CCDA) serving as the coordinating agency for the entire plan.

The successful implementation of this TAP is subject to several risks. Data Quality and Management is a risk, as inaccurate or incomplete baseline data and weak management systems can undermine monitoring and evaluation; mitigation involves establishing standardized monitoring and reporting frameworks with regular training and technical support. Community Engagement and Awareness is another risk, as mistrust or low awareness can limit participation; mitigation involves implementing comprehensive stakeholder mapping and communication strategies, ensuring culturally appropriate outreach and strong local ownership. Institutional and Coordination Challenges are also a risk, as unclear roles, limited inter-sectoral collaboration, and fragmented governance can lead to inefficiencies; mitigation involves establishing clear Terms of Reference (ToRs), coordination platforms, and inter-agency agreements to define roles and reduce overlap. Capacity Constraints and Human Resource Issues are a risk, as limited technical expertise, difficulty retaining staff, and inadequate training can stall progress; mitigation involves implementing demand-driven training, strategic hiring, retention incentives, and adaptable training programs. Lastly, Financial Instability is a risk, as predictable, long-term funding is crucial for incentive mechanisms; mitigation involves pursuing diversified funding sources and engaging early legislative support for legal recognition of customary systems.

This Technology Action Plan represents a robust and forward-looking strategy for Papua New Guinea to address its climate change mitigation commitments while fostering sustainable development. By prioritizing biomass gasification cook stoves, electric vehicle adoption, and reduced deforestation, coupled with strong cross-cutting efforts in gender equality, social inclusion, and environmental education, PNG is poised to make significant strides toward a low-carbon, resilient, and empowered future. The successful implementation of these activities hinges on strong institutional coordination, inclusive stakeholder engagement, and sustained political and financial support, paving an integrated pathway toward a greener and more prosperous PNG.

Chapter 1: Technology Action Plan and Project Ideas for the Energy Sector

1.1. TAP for the Energy Sector

1.1.1 Sector overview

The energy sector in PNG relies heavily on hydropower and diesel-powered generators, along with limited contributions from natural gas, solar energy, and wind. Diesel generators, commonly used in rural and remote areas, are inefficient and contribute significantly to GHG emissions. Transitioning from these inefficient systems to more sustainable options, such as expanding hydropower capacity or incorporating solar photovoltaic (PV) systems, could significantly improve energy efficiency and reduce GHG emissions. Furthermore, adopting energy efficiency measures for buildings and industrial processes would decrease electricity demand, further minimising reliance on diesel and reducing associated emissions.

According to PNG's National Inventory Report (2000-2017), GHG emissions from the Energy sector increased from 2661 kt CO_2 eq in 2000 to 5056 kt CO_2 eq in 2017. That is an increase of 1058 CO_2 eq (90%). The main driving factor is the increase in economic activities.

PNG's Enhanced NDC 2020 sets an ambitious target to reduce GHG emissions by achieving 50 per cent carbon neutrality by 2030, compared to a business-as-usual scenario. This target includes a focus on increasing the share of renewables from 30% in 2015 to 78% in 2030, reducing energy demand through energy efficiency, and establishing a framework for fossil fuel emission offsetting.

Furthermore, a number of policies, laws, and regulations related to the energy sector's development and technology deployment have been put in place to enable the transfer and diffusion of energy technologies in the country. These include:

i. National Energy Policy 2017 – 2027

The general objective of the energy policy is to ensure an affordable, competitive, sustainable, and reliable supply of energy to meet national and provincial development needs at the least cost, while protecting and conserving the environment. The policy sets out the measures required to achieve these objectives, such as promoting the introduction of renewable energies.

ii. Papua New Guinea's Sustainable Development Goal 13 Roadmap

The Roadmap consists of a set of 30 actions that need to be achieved by 2030. The timeline outlines four phases of milestones that will act as the foundation for PNG to achieve the 30 actions of the Roadmap by 2030 and therefore the key targets of SDG 13 and PNG's NDC. The 10 sectoral themes relate to climate governance, energy, forestry, agriculture, infrastructure, fisheries, tourism, biodiversity, minerals, and health.

iii. Climate Change (Management) Act 2015

The Climate Change (Management) Act was established in 2015, and the Climate Change and Development Authority has been designated as the governing body of PNG's climate change policy. Regarding mitigation, it is obligatory to prepare and submit information, including inventories in accordance with the UNFCCC's reporting requirements, and to formulate mitigation plans for entities implementing emission actions in specific fields.

iv. Climate Change (Management) (Nationally Determined Contribution) Regulation 2022

The Climate Change (Management) (Nationally Determined Contribution) Regulation has been prepared to provide a regulatory framework for the implementation of PNG's NDCs. Among other things, the regulation provides for the establishment of a Technical Advisory Committee and Sub-

Technical Working Committee, formal recognition of targets contained in the NDCs; development of an implementation plan; implementation measures; and Monitoring, Reporting and Verification.

PNG has prioritised a set of mitigation technologies for the Energy Sector through national consultations, expert input, and multi-criteria analysis processes conducted as part of the Technology Needs Assessment. The prioritised technologies, including the scores and ranking, are in Table 1 below.

Table 1: Prioritised mitigation technologies for the Energy sector in PNG (identified in the Technology Needs Assessment - Report I)

Technology Options	Total Score	Ranking
Biomass Gasification Cook Stoves	67.3	1
Solar Power Plant	53.9	2
Hydropower Plant	53.6	3

The list above was presented to the stakeholders in a workshop setting during the consultation process for the barrier analysis of these technologies. They were requested to select the most feasible technologies. The stakeholders selected through a consensus that Biomass Gasification Cook Stoves as the most feasible technology. Thus, the barrier analysis and enabling framework were focused on Biomass Gasification Cook Stoves as outlined in the BAEF report.

1.1.2 Action Plan for Biomass Gasification Cook Stoves

1.1.2.1. Introduction

Biomass gasification cook stoves are designed to utilize biomass materials (such as wood, crop residues, and other organic matter) for cooking by converting them into useful energy through a process called gasification. Gasification is a thermochemical process that heats biomass in a low-oxygen environment, producing a combustible gas known as producer gas, which can then be used for cooking.

These stoves are typically more efficient and cleaner than traditional open-fire stoves. Traditional Biomass Stoves (three-stone fires or simple biomass stoves) emit approximately 250-350 g of CO_2 per kWh of energy produced. Biomass Gasification Cook Stove (with high efficiency and clean combustion) emit around 100-200 g of CO_2 per kWh of energy produced, depending on the stove and fuel. This shows that Biomass Gasification Cook Stoves can reduce carbon emissions by up to 50% or more compared to traditional cooking methods, though the carbon intensity still varies depending on:

- The efficiency of the gasification process
- The quality and moisture content of the biomass fuel
- The operation and maintenance of the stove

The advantages of the Biomass Gasification Cook Stoves include:

- Health Benefits: By producing fewer harmful emissions, gasification stoves help improve indoor air quality, significantly reducing the risk of respiratory illnesses, eye irritation, and other health issues associated with traditional cooking methods
- Lower Fuel Consumption: Because gasification stoves are more efficient, they reduce the amount of wood or biomass needed for cooking. This leads to lower rates of deforestation and environmental degradation, as less biomass is harvested from forests or agricultural land.
    - Reduced Time Spent Collecting Fuel: Biomass gasification stoves require less fuel to

produce the same amount of heat, which means that people spend less time collecting firewood or biomass.

- Off-Grid Solution: Biomass gasification stoves are especially useful in off-grid or remote areas where access to modern energy sources like electricity or LPG is limited or unavailable.

The disadvantages of the Biomass Gasification Cook Stoves include:

- Upfront Investment: Biomass Gasification Cook Stoves generally have a higher initial cost than traditional stoves. This cost can be a significant barrier for low-income households, especially in rural or off-grid areas where purchasing power is limited.
- Availability of Replacement Parts: In remote areas, replacement parts or spare components for Biomass Gasification Cook Stoves may not be readily available
- Challenging Performance in Cold or Wet Conditions: Gasification stoves may not perform as well in cold or wet conditions, particularly in areas with high humidity, where the biomass may be harder to dry or burn efficiently.
- Storage of Biomass Fuel: Proper fuel storage is critical for the efficient operation of biomass gasification stoves.

Biomass Gasification Cookstoves have significant potential in PNG, where the majority of the population relies on traditional biomass fuels such as wood, charcoal, and crop residues for cooking. These methods often contribute to indoor air pollution, deforestation, and inefficient fuel use, all of which could be mitigated with the adoption of gasification technologies.

1.1.2.2. Ambition for the TAP

The ambition to achieve 20% penetration of biomass gasification cookstoves in rural areas by 2040 reflects Papua New Guinea's commitment to advancing clean energy solutions that are both climate-resilient and locally appropriate. This goal aims to replace traditional, inefficient, and polluting cooking methods with cleaner technologies that reduce reliance on firewood, lower household emissions, and improve indoor air quality. By focusing on rural communities—where the majority of households still depend on biomass for cooking—the initiative targets areas with the greatest need and potential impact. It also lays the foundation for long-term behavioural change, market development, and public-private collaboration in the clean cooking sector.

1.1.2.3. Actions and Activities selected for inclusion in the TAP

Summary of barriers and measures to overcome them

The barriers for the promotion of Biomass Gasification Cookstoves and their analysis were described in Report II, BAEF. To develop the TAP, the sectoral working group, composed of key stakeholders in the field, focused on discussing the very significant (score of 5) barriers that block the promotion of the Biomass Gasification Cookstoves in PNG, which are outlined in Table 2 below.

Table 2: List of very significant barriers

No	Broad Categories of Barriers	Identified Barrier	Score
A	Economic and Financial		
1		High upfront cost	5
B	Policy, Legal, and Regulatory		
1		Absence of specific policy direction to drive the adoption of biomass gasification cook stoves	5

2		Lack of a legal and regulatory framework to support the adoption and integration of biomass gasification cook stoves	5
C	Technical		
1		Lack of Standardization and Quality Control	5
D	Networking		
1		Limited Public-Private Partnerships	5
2		Fragmented Stakeholder Engagement	5
E	Institutional and Organizational		
1		Limited Government Capacity	5
F	Capacity Barriers		
1		Lack of Skilled Workforce	5
G	Social, Cultural, and Gender Barriers		
1		Resistance to Change and Technological Adoption	5

The score of the Barrier:

1: Not Very Significant

2: Not Significant

3: Moderate

4: Significant

5: Very Significant

From the above list, the working group members agreed by consensus to select four very significant barriers for the development of TAP actions and activities, expressed in the following chapters:

(i) High Upfront cost

The high upfront cost of Biomass Gasification Cookstoves is a major barrier in PNG, where many households, particularly in rural areas, have limited disposable income. These stoves often cost significantly more than traditional open-fire setups, with prices ranging from USD 40 to USD 70 or more. Without access to microfinance, subsidies, or installment payment options, most low-income families cannot afford the initial investment, even if the stove offers long-term savings. This cost hurdle discourages adoption and limits market penetration, especially among the populations that would benefit most from cleaner, more efficient cooking solutions.

(ii) Absence of specific policy direction to drive the adoption of biomass gasification cook stoves

The lack of a legal and regulatory framework to support the adoption and integration of Biomass Gasification Cook stoves in PNG poses a significant barrier to their widespread use. Without clear

standards for safety, performance, and emissions, there is no mechanism to ensure product quality or protect consumers. This regulatory gap also limits the ability to monitor market activities, enforce compliance, or offer incentives to manufacturers and distributors. Establishing a formal legal structure would provide the necessary oversight, build trust in the technology, and create an enabling environment for investment, innovation, and large-scale adoption.

(iii) Limited Public-Private Partnerships

Limited public-private partnerships (PPPs) significantly hinder the scaling of Biomass Gasification Cook Stoves initiatives in PNG. Collaboration between government bodies, NGOs, and private sector players remains weak, resulting in fragmented efforts, underutilised resources, and missed opportunities for innovation and investment. Without strong PPPs, there is limited support for developing local manufacturing, distribution networks, and user training programs. This disconnect also reduces the potential for policy incentives, such as subsidies or tax relief, which are crucial for encouraging private sector involvement and making the technology more accessible to low-income communities.

(iv) Limited Government Capacity

Limited government capacity is a significant barrier to the widespread adoption of Biomass Gasification Cook Stoves in PNG. Many government agencies lack the technical expertise, resources, and infrastructure needed to effectively support the promotion, regulation, and scaling of clean cooking technologies. This includes challenges in creating and enforcing policies, providing financial incentives, or ensuring the availability of training for both consumers and technicians. As a result, there is insufficient guidance or oversight to foster a stable market for the technology, hindering both private sector involvement and the broader success of clean cooking initiatives across the country

Actions selected for inclusion in the TAP

The measures to overcome the barriers mentioned above that were described in Report II, BAEF, are selected as actions that will be part of the Action Plan for Biomass Gasification Cook Stoves technology:

Action 1: Implement targeted subsidies or micro-financing schemes to reduce the upfront cost

To address the barrier of high upfront costs, targeted subsidies or micro-financing schemes can be introduced to make Biomass Gasification Cook Stoves more affordable for low-income households. These financial mechanisms would offer reduced initial costs through government or donor funding, enabling rural communities to access the technology without significant financial strain. Microloans could be structured with low-interest rates and flexible repayment terms, tailored to the income levels and cycles of rural populations.

Action 2: Develop a specific policy direction to drive the adoption of biomass gasification cook stoves

Developing a specific policy direction to drive the adoption of Biomass Gasification Cook Stoves would involve crafting a comprehensive national strategy that outlines clear objectives, incentives, and regulatory frameworks to promote the technology. This policy could include subsidies, tax breaks, or low-interest loans to reduce the upfront costs for households, particularly in rural areas. It would also set adoption targets, establish quality and safety standards for the cook stoves, and encourage public-private partnerships for distribution and maintenance. Additionally, the policy could integrate education and awareness campaigns to highlight the benefits of Biomass Gasification Cook Stoves, such as improved health outcomes and environmental sustainability, ensuring broad community support and engagement.

Action 3: Facilitate the creation of public-private partnerships

Facilitating the creation of public-private partnerships (PPPs) for Biomass Gasification Cook Stoves would involve bringing together government agencies, private sector actors, NGOs, and donor

partners to collaboratively support the production, distribution, and financing of clean cooking technologies.

Action 4: Establish a dedicated unit within the relevant ministry or agency

Establishing a dedicated unit within a relevant ministry would provide focused leadership and coordination for the promotion and implementation of Biomass Gasification Cookstoves initiatives. This unit would be responsible for policy development, stakeholder engagement, monitoring and evaluation, capacity building, and mobilising funding for clean cooking programs. It would also coordinate with provincial and district governments to ensure effective delivery of services and alignment with local development plans. By institutionalizing this function, the government can ensure sustained attention, better resource allocation, and accountability, while reinforcing the integration of clean cooking into PNG's broader energy access, health, and climate resilience strategies.

Activities identified for the implementation of selected actions

The activities identified for the effective implementation of the proposed actions encompass a comprehensive range of initiatives designed to promote Biomass Gasification Cook Stoves. Table 3 outlines the activities for each selected action.

Table 3: Activities identified for the implementation of selected actions

Actions	Activities to be implemented
Action 1: Implement targeted subsidies or micro-financing schemes to reduce the upfront cost	Design appropriate financing models that suit rural or low-income households by partnering with local microfinance institutions
	Conduct socio-economic and geographic mapping to identify households most in need, prioritizing vulnerable groups such as women-led households, rural communities, or areas with high health or environmental risk.
	Implement community outreach campaigns to inform people about the availability of subsidies or financing options.
	Establish a simple monitoring system to track the distribution, usage, and repayment of financing schemes.
Action 2: Develop a specific policy direction to drive the adoption of biomass gasification cookstoves	Assess existing energy, environment, and health policies to identify gaps or barriers affecting the adoption of biomass gasification cookstoves. Review international best practices and align potential policies with national development goals.
	Develop a dedicated policy or strategy that outlines standards, incentives, targets, and responsibilities for promoting biomass gasification cookstoves. And engage stakeholders (e.g., government, private sector, NGOs, communities) through consultations and validation workshops.
	Define performance and safety standards for biomass gasification cookstoves to ensure quality and efficiency.
	Ensure the policy is mainstreamed into national and sub-national development plans, including energy access and climate strategies.

Actions	Activities to be implemented
Action 3: Facilitate the creation of public-private partnerships	Conduct stakeholder mapping to identify businesses, investors, and service providers interested in clean energy and sustainable technologies (e.g., clean cookstoves, renewable energy, sustainable forestry). And organize targeted outreach events or business forums to promote investment opportunities.
	Create clear guidelines outlining roles, risk-sharing, and benefits for public and private partners.
	Train government staff on PPP negotiation, contract management, and monitoring.
Action 4: Establish a dedicated unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.
	Hire staff with expertise in energy, environment, policy, and project management

1.1.2.4. Stakeholders and Timelines for Implementation of TAP

Table 4 below outlines the stakeholders responsible for implementing each activity. Most of the responsible stakeholders are government agencies. The National Energy Authority, which is the lead agency for the energy sector, will lead the implementation of most of these activities, with CCDA serving as the coordinating agency. The estimated period of implementation is 2026 to 2028.

Table 4: Name of institutions involved and estimated implementation period

Actions	Activities to be implemented	Stakeholders	Estimated period of implementation
Action 1: Implement targeted subsidies or micro-financing schemes to reduce the upfront cost	Design appropriate financing models that suit rural or low-income households by partnering with local microfinance institutions	CCDA, National Energy Authority, Green Finance Centre, Department of Treasury	2026-2028
	Conduct socio-economic and geographic mapping to identify households most in need, prioritizing vulnerable groups such as women-led households, rural communities, or areas with high health or environmental risk.	CCDA, National Energy Authority, and National Statistics Office	2026-2027

Actions	Activities to be implemented	Stakeholders	Estimated period of implementation
	Implement community outreach campaigns to inform people about the availability of subsidies or financing options.	CCDA, National Energy Authority, Green Finance Centre	2026-2027
	Establish a simple monitoring system to track the distribution, usage, and repayment of financing schemes.	Green Finance Centre	2026-2028
Action 2: Develop a specific policy direction to drive the adoption of biomass gasification cook stoves	Assess existing energy, environment, and health policies to identify gaps or barriers affecting the adoption of biomass gasification cookstoves. Review international best practices and align potential policies with national development goals.	CCDA, National Energy Authority	2026
	Develop a dedicated policy or strategy that outlines standards, incentives, targets, and responsibilities for promoting biomass gasification cookstoves. And engage stakeholders (e.g., government, private sector, NGOs, communities) through consultations and validation workshops.	CCDA, National Energy Authority	2027
	Define performance and safety standards for biomass gasification cookstoves to ensure quality and efficiency.	CCDA, National Energy Authority and NISIT	2026-2027
	Ensure the policy is mainstreamed into national and sub-national development plans, including energy access and climate strategies.	CCDA, National Energy Authority, and DPLGA	2027-2028
Action 3: Facilitate the creation of public-private partnerships	Conduct stakeholder mapping to identify businesses, investors, and service providers interested in clean energy and sustainable technologies (e.g., clean cookstoves, renewable energy, sustainable forestry). And organize targeted outreach events or business forums to promote investment opportunities.	CCDA, National Energy Authority	2026

Actions	Activities to be implemented	Stakeholders	Estimated period of implementation
	Create clear guidelines outlining roles, risk-sharing, and benefits for public and private partners.	CCDA, National Energy Authority	2026-2027
	Train government staff on PPP negotiation, contract management, and monitoring.	CCDA, National Energy Authority	2027
Action 4: Establish a dedicated unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency	National Energy Authority	2028
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.	National Energy Authority	2028
	Hire staff with expertise in energy, environment, policy, and project management	National Energy Authority	2028

1.1.2.5. Estimation of Resources Needed for Action and Activities

The estimation of financial resources necessary for the implementation of the actions and activities listed above is based on experience implementing similar activities in PNG. Table 5 below outlines the amount needed to implement each activity. The main objective of each action and activity is to provide an enabling environment to encourage people to purchase and use biomass gasification cook stoves. Thus, there is no action or activity that includes the dissemination of biomass gasification cook stoves.

Table 5: Assessment of resources needed for TAP actions and activities

Actions	Activities to be implemented	Budget per activity (USD)
Action 1: Implement targeted subsidies or micro-financing schemes to reduce the upfront cost	Design appropriate financing models that suit rural or low-income households by partnering with local microfinance institutions	100,000
	Conduct socio-economic and geographic mapping to identify households most in need, prioritizing vulnerable groups such as women-led households, rural communities, or areas with high health or environmental risk.	100,000
	Implement community outreach campaigns to inform people about the availability of subsidies or financing options.	200,000

Actions	Activities to be implemented	Budget per activity (USD)
	Establish a simple monitoring system to track the distribution, usage, and repayment of financing schemes.	100,000
Action 2: Develop a specific policy direction to drive the adoption of biomass gasification cookstoves	Assess existing energy, environment, and health policies to identify gaps or barriers affecting the adoption of biomass gasification cookstoves. Review international best practices and align potential policies with national development goals.	10,000
	Develop a dedicated policy or strategy that outlines standards, incentives, targets, and responsibilities for promoting biomass gasification cookstoves. And engage stakeholders (e.g., government, private sector, NGOs, communities) through consultations and validation workshops.	200,000
	Define performance and safety standards for biomass gasification cookstoves to ensure quality and efficiency.	50,000
	Ensure the policy is mainstreamed into national and sub-national development plans, including energy access and climate strategies.	20,000
Action 3: Facilitate the creation of public-private partnerships	Conduct stakeholder mapping to identify businesses, investors, and service providers interested in clean energy and sustainable technologies (e.g., clean cookstoves, renewable energy, sustainable forestry). And organize targeted outreach events or business forums to promote investment opportunities.	30,000
	Create clear guidelines outlining roles, risk-sharing, and benefits for public and private partners.	30,000
	Train government staff on PPP negotiation, contract management, and monitoring.	50,000
Action 4: Establish a dedicated unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency	15,000
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.	50,000

Actions	Activities to be implemented	Budget per activity (USD)
	Hire staff with expertise in energy, environment, policy, and project management	15,000

1.1.2.6. Management Planning

Risks and Contingency Planning

A major risk to successful implementation lies in the quality and consistency of data collection and management. Inaccurate or incomplete baseline data, weak data management systems, and inconsistent reporting protocols can undermine the integrity of monitoring and evaluation processes. This can result in poor decision-making, misallocation of resources, and an inability to track progress effectively.

Community engagement and awareness pose another significant challenge. Mistrust or low awareness among local communities, particularly in areas where customary land rights are sensitive can limit participation in forest conservation and clean energy initiatives. Without culturally appropriate outreach and strong local ownership, uptake of technologies like EVs or sustainable land practices may remain low.

There are also institutional and coordination challenges, including unclear or overly broad Terms of Reference (ToRs), limited inter-sectoral collaboration, and fragmented governance between national and sub-national actors. These issues can lead to duplication of efforts, inefficient resource use, and confusion over roles and responsibilities. Moreover, incomplete or outdated stakeholder mapping may leave out key actors, weakening the foundation for effective partnerships and policy design.

Capacity constraints and human resource issues further compound the risks. These include limited technical expertise, difficulty attracting and retaining qualified staff, and inadequate or poorly targeted training programs that fail to engage participants or align with international standards. Turnover of trained personnel and limited continuity in institutional knowledge can stall long-term progress.

To address these risks, the program will establish a strong foundation in capacity building, inclusive stakeholder engagement, and institutional coordination. A standardized monitoring and reporting framework will be developed, accompanied by regular training and technical support to improve data quality and use. Comprehensive stakeholder mapping and communication strategies will build trust and improve community participation. Clear ToRs, coordination platforms, and inter-agency agreements will ensure clarity in roles and reduce overlap. Lastly, contingency staffing plans, incentives for retention, and adaptable training programs will be implemented to maintain institutional capacity and resilience.

Next Steps

The main steps to be taken in the implementation of TAP are related to the promotion of new technologies in PNG by discouraging the traditional fuel wood, conducting awareness on the benefits of Biomass Gasification Cook Stoves, specifically targeting the local communities, as well as increasing the institutional capacities. At the same time, it is necessary to speed up the Procedure for the development and approval of the Government Decision on the regulation on the standards.

1.1.2.7. TAP overview table

Table 6: TAP overview of Cook Stoves in Biomass Gasification

Sector	Energy							
Sub-sector	Residential							
Technology	Biomass Gasification Cook Stoves							
Ambition	The ambition is to establish 20% of biomass gasification Cook Stoves penetration rural areas (by 2040)							
Benefits	Key benefits of this ambition: 1. Improved health outcomes through reduced indoor air pollution and exposure to smoke, especially for women and children. 2. Lower pressure on forests by decreasing the demand for fuelwood, contributing to deforestation and degradation reduction. 3. Economic savings for rural households through more efficient fuel use and time saved in wood collection. 4. Increased local employment and innovation in clean energy technologies and cookstove supply chains.							
Action	Activities to be implemented	Source of funding	Responsible body	Estimated period of implementation	Risks	Success criteria	Indicators for monitoring of implementation	Budget per activity (USD)
Action 1: Implement targeted subsidies or micro-financing schemes to	Design appropriate financing models that suit rural or low-income households by partnering with local microfinance institutions	GoPNG, Bilateral or Multilateral funding source	CCDA,National Energy Authority, Green Finance Centre, Department of Treasury	2026-2028	The risk of not promoting this initiative	Financial model is designed	Number of financial models designed and operationalized	100,000

reduce the upfront cost	Conduct socio-economic and geographic mapping to identify households most in need, prioritizing vulnerable groups such as women-led households, rural communities, or areas with high health or environmental risk.	GoPNG, Bilateral or Multilateral funding source	CCDA,National Energy Authority and National Statistics Office	2026-2027	Inaccurate or incomplete data collection	Clear identification of priority households	Percentage of target areas successfully mapped with validated data on vulnerable households, disaggregated by gender and geographic location.	100,000
	Implement community outreach campaigns to inform people about the availability of subsidies or financing options.	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority, Green Finance Centre	2026-2027	Low community awareness or mistrust	Increased community interest and participation	Number of outreach events conducted	200,000
	Establish a simple monitoring system to track the distribution, usage, and repayment of financing schemes.	GoPNG, Bilateral or Multilateral funding source	Green Finance Centre	2026-2028	Weak data management or inconsistent reporting	A functioning and user-friendly monitoring system	Number of financing recipients accurately tracked for distribution, usage, and repayment status within the monitoring system	100,000

Action 2: Develop a specific policy direction to drive the adoption of biomass gasification cook stoves	Assess existing energy, environment, and health policies to identify gaps or barriers affecting the adoption of biomass gasification cookstoves. Review international best practices and align potential policies with national development goals.	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority	2026	Lack of inter-sectoral coordination	A comprehensive policy review report	Completion and validation of a policy gap analysis report	10,000
	Develop a dedicated policy or strategy that outlines standards, incentives, targets, and responsibilities for promoting biomass gasification cookstoves. And engage stakeholders (e.g., government, private sector, NGOs, communities) through consultations and validation workshops.	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority	2027	Limited stakeholder engagement or lack of political buy-in	A comprehensive and inclusive cookstove policy or strategy	Completion and official endorsement of a national biomass gasification cookstove policy or strategy	200,000

	Define performance and safety standards for biomass gasification cookstoves to ensure quality and efficiency	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority and NISIT	2026-2027	Lack of technical expertise or alignment with international standards	National performance and safety standards are officially established	Number of officially approved performance and safety standards for biomass gasification cookstoves.	50,000
	Ensure the policy is mainstreamed into national and sub-national development plans, including energy access and climate strategies.	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority, and DPLGA	2027-2028	Lack of coordination between sectors or tiers of government	Relevant government departments and provincial authorities adopt and implement actions aligned with the policy	Number of national and sub-national planning documents that incorporate elements of the biomass gasification cookstove policy	20,000
Action 3: Facilitate the creation of public-private partnerships	Conduct stakeholder mapping to identify businesses, investors, and service providers interested in clean energy and sustainable technologies (e.g., clean cookstoves, renewable energy, sustainable forestry). And organize targeted outreach events or business	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority	2026	Incomplete or outdated stakeholder mapping	A comprehensive and up-to-date stakeholder database is developed	Number of stakeholders identified and profiled through mapping, and number of outreach events or business forums successfully conducted	30,000

	forums to promote investment opportunities.							
	Create clear guidelines outlining roles, risk-sharing, and benefits for public and private partners.	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority	2026-2027	Ambiguity or imbalance in roles and responsibilities	Guidelines are clearly defined, transparent, and mutually agreed upon by key stakeholders	Number of PPP agreements or projects developed using the standardized guidelines	30,000
	Train government staff on PPP negotiation, contract management, and monitoring.	GoPNG, Bilateral or Multilateral funding source	CCDA, National Energy Authority	2027	Limited capacity or turnover of trained staff	Government staff demonstrate improved knowledge and skills in PPP negotiation, contract management, and monitoring	Number and percentage of government staff trained with demonstrated competency improvements through pre- and post-training assessments	50,000

Action 4: Establish a dedicated unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency	GoPNG, Bilateral or Multilateral funding source	National Energy Authority	2028	Unclear or overly broad ToR	The ToR clearly define the unit's mandate, specific functions, required skills, and hierarchical placement within the agency.	Completion and official approval of the unit's ToR by relevant authorities	15,000
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.	GoPNG, Bilateral or Multilateral funding source	National Energy Authority	2028	Insufficient training relevance or low participant engagement	Increasing the institutional capacities of NEA	Number of trained personnel	50,000
	Hire staff with expertise in energy, environment, policy, and project management.	GoPNG, Bilateral or Multilateral funding source	National Energy Authority	2028	Difficulty attracting qualified candidates	Increasing the institutional capacities of NEA	Number of hired staff	15,000

1.2. Project Idea for the Energy Sector

The table below outlines a project idea for the energy sector. The project involves Pilot Dissemination of Biomass Gasification Cookstoves in Eastern Highlands Province

Table 7: Project Idea for the Energy Sector

Name of Project Idea	**Pilot Dissemination of Biomass Gasification Cookstoves in Eastern Highlands Province**
Introduction	Poor-quality cooking fires remain one of the main drivers of forest degradation, household air pollution related illness, and fuelwood burden in Papua New Guinea. Eastern Highlands Province (EHP) has high rural population density, expanding coffee gardens that pressure local forests, and active women's church networks that can accelerate technology uptake. This pilot tests locally assembled, forced-draft biomass gasification cookstoves that cut fuel use by ±60 %, slash indoor smoke, and generate biochar for soil improvement, aligning with PNG's Biomass Gasification Strategy and the Nationally Determined Contribution (NDC 2.0) targets for the LULUCF sector
Project Objectives	• Demonstrate the technical and social viability of gasification stoves in 500 rural households in EHP within 18 months. • Reduce household fuelwood consumption by ≥50 % and particulate emissions by ≥70 % relative to baseline three-stone fires. • Build a community-based supply and maintenance ecosystem (two trained micro-entrepreneurs per LLG). • Generate verifiable data on emission reductions and co-benefits to inform scale-up
Project results	• Result 1: 500 stoves installed and operating • Result 2: Average fuelwood use ≥ 50 % • Result 3: 20 local technicians/business owners trained (≥40 % women) • Result 4: 250 t CO_2e of emissions avoided over 18 months
Project activities	• Baseline Assessment & Community Co-Design (household surveys, focus groups) • Social Marketing & Awareness Campaign (radio spots, church group demos) • Local Assembly & Quality Assurance (partner SME fabricates and tests units) • Distribution & User Training (cluster demonstrations, user manuals in Tok Pisin) • After-Sales Service System (spare-parts stockists, WhatsApp helpline)

	• Monitoring, Verification & Learning (MVL) (fuel-use metering, health surveys) • Project Management, Reporting & Knowledge Sharing (lessons paper, policy brief)
Project budget	• Baseline Assessment & Community Co-Design (household surveys, focus groups) – **USD 21, 600** • Social Marketing & Awareness Campaign (radio spots, church group demos) – **USD 27, 000** • Local Assembly & Quality Assurance (partner SME fabricates and tests units) – **USD 54, 000** • Distribution & User Training (cluster demonstrations, user manuals in Tok Pisin)– **USD 8, 100** • After-Sales Service System (spare-parts stockists, WhatsApp helpline)– **USD 5, 400** • Monitoring, Verification & Learning (MVL) (fuel-use metering, health surveys)– **USD 13 500** • Project Management, Reporting & Knowledge Sharing (lessons paper, policy brief) – **USD 5, 400** • Contingency (10%) – **USD 13 500** Total– **USD 148, 500**
Funding sources	GoPNG, Bilateral or Multilateral funding source
Measurement/Evaluation	The National Energy Authority will be responsible for monitoring and evaluating the progress of the project
Possible complications/challenges when implementing the project	Possible challenges include a lack of cooperation from the private sector and local communities. Furthermore, the availability of data will also be a possible challenge
Responsibilities and coordination	The National Energy Authority will lead the implementation of the activities, while the Climate Change and Development Authority will be responsible for coordination
Project beneficiaries	• 500 rural households (≈ 3 500 people) in Obura-Wonenara & Kainantu LLGs • Women and children, experiencing reduced smoke exposure and fuel-collecting burden • 20 local youth/women entrepreneurs trained in fabrication and maintenance • Provincial Forestry & Environment Officers, receiving data and capacity on clean-cooking MRV • National climate agenda, through early evidence for scaling gasification stoves toward NDC targets and potential carbon-credit generation

Chapter 2: Technology Action Plan and Project Ideas for the Transport Sector

2.1. TAP for the Transport Sector

2.1.1. Sector overview

The demand for vehicles in PNG is steadily increasing, driven by economic development, urbanisation, and population growth. This includes a rise in used-imported vehicles, which are commonly used due to their affordability. Additionally, there is an increasing preference for vehicles with larger engine sizes, particularly four-wheel drives, which are well-suited to the challenging terrain but contribute to higher fuel consumption and greenhouse gas emissions.

According to PNG's National Inventory Report (2000-2017), GHG emissions from the transport sector increased from 888 kt CO2 eq in 2000 to 1,946 kt CO2 eq in 2017. That is an increase of 1058 kt CO2 eq (119%). The main driving factor is the increase in the number of internal combustion engine vehicles.

PNG's Enhanced NDC 2020 sets an ambitious target to reduce GHG emissions by achieving 50 per cent carbon neutrality by 2030, compared to a business-as-usual scenario. This target includes a focus on sustainable transportation solutions such as the adoption of low-carbon vehicles, including electric vehicles, and the improvement of road infrastructure to be more resilient to the impacts of climate change.

Furthermore, a number of policies, laws, and regulations related to the energy sector's development and technology deployment have been put in place to enable the transfer and diffusion of energy technologies in the country. These include:

i. Papua New Guinea's Sustainable Development Goal 13 Roadmap

The Roadmap consists of a set of 30 actions that need to be achieved by 2030. The timeline outlines four phases of milestones that will act as the foundation for PNG to achieve the 30 actions of the Roadmap by 2030 and therefore the key targets of SDG 13 and PNG's NDC. The 10 sectoral themes relate to climate governance, energy, forestry, agriculture, infrastructure, fisheries, tourism, biodiversity, minerals, and health.

ii. Climate Change (Management) Act 2015

The Climate Change (Management) Act was established in 2015, and the Climate Change and Development Authority has been designated as the governing body of PNG's climate change policy. Regarding mitigation, it is obligatory to prepare and submit information, including inventories in accordance with the UNFCCC's reporting requirements, and to formulate mitigation plans for entities implementing emission actions in specific fields.

iii. Climate Change (Management) (Nationally Determined Contribution) Regulation 2022

The Climate Change (Management) (Nationally Determined Contribution) Regulation has been prepared to provide a regulatory framework for the implementation of PNG's NDCs. Among other things, the regulation provides for the establishment of a Technical Advisory Committee and Sub-Technical Working Committee, formal recognition of targets contained in the NDCs; development of an implementation plan; implementation measures; and Monitoring, Reporting, and Verification

PNG has prioritised a set of mitigation technologies for the Transport Sector through national consultations, expert input, and multi-criteria analysis processes conducted as part of the Technology

Needs Assessment. The prioritised technologies, including the scores and ranking, are in Table 8Table 8 below.

Table 8: Prioritised mitigation technologies for the Transport sector in PNG identified in the Technology Needs Assessment (Report I)

Technology Options	Total Score	Ranking
Electric Vehicles	40.61	1
Hybrid Vehicles	40.49	2

The list above was presented to the stakeholders in a workshop setting during the consultation process for the barrier analysis of these technologies. They were requested to select the most feasible technologies. The stakeholders selected through a consensus that Electric Vehicles as the most feasible technology. Thus, the barrier analysis and enabling framework were focused on Electric Vehicles as outlined in the BAEF report.

2.1.2. Action Plan for Electric Vehicles

2.1.2.1. Introduction

An electric vehicle (EV) is a type of vehicle that is powered entirely or partially by electricity, rather than by gasoline or diesel. The key components of an electric vehicle include an electric motor, battery pack, and electronic controller.

The carbon intensity of the electricity used to charge the vehicle depends on the mix of energy sources used to generate power. Here's an example of carbon intensity based on different energy sources:

- Coal-powered grid: The carbon intensity of electricity from coal can be around 900 to 1,200 grams of CO_2 per kWh.
- Natural gas grid: The carbon intensity of electricity from natural gas is generally around 400 to 500 grams of CO_2 per kWh.
- Renewable energy grid (wind, solar, hydro): Zero or very low emissions, typically 0 to 50 grams of CO_2 per kWh, depending on the efficiency and geographical location.
- The advantages of EVs over internal combustion engine vehicles include:
- Lower Operating Costs: EVs are more efficient than ICE vehicles. The cost of electricity per mile is usually much lower than the cost of gasoline or diesel.
- Lower Maintenance Costs: Electric vehicles have fewer moving parts compared to traditional vehicles.
- Highly Efficient: Electric motors are much more efficient at converting energy into motion than internal combustion engines. While ICE vehicles typically convert only about 20-30% of the energy from gasoline into useful power, electric motors can achieve efficiency rates of around 85-90%, making them a more energy-efficient option.
- Home Charging: One of the greatest advantages of owning an EV is the ability to charge it at home using a standard electrical outlet or a dedicated home charger

On the other end, the disadvantages of EVs include:

- Purchase Price: EVs generally have a higher initial purchase price compared to conventional gasoline or diesel vehicles, primarily due to the cost of the battery
- Driving Range: Many EVs still have a limited driving range on a single charge compared to gasoline vehicles, although this is improving.
- Insufficient Charging Stations: While the number of EV charging stations is growing, it remains insufficient in many areas, particularly rural regions or developing countries.

- Demand on the Grid: As EV adoption grows, there could be significant pressure on the electricity grid, especially in regions with limited energy generation capacity.

The potential for electric vehicles in PNG is promising, but it faces several challenges and opportunities that need to be addressed to enable widespread adoption. PNG is a developing country with a mix of urban and rural areas, and its unique geography and infrastructure pose both hurdles and potential for innovation in the EV market. Electric vehicle penetration in PNG is very low, with less than 1%.

2.1.2.2. Ambition for the TAP

The ambition of this technology is to achieve 5% electric vehicle (EV) penetration in urban centres by 2040, as agreed upon by stakeholders, which represents an important first step toward PNG's transition to a cleaner and more sustainable transport system. While modest in scale, this target acknowledges the country's current infrastructural and economic constraints while laying the groundwork for gradual transformation. By focusing on urban centres where vehicle density, emissions, and public visibility are highest- the initiative aims to catalyse broader public acceptance, attract private investment, and encourage future policy development. This ambition serves as a pilot for deeper electrification in subsequent decades and signals the country's commitment to low-emission development pathways in alignment with its climate goals.

2.1.2.3. Actions and Activities selected for inclusion in the TAP

Summary of barriers and measures to overcome them

The barriers for the promotion of Electric Vehicles and their analysis were described in Report II, BAEF. To develop the TAP, the sectoral working group, composed of key stakeholders in the field, focused on discussing the very significant (score of 5) barriers that block the promotion of Electric Vehicles in PNG, which are outlined in Table 9below.

Table 9: List of identified barriers and corresponding score

No	Broad Categories of Barriers	Identified Barrier	Score
A	Economic and Financial		
1		High cost of importing EVs	5
B	Policy, Legal, and Regulatory		
1		Absence of specific policy direction to drive EV transition	5
2		Lack of legal and regulatory framework to support the adoption and integration of EVs	5
C	Technical		
1		EVs unsuitable for long-distance travel or use in rural areas	5
2		Lack of charging Infrastructure	5
D	Networking		
1		Limited Public-Private Partnerships	5

2		Fragmented Stakeholder Engagement	5
E	Institutional and Organizational		
1		Limited Government Capacity	5
F	Capacity Barriers		
1		Lack of Skilled Workforce	5
G	Social, Cultural, and Gender Barriers		
1		Resistance to Change and Technological Adoption	5

The score of the Barrier:

1: Not Very Significant

2: Not Significant

3: Moderate

4: Significant

5: Very Significant

The working group members agreed by consensus to select only five very significant barriers for the development of TAP actions and activities, since there is ongoing work to address some of the very significant barriers outlined above, such as the development of an EV policy. These five barriers are expressed in the following chapters:

(i) High cost of importing EVs

Importing EVs into PNG entails significant costs, despite recent government initiatives to encourage adoption. While the government has repealed tariffs on EV imports to promote a greener economy, importers still face substantial expenses, including freight, insurance, and a 10% Goods and Services Tax (GST). Additional costs such as brokerage fees, quarantine clearance, port handling, safety inspections, and registration can further inflate the total expense, often doubling the original purchase price. These financial barriers make EVs less accessible to the average consumer in PNG, hindering widespread adoption despite the environmental benefits.

(ii) Lack of a legal and regulatory framework to support the adoption and integration of EVs

PNG does not have a dedicated regulatory framework to support the adoption and integration of EVs. There are no laws or binding standards in place to govern key aspects such as EV safety, charging infrastructure, battery disposal, or vehicle emissions. The lack of legal provisions also extends to areas like vehicle classification and registration, which are essential for distinguishing EVs from conventional vehicles and enabling appropriate incentives or compliance measures.

(iii) Limited Public-Private Partnership

In PNG, limited public-private partnerships (PPPs) hinder the development of essential infrastructure and services needed to support EV adoption. While the government plays a crucial role in policy-making, there is a lack of collaboration with the private sector to invest in critical areas like charging stations, battery exchange facilities, and maintenance networks.

(iv) Limited Government Capacity

The government lacks dedicated departments or units focused on the promotion and regulation of electric vehicles. There is insufficient technical expertise within key institutions to develop and enforce policies, regulations, and standards for EVs, making it difficult to create a supportive environment for EV adoption.

(v) Lack of skilled workforce

There is a shortage of trained professionals in both the public and private sectors who can manage, service, and maintain EVs. From mechanics to engineers, the workforce lacks the necessary skills to support EV infrastructure and vehicles, which makes it difficult to sustain the EV market in PNG.

Actions selected for inclusion in the TAP

The measures to overcome the barriers mentioned above that were described in Report II, BAEF, are selected as actions that will be part of the Action Plan for the EV technology:

Action 1: Create a mechanism to evaluate the high cost of importing EVs

To evaluate the high cost of importing EVs, establish a multi-stakeholder committee including government, industry experts, and financial institutions to assess import duties, taxes, and logistical costs.

Action 2: Develop a legal and regulatory framework to support the adoption and integration of EVs

Establish a regulatory framework that includes tax incentives, EV registration quotas, and charging infrastructure standards, alongside emission reduction targets and a phased ban on ICE vehicle sales.

Action 3: Establish a dedicated EV Public-Private Partnerships task force or coordination unit

Establish a dedicated EV Public-Private Partnerships (PPP) task force within the relevant government agency to facilitate collaboration between the public sector, private companies, and stakeholders. This unit will focus on identifying investment opportunities, creating joint funding models, and streamlining regulations to encourage private sector participation in EV infrastructure, manufacturing, and services.

Action 4: Establish a dedicated EV unit within the relevant ministry or agency

Establish a dedicated EV unit within the relevant government ministry or agency to lead the development and implementation of EV-related policies, programs, and regulations. This unit will be responsible for coordinating EV initiatives, securing funding, engaging stakeholders, and ensuring effective policy execution to drive the transition to electric vehicles.

Action 5: Launch a national EV training and certification program

Launch a national EV training and certification program in collaboration with technical institutions, industry leaders, and government agencies to build a skilled workforce in EV manufacturing, maintenance, and charging infrastructure. The program will provide certified training in key areas such as battery management, vehicle repair, and installation of charging stations, ensuring a workforce ready to support the growing EV sector

Activities identified for the implementation of selected actions

The activities identified for the effective implementation of the proposed actions encompass a comprehensive range of initiatives designed to promote Electric vehicles. Table 10 outlines the activities for each selected action.

Table 10: Activities identified for the implementation of selected actions (Electric vehicles)

Actions	Activities to be implemented
Action 1: Create a mechanism to evaluate the high cost of importing EVs	Conduct a comprehensive cost analysis of EV imports
	Review relevant policies, taxes, and import regulations
	Engage stakeholders through consultations and surveys
	Develop and propose a policy briefing or roadmap
Action 2: Develop a legal and regulatory framework to support the adoption and integration of EVs	Conduct a legislative and policy gap analysis
	Draft EV-specific laws, regulations, and standards
	Engage stakeholders for consultation and validation
	Facilitate approval and implementation of the legal framework
Action 3: Establish a dedicated EV Public-Private Partnerships task force or coordination unit	Develop the mandate, structure, and terms of reference
	Formally establish and resource the task force
	Facilitate stakeholder engagement and partnership development
	Develop and implement a national EV coordination plan
Action 4: Establish a dedicated EV unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.
	Hire staff with expertise in transport, energy, environment, policy, and project management.
Action 5: Launch a national EV training and certification program	Conduct a skills and training needs assessment
	Develop EV-specific training curricula and certification standards
	Partner with technical institutions and training providers
	Launch pilot training programs and expand nationwide

2.1.2.4. Stakeholders and Timelines for Implementation of TAP

Table 11 below outlines the stakeholders responsible for implementing each activity. Most of the responsible stakeholders are government agencies. The Department of Transport, which is the lead agency for the transport sector, will lead the implementation of most of these activities, with CCDA serving as the coordinating agency. The estimated period of implementation is 2026 to 2028.

Table 11: Name of institutions involved and estimated implementation period

Actions	Activities to be implemented	Stakeholders	Estimated implementation period
Action 1: Create a mechanism to evaluate the high cost of importing EVs	Conduct a comprehensive cost analysis of EV imports	CCDA and Department of Transport	2026
	Review relevant policies, taxes, and import regulations	CCDA and Department of Transport	2026
	Engage stakeholders through consultations and surveys	CCDA and Department of Transport	2026
	Develop and propose a policy briefing or roadmap	CCDA and Department of Transport	2026
Action 2: Develop a legal and regulatory framework to support the adoption and integration of EVs	Conduct a legislative and policy gap analysis	CCDA, Department of Transport and Office of State Solicitor	2026
	Draft EV-specific laws, regulations, and standards	CCDA, Department of Transport and Office of State Solicitor	2027
	Engage stakeholders for consultation and validation	CCDA, Department of Transport and Office of State Solicitor	2027
	Facilitate approval and implementation of the legal framework	CCDA, Department of Transport and Office of State Solicitor	2027
Action 3: Establish a dedicated EV Public-Private Partnerships task force or coordination unit	Develop the mandate, structure, and terms of reference	CCDA and Department of Transport	2027
	Formally establish and resource the task force	CCDA and Department of Transport	2027
	Facilitate stakeholder engagement and partnership development	CCDA and Department of Transport	2027-2028
	Develop and implement a national EV coordination plan	Department of Transport and Deparment of Personal Management	2028
Action 4: Establish a dedicated EV unit within the	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency	Department of Transport and Deparment of Personal Management	2028

Actions	Activities to be implemented	Stakeholders	Estimated implementation period
relevant ministry or agency	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.	Department of Transport and Deparment of Personal Management	2028
	Hire staff with expertise in transport, energy, environment, policy, and project management.	Department of Transport, Deparment of Education	2027
Action 5: Launch a national EV training and certification program	Conduct a skills and training needs assessment	Department of Transport, Deparment of Education	2028
	Develop EV-specific training curricula and certification standards	Department of Transport, Deparment of Education	2028
	Partner with technical institutions and training providers	Department of Transport, Deparment of Education	2028
	Launch pilot training programs and expand nationwide	CCDA and Department of Transport	2026

2.1.2.5. Estimation of Resources Needed for Action and Activities

The estimation of financial resources necessary for the implementation of the actions and activities listed above are based on experience implementing similar activities in PNG. Table 12 below outlines the amount needed to implement each activity.

Table 12: Assessment of resources needed for TAP actions and activities

Actions	Activities to be implemented	Budget per activity (USD)
Action 1: Create a mechanism to evaluate the high cost of importing EVs	Conduct a comprehensive cost analysis of EV imports	15,000
	Review relevant policies, taxes, and import regulations	8,000
	Engage stakeholders through consultations and surveys	8,000
	Develop and propose a policy briefing or roadmap	15,000
Action 2: Develop a legal and regulatory framework to	Conduct a legislative and policy gap analysis	15,000

Actions	Activities to be implemented	Budget per activity (USD)
support the adoption and integration of EVs	Draft EV-specific laws, regulations, and standards	15,000
	Engage stakeholders for consultation and validation	15,000
	Facilitate approval and implementation of the legal framework	20,000
Action 3: Establish a dedicated EV Public-Private Partnerships task force or coordination unit	Develop the mandate, structure, and terms of reference	10,000
	Formally establish and resource the task force	10,000
	Facilitate stakeholder engagement and partnership development	20,000
	Develop and implement a national EV coordination plan	20,000
Action 4: Establish a dedicated EV unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency	25,000
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.	8,000
	Hire staff with expertise in transport, energy, environment, policy, and project management.	5,000
Action 5: Launch a national EV training and certification program	Conduct a skills and training needs assessment	20,000
	Develop EV-specific training curricula and certification standards	8,000
	Partner with technical institutions and training providers	10,000
	Launch pilot training programs and expand nationwide	Budget per activity (USD)

2.1.2.6. Management Planning

Risks and Contigency Planning

One of the core risks to effective planning and implementation is the incomplete or inaccurate information base. This includes flawed cost data, outdated or fragmented regulatory information, and gaps in sectoral laws or cross-sector linkages. These issues can lead to misinformed decisions, misaligned policies, and financial inefficiencies that undermine long-term program sustainability.

Stakeholder engagement and political support are also major concerns. Low stakeholder participation, non-representative feedback, resistance from key actors, or lack of political commitment can create delays or derail the policy development process. Without inclusive and consistent engagement, policies may not reflect real-world needs or secure the buy-in needed for successful implementation, particularly in politically sensitive areas such as electric vehicle (EV) adoption or regulatory reform.

Coordination and governance challenges further threaten implementation. Poorly defined roles, ambiguous terms of reference (ToR), and lack of clarity among government tiers or between public-private actors can result in duplication, inefficiency, and a lack of accountability. Misalignment of interests between stakeholders, coupled with weak collaboration mechanisms, risks fragmenting efforts and slowing down program progress.

Lastly, human resource and capacity development risks include difficulty attracting or retaining skilled personnel, mismatched or overly theoretical training content, and biased assessments that fail to identify real capacity needs. These gaps can prevent the successful rollout of new initiatives, especially during critical phases such as pilot testing or policy rollout, and limit alignment with evolving industry standards and international best practices.

To mitigate these risks, the program will implement a multi-tiered risk management approach involving real-time data validation, targeted stakeholder mapping, and regular cross-sectoral coordination meetings. A clear institutional framework with defined ToRs and accountability mechanisms will be established, and stakeholder engagement will be inclusive, iterative, and transparent. Capacity gaps will be addressed through demand-driven training, strategic hiring, and retention incentives. Pilot programs will incorporate flexible design elements to allow adaptive learning and scale-up based on evidence and stakeholder feedback.

Nest Steps

The main steps to be taken in the implementation of TAP are related to the promotion of new technologies in PNG by discouraging the ICE vehicle, equipment by investors, as well as increasing the institutional capacities. At the same time, it is necessary to speed up the Procedure for the development and approval of the Government Decision on the regulation on the standards.

2.1.2.7. TAP overview table

Table 13: TAP for Electric Vehicles

Sector	Transport							
Sub-sector	Road Transport							
Technology	Electric vehicle							
Ambition	The ambition of this technology is to achieve 5% electric vehicle (EV) penetration in urban centres by 2040, as agreed upon by stakeholders, which represents an important first step toward Papua New Guinea's transition to a cleaner and more sustainable transport system.							
Benefits	Main benefits of this EV penetration target: 1. Reduced air pollution and improved public health in congested urban areas. 2.Lower greenhouse gas emissions, contributing to PNG's NDC targets and climate commitments. 3. Decreased reliance on imported fossil fuels, improving energy security, and reducing foreign exchange pressure. 4. Increased opportunities for innovation, green jobs, and private sector investment in sustainable transport and energy services.							
Action	Activities to be implemented	Source of funding	Responsible body and focal point	Estimated period of implementation	Rists	Success criteria	Indicators for monitoring of implementation	Budget per activity (USD)

	Conduct a comprehensive cost analysis of EV imports	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2026	Incomplete or inaccurate cost data	The cost analysis clearly identifies major cost drivers and opportunities for cost reduction or policy intervention	Completion of a validated cost analysis report outlining total import costs and key cost components for different EV types.	15,000
Action 1: Create a mechanism to evaluate the high cost of importing Evs	Review relevant policies, taxes, and import regulations	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2026	Fragmented or outdated regulatory information	A comprehensive policy review report is completed, identifying all applicable laws, tax structures, and regulatory measures that impact EV importation and adoption	Number of relevant policies, tax instruments, and regulations reviewed and analyzed for their impact on EV adoption	8,000
	Engage stakeholders through consultations and surveys	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2026	Low stakeholder participation or non-representative feedback	Stakeholder engagement is inclusive, well-coordinated, and representative, capturing views from government, private sector, civil society, and end-users	Number and diversity of stakeholders engaged through consultations and surveys	8,000

	Develop and propose a policy briefing or roadmap	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2026	Lack of political support or unclear policy direction	A clear, evidence-based policy briefing or roadmap is developed that outlines short-, medium-, and long-term actions, responsible agencies, timelines, and resource needs	Completion and official submission of the EV policy roadmap or briefing document to relevant government bodies	15,000
Action 2: Develop a legal and regulatory framework to support the adoption and integration of Evs	Conduct a legislative and policy gap analysis	GoPNG, Bilateral or Multilateral funding source	CCDA, Department of Transport and Office of State Solicitor	2026	Overlooking relevant sectoral laws or missing cross-sector linkages	A comprehensive and cross-sectoral analysis report is completed, identifying specific legal and policy gaps, inconsistencies, or barriers to EV adoption	Completion of a validated policy and legal gap analysis report with identified actions for legal or regulatory reform	15,000
	Draft EV-specific laws, regulations, and standards	GoPNG, Bilateral or Multilateral funding source	CCDA, Department of Transport and Office of State Solicitor	2027	Lack of technical expertise or stakeholder alignment	Clear, technically sound, and enforceable draft laws and regulations are prepared, covering EV classification, safety standards, charging infrastructure,	Number of EV-specific legal and regulatory instruments drafted and submitted for review or approval	15,000

						incentives, and compliance mechanisms.		
	Engage stakeholders for consultation and validation	GoPNG, Bilateral or Multilateral funding source	CCDA, Department of Transport and Office of State Solicitor	2027	Stakeholder resistance or limited participation	A broad and inclusive consultation process is conducted, capturing feedback from government, private sector, civil society, technical experts, and end-users	Number of stakeholders consulted and percentage of their feedback incorporated into final legal or regulatory drafts.	15,000
	Facilitate approval and implementation of the legal framework	GoPNG, Bilateral or Multilateral funding source	CCDA, Department of Transport and Office of State Solicitor	2027	Delays in political or administrative approval processes	The legal framework is officially endorsed by the appropriate legislative or regulatory bodies, with clear institutional mandates for enforcement	Legal framework approved and gazetted, with implementation guidelines developed and disseminated	20,000

Action 3: Establish a dedicated EV Public-Private Partnerships task force or coordination unit	Develop the mandate, structure, and terms of reference	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2027	Poorly defined roles or overlapping responsibilities, which may lead to confusion, inefficiency, or lack of accountability among task force members.	A clear and officially endorsed mandate is established	Completion and official endorsement of the task force's mandate, structure, and ToR by the relevant lead agency or ministry	10,000
	Facilitate stakeholder engagement and partnership development	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2027	Weak collaboration or misalignment of interests between public and private stakeholders	Active participation and collaboration from key government agencies, private sector players, NGOs, and technical experts in regular engagement activities.	Number of stakeholder engagement events held and partnerships or MOUs established through the coordination unit	10,000
	Develop and implement a national EV coordination plan	GoPNG, Bilateral or Multilateral funding source	CCDA and Department of Transport	2027-2028	Lack of coordination among stakeholders and unclear roles, which could result in fragmented efforts,	A comprehensive national EV coordination plan is developed, clearly outlining roles, responsibilities, timelines, targets,	Completion and official endorsement of the national EV coordination plan	20,000

					duplication, or delays in EV adoption.	and resource needs across sectors		
Action 4: Establish a dedicated EV unit within the relevant ministry or agency	Develop terms of reference outlining the unit's responsibilities, staffing needs, reporting lines, and integration into existing agency	GoPNG, Bilateral or Multilateral funding source	Department of Transport and Deparment of Personal Management	2028	Ambiguous ToR may lead to unclear roles and accountability, resulting in operational inefficiencies	ToR are clear, concise, and formally approved by agency leadership.	Completion and official endorsement of the ToR document	20,000
	Provide training on technical aspects, policy coordination, data management, and stakeholder facilitation.	GoPNG, Bilateral or Multilateral funding source	Department of Transport and Deparment of Personal Management	2028	Training content may not align with participant needs or be too theoretical	Training is tailored to the participants' roles and capacity levels, combining theory with practical exercises and case studies	Number of participants trained, with at least 80% showing measurable competency improvement based on pre- and post-training evaluations	25,000
	Hire staff with expertise in transport, energy, environment,	GoPNG, Bilateral or Multilateral	Department of Transport and Deparment of	2028	Challenges in attracting and retaining qualified candidates	Recruitment of qualified professionals with relevant expertise	Number of positions filled with qualified staff	8,000

	policy, and project management.	funding source	Personal Management			matching the unit's strategic needs	within the planned timeframe	
Action 5: Launch a national EV training and certification program	Conduct a skills and training needs assessment	GoPNG, Bilateral or Multilateral funding source	Department of Transport, Deparment of Education	2027	Incomplete or biased assessment results	The assessment is comprehensive, participatory, and uses validated tools to identify existing skills, gaps, and training priorities	Percentage of relevant staff completing the assessment	5,000
	Develop EV-specific training curricula and certification standards	GoPNG, Bilateral or Multilateral funding source	Department of Transport, Deparment of Education	2028	Lack of alignment with industry needs or international standards	Curricula and certification standards are developed in consultation with industry experts, training institutions, and regulatory bodies	Completion and accreditation of EV training curricula and certification standards	20,000
	Partner with technical institutions and training providers	GoPNG, Bilateral or Multilateral funding source	Department of Transport, Deparment of Education	2028	Weak collaboration or mismatched expectations	Establishment of formal partnerships or MOUs with reputable technical institutions and training providers	Number of formal partnership agreements signed with technical institutions and training providers	8,000

	Launch pilot training programs and expand nationwide	GoPNG, Bilateral or Multilateral funding source	Department of Transport, Deparment of Education	2028	Limited participation or resource constraints during pilot phase	Successful implementation of pilot training programs with measurable learning outcomes and participant satisfaction	Number of pilot training sessions conducted and participants trained	10,000

2.2. Project Idea for the Transport Sector

The table below outlines a project idea for the transport sector. The project involves a Pilot Introduction of Electric Vehicles in the Car Hire Sector

Table 14: Project Idea for the Transport Sector

Name of Project Idea	**Pilot Introduction of Electric Vehicles in the Car Hire Sector**
Introduction	Papua New Guinea's transport sector is one of the largest and fastest-growing sources of GHG emissions. With nearly 100% of the national fleet powered by fossil fuels, there is an urgent need to test and scale low-emission alternatives. This pilot project will introduce electric vehicles (EVs) into the fleet of a mid-sized hire car company operating in Port Moresby. By testing their commercial, operational, and environmental performance in real-world conditions, the project aims to build the business case for EV adoption in PNG's private transport sector, while reducing emissions and air pollution in urban areas.
Project Objectives	• Demonstrate the viability of integrating EVs into commercial hire fleets in Port Moresby. • Assess the operational performance, customer satisfaction, and emissions savings from EV usage. • Build capacity within the hire car company and its staff for EV operation and maintenance. • Generate data and insights to inform policy development, financing instruments, and private-sector incentives.
Project results	• Result 1: 5 EVs introduced into fleet • Result 2: 50 tCO_2e emissions avoided over 12 months • Result 3: 90% customer satisfaction with EV rides • Result 4: Hire company trained in EV operation, maintenance & data tracking • Result 5: Policy brief and investment roadmap produced
Project activities	• Procurement of Electric Vehicles (5 EVs, ideally SUVs or compact sedans suited for urban travel) • Installation of EV Charging Infrastructure (1–2 chargers at company HQ, solar integration optional) • Staff Capacity Building (training drivers, mechanics, and managers on EVs) • Public Awareness & Marketing (branding EVs, customer education, media promotion) • Monitoring and Data Collection (track mileage, power usage, maintenance frequency) • Reporting and Policy Engagement (host stakeholder roundtables, produce final report)

Project budget	• Procurement of Electric Vehicles (5 EVs, ideally SUVs or compact sedans suited for urban travel) **– USD 270,000** • Installation of EV Charging Infrastructure (1–2 chargers at company HQ, solar integration optional) **– USD 40,500** • Staff Capacity Building (training drivers, mechanics, and managers on EVs)**– USD 13,500** • Public Awareness & Marketing (branding EVs, customer education, media promotion)**– USD 21,600** • Monitoring and Data Collection (track mileage, power usage, maintenance frequency)**– USD 10,800** • Reporting and Policy Engagement (host stakeholder roundtables, produce final report)**– USD 8,100** • **Contingency - – USD 36,450** **Total – USD 400,950**
Funding sources	GoPNG, Bilateral or Multilateral funding source
Measurement/Evaluation	The Department of Transport will be responsible for monitoring and evaluating the progress of the project
Possible complications/challenges when implementing the project	Possible challenges include a lack of cooperation from the private sector. Furthermore, the availability of data will also be a possible challenge
Responsibilities and coordination	The Department of Transport will lead the implementation of the activities, while the Climate Change and Development Authority will be responsible for coordination
Project beneficiaries	• Hire car company: Builds capacity, brand value, and first-mover advantage • Drivers and mechanics: Gain knowledge in EV operations, creating new green skills • Customers: Experience clean, quiet, comfortable rides • Port Moresby residents: Benefit from reduced local air pollution • National government: Receives evidence for electric mobility incentives and policies • PNG's NDC implementation: Contributes to low-carbon transition and emissions reduction in the transport sector

Chapter 3: Technology Action Plan and Project Ideas for the LULUCF Sector

3.1. TAP for the LULUCF Sector

3.1. Sector overview

PNG is home to the third-largest tropical rainforest in the world, following the Amazon and the Congo basins. This rainforest is part of the island of New Guinea, which is shared by PNG and Indonesia.

In 2015, PNG's forest cover was estimated to be 78% (About 35.949 million hectares) of the total national area. The average annual deforestation rate was 0.07% for the period between 2009 and 2013, and it increased to 0.08% for the period 2014-2018 (GoPNG, 2017), which qualifies PNG as a High Forest Cover, Low Deforestation (HFLD) country. The remaining 10.2 million (22%) are cropland, grassland, settlement, wetland and other land uses (Table 15 and Figure 1). Cropland is the second major land use, with 5.2 million hectares (11.22%), followed by grassland (2.4 million hectares or 5.27%), wetland (2.1 million hectares or 4.61%), settlement (0.4 million hectares or 0.88%), and other (0.059 million hectares or 0.13%).

Table 15:PNG Land Use Composition in 2018

Land use type	2018 (hectares)
Forest land	35,949,057.11
Cropland	5,179,577.88
Grassland	2,432,933.95
Wetlands	2,129,628.98
Settlements	404,290.72
Other land	59,277.17

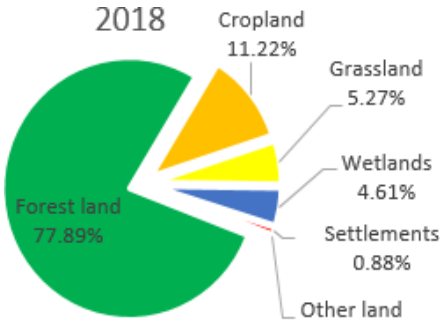

Figure 1: Land Use in PNG (2018)

Drivers of deforestation and forest degradation in PNG

Deforestation between 2000 and 2015 affected 261,528 hectares in PNG, resulting in average annual emissions of over 5 Mt CO_2e. The main cause of deforestation has been the conversion of forestland into cropland, which accounts for 87% of the total deforestation. Shifting agriculture is responsible for 63% of the deforested land, while commercial agricultural developments, particularly oil palm plantations, account for 30% of the clearing.

The impact of commercial agriculture has significantly increased since 2000, due to the rapid expansion of SABLs. Only a small portion of the 5.1 million hectare leases, have initiated activities, and there has been an official moratorium followed by a subsequent suspension of many of them, although some logging and land conversion have still occurred.

These trends are closely tied to ongoing population growth, which has an annual growth rate of 3.1% and is likely to continue in the coming years. The demand for agricultural products driven by population growth will likely be a significant factor in forest cover conversion into shifting and permanent cropland.

Between 2000 and 2015, forest degradation affected approximately 2.5 million hectares, leading to average annual emissions of around 25 $MtCO_2e$. A significant 98.1% of these emissions were attributed to commercial logging.

This trend is expected to persist, primarily due to the area of forests currently under actual or potential concessions, which covers 8.6 and 8.4 million hectares, respectively. Since 2008, the impact of clearing to prepare land for future agricultural development in Special Agriculture Business Lease (SABL) areas has increasingly contributed to forest degradation.

Despite the ambitious goals outlined in Vision 2050, efforts to improve forest cover through reforestation and forest rehabilitation activities have been limited. The plan, as mentioned in the NRS, aims to establish 800,000 hectares of forest plantations by the middle of this century. As described in the NRS, the PNGFA estimates that approximately 60,000 hectares have been reforested so far, with a target of an additional 20,000 hectares to be achieved by 2030.

To respond to these challenges and strengthen its LULUCF-sector mitigation strategies, PNG has prioritised a set of mitigation technologies through national consultations, expert input, and multi-criteria analysis processes conducted as part of the Technology Needs Assessment. The prioritised technologies, including the scores and ranking, are in Table 16 below.

Table 16: Prioritised mitigation technologies for the LULUCF sector in PNG identified in the Technology Needs Assessment (Report I)

Technology Options	Total Score	Ranking
Reduced Deforestation and Forest Degradation	72.82	1
Reforestation and Rehabilitation	66.03	3
Sustainable Land Use Planning	65.45	2

The list above was presented to the stakeholders in a workshop setting during the consultation process for the barrier analysis of these technologies. They were requested to select the most feasible technologies. The stakeholders selected through a consensus that Reduced Deforestation and Forest Degradation is the most feasible technology. Thus, the barrier analysis and enabling framework were focused on Reduced Deforestation and Forest Degradation as outlined in the BAEF report.

3.1.2. Action Plan for Reduced Deforestation and Forest Degradation

3.1.2.1. Introduction

Reduced Deforestation and Forest Degradation is a vital mitigation technology for PNG, where approximately 78% of the land area is covered by forests, most of which are under customary ownership. This approach promotes the conservation, sustainable management, and restoration of forest ecosystems, thereby reducing GHG emissions and enhancing carbon sequestration. It also supports biodiversity conservation, watershed protection, and the sustainability of forest-dependent livelihoods.

The technology addresses key drivers of forest loss such as illegal logging, unsustainable agriculture, and infrastructure expansion by promoting land-use planning, sustainable forest management (SFM), and stricter enforcement of forestry regulations. A central component of REDD+ is the establishment of robust forest monitoring systems that integrate remote sensing, Geographic Information Systems (GIS), and field-based data collection to assess forest cover, degradation, and carbon stocks over time.

In PNG, institutions such as the CCDA and the PNGFA are working to build national capacity for monitoring, reporting, and verification (MRV) of forest emissions and removals. Data collection systems, which include Collect Earth and National Forest Inventory (NFI) are being developed to

include not only forest area and biomass, but also non-timber forest products, biodiversity indicators, and socio-economic information relevant to local communities and customary landowners. These systems rely on a combination of aerial data interpretation and structured field surveys, including the use of cluster plots and stratified sampling techniques.

REDD+ contributes directly to PNG's NDC by reducing emissions from the LULUCF sector. Forest conservation and restoration enhance carbon sinks by sequestering CO_2 through increased biomass and improved soil organic carbon. Rehabilitating degraded lands through reforestation and community-based conservation further strengthens these carbon sinks and helps reverse historical forest degradation.

In addition to climate benefits, REDD+ offers long-term economic opportunities such as sustainable timber harvesting, eco-tourism, and participation in carbon markets. Socially, it supports community resilience by involving landowners in conservation planning and enhancing forest-based livelihoods, an essential contribution in a country like PNG, where approximately 85% of the population depends on forests for their livelihoods. Environmentally, REDD+ helps maintain biodiversity, prevents soil erosion, protects watersheds, and safeguards critical habitats for native species.

3.1.2.2. Ambition for the TAP

Papua New Guinea has set a bold ambition to strengthen forest governance and reduce emissions by building institutional capacity, mobilising climate finance, and enhancing conservation outcomes. By 2030, the country aims to train 70 provincial forestry and environment officers in forest monitoring, enforcement, and GIS applications, secure at least USD 50 million in REDD+ financing to support sustainable forest management and community-based incentives, and achieve a 25% reduction in national deforestation and forest degradation compared to the 2015 baseline. This integrated approach reflects PNG's commitment to preserving its rich biodiversity, empowering local institutions, and delivering tangible climate action.

3.1.2.3. Actions and Activities selected for inclusion in the TAP

Summary of barriers and measures to overcome them

The barriers for the promotion of Reduced Deforestation and Forest Degradation and their analysis were described in Report II, BAEF. To develop the TAP, the sectoral working group, composed of key stakeholders in the field, focused on discussing the significant (score 4) and very significant (score of 5) barriers that block the promotion of Reduced Deforestation and Forest Degradation in PNG, which are outlined in Table 17below.

Table 17: List of very significant identified barriers

No	Barrier Category	Identified Barriers	Score
A	Economic and Financial		
1		Heavy dependence on income from logging and subsistence agriculture, leading to forest conversion	5
B	Policy, Legal, and Regulatory		
1		Conflicting sectoral policies (e.g., agriculture, forestry, mining, and infrastructure)	4
2		Unclear land tenure and forest ownership rights, especially for customary landowners	4
D	Institutional and Organizational		

1		Insufficient implementation capacity at subnational and local levels	4
E	Social, Cultural, and Gender		
1		Traditional land-use practices such as slash-and-burn agriculture contribute to deforestation	4
2		Gender inequalities in forest governance and benefit-sharing mechanisms	4
3		Cultural reliance on forest resources with minimal focus on sustainable management	4
F	Information and Awareness		
1		Inadequate exposure to success stories or models of sustainable forest and land management	4

The score of the Barrier:

1: Not Very Significant

2: Not Significant

3: Moderate

4: Significant

5: Very Significant

The working group members agreed by consensus to select only five barriers for the development of TAP actions and activities, since there is ongoing work to address some of the very significant barriers outlined above, such as aligning sectoral policies. These five barriers are expressed in the following chapters:

(i) Heavy dependence on income from logging and subsistence agriculture, leading to forest conversion

A significant portion of PNG's economy and rural livelihoods is heavily reliant on logging and subsistence agriculture. In 2021, the country exported over 3 million cubic meters of logs, generating substantial revenue. However, customary landowners received only about $6 per cubic meter, equating to roughly 6% of the total log export revenues. Additionally, subsistence agriculture is the backbone of PNG's food production sector, contributing 25% to the Gross Domestic Product (GDP) and providing employment and income for the rural majority. This dependence on activities that often lead to forest conversion poses a challenge to conservation efforts.

(ii) Unclear land tenure and forest ownership rights, especially for customary landowners

Approximately 97% of land in PNG is under customary tenure, governed by traditional laws and practices. The lack of formal documentation and clear legal recognition of these customary rights leads to disputes and challenges in implementing forest conservation initiatives, as landowners may be excluded from decision-making processes.

(iii) Insufficient implementation capacity at subnational and local levels

Provincial and local government bodies often lack the necessary resources, training, and authority to effectively implement forest conservation policies. This deficiency hinders the translation of national strategies into actionable plans at the community level.

(iv) Gender inequalities in forest governance and benefit-sharing mechanisms

Women in PNG often have limited participation in forest governance and decision-making processes, despite their significant roles in forest resource utilisation. This gender disparity affects the equitable distribution of benefits from forest conservation programs and undermines the inclusivity of such initiatives.

(v) Inadequate exposure to success stories or models of sustainable forest and land management

Sharing successful examples of sustainable forest management can inspire and guide communities in adopting similar practices. However, such success stories are not widely shared or accessible in PNG, limiting opportunities for learning and replication.

Actions selected for inclusion in the TAP

The measures to overcome the barriers mentioned above that were described in Report II, BAEF, are selected as actions that will be part of the Action Plan for the Reduced Deforestation and Forest Degradation technology:

Action 1: Provide financial incentives for forest conservation and sustainable land use (e.g., Payments for Ecosystem Services)

Provide financial incentives for the forest conservation introduced and scale up mechanisms such as Payments for Ecosystem Services (PES) and conditional transfers to incentivize forest conservation by local communities and landowners. Such financial incentives can compensate for the opportunity costs of avoided deforestation.

Action 2: Recognise customary land rights and integrate them into forest governance frameworks

Work with local landowners and communities to integrate customary land tenure into national forest governance frameworks, supporting participatory land use mapping and legal recognition.

Action 3: Establish or improve forest monitoring systems and reporting structures

Develop and operationalize a national forest monitoring system (NFMS) integrated with the national GHG inventory and accessible to stakeholders at all levels.

Action 4: Ensure gender equality in decision-making processes and access to forest resources

Implement policies and programs that promote the active participation of women in forest governance, ensuring equal access to forest resources and capacity-building opportunities.

Action 5: Support education programs at all levels to instill environmental values and sustainable land practices

Support the incorporation of forest and climate change education into primary, secondary, and tertiary curricula to build a generation of environmentally conscious citizens.

Activities identified for the implementation of selected actions

The activities identified for the effective implementation of the proposed actions encompass a comprehensive range of initiatives designed to promote Reduced Deforestation and Forest Degradation. Table 18 outlines the activities for each selected action.

Table 18:Activities identified for the implementation of selected actions for Reduced Deforestation and Forest Degradation

Actions	Activities to be Implemented
Action 1: Provide financial incentives for forest conservation and sustainable land use	Design and establish an incentive mechanism (e.g., Payments for Ecosystem Services - PES)
	Identify and engage eligible communities and landowners
	Mobilize and allocate sustainable financing sources
	Monitor compliance and verify conservation outcomes
Action 2: Recognise customary land rights and integrate them into forest governance frameworks	Map and document customary land tenure and forest use
	Review and reform legal and policy frameworks
	Build capacity of local communities and governance bodies
	Integrate customary rights into formal forest management plans and processes
Action 3: Establish or improve forest monitoring systems and reporting structures	Assess current forest monitoring capacity and gaps
	Develop or upgrade forest monitoring technologies and methodologies
	Build institutional capacity and train personnel
	Establish transparent and regular reporting mechanisms
Action 4: Ensure gender equality in decision-making processes and access to forest resources	Conduct gender analysis and baseline assessment
	Develop and implement gender-responsive policies and guidelines
	Build capacity and empower women and marginalized groups
	Establish monitoring and accountability mechanisms for gender equality
Action 5: Support education programs at all levels to instill environmental values and sustainable land practices	Develop and integrate environmental and sustainable land use curricula
	Train educators and facilitators
	Launch community outreach and awareness campaigns
	Establish partnerships with NGOs and local organizations

3.1.2.4. Stakeholders and Timelines for Implementation of TAP

Table 19 below outlines the stakeholders responsible for implementing each activity. Most of the responsible stakeholders are government agencies. The PNG Forest Authority, which is the lead agency for the forestry sector, will lead the implementation of most of these activities, with CCDA serving as the coordinating agency. The estimated period of implementation is 2026 to 2030.

Table 19:Name of institutions involved and estimated implementation period

Actions	Activities to be Implemented	Stakeholders	Estimated period of implementation
Action 1: Provide financial incentives for forest conservation and sustainable land use	Design and establish an incentive mechanism (e.g., Payments for Ecosystem Services - PES)	CCDA, PNG Forest Authority, Department of Treasury and Green Finance Centre	2026
	Identify and engage eligible communities and landowners	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026
	Mobilize and allocate sustainable financing sources	CCDA, PNG Forest Authority, Department of Treasury and Green Finance Centre	2026-2027
	Monitor compliance and verify conservation outcomes	CCDA, PNG Forest Authority	2027-2030
Action 2: Recognise customary land rights and integrate them into forest governance frameworks	Map and document customary land tenure and forest use	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2028
	Review and reform legal and policy frameworks	CCDA, PNG Forest Authority	2027
	Build capacity of local communities and governance bodies	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2028
	Integrate customary rights into formal forest management plans and processes	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026
Action 3: Establish or improve forest monitoring systems and reporting structures	Assess current forest monitoring capacity and gaps	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2028
	Develop or upgrade forest monitoring technologies and methodologies	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2027

Actions	Activities to be Implemented	Stakeholders	Estimated period of implementation
	Build institutional capacity and train personnel	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026
	Establish transparent and regular reporting mechanisms	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2027
Action 4: Ensure gender equality in decision-making processes and access to forest resources	Conduct gender analysis and baseline assessment	CCDA, PNG Forest Authority, Department of Education and Department of Lands and Physical Planning	2026-2027
	Develop and implement gender-responsive policies and guidelines	CCDA, PNG Forest Authority, Department of Education and Department of Lands and Physical Planning	2027
	Build capacity and empower women and marginalized groups	CCDA, PNG Forest Authority	2027-2028
	Establish monitoring and accountability mechanisms for gender equality	CCDA, PNG Forest Authority	2027
Action 5: Support education programs at all levels to instill environmental values and sustainable land practices	Develop and integrate environmental and sustainable land use curricula	Responsible body and focal point	Estimated period of implementation
	Train educators and facilitators	CCDA, PNG Forest Authority, Department of Treasury and Green Finance Centre	2026
	Launch community outreach and awareness campaigns	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026
	Establish partnerships with NGOs and local organizations	CCDA, PNG Forest Authority, Department of Treasury and Green Finance Centre	2026-2027

3.1.2.5. Estimation of Resources Needed for Action and Activities

The estimation of financial resources necessary for the implementation of the actions and activities listed above is based on experience implementing similar activities in PNG. Table 20 below outlines the amount needed to implement each activity.

Table 20: Assessment of resources needed for TAP actions and activities

Actions	Activities to be Implemented	Budget per activity (USD)
Action 1: Provide financial incentives for forest conservation and sustainable land use	Design and establish an incentive mechanism (e.g., Payments for Ecosystem Services - PES)	30,000
	Identify and engage eligible communities and landowners	100,000
	Mobilize and allocate sustainable financing sources	10,000
	Monitor compliance and verify conservation outcomes	20,000
Action 2: Recognise customary land rights and integrate them into forest governance frameworks	Map and document customary land tenure and forest use	500,000
	Review and reform legal and policy frameworks	30,000
	Build capacity of local communities and governance bodies	20,000
	Integrate customary rights into formal forest management plans and processes	8,000
Action 3: Establish or improve forest monitoring systems and reporting structures	Assess current forest monitoring capacity and gaps	100,000
	Develop or upgrade forest monitoring technologies and methodologies	100,000
	Build institutional capacity and train personnel	8,000
	Establish transparent and regular reporting mechanisms	10,000
Action 4: Ensure gender	Conduct gender analysis and baseline assessment	10,000

Actions	Activities to be Implemented	Budget per activity (USD)
equality in decision-making processes and access to forest resources	Develop and implement gender-responsive policies and guidelines	50,000
	Build capacity and empower women and marginalized groups	50,000
	Establish monitoring and accountability mechanisms for gender equality	10,000
Action 5: Support education programs at all levels to instill environmental values and sustainable land practices	Develop and integrate environmental and sustainable land use curricula	10,000
	Train educators and facilitators	30,000
	Launch community outreach and awareness campaigns	100,000
	Establish partnerships with NGOs and local organizations	10,000

3.1.2.6. Management Planning

Risks and Contingency Planning

One of the central risks in the implementation of incentive-based and community-driven programs is weak stakeholder buy-in and unclear benefit-sharing arrangements. When eligible participants are misidentified or excluded, it can lead to mistrust and disputes, especially in areas where customary land rights and usage boundaries are not clearly defined. These issues can significantly delay project activities, reduce effectiveness, and limit long-term community engagement.

Another critical concern is the instability of financing and institutional support. Incentive mechanisms like Payments for Ecosystem Services (PES) depend on predictable, long-term funding streams. Without sufficient and sustained financing, these programs risk becoming short-lived or failing to scale. Similarly, resistance to reform, slow legislative processes, or a lack of institutional recognition of customary systems can weaken the legal basis for such mechanisms and undermine their credibility.

Technical and monitoring limitations also pose substantial risks. Inadequate capacity to monitor, verify, and report on program outcomes, particularly where advanced technologies or complex data systems are involved can result in unreliable information and reduced stakeholder trust. High costs and the technical complexity of modern monitoring systems can further hinder uptake in remote or under-resourced areas. Inconsistent data practices and limited transparency make it difficult to evaluate impact and adjust course.

Finally, social inclusion and education-related challenges may compromise broader development outcomes. These include the lack of gender-disaggregated data, cultural resistance to change, and

limited awareness or engagement from communities. Curricula that are not contextually relevant, combined with underprepared educators, can reduce the effectiveness of environmental education. Similarly, poorly coordinated outreach efforts and unclear institutional roles may prevent strong cross-sectoral collaboration and limit the reach of awareness campaigns.

To address these risks, the program will adopt an integrated approach that includes inclusive stakeholder mapping and benefit-sharing frameworks, participatory land boundary verification, and early legislative engagement to build legal recognition of customary systems. Financial sustainability will be pursued through diversified funding sources, while monitoring systems will combine community-based methods with appropriate technologies. Gender-responsive strategies, context-sensitive curricula, and targeted educator training will ensure inclusive education and outreach. Cross-sectoral coordination platforms and clearly defined roles will be established to align efforts and enhance transparency across all levels.

Next Steps

The main steps to be taken in the implementation of TAP are related to Reduced Deforestation and Forest Degradation in PNG, which include conducting awareness on the targeted communities and informing them of the benefits of this technology. Furthermore, increasing the institutional capacities. At the same time, it is necessary to speed up the Procedure for the development and approval of the Government Decision on the regulation on the standards.

3.1.2.7. TAP overview table

Table 21: TAP overview for the LULUCF sector

Sector	Land Use Land Use Change and Forestry							
Sub-sector	Crop Land and Forest Land							
Technology	Reduced Deforestation and Forest Degradation							
Ambition	By 2030, the country aims to train 70 provincial forestry and environment officers in forest monitoring, enforcement, and GIS applications, secure at least USD 50 million in REDD+ financing to support sustainable forest management and community-based incentives, and achieve a 25% reduction in national deforestation and forest degradation compared to the 2015 baseline.							
Benefits	The main benefits include 1. Enhanced national capacity to monitor and manage forests effectively at both national and provincial levels 2. Significant reduction in carbon emissions through decreased deforestation and forest degradation. 3. Increased financial support for forest-dependent communities, promoting sustainable livelihoods. 4. Strengthened biodiversity conservation, helping safeguard critical ecosystems and cultural heritage.							
Action	Activities to be implemented	Source of funding	Responsible body and focal point	Estimated period of implementation	Rists	Success criteria	Indicators for monitoring of implementation	Budget per activity
Action 1: Provide financial incentives for forest conservation and sustainable land use	Design and establish an incentive mechanism (e.g., Payments for Ecosystem Services - PES)	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority, Department of Treasury and Green Finance Centre	2026	Weak stakeholder buy-in or unclear benefit-sharing arrangements	Development of a transparent, equitable, and easy-to-understand PES framework that clearly defines eligibility, payment criteria, and	Number of participants enrolled in the PES program and payments disbursed	30,000

						verification processes		
	Identify and engage eligible communities and landowners	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026	Misidentification or exclusion of eligible participants	Comprehensive and participatory mapping and verification of land tenure and community boundaries	Number and percentage of eligible communities and landowners formally enrolled in the PES program	100,000
	Mobilize and allocate sustainable financing sources	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority, Department of Treasury and Green Finance Centre	2026-2027	Insufficient or unstable funding streams, which could jeopardize the long-term sustainability of incentive mechanisms and related projects	Identification and securing of diverse, reliable funding sources (e.g., government budgets, donor grants, carbon finance, private sector investments).	Amount and diversity of funds mobilized and allocated annually to PES and conservation activities	10,000

	Monitor compliance and verify conservation outcomes	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority	2027-2030	Inadequate monitoring capacity or data accuracy, which may lead to unreliable verification and reduced trust in the program	Establishment of robust, transparent monitoring protocols combining community-based and technical approaches	Percentage of participating sites monitored and verified according to established protocols	20,000
Action 2: Recognise customary land rights and integrate them into forest governance frameworks	Map and document customary land tenure and forest use	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2028	Disputes or lack of clarity over land boundaries and usage rights, which can hinder project implementation and community trust	Participatory and transparent mapping processes involving local communities, traditional leaders, and relevant stakeholders	Number and area of customary lands and forest use zones accurately mapped and documented	500,000
	Review and reform legal and policy frameworks	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority	2027	Resistance to reform or slow legislative processes	Development and adoption of reforms that strengthen customary land rights and promote sustainable forest management.	Number of legal and policy reforms proposed, adopted, and implemented	30,000

	Integrate customary rights into formal forest management plans and processes	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2028	Institutional resistance or lack of recognition of customary systems	Mechanisms are established for ongoing participation of customary landowners in decision-making and management	Number and proportion of forest management plans that include documented customary rights and governance arrangements	20,000
Action 3: Establish or improve forest monitoring systems and reporting structures	Assess current forest monitoring capacity and gaps	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026	Inadequate technical capacity or resource limitations	Comprehensive assessment of existing monitoring tools, technologies, human resources, and institutional arrangements	Completion of a detailed forest monitoring capacity assessment report	8,000
	Develop or upgrade forest monitoring technologies and methodologies	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2028	High costs or technical complexity may limit the adoption and sustainability of advanced monitoring systems	Adoption of standardized methodologies and protocols ensuring data consistency and comparability	Number and type of new or upgraded monitoring technologies deployed	100,000
	Establish transparent and regular reporting mechanisms	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and	2026-2027	Inconsistent data reporting or lack of transparency	Development of clear reporting protocols and schedules	Frequency and timeliness of reports produced and disseminated	100,000

			Physical Planning			accessible to all stakeholders		
Action 4: Ensure gender equality in decision-making processes and access to forest resources	Conduct gender analysis and baseline assessment	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026	Insufficient gender-disaggregated data or cultural barriers, which may lead to incomplete analysis and perpetuate gender inequalities.	Collection of comprehensive, gender-disaggregated data reflecting the roles, needs, and constraints of different genders	Inclusion of gender-specific indicators in monitoring frameworks	8,000
	Develop and implement gender-responsive policies and guidelines	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority and Department of Lands and Physical Planning	2026-2027	Resistance to change or lack of awareness among stakeholders	Clear mechanisms for implementation, monitoring, and accountability are established	Number of gender-responsive policies and guidelines developed and formally adopted	10,000
Action 5: Support education programs at all levels to instill environmental values and	Develop and integrate environmental and sustainable land use curricula	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority, Department of Education and Department of Lands and	2026-2027	Curricula may not be contextually relevant or aligned with local knowledge systems	Curricula are locally adapted, age-appropriate, and aligned with national education standards	Number of educational institutions adopting the curricula	10,000

sustainable land practices			Physical Planning					
	Train educators and facilitators	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority, Department of Education and Department of Lands and Physical Planning	2027	Educators may lack the necessary background knowledge or teaching methods	Educators are equipped with both subject knowledge and interactive teaching methodologies	Number of educators and facilitators trained, disaggregated by region and gender	50,000
	Launch community outreach and awareness campaigns	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority	2027-2028	Low community engagement or limited message reach	Active participation of community leaders, women, youth, and traditional knowledge holders in campaign design and delivery	Number of communities reached and outreach events conducted	50,000
	Establish partnerships with NGOs and local organizations	GoPNG, Bilateral or Multilateral funding source	CCDA, PNG Forest Authority	2027	Lack of coordination or unclear roles	Formal partnership agreements (e.g., MOUs or contracts) are established with clear roles, responsibilities, and shared goals	Number of active partnerships established with NGOs and local organizations	10,000

3.2. Project Idea for the LULUCF Sector

The table below outlines a project idea for the LULUCF Sector. The project involves a Community-Led Pilot to Reduce Deforestation & Forest Degradation.

Table 22: Project Idea for the LULUCF Sector

Name of Project Idea	**Community-Led Pilot to Reduce Deforestation & Forest Degradation**
Introduction	Manus Province hosts some of Papua New Guinea's last intact lowland rainforest, but shifting cultivation, small-scale logging, and fuel-wood demand are accelerating forest loss. This 24-month pilot partners with Tulu Village to demonstrate that community stewardship, alternative livelihoods, and simple monitoring technology can curb deforestation while boosting household incomes. Lessons will feed into Manus' emerging Provincial Climate Action Plan and PNG's national REDD+ program.
Project Objectives	• Reduce annual forest loss by at least 40 % within the 2 000 ha customary land parcel targeted. • Strengthen community governance through an endorsed Forest Management & Conservation Plan. • Diversify livelihoods so that 60 households earn ≥ 20 % of income from agro-forestry or eco-products. • Establish a low-cost MRV system* (GPS-enabled phones + free satellite data) operated by trained local monitors.
Project results	• Result 1: Net forest-cover loss ≤ 12 ha (baseline = 30 ha/yr) • Result 2: Forest Plan ratified by clan leaders; bylaws registered with LLG • Result 3: 10 ha cocoa-gliricidia agro-forestry planted; 15 women's groups producing vanilla & galip products • Result 4:Monthly patrol logs & bi-annual satellite reports submitted to CCDA
Project activities	• Participatory land-use mapping & drafting of Forest Management Plan • Training & equipping a 12-member Community Forest Monitoring Team • Establishing agro-forestry demo plots (cocoa, galip, vanilla) & value-chain training • Awareness & environmental-education campaign in schools, churches & radio • Community enforcement support: patrol gear, smartphone app, grievance redress mechanism

	• Project management, gender-inclusive M&E & knowledge sharing
Project budget	• Participatory land-use mapping & drafting of Forest Management Plan **– USD 12,150** • Training & equipping a 12-member Community Forest Monitoring Team **– USD 16,200** • Establishing agro-forestry demo plots (cocoa, galip, vanilla) & value-chain training**– USD 29,700** • Awareness & environmental-education campaign in schools, churches & radio**– USD 6,750** • Community enforcement support: patrol gear, smartphone app, grievance redress mechanism**– USD 9,450** • Project management, gender-inclusive M&E & knowledge sharing**– USD 20,250** **Total – US 94,500**
Funding sources	GoPNG, Bilateral or Multilateral funding source
Measurement/Evaluation	The PNG Forest Authority will be responsible for monitoring and evaluating the progress of the project
Possible complications/challenges when implementing the project	Possible challenges include a lack of cooperation from the government agencies and the local communities. Furthermore, the availability of data will also be a possible challenge
Responsibilities and coordination	The PNG Forest Authority will lead the implementation of the activities, while the Climate Change and Development Authority will be responsible for coordination
Project beneficiaries	• 60 households (≈ 360 people) in Tulu Village directly engaged in livelihood activities. • 12 community monitors gaining technical and leadership skills (40 % women, 50 % youth). • Local schools & churches reaching ~ 500 students/congregants via awareness program. • Manus Provincial Government & CCDA – receive a replicable model and geospatial data for REDD+ reporting. • PNG & global community – climate-mitigation benefits (approx. 14 000 t CO_2e avoided over 5 years, as modeled).

Chapter 5: Conclusion

Beyond sector-specific actions, the TAP emphasises two crucial cross-cutting pillars that are integral to its success. Gender Equality and Social Inclusion explicitly integrates gender equity, ensuring that women, youth, and local communities are actively involved in shaping and benefiting from environmental initiatives. This involves not only promoting women's participation in forest governance and decision-making but also ensuring their equitable access to resources and tailoring education programs to diverse community needs, thereby fostering more inclusive and effective outcomes. Complementing this, Environmental Education and Awareness places a strong emphasis on building national capacity through inclusive education and outreach. This entails incorporating forest and climate change education into curricula at all levels, from primary to tertiary, training educators to effectively deliver this knowledge, and launching broad community awareness campaigns. These efforts are designed to instil enduring values of sustainability across generations, cultivating a citizenry that is informed, engaged, and committed to climate action.

The successful implementation of this comprehensive TAP is supported by a total estimated budget for strategic actions across the three sectors of USD 2,458,000. This is further bolstered by additional budgets for the vital pilot projects: USD 148,500 for biomass cook stoves, USD 400,950 for electric vehicles, and USD 94,500 for LULUCF initiatives. Funding for these critical endeavours is anticipated from a diverse range of sources, including the Government of PNG (GoPNG) itself, as well as bilateral and multilateral funding partners, underscoring a shared commitment to PNG's climate goals. Oversight and leadership for the plan's execution will be distributed across key government agencies. The National Energy Authority, Department of Transport, and PNG Forest Authority will spearhead implementation within their respective sectors, while the Climate Change and Development Authority will serve as the central coordinating agency, ensuring coherence and synergy across all initiatives.

The successful implementation of this TAP faces several critical challenges, including issues with data quality and management, potential limitations in community engagement and awareness, and the complexities of institutional coordination. Furthermore, constraints related to capacity and human resources, alongside the risk of financial instability, could impede progress. To proactively address these, the plan outlines robust mitigation strategies: establishing standardised monitoring frameworks, implementing comprehensive stakeholder engagement and communication, defining clear roles through inter-agency agreements, prioritising demand-driven training and strategic hiring, and actively pursuing diversified funding sources with legislative support. Ultimately, this forward-looking strategy for Papua New Guinea, by prioritising clean energy, sustainable transport, and forest conservation, and integrating cross-cutting themes like gender equality and education, aims to achieve a low-carbon, resilient, and empowered future, contingent upon strong institutional coordination, inclusive stakeholder engagement, and sustained political and financial backing.

List of References

Government of Papua New Guinea. (2025). *Technology Needs Assessment Report: Climate Change Mitigation Technologies in Energy, Transport, and LULUCF Sectors of PNG.* Port Moresby: Climate Change and Development Authority

Papua New Guinea Climate Change and Development Authority. (2022). *Papua New Guinea Action Plan for Enhanced Transparency Framework on AFOLU and REDD+ National Forest Monitoring System 2022-2025.* Port Moresby: Climate Change and Development Authority.

Papua New Guinea Climate Change and Development Authority. (2020). *Papua New Guinea Enhanced Nationally Determined Contribution*. Port Moresby: Climate Change and Development Authority.

Papua New Guinea Climate Change and Development Authority. (2019). *Papua New Guinea First Biennial Update Report to the UNFCCC*. Port Moresby: Climate Change and Development Authority.

Papua New Guinea Forest Authority. (2022). *Papua New Guinea Forest and Land Use Change Assessment 2019 Update*. Port Moresby: PNG Forest Authority

Papua New Guinea Climate Change and Development Authority. (2012). *Papua New Guinea National Inventory Report 2000-2017*. Port Moresby: Climate Change and Development Authority.

Papua New Guinea Climate Change and Development Authority. (2017). *Papua New Guinea National REDD+ Strategy 2017-2027*. Port Moresby: Climate Change and Development Authority.

Papua New Guinea Climate Change and Development Authority. (2021). *Papua New Guinea Revised Enhanced NDC 2020 Implementation Plan (2021–2030)*. Port Moresby: Climate Change and Development Authority.

Papua New Guinea Climate Change and Development Authority. (2022). *Papua New Guinea Second Biennial Update Report to the UNFCCC*. Port Moresby: Climate Change and Development Authority.

United Nations Environment Programme and Technology University of Denmark Partnership (UNEP DTU Partnership). (2019). *Guidelines for a gender-responsive Technology Needs Assessment*. Copenhagen: UNEP Copenhagen Climate Centre.

United Nations Environment Programme and Technology University of Denmark Partnership (UNEP DTU Partnership). (2019). *Guidelines for Technology Needs Assessments*. Copenhagen: UNEP Copenhagen Climate Centre.

United Nations Environment Programme and Technology University of Denmark Partnership (UNEP DTU Partnership). (2018). *Overcoming Barriers to Transfer and Diffusion of Climate Technologies (Second Edition)*: Copenhagen: UNEP Copenhagen Climate Centre.

Annex I List of stakeholders involved and their contacts

No.	Name	Designation	Organization	Email Address
1	Mr. William Lakain	Managing Director	Climate Change & Development Authority	william.lakain@ccda.gov.pg
2	Ms. Debra Sungi	General Manager - MRV & National Communication Division	Climate Change & Development Authority	debra.sungi@ccda.gov.pg
3	Mr. Jason Paniu	Acting Manager – MRV Branch	Climate Change & Development Authority	jason.paniu@ccda.gov.pg
4	Mr. Erick Sarut	Manager – National Communication Branch	Climate Change & Development Authority	erick.sarut@ccda.gov.pg
5	Ms. Jacinta Kull	National Communication Officer - National Communication Branch	Climate Change & Development Authority	jacinta.kull@ccda.gov.pg
6	Mr. Japheth Gai	MRV Officer – MRV Branch	Climate Change & Development Authority	japheth.gai@ccda.gov.pg
7	Mr. Junior Solomon	MRV Officer – MRV Branch	Climate Change & Development Authority	junior.solomon@ccda.gov.pg
8	Ms. Everlyn Mel	MRV Officer – MRV Branch	Climate Change & Development Authority	everlyn.pmel@ccda.gov.pg
9	Mr. Iki Peter	Manager – Adaptation Branch, Adaptation and Projects Division	Climate Change & Development Authority	jonah.auka@ccda.gov.pg
14	Mr. Nathan Sapala	Project Coordinator – FAO-AusGov Project	FAO Papua New Guinea	nathan.sapala@fao.org

15	Mr. Christopher Mong	Nesting Expert - FAO GCF Readiness Project	FAO Papua New Guinea	christopher.mong@fao.org
16	Mr. Michael Klewaki	ICT Officer - FAO GCF Readiness & FAO-AusGov Project	FAO Papua New Guinea	michael.klewaki@fao.org
17	Mr. Dambis Kaip	Director – Forest Policy and Planning Directorate	PNG Forest Authority	dkaip@pngfa.gov.pg
18	Ms. Elizabeth Kaidong	Manager – Climate Change and REDD+ Branch	PNG Forest Authority	ekaidong@pngfa.gov.pg
19	Mr. Oala Iuda	GIS Officer – Climate Change and REDD+ Branch	PNG Forest Authority	oiuda@pngfa.gov.pg
20	Ms. Daisy Lepon	Principal Policy Advisor Economic	Department of Agriculture & Livestock	lepondaisy@gmail.com
21	Mr. Roger Suat	Senior GIS/RS Officer	Department of Agriculture & Livestock	rsuat24@gmail.com
22	Mr. Gibson Pitz	Manager Physical Planning Policy – Physical Planning Division	Department of Lands & Physical Planning	pitzg@lands.gov.pg
23	Mr. Vinila Vuapak	Senior Policy Officer	Department of Lands & Physical Planning	vvuapak@gmail.com
24	Mr. Malcolm Keako	Senior GIS Officer	Conservation & Environment Protection Authority	mkeako@gmail.com
25	Mr. Senson Mark	CEPA Project Advisor	Conservation & Environment Protection Authority	sensonhornbymark@gmail.com
26	Mr. Samson Leri	Director Research Branch	PNG Research, Science and Technology Secretariat	sljsamson@gmail.com

27	Ms. Wilhemina Age	Senior Statistician	National Statistical Office	WAge@nso.gov.pg
28	Ms. Dorothy Pion	GIS Specialist	Mineral Resource Authority	ddpion@mra.gov.pg
29	Mr. Wilfred Moi	Senior GIS Specialist	Mineral Resource Authority	wmoi@mra.gov.pg
30	Ms. Nicole Masta	Senior Aid Coordinator, Bilateral Branch, Foreign Aid Division	Department of National Planning and Monitoring	nicole_masta@planning.gov.pg
31	Mr. Penawa Andrew	Senior Policy Officer	Department of Mineral Policy and Geohazards Management	penawa_andrew@mineral.gov.pg
32	Mr. Selwyn Alua	Senior Policy Officer	Department of Provincial and Local Level Government Affairs (DPLLGA)	salua@dplga.gov.pg
33	Mr. Maihaea Huaupe	Policy Officer	Department of Transport	mhuaupe@transport.gov.pg
34	Mr. Timothy Mais	Executive Manager - Policy Planning and Research Division	National Energy Authority	timothy.mais@nea.gov.pg
35	Mr. Larsen Daboyan	Manager - Research and Statistics Officer	National Energy Authority	Kalina.naris@nea.gov.pg
36	Mr. Francis Sakato	Principal Analyst	Independent Consumer & Competition Commission	fsakato@iccc.gov.pg
37	Ms. Susie Loko	Advising Officer Classification Disputes Tariff – Trade, Excise & Valuation Division	PNG Customs	lokos@customs.gov.pg
38	Ms. Gertrude Miria	Research Officer Environment – Strategic Planning Division	National Capital District Commission	gmiria10@gmail.com

39	Mr. Roy Daggy	Senior Manager – Government Relations & Regulations	PNG Power Limited	rdaggy@pngpower.com.pg
40	Mr. Inoya Haguna	Environmental Coordinator	Puma Energy (PNG) Ltd	Inoya.Haguna@pumaenergy.com
41	Ms. Robertha Kiapranis	HSE Specialist- Environment	Puma Energy (PNG) Ltd	Robertha.Kiapranis@pumaenery.com
42	Mr. Greggory Soweni	Regulatory Supervisor	ExxonMobil PNG	greg.soweni@exxonmobil.com
43	Mr. Peter Pomaleu	Environment Supervisor	ExxonMobil PNG	peter.pomaleu@exxonmobil.com
44	Mr. Cosmas Apelis	Senior Forest Program Manager	The Nature Conservancy	capelis@TNC.ORG
45	Mr. Harry Aurere	Program Manager – Economics PNG-Australia Climate Change Initiative	Australian High Commission, Port Moresby	Harry.Aurere@dfat.gov.au
46	Mr. Masato Mkabayashi	JICA Expert, Forest Project	JICA PNG	Masaki.Aoki@jica.go.jp
47	Mr. Alvin Mokavelaga	Administration Officer	JICA PNG	Mokavelaga.Alvin@jica.go.jp
48	Ms. Nidatha Martin	Environment, Energy, and resilience Officer	USAID	nmartin@usaid.gov
49	Ms. Manau Renagi	Programme Manager – Forest, Climate Change & Biodiversity Nexus	Delegation of the European Union to Papua New Guinea	manau.renagi@eeas.europa.eu
51	Mr. Freddie Alei	Lecturer – Environmental Science	University of Papua New Guinea	falei@upng.ac.pg

53	Ms. Joecy Kabiu	Research Project Officer – Sustainable Land Development Programme	PNG National Research Institute	Joecy.Kabiu@pngnri.org
54	Ms. Phoebe Gwangilo	Journalist	South Pacific Post	pgwangilo@spp.com.pg
55	Mr. Michale Philip	Journalist	The National Newspaper	mphilip@thenational.com.pg
56	Ms. Sharon Engnui	Journalist	EM TV	sengnui@emtv.com.pg
57	Ms. Dulcie Amoniu	Journalist	National Broadcasting Corporation	damoniu@nbc.com.pg
58	Ms. Sandra Ulg	Journalist	FM 100	sulg@fm100.com.pg