



Developing a national policy for deploying and scaling up E-mobility and supporting sustainable infrastructure in Papua New Guinea

EV Policy Draft for PNG

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List of abbreviations

BAU	Business As Usual
BELCO	Bermuda Electric Light Company
BEV(s)	Battery Electric Vehicle(s)
BL&P	Barbados Light & Power Company
BYD	Chinese Automotive manufacturer
CCDA	Climate Change and Development Authority
CEB	Central Electricity Board
CEPA	Conservation and Environment Protection Authority
CNG	Compressed natural gas
CO ₂ eq.	Carbon Dioxide equivalents
CUC	Caribbean Utilities Company
DBM	Development Bank of Mauritius
DHL	Dalsey, Hillblom and Lynn (German logistic company)
DLPP	Department of Lands & Physical Planning
DoF	Department of Finance
DoT	Department of Transport
DoW	Department of Works
EPR	Extended Producer Responsibility
EVs	Electric Vehicles
FAME	Faster Adoption and Manufacturing of Hybrid & Electric Vehicles
GESI	Gender Equity Social Inclusive
GHG	Greenhouse Gas
GoPNG	Government of PNG
ICCC	Independent Consumer Competition Commission
ICCT	International Council on Clean Transportation
ICE	Internal Combustion Engine
ICEV(s)	Internal Combustion Engine Vehicle(s)
IDB	Inter-American Development Bank
IEA	International Energy Agency
IFCM	Industrial Finance Corporation of Mauritius
IPP	Independent power producers
kWh	Kilowatt-hour
LPG	Liquefied petroleum gas
MNRE	Ministry of New and Renewable Energy
MoF	Ministry of Finance
MRV	Monitoring, Reporting and Verification
MVIL	Motor Vehicle Insurance Limited
MW	Megawatt
NCDC	National Capital District Commission
NDC	Nationally Determined Contributions
NEA	National Energy Authority
NEMMP	National Electric Mobility Mission Plan
NEV	New Electric Vehicle
NISIT	National Institute of Standards and Industrial Technology
NTS	National Transport Strategy
OEM	Original Equipment Manufacturer
PGK	Papua New Guinean Kina
PICTs	Pacific Island Countries and Territories
PNG	Papua New Guinea
PPL	PNG Power Limited
PV	Photovoltaic
RE	Renewable Energy

RFP	Request for Proposal
RTA	Road Transport Authority
SDGs	Sustainable Development Goals
SIDS	Small Island Developing State
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
ZEV	Zero Emission Vehicles

1 Introduction

Climate Change is a global concern. Countries around the world are collaborating on climate mitigation and adaptation through the implementation of the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, the Agenda 2030's Sustainable Development Goals (SDGs), and other initiatives. Papua New Guinea (PNG) is a Small Island Developing State (SIDS) highly vulnerable to the impacts of climate change, such as the rise in sea level and extreme weather events. The Government of PNG (GoPNG) has taken a proactive approach to develop national policies and plans directed at climate-compatible development. In 2020, PNG submitted Enhanced Nationally Determined Contributions (NDC) which aligns with the PNG Vision 2050 which clearly establishes overall goal of achieving carbon neutrality of at least 50% by 2030 and 100% carbon neutrality by 2050.¹ National policies and measures are envisioned to support sectoral collaboration towards meeting these commitments.

2 Rationale

It has been projected that the number of vehicles in PNG will grow from 155,000 in 2005 to over 600,000 by 2030 with emissions likely to increase to up to 4.5MT CO₂e.² The Department of Transport (DoT) aims to adopt clean fuel technologies and to establish regulations with incentives for the adoption of fuel-efficient vehicles. The National Transport Strategy (NTS) and the Medium-Term Transport Plan (2019-2022) issued by the Department of Transport (DoT) includes e-mobility in PNG as the key strategy to decarbonize the transport sector.^{3,4}

The transport sector can only be decarbonised significantly if the electricity required to operate electric vehicles (EVs) is generated through renewable energies (RE). However, grid accessibility and reliability in PNG have already been a challenge without deploying EVs. PNG has a low electricity grid accessibility rate at only 13% of households.⁵ On-grid electricity generation in PNG is managed by PNG Power Limited (PPL) and Independent Power Producers (IPPs). The installed generation capacity is 580 megawatts (MW) comprising of a mix of fossil fuel- and non-fossil fuel-based sources.

PPL manages three major grids and 29 diesel-operated mini grids including in the provincial capitals. Fossil fuel-based generation sources (natural gas and diesel) contribute 51.6% (299 MW) to PNG's energy mix, compared to non-fossil-based generation sources (hydropower and geothermal) at approximately 48.8% (283MW).⁶

Between the years 2000 and 2015, the latest year for which numbers are available, the GHG emissions from the energy sector increased by 5,532 GgCO₂ equivalents (CO₂ eq.), or 88%. To address the increase in emission, the country aims to improve the energy mix by **increasing the share of renewables from the 30% recorded in 2015 to 78% by 2030**. Existing programs and measures are projected to increase the share of renewables to 65% by 2030. With additional funding support, it would even be possible to achieve 78% target as indicated in the 2020 NDC.¹

To advance electric vehicles (EVs) powered by affordable, reliable, and sustainable energy, various social, economic, technology and market barriers need to be effectively addressed through policy and finance instruments as well as other supportive measures. A barrier analysis has been undertaken in preparation of this EV policy draft. It is made available in the Annex. It is important that the design of PNG's e-mobility strategy learns from international experience. Chapter 3 outlines international EV policy initiatives. Chapter 4 outlines recommendations for different components of a national EV

policy. It needs to be emphasized that all recommendations are subject to ongoing discussions with relevant stakeholders and the GoPNG.

3 International EV targets and policies

In the past decade, considerable progress has been made in the EV sector. The widespread acknowledgement of the essential role of EVs as a high-potential CO₂-reducing technology has led to a rapid increase of the EV global market share from 120,000 EVs in 2012 to an estimated 16 million EVs in 2021.⁷ Several countries have incorporated EV support policies and measures in their national planning documents. The table below provides a summarized list of the diverse initiatives taken by different countries, featuring particularly SIDS as well as global EV leaders. These initiatives can serve as an example for measures PNG can adopt to advance EVs. PNG should continue to monitor these initiatives to better understand if they can serve as best-practice models.

TABLE 1 SAMPLE OF EV-RELEVANT INITIATIVES IN SELECTED COUNTRIES AND REGIONS

Countries	Target and Initiatives
Pacific Island Targets 2030 Targets 2050	Regional EV policy <ul style="list-style-type: none"> • 10 EV models are available • Battery swapping stations for low-voltage mobility • Good public awareness of EVs • Half of 4-wheel EVs charged use managed (smart) charging • EVs permeate all forms of mobility from single-person vehicles to trucks, buses, and boats • 90% of EVs use smart charging systems
Fiji Incentives	UNFCCC country commitment: Net zero by 2050^a RE commitment for electricity generation: 80% by 2020; 100% by 2030 <ul style="list-style-type: none"> • Zero import duty on EVs, Hybrids, LPG, CNG, solar powered vehicles • Zero duty on charging infrastructure • Zero excise duties on EVs • Reduced VAT on EVs
Barbados Initiatives	UNFCCC country commitment: close to zero GHG emissions by 2030 RE energy commitment: 100% by 2030 EV target: 100% of buses and government fleet by 2030 <ul style="list-style-type: none"> • Lowering of EV import duties • Various EV pilot projects
Bermuda Initiatives	UNFCCC country commitment: Net zero by 2050 RE commitment for electricity generation: 80% by 2020; 100% by 2030 RE energy commitment: 85% by 2035 <ul style="list-style-type: none"> • EVs have been duty-free since 2012, and EV batteries since 2017 • Zero duties on charging infrastructure
Cayman Islands Initiatives	UNFCCC country commitment: 68% reduced fossil fuels use in the transport sector by 2037 EV target: Convert government fleet by 7-10% to EV and hybrids by 2022 <ul style="list-style-type: none"> • Zero import duties on EVs • Differential electricity tariffs for EV charging during off-peak hours

^a "Net zero means "cutting greenhouse gas emissions to as close to zero as possible." <https://www.un.org/en/climatechange/net-zero-coalition>

Jamaica	<p>UNFCCC country commitment: near 60% reduction in GHG emissions by 2030 from 2005 levels</p> <p>RE Target: 50% by 2030</p> <p>EV Target: 16% public transport vehicles and 12% overall vehicles by 2030</p> <ul style="list-style-type: none"> • Reduced import duties on EVs • No fees for EV motor vehicle license for 5 years • Ban on import of vehicles older than 3 years
Mauritius	<p>UNFCCC country commitment: 40% reduction in GHG emissions by 2030</p> <p>RE target: 60% by 2030</p> <p>EV target: 2900 EV and 5500 hybrids by 2025</p>
Initiatives	<ul style="list-style-type: none"> • Incentives based on user groups (govt, taxi, companies, etc.) • Zero duty on EV and hybrids • Negative excise duties on EVs • Concessional lending rates for EV purchase • EVs to be charged using RE
Malta (EU)	<p>UNFCCC country commitment: 55% reduction in GHG emissions by 2030, net zero by 2050</p> <p>RE Target: 32% by 2030</p> <p>EV target: 65000 EVs by 2030</p>
Initiatives	<ul style="list-style-type: none"> • Grants for adopting EVs
China	<p>UNFCCC country commitment: Net zero before 2060</p> <p>RE Target: 20% by 2030</p> <p>EV Target: 40% of all domestic sales to be EVs by 2030</p>
Initiatives	<ul style="list-style-type: none"> • Subsidies based on EV types • Exemptions from road taxes, Parking privileges • Charging rebates • Creation of EV friendly cities
Norway	<p>UNFCCC country commitment: 50% by 2030, net zero by 2050</p> <p>RE Target: 100% RE for transport and heating by 2020</p> <p>EV target: 100% cars sold in 2025 are to be ZEV</p>
Initiatives	<ul style="list-style-type: none"> • No purchase tax on EVs. Purchase tax is based on CO₂ emissions. • No charges on ferries, toll roads. • Free municipal parking • Access to bus lanes • Public procurement only admits Zero Emission Vehicles (ZEV)
Chile	<p>UNFCCC country commitment: Net zero by 2050</p> <p>RE Target: 70% by 2030</p> <p>EV target: 100% EV sold in 2035</p>
Initiatives	<ul style="list-style-type: none"> • Establishes regulations and standards • Sets Energy Efficiency targets as an incentive for EVs • Free access to public chargers • Incentive programme for long distance fleets
India	<p>UNFCCC country commitment: Net zero by 2070</p> <p>RE Target: 50% by 2030</p> <p>EV Target: EV sales by 2030 - 30% of PVs, 70% commercial, 80% two and three wheelers.</p>
Initiatives	<ul style="list-style-type: none"> • National and state level EV policies • Subsidies on purchase • Tax incentives and preferential tariffs for setting up charging stations • Pilot initiatives

3.1 Pacific Islands

A *Regional Electric Mobility Policy for Pacific Island Countries and Territories (PICTs)* was prepared in 2020 following a decision made during the Fourth Pacific Regional Energy and Transport Ministers' Meeting, held in September 2019 in Apia, Samoa. Highlights of the policy document include the following:

1. The policy document proposes targets for 2030 and 2050 for the PICTs (see below).
2. Barriers to the adoption of EVs were identified and based on these, 38 policy recommendations have been provided. These recommendations cover four themes:
 - Central policy and administration
 - Standards and guidelines
 - Awareness raising and promotion
 - Demonstration and upscaling

The policy document provides a list of recommended policy actions without providing any details. The policy document proposes no fiscal incentives.

E-Mobility Target by 2030

1. Ten different models of manufacturer supported, mainstream EVs are available in the marketplace.
2. Battery swapping for low-voltage mobility use is available on a commercial scale in the marketplace.
3. There is good public awareness of EVs.
4. 50% of all four-wheeled EVs are charged through devices that are managed-charging enabled.

E-Mobility Target by 2050

1. Services provided by EVs are an integral and significant component of transport within the region and include single-person electrically assisted mobility options through to electric trucks, buses, and boats.
2. 90% of grid-supplied charging of mainstream EVs is provided through managed-charging systems.

3.1.1 Fiji

- Fiji has eliminated import duties on EVs as well as hybrid, LPG, CNG and solar-powered vehicles. The import duty for Internal Combustion Engine (ICE) vehicles is 32%.
- Import duties on EV-related items have also been eliminated, including solar and electrical charging stations and energy storage systems.
- The excise duty on EVs is 0% compared to 15% for ICE vehicles.
- Value added tax (VAT) is 9% for EVs compared to 15% for ICE vehicles.
- Fiji's Low Emission Development Strategy 2018-2050 recommends the development of an EV roadmap for Fiji that identifies which vehicle segments and areas to focus on and details intervention strategies and financial plans.⁸

3.2 Caribbean Islands

Unless indicated differently, the island individual and specific initiatives and policies outlined in the following are extracted from *Electrified Islands, The Road to e-Mobility in the Caribbean*¹⁰ published by the Organization of American States (OAS), the Inter-American Development Bank (IDB) and the Inter-American Dialogue (THE DIALOGUE) in 2020.

3.2.1 Barbados

- According to its 2019-2030 National Energy Policy, the Barbadian government aims to achieve a 49% nationwide reduction in fossil fuel consumption by 2023.
- By 2030, all buses and the government fleet are expected to be electrified.
- In 2020, a contract for deploying 33 electric buses was awarded to the manufacturer BYD.
- Import duties on EVs have been significantly lowered relative to those on ICE vehicles.
- The government is working with the Samuel Jackman Prescod Institute of Technology to make EV maintenance part of its general auto maintenance course.
- Pilot projects are being used to raise awareness of EVs among potential users. These projects have helped to increase the visibility of EVs on the island. The government is working with manufacturers to identify the measures necessary to increase the attractiveness of Barbados as a market and increase the number of brands and models available to consumers.
- Barbados Light & Power Company (BL&P), the island's sole utility, has invested in advanced/smart metering in order to monitor customer-level electricity usage more closely. Furthermore, it has collaborated with DHL for deploying 8 EVs.

3.2.2 Bermuda

- Import duties on EVs were eliminated in 2012, and those on EV batteries in 2017.
- Duties were also eliminated on EV charging stations, parts, and other accessories, in October 2018.
- To raise awareness of EVs, the Department of Energy hosted a free, multi-vendor EV showcase in 2017.
- The government has also conducted surveys to address myths about EVs
- The Bermuda Electric Light Company (BELCO) has been championing the benefits of EVs. It has deployed 14 electric vehicles in its fleet.
- Electric buses are also being considered for the public transport fleet.

3.2.3 Cayman Islands

- In the *National Energy Policy 2017-2037*, the government of the Cayman Islands committed to long-term goals with regards to e-mobility and renewable energy and suggests a mandatory marketing strategy for dealers and resellers that includes information on fuel efficiency to demonstrate the benefits of EVs.
- The Government will lead by example with an initiative to convert 10% of its 850-vehicle fleet to electric by 2022. It issued a tender for the supply of the EVs in August 2019.
- In 2019, import duties on EVs were eliminated for personal use vehicles valued under \$30,000.
- The Caribbean Utilities Company (CUC) created special tariffs to incentivize off-peak charging. Residents obtain a discount of 37% on electricity if they charge their EVs during off-peak hours (11pm – 8am). This has been an efficient measure to create more home EV chargers.

3.2.4 Jamaica

- Jamaica identified electric mobility as an area of priority.

- In 2021, import duties for EVs were between 20%-30%. Recommendations to lower these rates have been given.
- In July 2022, it was announced that the license fee would be eliminated, and duty rates would be lowered for any imported car with a maximum age of 3 years. The same article outlines that import duties for EVs are going to be reduced from 30% to 10%.⁹
- Under an Inter-American Development Bank (IDB)-funded initiative, the government has partnered with leading automotive distributor Stewart's Automotive Group, to loan BYD-brand EVs to government bodies for a trial period. Five ministries have been invited to participate in the trials.¹⁰¹¹

3.3 Mauritius

Mauritius has set an ambitious goal to adopt 2,900 EVs and 5,500 hybrid vehicles by 2025 and to deploy 12,000 chargers by 2025. These chargers include fast chargers, public chargers, and private chargers. Six main sub-targets have been identified and a set of policy measures has been created to achieve this goal.¹²

TABLE 2 MAURITIUS' STRATEGIES FOR EV INTEGRATION

Suitable Vehicles	Focus on Battery Electric Vehicles (BEVs) and implement a National Battery Plan to ensure long term sustainability through second life applications and battery recycling.
Incentives	Start small in a phased approach and scale EV incentives by target groups: taxi, corporate & government while monitoring growth.
Charging Infrastructure	Facilitate a nationwide open fast charging network to allow freedom to drive anywhere on the island.
Raising Awareness	Build the EV Community for raising awareness & sharing of expertise among stakeholders
Knowledge Sharing	Phased implementation of smart charging & vehicle-to-grid strategy taking global best practices from international leaders in private and public domain to ensure a reliable and affordable grid.
Clean power & Economic Opportunities	Clean power for EVs stimulation program to support energy self-sufficiency, reduction of emissions and economic opportunities.

Some of the initiatives for the adoption of EVs are outlined in the following:

- For EVs, excise duty and reduced road taxes and registration fees
- The National Transport Corporation (NTC) launched the first e-bus in February 2022¹³ and plans to purchase 200 electric buses to renew 50% of its fleet¹⁴
- The Central Electricity Board (CEB) launched a *Solar PV Scheme for Charging of Electric Vehicles*¹⁵ in 2021. Thus, EVs will be charged using renewable energy.

In addition, the government has set a target to achieve 60% renewable energy by 2030 and has developed the following supporting documents:

- A grid code is under preparation, and smart grid roadmap has been developed.
- The Mauritius Renewable Energy Roadmap to 2030 has been published.
- The Renewable Energy Master Plan for 2015-2025 has been developed.

3.4 Malta

- In 2013 Malta developed the National Electromobility Action Plan, which was implemented between 2014 and 2020. It consists of 19 objectives to facilitate an EV transition program.¹⁶
- The EU's Recovery and Resilience Facility will invest more than \$116 million by 2026 to address Malta's 2050 carbon-neutrality objective, with a substantial portion of these funds being channeled towards the decarbonization of transport.
- Malta's government is issuing grants of up to €11,000 for buyers of electric cars and electric vans. Electric minibuses and electric small trucks are subsidized with 40% of the invoice value, up to a maximum of € 40,000. Electric coaches and trucks are also subsidized with 40% of the invoice value, up to a maximum of € 250.000.¹⁷
- Malta has set a target of 65,000 EVs by 2030.¹⁸
- Currently Malta offers approximately 362 public charging stations and there are plans to add another 1,200 charging stations over the next three years.

3.5 China

In the Chinese 14th Five-year Plan on Energy Saving and Emission Reduction Work Plan, the country had set a target of achieving 20% of all new vehicles sales to be EVs. The country has achieved this target already in 2022.¹⁹ Its New Electric Vehicle (NEV) program, started in 2009 with the subsidy scheme) piloted in Ten Cities, Thousand Vehicles. The subsidy program covered 30-50% of the vehicle cost. Other policy initiatives included an exemption from travel tax, parking privileges, and road access. The subsidy program was initially aimed at public fleets to be operated under pilot projects, in 2010 this was extended to private cars to be deployed in pilot tests. Post 2013, the program was extended to all types of vehicles nationwide, and the subsidy was gradually to be phased out by 2022 but the Covid 19 pandemic has led to the extension of this subsidy. The NEV subsidy program prioritized vehicle models with longer driving ranges, better fuel economy and high-density batteries.

In 2017, a NEV credit mandate was introduced by the national government to incentivize sales from EV manufacturers. The program set annual credit targets for manufacturers as a percentage of their annual EV sales. During 2020 many local governments dictated measures aimed at low-emission vehicles to support their sales, such as time-limited purchase subsidies, charging rebates to new adopters and traffic restriction waivers for EVs.²⁰

Figure 1

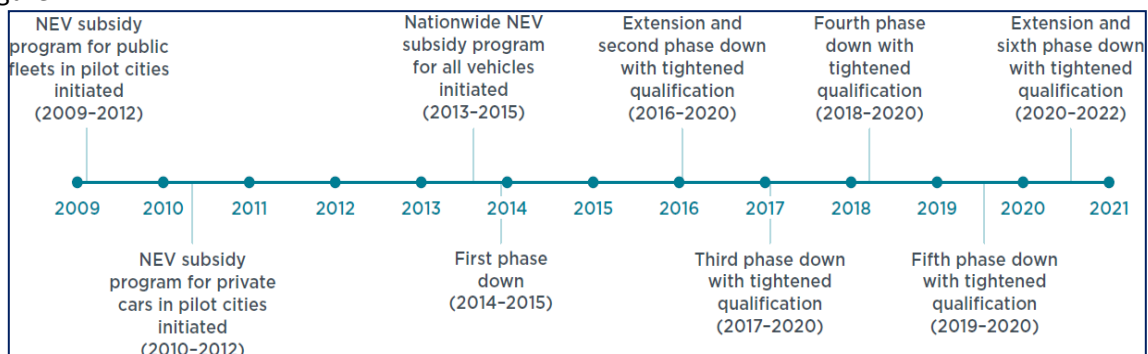


FIGURE 1 TIMELINE OF CHINA'S NATIONAL SUBSIDY PROGRAM FOR NEW ENERGY VEHICLES

SOURCE: ICCT (2020). 21

The EV30@30 Campaign launched in 2017, aimed to reach a 30% EV sales share by 2030 across all signatory countries (China included). The campaign focused on five core actions to develop EV uptake in local markets, namely:

- Supporting and tracking the deployment of EV chargers;
- Stimulating public and private sector commitments to incorporate EVs in company fleets;
- Scaling up policy research and information exchanges;
- Supporting governments through training and capacity building; and
- Establishing the Global EV Pilot City Program to achieve 100 EV-friendly cities over five years.

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3.6 Norway

As of 2021, 65% of cars sold in Norway were BEVs, with expectations for 2022 reaching 80%.²³ Norway provides financial incentives for EV purchases based on CO₂ emissions. In addition, EVs are exempt from registration taxes and value-added tax, and EVs owners are exempt from tolls and parking fees. EVs were also given preferential access to bus lanes. In addition, subsidies were provided for developing charging infrastructure across the country through direct grants to the service provider.

3.7 Chile

The main guiding document for the development of electric mobility in Chile is the National Electromobility Strategy, which was launched in 2017 and updated in March 2022.²⁴ As from 2035 the following will be EV:

- 100% of light and medium vehicle sales
- 100% of the sales of public transport (buses, taxis, and collectives)
- 100% of the sales of larger mobile machinery, which includes extraction trucks and heavy mining machinery.

The National Electromobility Strategy offers a roadmap to achieve these electrification targets through the following:

- Establishing the necessary regulations and standardization requirements of components that favour an efficient development of electromobility from the energy, environmental and mobility points of view.
- Promoting the deployment of electric vehicles in the public transport system of different cities of the country.
- Supporting the research and development of electromobility and enhancing the formation of human capital.
- Promoting the development of electromobility, generating new balances that allow the market to support itself.

3.8 India

India has committed to moving towards an overarching goal of 30% electric mobility. It has put in place policies and regulations to promote EV adoption.

The National Electric Mobility Mission Plan (NEMMP) 2020, was adopted in 2013 and laid down the vision and roadmap for EV penetration in India. The NEMMP establishes incentives in four key areas:

- Demand incentives,
- Manufacturing of EVs,
- Charging infrastructure development, and
- Research and development.

FAME I (Faster Adoption and Manufacturing of Hybrid & Electric Vehicles) was first launched in 2015 as a flagship scheme under the NEMMP 2020 mission plan of the national government, to enhance hybrid and electric technologies in India. The scheme was initially launched over a two-year period with an overall budget of USD 113 million. The funds were used to provide direct subsidies to EV buyers and was used for piloting projects. 465 buses were sanctioned to various cities/states under FAME I.²⁵

In March 2019, the FAME–II scheme was launched, with an outlay of approximately (USD 1.2 Billion) from FY2019-20 till FY2021-22. The subsidies under FAME II are limited to EVs using advanced Lithium-ion (Li-ion) batteries and newer technologies only. It included deployment of 1 million two-wheelers, 0.5 million three-wheelers, 55,000 four-wheelers and 7,090 e-buses. Furthermore, the Ministry of New and Renewable Energy (MNRE) has sanctioned the installation of 2,877 charging stations during this time frame.²⁶

Between 2017 and 2021, more than 21 Indian states have either notified or drafted state electric vehicle policies. The vision of state EV policies is to make states preferred destinations for EVs and component manufacturing, and at the same time increase EV adoption within states.

4 PNG EV Policy Recommendations

4.1 Vision and Goals

The primary objective of the PNG Electric Vehicle Policy, 2022 (in short “Policy”) is to initiate and accelerate the adoption of EVs, especially in the category of public and employee transport, as well as in logistics (in urban areas). The target of the policy is to adopt EVs rapidly and to reach a **15% share of EVs in all new vehicle registrations by 2030**, thereby jumpstarting the EV market, providing new mobility choices as well as economic and social opportunities for Papua New Guineans, and reducing local pollutants as well as GHG emissions from the transport sector.

The Policy will also seek to put in place measures to support job creation wherever possible, including in the creation and maintenance of infrastructure and the repair and maintenance of EVs.

4.2 Policy Strategy

We propose that the policy be implemented through the following instruments:

- a) GoPNG leadership
- b) E-bus pilot project
- c) Gender-inclusive Skill Centers
- d) Battery Recycling Ecosystem
- e) Data collection and information sharing
- f) Charging network and database
- g) Financial and fiscal instrumentsⁱⁱ
- h) Administrative framework for policy implementation.

a) GoPNG leadership

- 1.1. To establish the feasibility for large-scale adoption of electric passenger four wheelers, all new vehicles procured by the government will be electric, unless no suitable EV models exist. The government demonstrates leadership by transitioning its entire fleet to electric.
- 1.2. All leased/hired cars used for commutes of PNG Government officials shall be transitioned to electric by the end of the validity period of this policy.

b) E-bus pilot project

- 2.1 In the year 2023, the PNG national government, with financial support from international donors, will purchase 5 electric buses for a pilot project in Port Moresby. The buses will be operated by NCDC. At least three slow chargers will be installed at the bus depot for overnight charging of the buses.

c) Gender-inclusive Skill Centres

- 3.1 New jobs for all genders can be created due to increased EV adoption – e.g., charging station operators and EV service mechanics. Port Moresby shall aspire to become a hub for the provision of training related to jobs in the EV eco-system. Courses shall be designed to train EV drivers (new

ⁱⁱ The suggested values for the financial incentives and other fiscal measures are indicative and need to be uptaken by the Ministry of Finance.

- drivers), mechanics and charging station staff in partnership with original equipment manufacturers (OEMs) and private players. These courses shall be delivered through the Skill Centres set up by PNG Government in existing training centres like POMTECH that already have an automotive department.
- 3.2 The Skill Centres shall also offer short re-training courses for ICE vehicle mechanics who would like to be trained in repairing and servicing EVs.
 - 3.3 Private sector partners, i.e., auto OEMs, retail partners and other private players shall be allowed to conduct their own staff training.

d) Battery Recycling Ecosystem

- 4.1 EV batteries typically need to be replaced once they have degraded to operating at 80% of their capacities. Batteries that have reached their end of automotive life must either be reused in other settings or recycled, as a lack of adequate reuse or recycling can carry a high environmental cost. Not only can discarded EV batteries generate toxic gases if damaged during disposal, but EV batteries contain valuable core materials such as lithium and cobalt.
- 4.2 The Government of PNG shall develop a battery reuse and recycling policy that shall encourage and prioritise the reuse of EV batteries that have reached the end of their life and secondly, provide a framework to set up recycling businesses in collaboration with international EV and EV battery recycling firms. Lithium-ion batteries can have a profitable second life as backup storage for grid-scale solar PV installations, where they could operate for a decade or more in this less-demanding role. Extended Producer Responsibility (EPR) would be an appropriate approach to addressing the issue of used batteries in the short term.
- 4.3 Scrapping of both ICE and EVs must be mandated through an appropriate regulation/guideline.

e) Data collection and information sharing

- 5.1 An open source, publicly owned database/mobile application shall be developed by Department of Transport, PNG, offering historical and real-time information on public charging infrastructure i.e., kWh, session length, vehicle type if applicable, number of charging events, location (latitude, longitude) of the charger, number of chargers at site, site classification, payment amount, pay structure (by hour, or by kWh, or by session), as well as payment rate. The private entities shall have to provide data to this public database.
- 5.2 Vehicle-specific data such as the emission class, engine and fuel type, year of first registration etc. shall be collected to enhance existing policies and to measure the GHG emission reductions achieved through mitigation measures such as the deployment of EVs.

f) Charging network and database

Experience in other countries indicates that availability of charging infrastructure is a key driver of EV adoption. The objective of the policy shall be to create an enabling environment for the provision of private as well as public charging infrastructure.

Private charging points:

- 6.1. It is expected that most EV users shall use home and workplace charging points for their core charging needs. However, charging points at these locations need to be engineered for safe charging of EVs, communicate with PPL (utility company) to enable load management, and offer metering that enables

shared use and special tariffs (electricity rates) to EV owners. The following policy measures shall be put in place to encourage installation of such charging points within homes and workplaces.

- 6.2. Changes in building regulations shall be made to ensure all new home and workplace parking is 'EV ready' (i.e., adequate space allocation with conduits and power supply infrastructure in place for EV chargers). Additionally, buildings will need to be able to accommodate additional power load, equivalent to the power required for all charging points to be operated safely and simultaneously. The Ministry of Works has announced in 2022 that it has started the process of reviewing the existing Building Act 1971 and the Building Regulations 1994 and will establish new building standards and codes in line with environmental requirements.
- 6.3. All existing residential and commercial building owners shall be encouraged to install private charging points on their premises. These charging points should provide options for external vehicles to visit for charging. The PNG Power Limited shall provide a **grant for the purchase of charging equipment up to PNG Kina 1,000** per charging point for the first 100 charging points.
- 6.4. Charging standards applicable in PNG will be defined and adopted by National Institute of Standards and Industrial Technology (NISIT) and include standards for DC and AC chargers, equipment, connectors, and associated electronics.
- 6.5. Customers of PPL will request charging installations on their premises. The utility company shall install chargers at their customers' premises as requested and recover additional installation related charges as applicable and approved by the electricity regulatory body (NEA/ICCC) through their electricity bills.

Public charging infrastructure:

- 6.6. Providing accessible public charging facilities within 5 km by road from anywhere in Port Moresby and other urban areas is a key objective of this policy. As several stakeholders involved in the implementation of public charging infrastructure within Port Moresby, the EV committee formed at the city level should address these issues.
- 6.7. Private entities should be invited through a formal bidding process to establish and operate charging stations across Port Moresby and other urban areas in PNG. Land prices are typically high, so if charging locations can be provided at reduced rental rates or on government land for no cost, this can boost the adoption of EVs. These locations shall be spaces in existing government offices, hospitals, shopping areas, schools etc. keeping in mind the required safety standards. A list of locations for deploying charging stations shall be identified by the EV committee within six months of issuance of the policy.
- 6.8. The private entities shall be selected and allocated to identified charging locations based on a process to be defined by the EV committee.

Favourable electricity tariff for charging facilities:

- 6.10 The electricity tariff applicable to all charging stations for commercial use (i.e. charging facilities used by fleet owners) shall be communicated in the Tariff Schedule on an annual basis by NEA/ICCC. The Tariff Schedule shall consider i) cost differences for electricity generation during day and night, which is especially relevant for electricity generation through renewable energy sources such as wind and solar, and ii) the stability of the electricity grid by offering lower tariffs at times when the overall electricity demand is below the average demand (i.e. during the night) in order to avoid peak loads that could negatively impact grid stability. The electricity tariff for EV charging shall be in line with current industrial customer rates for the entire duration of this policy.

- 6.11 Tariff concessions outlined in section 3.10 shall also be extended to all private charging points that are compliant with the standards.

Renewable energy for EVs:

- 6.12 Off-grid charging infrastructure based on solar photovoltaic (PV) will be explored to charge electric buses and to ensure uninterrupted electrical supply.
- 6.13 The private entities that have won competitive bids to operate charging stations as well as all other public charging station operators shall be encouraged to use renewable sources of power through measures included in the NEA-planned Small Off-Grid Regulations. In consultation with stakeholders, PNG Power Limited shall explore the option to provide off-grid PV-based electricity for EV charging.
- 6.14 Furthermore, the private entities can explore power banking facilities with PNG Power Limited for generation and use of renewable power. Power banking essentially assists in addressing power surplus and deficient situations. Pairing of smart chargers with large-scale energy storage could provide energy for fast charging without creating an unexpected burden to the power grid.
- 6.15 The Government shall provide additional grants of PNG Kina 1,000 to operators of charging stations that use renewable energy sources, for the first 100 installations.

User charging costs and payment infrastructure:

- 6.16 User charging costs for all public charging stations will be standardised and published by the competent authorities (NEA/ICCC/PPL). Costs will be based on type of charger (fast/slow); and charged per session; per kWh; per hour and according to the Tariff Schedule (3.10.).
- 6.17 Charging station operators shall be expected to accept payments through multiple modes such as cash, cards, and digital payment options if available.

g) Financial and fiscal instruments

Initiatives applicable across vehicle segments

- 3.1 Fiscal measures: Import duties, road tax, registration fees and other related vehicle fees shall be waived for all EVs, charging stations, batteries, and spare parts.
- 3.2 The purchase/demand incentives offered under the policy (i.e., Purchase and Scrapping Incentives) for all EVs shall be paid out directly to the registered owners by the Department of Transport, PNG, based on claims made by individual buyers after the purchase of the vehicle.
- 3.3 Low interest/interest subvention schemes will be explored by the Department of Transport to be offered by National banks in PNG for application to credit for the purchase of EVs.
- 3.4 All electric vehicles registered shall be issued a green number plate by the Road Transport Authority (RTA), Department of Transport.

Initiatives for different modes of vehicles

To encourage the early adoption of EVs and introduce an EV market, this policy first incentivizes the purchase and use of electric employee transport vehicles, buses, and logistics vehicles.

Public transport fleet:

- 4.1 Additional buses are expected to be purchased for the Port Moresby public transport fleet in the period of 2022 to 2027. Given the small size of fleet operated by the National Capital District Commission (NCDC), the PNG national government should commit to providing appropriate incentives and other support necessary to ensure that fully electric buses constitute at least **50% of all new buses** (i.e., for all public transport vehicles with 15 seats or more) procured for the city fleet.

Freight (commercial) vehicles and employee transportation vehicles:

- 4.2 Small commercial vehicles used as goods or freight vehicles are used for low capacity, short distance deliveries in congested areas of the city. The policy recognizes their importance and supports incentives for the rapid electrification of this fleet.
- 4.3 Individuals and fleet owners shall be encouraged to purchase EVs for freight and for employee transportation services for different companies in PNG, through the provision of **a purchase incentive of PNG Kina 2,000 each for the first 500 vehicles** to be registered in PNG after the issuance of this policy.
- 4.4 ICE freight/passenger transport vehicles over a certain age can cause significant pollution. Scrapping these vehicles will potentially create demand for electric vehicles in the market. Purchasers of EVs (i.e., vehicles eligible for the Purchase Incentive) will be eligible for a Scrapping Incentive for scrapping and de-registering old ICE freight/passenger transport vehicles registered in PNG. **Up to PNG Kina 1,000 for the first 1,000 vehicles** shall be reimbursed by the PNG National Government to the purchasers of EVs, subject to evidence of confirmation of scrapping and de-registration of an ICE vehicle. The definition of an old vehicle eligible for scrapping will be defined by the Department of Transport.

Four-wheelers (E-Cars):

- 4.5 A Purchase Incentive of **PNG Kina 100 per kWh** of battery capacity shall be provided per electric four-wheeler (**subject to a maximum incentive of PNG Kina 2,000 per vehicle**) to the owners of the first **500 e-cars** to be registered in PNG after the issuance of this policy. The incentives shall be applicable only to electric four-wheelers with lithium-ion batteries.
- 4.6 A scrapping policy will be applicable to cars whose first registration was in 2007 or beforehand. **Up to PNG Kina 1,000 for the first 1,000 vehicles** shall be reimbursed by the PNG National Government to purchasers of electric cars who can provide evidence of the scrapping of an ICE vehicle.

h) Administrative framework for policy implementation

- 5.1 The Department of Transport, PNG, shall be the nodal department for the implementation of this National EV Policy.
- 5.2 Operational guidelines shall be created, i.e. for the claim of incentives offered under this policy (i.e. purchase and scrapping incentives) and issued from time to time by the Department of Transport with the approval of Minister (Transport) as Competent Authority.
- 5.3 A National EV Unit shall be constituted by the Department of Transport as the apex body for effective implementation of the PNG Electric Vehicle Policy, 2022. This National EV Unit, situated in Port Moresby, shall be responsible for the effective day-to-day implementation of the PNG EV Policy and comprise staff with relevant technical expertise to exclusively deal with all matters related to electric

mobility in PNG. All requisite compliance with relevant statutes, provisions or rules made thereunder shall be ensured by the respective departments/agencies.

- 5.4 The Department of Transport and the National EV Unit shall design and implement an intensive public outreach and communications campaign focused on creating awareness regarding the benefits of adopting electric vehicles and key elements of the policy.
- 5.5 The National EV Unit will also be the point of contact for EV initiatives undertaken in other parts of the country through the provincial Department of Transport offices.
- 5.6 An EV Committee consisting of relevant stakeholders will be established under the Department of Transport and will be responsible for regularly reviewing the performance of various measures under the policy and take additional measures, as necessary, for effective implementation so to achieve the primary objective of the policy i.e. reducing GHG emissions in the transport sector.
- 5.7 The Department of Transport remains committed to providing stability to the EV policy framework.
- 5.8 Gender equity and social inclusion (GESI) principles must be adopted, and a gender perspective must be mainstreamed in all development processes of EV policies and processes. Electric mobility has gender equality implications, and the participation of all genders, as well as people with disabilities and other vulnerable groups, in EV policy planning, design, implementation, monitoring and evaluation must be facilitated and embraced.

TABLE 3 SUMMARY OF THE PNG POLICY RECOMMENDATION

Objective: 15% of all new vehicle registrations to be electric vehicles by 2030, resulting in reduced emissions from transport sector			
Focus segment of vehicles: Buses, employee transportation vehicles, small commercial (freight) vehicles & cars			
PARAMETERS	TARGET	REMARKS	RESPONSIBLE AUTHORITY (entities which must work together to implement measures)
a. GoPNG leadership			
Government vehicles	100% of new cars procured by Government are EVs. 100% of cars leased or rented by Government leased are EVs.		
b. E-bus pilot project			
Public transport	Five buses to be piloted.	To be funded by international donors	DoT, CCDA, NCDC
c. Gender-inclusive Skill Centers			
Skilling for EVs	Establish Skill Centres to provide the necessary know-how and skills to technicians to repair, service and maintain EVs and charging infrastructure. <ul style="list-style-type: none"> - Existing institutions like POMTECH to become knowledge hubs for EVs - Short-term courses available for current ICE vehicle technicians who would like to upgrade skills to EVs Private sector will be allowed to set up their own training programmes for their staff		DoE, DoT, Car importers
d. Battery Recycling Ecosystem			
Battery recycling	Development of a battery recycling policy and guidelines for adoption at the earliest. Extended Producer Responsibility can be adopted.		CEPA, NISIT
Recycling of EVs	Mandate scrapping through adoption of regulations/guidelines for end of life ICE and EVs.		CEPA, NISIT
e. Data collection and information sharing			
Information sharing	Creation of a public database/mobile application providing all historical and real-time information on public charging infrastructure <ul style="list-style-type: none"> - Location 	This will be a useful tool for planning future charging installations	DoT, PPL

Objective: 15% of all new vehicle registrations to be electric vehicles by 2030, resulting in reduced emissions from transport sector
Focus segment of vehicles: Buses, employee transportation vehicles, small commercial (freight) vehicles & cars

PARAMETERS	TARGET	REMARKS	RESPONSIBLE AUTHORITY (entities which must work together to implement measures)
	<ul style="list-style-type: none"> - No. of charging points at location - Availability at any given point - Vehicle types that can be charged - Fee structure - Payment modalities - Number of events (vehicles charged) Customer reviews		
	Develop comprehensive data collection frameworks, ideally in an electronic format (i.e. electronic vehicle registration forms), to facilitate the establishment of a standardized database for future analysis and planning of initiatives.		DoT, MVIL, RTA, Customs, NCDC,
f. Charging network			
Regulatory norms for buildings	Changes in building regulations to accommodate electric vehicles <ul style="list-style-type: none"> - All new buildings with secure parking spaces must allocate a specific % of area for charging stations. All new buildings with secure parking spaces to include the electrical equipment necessary to enable the easy and low-cost installation of charging stations	Existing Building Act, Regulations, building codes and standards will need to be amended.	DoW, DoT, PPL, NEA, NISIT Institution of Engineers Papua New Guinea Incorporated,
Installation of EV charging stations	PNG Power Limited shall provide a grant for the purchase of charging equipment up to PGK 1,000 per charging point for the first 100 charging points. Provide accessible and safe public charging facilities within 5 km travel from anywhere in Port Moresby.	Charging standards applicable in PNG will be defined and adopted by the NISIT	DoF, PPL, NEA, NISIT, NCDC, DLPP
Electricity tariffs for EV charging stations	Standardized electricity tariffs will be developed for commercial charging and private charging installations.	NEA/ICCC/PPL will communicate tariffs and concessions as applicable	NEA, PPL, ICC, IPP, DoF

Objective: 15% of all new vehicle registrations to be electric vehicles by 2030, resulting in reduced emissions from transport sector
Focus segment of vehicles: Buses, employee transportation vehicles, small commercial (freight) vehicles & cars

PARAMETERS	TARGET	REMARKS	RESPONSIBLE AUTHORITY (entities which must work together to implement measures)
	Rates to be at par with current Industrial Customers for the entire duration of the policy.		
Renewable energy for EVs	Inclusion of specific measures in the planned Small off-grid Regulations for meeting EV charging needs: <ul style="list-style-type: none"> - Pairing smart chargers with large-scale energy storage to power EVs - Manage charging at times when clean energy is available PGK 1,000 to operators of charging stations powered by renewable energy sources for the first 100 installations		NEA, PPL, IPP, DoF
User fees and payment infrastructure	Charging costs for public charging stations will be standardized by NEA/ICCC/PPL, to be determined on the basis of <ul style="list-style-type: none"> - Type of charger (fast/slow) - Per kWh - Per hour - Per charging session Charging station operators to be paid by customers using available modes of payment (i.e., credit cards, debit cards, online transfers, and mobile wallets).		NEA, PPL, ICC, IPP
g. Financial and fiscal instruments (including general initiatives across vehicle types)			
Public transport:	50 % of new buses purchased to be electric.	Buses are referred to as any vehicle >15-seater	DoT, CCDA, NCDC
Commercial vehicles (freight) and employee transportation vehicles:	PGK 2,000 each to the first 500 E - vehicles. Scrapping incentive: PGK 1,000 for first 1,000 vehicles.	Referring to small-size commercial vehicles used to cover short distances	DoT, DoF, CEPA



Objective: 15% of all new vehicle registrations to be electric vehicles by 2030, resulting in reduced emissions from transport sector			
Focus segment of vehicles: Buses, employee transportation vehicles, small commercial (freight) vehicles & cars			
PARAMETERS	TARGET	REMARKS	RESPONSIBLE AUTHORITY (entities which must work together to implement measures)
		for delivery purposes and to transport staff	
Four-wheelers (e-cars):	PGK 100 per kWh of battery capacity shall be provided per electric four-wheeler (subject to a maximum incentive of PGK 2,000 per vehicle) for the first 500 cars. Scrapping incentive: PGK 1,000 for first 1,000 cars.	A 300 km range vehicle would have approx. 30 kWh battery	DoT, PPL, NEA, MoF, DoW, CEPA
Fiscal measures	100% Waiver of the following levies for all EV types including charging infrastructure and battery <ul style="list-style-type: none"> - Import duties - Road taxes - Registration fees - Parking fees Any other charges levied for ICE vehicles		MoF, DoT, RTA, Owners of public parking space
Interest subvention/low interest rates	All loans for EV purchase will offer lower costs than existing vehicle loans.		MoF, private and public banks
Special registration	All EVs will have a green number plate.	This will help in raising awareness and communicating effectively on EVs.	DoT, RTA
Procedural actions	All incentives for purchase of EVs and scrapping of old ICE vehicles will be paid directly to the buyer of the EV. Drafting of Operational Guidelines for Standardized procedure to apply for the incentives.		DoT, MoF
<i>h. Administrative framework for policy implementation</i>			
Institutional structure	At the national level: Creation of a National EV Unit for cross-sector coordination on e-mobility issues Establishing an EV committee consisting of relevant stakeholders as a nodal review body for implementation of the EV policy		DoT

Objective: 15% of all new vehicle registrations to be electric vehicles by 2030, resulting in reduced emissions from transport sector

Focus segment of vehicles: Buses, employee transportation vehicles, small commercial (freight) vehicles & cars

PARAMETERS	TARGET	REMARKS	RESPONSIBLE AUTHORITY (entities which must work together to implement measures)
	Creation of a national fund to support the deployment of electric vehicles		
Gender mainstreaming			
Gender equity and social inclusion (GESI)	<p>To include gender as a cross-cutting issue across the policy initiatives:</p> <ul style="list-style-type: none"> - Decision-making structures to include people of all genders as well as representatives of vulnerable groups (i.e., representation of women in National EV Unit and EV committee) - Inclusion of all genders and vulnerable communities in designing and implementation of activities under the policy (i.e., Skills training, beneficiaries in incentive schemes under the policy, women headed business encouraged and given preference in establishing charging stations etc.) 		DoT

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