Autonomous Bougainville Government

BOUGAINVILLE STRATEGIC ENERGY PLAN 2023 -2033

This document is an attachment to the Bougainville Energy Policy 2022. It is a guiding tool to direct implementation action to be taken towards achieving the energy sector visions and goals set by the Bougainville Energy Policy. It will guide the development of the energy sector in Bougainville over the next ten years. While the policy is designed to be longer term, the plan will be subject to performance review after 10 years.

DEPARTMENT OF MINERAL & ENERGY RESOURCES

MARCH 2023

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Background

The Bougainville Strategic Energy Plan 2023-2033 will guide the development of the energy sector in Bougainville over the next ten years. It encompasses the plan of actions to be taken towards achieving the energy sector visions and goals set by the Bougainville Energy Policy. The main policy goals and objectives are to "achieve affordable, accessible and sustainable energy to enhance economic growth and betterment of livelihoods of people of the Autonomous Region of Bougainville.

With the adoption of the Bougainville Energy Policy (BEP) 2022, the issues listed below were considered important and form part of this BSEP document:

- To accept Bougainville energy targets and goals for the development of the energy sector;
- To enact the current policy vision, outcomes, goals, policy statements/outputs, key thematic areas, strategies, and activities to provide better platform for national, regional and global developments in the energy and climate change areas, including the development of baseline indicators for monitoring progress and impacts;
- To establish a Bougainville Energy Office (BEO) to manage sustainable energy development plans for Bougainville;
- To embed land use policy and agreements to increase energy access for Bougainville;
- To install Bougainville energy human resources development road map to take lead in the energy development;
- To install energy policy efficiency to ensure reliability, security and high quality of energy services and energy access, especially in areas of Transport energy use, Power generation and distribution, and renewable energy systems.
- To install the overall policy and regulatory framework in the energy sector;
- To put in place and institutionalize the implementation of a sustainable monitoring and evaluation mechanism for the implementation of activities in the energy sector, including financial regimes to promote all and including private sector participation;
- To improve coordination and partnerships between key local stakeholders and development partners; and
- To achieve, through BEO, mainstream energy across all sectors and regional and global initiatives, including the Sustainable Energy for All (SE4ALL) initiative.

The Bougainville Energy Policy lays out **ten thematic or key result areas** of energy:

(1) Policy administration and coordination;
(2) Petroleum (fossil fuel) energy resources;
(3) Transport energy use and renewable energy;

(4) Power and electricity;
(5) Outer Island and Rural Electrification;
(6) Renewable energy resources;
(7) Energy efficiency, and conservation;
(8) Tariff and prices;
(9) Human, Environment and disaster risk management; and
(10) Energy data management.

From these key policy areas, there are **seven measurable energy outcomes** that the plans needs to achieve, these includes (1) increased access to sustainable and affordable modern energy supply, (2) secure and reliable downstream petroleum supply system, (3) improved secure and reliable electricity supply system, (4) reliable and low emissions electricity and other energy use sources and storage supply system, (5) efficient and timely investment in energy infrastructure, (6) effective development of open and competitive markets, and (7) strong Leadership and governance in energy

Strategic Vision

The strategic vision for energy sector is well aligned to the Bougainville Energy Policy, 2022, *"an improved quality of life for the people of the Bougainville through accessible, clean, reliable affordable, environmentally appropriate and sustainable energy services."*

The Plan

This plan is a guiding tool to direct action in developing and establishing varying energy resources. The plan is comprised of five elements:

1. Key priorities as desired outcomes for Bougainville consumers;
2. A set of measurable objectives for each outcome;
3. An Agreed Action Plan to deliver the plan's outcomes;
4. A set of matrix to monitor progress;
5. A governance framework that establishes accountability;

Fig. 1-Elements within the Plan

Tangible Outcomes

The seven (7) high level outcomes are centered around one key priority for consumers - to have access to affordable and sustainable modern energy services. The planned activities for the six other outcomes are put in place to support this central priority as part of the policy deliverables. It is prudent these key areas of energy supply outcomes enable and steer the energy policy aspirations and directions, both within the government and the energy consumer, and to ensure that it meets the market design and services to achieve the most critical outcome which is "access to energy affordability. Strong leadership and governance are vital tools in the energy market sectors and within ABG structures to ensure Bougainville achieves her energy priorities.

The roles of Bougainville Energy Office (BEO) together and Bougainville Energy Advisory Council (BEAC) will provide guidance to administration, planning and implementation of the energy plans. These will provide strong leadership with implementation agencies and stakeholders at all levels of community and business to ensure energy infrastructure and services reach the population.

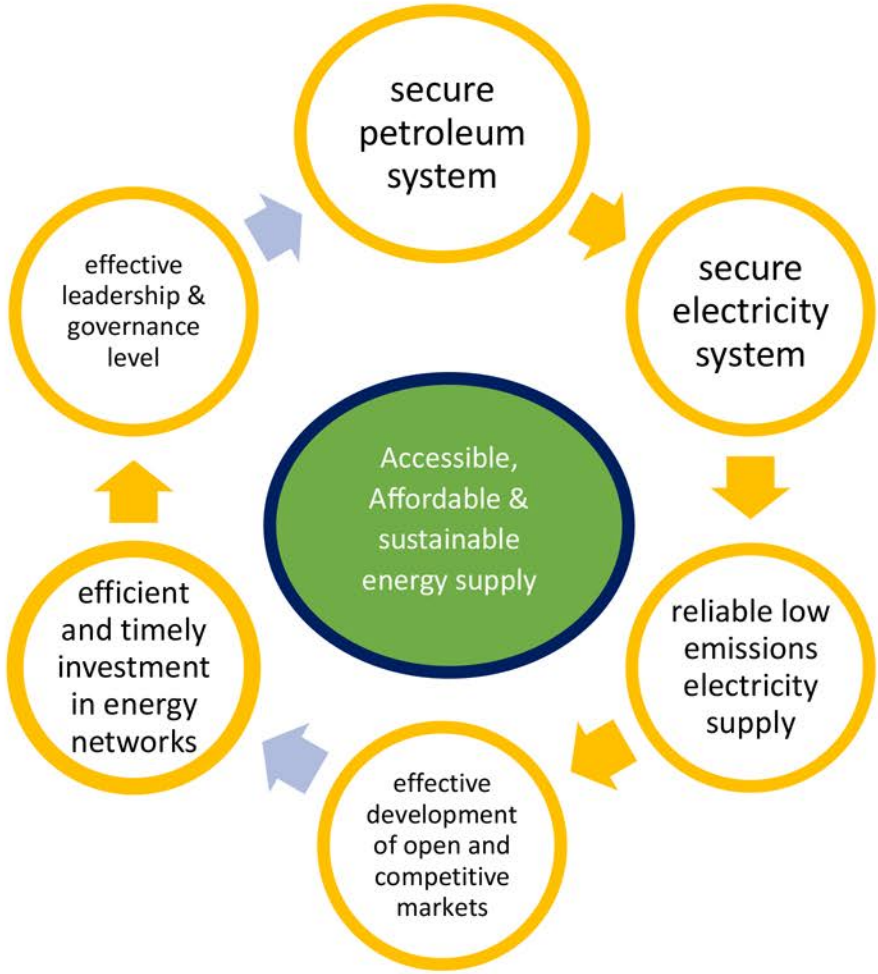

Fig 2. Strategic Energy Plan Outcomes

Measurable Objectives for each outcome

Table 1- Energy Outcomes and corresponding Objectives.

Outcomes	Objectives
Access to sustainable and affordable modern energy supply for all Bougainvillean's and Businesses	1. Energy is equitable and accessed by all customers, supported by adequate energy producer and consumer protection and access to dispute resolution. AC.01 2. Customers are empowered to manage their demands and can access distributed energy and energy efficiency solutions. AC.02 3. Vulnerable customers are adequately supported with suitable pricing plans and are able access energy supply and energy efficiency schemes. AC .03
Secure and reliable downstream petroleum supply system	**4.** ABG Petroleum Downstream SOE becomes sole importer and wholesaler of bulk petroleum in AROB, **SP.01** **5.** Markets and distributors operate safely, securely, with product quality in mind as consumer access to affordable petroleum supply services, supported. **SP.02** 6. ABG SOE and marketers are able to protect consumer safety, environment and quality measures and have access to legislative framework and regulations and access to international standards for any guidance for any dispute resolutions, engineering and operations. Petroleum disaster resilience planning and response is adequately in place and tested. **SP.03**
Secure and reliable electricity supply system	7. ABG Electricity/Power SOE becomes the managing owner and operator of safe, secure and efficient power generation and distribution in full range electricity operating conditions with full control**. SE.01** 8. System planning and development is undertaken by clear and transparent regulations and standards. Electricity supply and distribution disaster and resilience planning is adequately in place and tested. **SE.02**
Reliable and low effluent levels with emissions and oily waste derived from electricity and other energy use sources and storage supply system	9. ABG SOE Company manages electricity quality through supply side power generation to reduce effluent levels-both emissions and oily waste. ABG SOE Company and market have fuel and oil import quality testing and analysis caried against relevant standards and regulations to prevent contaminations in fuels to ensure high burning efficiency and reduction of waste levels through emissions and fluid waste. **RE.01** 10. ABG SOE, industries and market efficiently manage changes and plans to harness industry risks to support timely investments, maintenance, decisions on technology innovations and retirement of energy assets. **RE.02** 11. ABG has legal framework to control imported vessels and vehicle age and end of life both vessel and vehicle life policy to prevent and control transport energy use which affects propagation of effluents-emissions and oily waste levels. Reward and penalty should apply. **RE.03**

Efficient and timely Investment in energy Infrastructure	12. Investment solutions are optimal across all resources, showing a case of project investment viability through tight Land use agreements **ET.01** 13. Efficient regulation on electricity network of whether government or market access to investment. **ET.02** 14. Energy networks incentivized to be efficient platforms for energy services. **ET.03**
Effective Development of Open and Competitive Market	15. Wholesale and retail markets are competitive and deliver efficient outcomes for consumers. 16. Access to efficiently priced fuel and transport 17. Innovation is incentivized and enables value from new and efficient technologies
Strong Leadership and governance in energy	18. Developed enabling legislative frameworks and financial strength for energy development, access, and growth of energy through land use, technology change and skilled people. Relevant energy institutions are established immediately.

The energy objectives are identified as;

AC- Access to energy and satisfied customers.
SP- Secure Petroleum system
SE- Secure Electricity
RE- Reliable and Efficient Low Emissions Energy Development
ET-Efficient and Timely investment
ED- Effective Development

Actions for implementations

Delivering the outcomes of the plan requires well versed and skilled personnel with logical set of coordinated action plans across industry, community level and the government. Actions and tools available to implement the plan across energy administration and policy, petroleum, electricity sectors require the setup of the Bougainville Energy Office (BEO), set up of energy legislations, regulations, operational procedures and standing manuals and consumer driven solutions.

The setup of Bougainville Energy Advisory Council and the BEO will support the implementation.

This action plan provides a basis for planning, budgeting and delivery of outcomes set out in it. Whether it be successful or fails in the future, will all rest with how much Bougainville

government and institutions are prioritizing the energy development and the eagerness to see energy becoming a leading sector in Bougainville's future.

The current and imminent challenges are real for Bougainville in the energy sector; thus, one has to be excited to be part of the changes through agreed planned actions.

Existing and imminent challenges

The list below provides a snapshot of existing and imminent challenges:

- Limited Finance for development and lack of budgetary support towards the energy sector, due to lack of support strategy and action plan on energy that is visible, focused and driven by ABG;
- Unstable landowner issues prevailing with land use for development;
- High fuel prices, because Bougainville is excluded from the ICCC and IPP pricing systems which PNG is using;
- Bougainville government has no control over the unreliable, out of control bulk fuel supply and storage infrastructure on Bougainville;
- The energy related taxes are absorbed through PNG;
- Skilled energy people are a scarcity issue;
- Ageing power generation infrastructure, which lacks minimum requirements to remain operational;
  E.g. 1. ARAWA Power plant has two brand new high speed diesel engines capable of providing thermal power, but it has a fuel storage tank only capable of holding one week generation demand. Therefore, the facility remains inoperative on average 3- 4 weeks, thus allowing Arawa and nearby grid customers remain without any access to power.

  Eg. 2. Buka Power Plant infrastructure is not meeting minimum service and maintenance requirements over a prolong period of time. Thus, allows for continuous power outages every week;
- Limited power distribution coverage, due to lack of infrastructure;
- No low emissions electricity supply. The renewable energy access is more minor individual person inputs rather than government taking a collective infrastructure development;
- Transport energy use plans are not coordinated in line with energy infrastructure and supply plans.
- Long term energy development plans have not been implemented; the 2018-2022 Bougainville Strategic Action plan and the 2016-2030 Bougainville Energy Strategy Plan.

Emerging and anticipated challenges

The emerging and anticipated challenges, are some of the issues already posing threats to the implementation of energy projects. While other challenges and threats remain, steps must be taken to address these on the long-term basis, for the benefit of Bougainville customers and government and its people.

The long-term action plans will be guided by the policy direction and carried out by the BEO and the BEAC.

It is prudent during this transition period for ABG to conduct further assessments on major long-term energy infrastructure investments. ABG must have a serious plan to educate and upskill Bougainvillean's in all and various aspects of energy resource development and implementation.

Energy supply and distribution resources were destroyed or abandoned during the height of the civil conflict on the Island more than 30 years ago. The ABG must take the energy strategic plans to start from ground zero and rehabilitate these destroyed and abandon resources; this is a massive challenge for the energy plan survival.

The year 2027 is the crucial year for Bougainville's political position, hence, any plans to invest in energy infrastructure where new and existing technology will be introduced is now. This also includes critical development in areas relating to the people's energy competency base levels.

Land matters associated with energy development plans need to be discussed now, and any future agreements mooted to safeguard energy development progress on long term basis.

The Bougainville Strategic Energy Plan 2023-2033 is sets out in a descriptive way to allow for easy reading and operability of the plan, to follow through.

Table 2 below describes the major actions in the BEO's workplan and their alignment to the Table 1 stated outcomes and objectives.

Table 2-Bougainville Energy Office Work Plan

The delivery timeline targets refer to timeframe the initiative is likely to remain a focus for the BOE and BESC's work program. The description abbreviations signify action timeline versus timeframe allowed;

ST-Short Term, **MT**-,Medium Term and **LT-**Long Term

Action	Description	Relevant Objectives /Timeframes Target /Relevant Market Review
Accessibility and Affordability to Consumers (Access to Energy and Satisfied Consumers)		
BESP-2016, Marsol Consultants-Energy Documents Review-2021, Recommendations – To install energy supply & Distribution systems to Consumers throughout Bougainville	To install power generation and distribution infrastructure at entire Bougainville consumers- Urban Grids to be improved and upgraded and Rural Electrification Plan to installed and delivered to provided access of electricity by 30% of rural and 70% of Urban consumers accessed to power from current 2-5% consumers accessed by 2030	MT BEP 2022 Policy Goals
ABG Reforms to support electricity & consumer action	The Bougainville Power Infrastructure and electricity supply. A joint initiative between PNG Power Limited and ABG -MOU 2021 to set up a Bougainville Power Company	ST MOU 2021 PNGPL and ABG
	The Bougainville Energy Policy [BEP] is a BEC sanctioned policy document to improve energy access and affordability by 30% for Rural and Outer Islands and 70% for Urban consumers	LT BEP 2022 Policy Goals
Security [Secure Petroleum System]		
Fuel Import Supply Security	The Bougainville Energy Policy [BEP] is a BEC sanctioned policy document to improve energy access and affordability by 30% of PNG IPP price through direct import	LT BEP 2022 Policy Goals & Considerations
Fuel Receipt and storage security	Investigations into access and ownership to former BCL fuel storage tanks at Loloho	LT BEP 2022 Policy Goals & considerations.
Fuel Price security	Bougainville fuel price regulatory framework is set up to base on full cost recovery basis through optimized cost and benefit to Operator and consumer	ST, LT Bougainville Energy Policy 2022
Security [Secure Electricity System]		
Land security	The Bougainville Energy Policy [BEP] is a BEC sanctioned policy document to improve energy access and affordability by 30% for Rural and Outer Islands and 70% for Urban consumers through secure agreements for land use	LT BEP 2022 Policy Goals & considerations
Fuel Security	The Bougainville Energy Policy [BEP] is a BEC sanctioned policy document to improve energy access and affordability by 30% for Rural and Outer Islands and 70% for Urban consumers	LT BEP 2022 Policy Goals & considerations
Plant Asset Security	MOU between ABG and PNGPL to access the PNGPL assets in Arawa and Buka to reform the integrity of assets and transition to ABG control	ST 2021 MOU -PNGPL and ABG

Power Tariff Security	Bougainville power tariff regulatory framework is set up to base on full cost recovery basis through optimized cost and benefit to Operator and consumer	ST, LT Bougainville Energy Policy 2022
Action	**Description**	**Relevant Objectives /Timeframes Target /Relevant Market Review**
Reliability [Reliable and Low emissions Energy]		
System Security & Reliability Action Plan -Electricity & Low Emissions Energy (Renewable Energy) service	***Power Operator Reliability***. The Bougainville Electricity Operator Obligation and Duty of Care, must have system reliability mechanism in place to sustain both supply side and distribution side of electricity 24 hours 7 days a week.	LT Bougainville Energy Policy
	Intervention Mechanism and System Strength Management. The Bougainville Power Operator shall have a system to evaluate the effectiveness of the interventions framework considering new installation load demands and increasing load change to manage system security and related system strength frameworks.	LT Bougainville Energy Policy 2022
	Resilience and Disaster Risk Planning Management. The Bougainville Power Company have a system where it responds ably and capably to any disaster and emergency faced in electricity infrastructure, supply side and distribution side of providing electricity service that consumer is happy.	MT Bougainville Energy Policy 2022
System Security & Reliability Action Plan -Petroleum service	***Operator Infrastructure integrity and security***. The operator must have a system for all petroleum infrastructure remain operational, that supply security is not impacted.	ST Bougainville Energy Policy-2022
	Resilience and Disaster Risk Planning Management. Bougainville Petroleum Company shall have a system where it responds ably and capably to any disaster and emergency faced in petroleum infrastructure and supply import and distribution in providing service to consumer.	MT Bougainville Energy Policy 2022
Investment in Energy Network [Efficient and Timely Investment in Networks and Resources]		
Integrated System Plan	The separate Energy Integrated System Plans. Action plans for Electricity, Petroleum, and Energy Transport use which develops a regulatory framework that will deliver an optimized portfolio of energy network investments to install new infrastructure, and to maintain the Accessibility, Reliability, and affordability of the energy system.	MT Bougainville Energy Policy 2022
Electricity Networks Economic Regulatory Framework **set up**	Study to provide a blueprint for how the network regulation can evolve to efficiently optimize distributed energy resources in a manner that ***optimizes*** cost for all consumers and operator.	MT Bougainville Energy Policy 2022
Transport Energy Use Reforms	***Better Regulation of Transport Energy Use*** to address deficiencies in Air and Sea Transport consumers and restrict monopoly fuel pricing.	MT Bougainville Energy Policy 2022

Action	Description	Relevant Objectives /Timeframes Target /Relevant Market Review
Petroleum Networks Economic Regulatory Framework **Set Up**	Study to provide a blueprint for how the network regulation can evolve to efficiently optimize distributed fuels in a manner that ***optimizes*** cost for all consumers and operator.	MT Bougainville Energy Policy 2022
Energy Human Capacity Plan	Study to provide a blueprint for how the energy network human capacity road map and regulation can evolve to efficiently manage energy resources production in a manner it matches the energy technology requirements.	ST, LT Bougainville Energy Policy 2022
Open and Competitive Markets (Effective Development of Open and Competitive Markets)		
Prior– 2027 Market Design	This review will assess if the Bougainville Electricity Market can introduce PPP's to provide additional services necessary for it to remain secure, reliable, optimum cost and still serve the best interest of Stakeholders.	MT, LT Bougainville Energy Policy, 2022
Hydro Power Strategy	Development of a Bougainville strategy to map the development of Hydro Power in whole Bougainville. The development comes post major feasibility study on all hydro power potential sites and resources	ST, LT Bougainville Energy Policy 2022
Energy Efficient Appliances and Machinery	Development of a Bougainville strategy to map the development of use of energy efficient appliance and machinery in whole Bougainville and be able to provide tax and other incentives to improve technology.	ST, LT Bougainville Energy Policy 2022
Strong but agile governance		
Approval for BEO to be operational	Bougainville Energy Office set up	ST Bougainville Energy Policy 2022
Approval for BPC operational	Bougainville Power Company set up	ST Bougainville Energy Policy 2022
Approval for BEAC Operational	Bougainville Energy Advisory Council set up	ST Bougainville Energy Policy 2022

Additional Consideration

As the energy plan is set up and in motion, the ABG, will require support from energy stakeholders for the development of energy infrastructure and services in Bougainville.

While Bougainville is host to an abundance of energy resources, development of low-emission, clean and sustainable energy resources such as hydro-power and geo-thermal energy is essential.

However, with the transition, Bougainville must also need to tap into cheaper energy resources, those that are easily sourced with low capital start up requirements. With those low energy costs that could easily start the mineral extraction, manufacturing, power generation and transport energy use, in particular, the use of hydrocarbon refined fuels as a primary source, supported with Biofuel and Solar power.

While maintaining a thermal power generation, and Solar energy source power which has a smooth record so far, Bougainville must start to look into development of its long-term energy sources such as hydro and geo-thermal. These two types of renewable energy sources although require high financial start up inputs, in the long run, is very beneficial, especially when Bougainville is in better economic position to increase development in sector. Such establishment will greatly be beneficial to sustain the supply and increase rate of affordability and access to people and businesses on Bougainville.

Metrics as measures of Progress

Primary metrics below have been identified to track high level progress against the energy outcome categories -

Table 3: Primary metrics of Strategic Energy Plan

Category	METRIC
Accessibility-Electricity	No of households connected to power grid and or have standalone PV Solar
Accessibility-Petroleum	No of wholesale and retail outlets installed accessible by economic and social sectors
Affordability-Electricity	Representative consumers retail bills for electricity
Affordability-Petroleum	Minimum 20% lower to IPP price at both Retail and Wholesale fuel price
Security	Number of system interventions related to system security for both Power and Petroleum
Reliability	Volume of Potential Energy not distributed and number of power outages and fuel stock outs. Meeting 90% of manufacturer machinery Load capacity and producing 80% of demanded load capacity

Sustainability	Electricity and Petroleum emissions
Efficiency	Power Generation specific Fuel consumption (kWhr per litre)
Trained and competent energy personnel	No of trained and competent energy staff in key areas of energy investment and operations

In addition, 43 detailed metrics will allow reporting against the 17 objectives of the plan. The metrics may be subject to reviews as the energy market evolves. The full list of the metrics is included in Attachment A.

The metrics are transparent and an independent set of measures by which progress (or otherwise) can be measured and reported on a consistent basis over a period of time. Some of the metrics have multiple sub-components or include potential other measures that could be used to provide context or qualification of the main metric. The intention is to provide a level of assistance in the evaluation process to ensure the integrity of the Bougainville Energy KPI report is sustained.

It is important to consider the metrics in a broader context in the course of a rapidly changing energy sector and circumstances within the whole of Bougainville. Given the interdependence of energy industry, change in a particular metric year on year could be a result of a range of external factors and may not necessarily represent an improvement or worsening in circumstances. In reporting of the metrics, assessing the reason for change will be as important as assessing the direction of change.

Governance Framework

The energy governance framework is a shared responsibility between the Bougainville Energy office (BEO) and the relevant departments within the ABG structure.

The BEO shall become the central administration, planning and management office for energy in AROB. The office shall coordinate with the relevant Departments that implements the various energy components such as the Department of Technical Services, Department of Mineral & Energy, Department of Lands, Physical Planning, Environment, Conservation and Climate Change, Department of Finance & Treasury, Department of Commerce, Trade & Industry, etc.

The functions of the BEO are to: (1)Administer and Coordinate energy; (2)Regulate Energy in AROB; (3)Promote and encourage the conservation and efficient use of renewable energy, (4)Develop for Bougainville Executive consideration of the energy policy, strategies and action plans to ensure subsequent implementation; (5) Monitor electricity tariffs; (6) Monitor and

approve the quality of imported petroleum products in compliance with fuel standards; (7) Serve as the central repository for data collection, analysis and reporting; (8) Launch campaigns and build community outreach and awareness of issues related to sources of energy, energy usage and energy conservation; (9)Coordinate and Liaise with other Government departments/agencies/offices and state-owned enterprises towards the implementation of the energy policy, strategies and plans.

The functions and powers of the BEO also include the identification of officers who are responsible for the carrying out the operational functions. The BEO will be headed by Director, who is an employee of the Public Service and report to the Chief Secretary. The Director will oversee the administration and management of BEO. Director may recruit, develop and maintain effective staff. He recruits senior officers, each to be responsible for each of a Division within BEO, which includes (i) administration, planning and management Officer; (ii) energy data management officer, (iii) energy resilience, efficiency and renewable Officer, (iv) Petroleum and Power Office, and (v) Transport Energy Use Officer. These are public services officers.

The BEO organizational structure is shown on Fig 3-

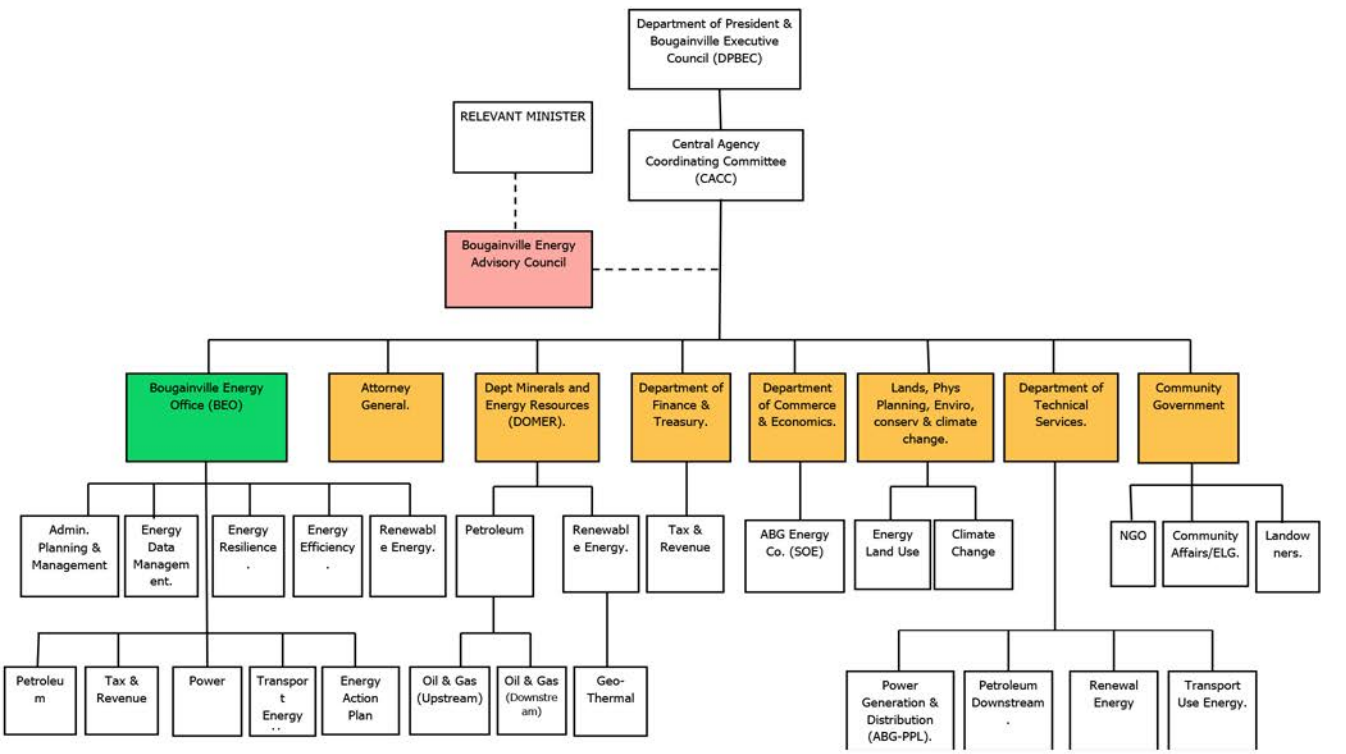

Fig. 3 -Bougainville Energy Organizational Framework

Attachment A - Strategic Energy Plan Metrics

The metrics is set out and will be discussed at most strategic levels to ensure that location base challenges are identified with relevant actions to be considered by BEO and ABG with its development partners and Bougainville Energy Advisory Council.

Outcome 1: *Access to sustainable and affordable modern energy supply for all Bougainvillean's and Businesses*

Energy is equitable and accessed by all customers, supported by adequate energy producer and consumer protection and access to dispute resolution.

Metric(s)	Source	Notes
Number of Household power installations to grid	BEO, BPC and Community level Government	Establishes household access to supplied energy source.
Number of Household stand alone PV solar set up	BEO, BPC and Community Level government	Establishes household access to supplied energy source, in reality through low emissions alternative energy source.
Real representative domestic retail tariff /Price in each Rural and Urban sectors over time	BPC, BEO and Community Level government	Retail tariff as established by regulation and implemented by BPC Retail fuel pump price as established by regulation implemented by petroleum wholesaler and retailer
Number of Customers on hardship programs over time in Rural and Urban sectors	BPC, BEO and Community Government	This metrics relates to low income earners and those in rural areas with very limited income to meet energy costs, support and subsidy
Real representative commercial and Industrial energy prices over time	DOMER, BPC, BEO	This refers to commercial and industrial use of both electricity and petroleum for machinery and transport to do their business.

Customers are empowered to manage their demands and can access distributed energy and energy efficiency solutions.

Metric(s)	Source	Notes
% of customers who have meters installed at households	BPC and BEO	Cash power meter installations in all households is a positive way to control demand and budget
% of reduction of cost in energy due to use of energy efficient appliances at household and consumers	BPC , Electrical hardware and BEO	This can be introduced through electrical warehouses and hardware who import energy efficient appliances
No. of latest model vehicles imported	Automotive Dealers and BEO	This is a measure of road transport energy use efficiency in both reduced cost at longer mileage travel

Vulnerable customers are adequately supported with suitable pricing plans and are able access energy supply and energy efficiency schemes.

Metric(s)	Source	Notes
No of vulnerable customers without access to power	BEO and Community level government	The lack of access by the disadvantaged clearly shows the energy supply to them is not considered by BPC
No of Vulnerable household occupants getting a form of employment or trade incentive to support earn cash to pay their bills	BEO and Community level governments	The vulnerable customers are supported to make money to help with paying for their energy source

Outcome 2: Secure and Reliable downstream petroleum supply system.

ABG Petroleum Downstream SOE becomes sole importer and wholesaler of bulk petroleum in AROB,

Metric(s)	Source	Notes
Signed facility use agreement between ABG, BCL and LO's and BPC -SOE to operate the Tankfarm at Loloho	BEO, BPC and Chief Secretary	A signed agreement for use of petroleum assets and other related infrastructure allows for reliable import process to eventuate and evolve
Signed fuel supply import agreement between ABG SOE -BPC and Fuel Supplier	BPC, BEO and Chief Secretary	A signed fuel import supply agreement means the infrastructure is habilitated into a modern oil industry standard, Petroleum people resources and distribution systems[1] all in place to receive import and distribute fuels in whole AROB
Bougainville fuel price and tax regulation and template is approved and established	BEO, BPC, Ministry of Commerce, Chief Secretary	

1. Distribution systems-tanks, truck gantry, pipeline, HSSE , Quality, Road Transport, petroleum people, manuals, SOPS, Govt license to operate, CEPA license to operate, retailers license to operate, price template approved and are all in total readiness

ABG SOE and marketers are able to protect consumer safety, environment and quality measures and have access to legislative framework and regulations and access to international standards for any guidance for any dispute resolutions, engineering and operations. Petroleum disaster resilience planning and response is adequately in place and tested.

Metric(s)	Source	Notes
Bougainville downstream petroleum Legislation and Regulation is put in place	BEO and Chief Secretary	Legislation and regulation for petroleum downstream is critical for petroleum operations and market distribution for benefit od consumer

Markets and distributors operate safely, securely, with product quality in mind as consumer access to affordable petroleum supply services is supported.

Metric(s)	Source	Notes
Facility OIR audits conducted once a year in whole Bougainville for all license operators at wholesale and retail sites	BEO, BPC	OIR audits are conducted initially once a year and upon successful results be put to every two year. The OIR is part of the operator license condition.

Outcome 3: Secure and Reliable electricity supply system.

ABG Electricity/Power SOE becomes the managing owner and operator of safe, secure and efficient power generation and distribution in full range electricity operating conditions with full control.

Metric(s)	Source	Notes
Number of Signed Long term land use lease for power plant site and distribution facility easement	BPC and Lands Department and Community government and Dept of Technical Services	Critical metrics for electricity supply
Number fuel stock out and number of fuel outages dueo to lack of fuel at each Power plant	BPC and Dept of Technical Services	Supply security planning is critical measure to electrical services supply so long as BPC operates power plants using thermal generators
BPC as an SOE of ABG is established and Operational within 6 months of issue of the approval to Energy Strategy and Action Plan	Chief Secretary, Commerce Dept - SOE leaders and Chief Secretary	Energy development can only happen with a leader in the position of Bougainville Power Company(BPC). The MOU between PNG PL and ABG is in existence for over 24 months. Funding and recruitment of personnel to take charge of Company.
Established Regulation framework and BPC for Power tariff	BEO, Chief Secretary, commerce/Tax Ministry, SPC	power tariff and Tax requires regulations and regional support to establish a template

System planning and development is undertaken by clear and transparent regulations and standards. Electricity supply and distribution disaster and resilience planning is adequately in place and tested.

Metric(s)	Source	Notes
Established Regulation framework and registered member of PPA	BEO, Chief Secretary, Commerce Dept	Longevity of assets needs to be supported by both regulations and SOP and Standards Technical and Management support can be sourced through PPA (Pacific Power Association) membership

Outcome 4: Reliable and low emissions electricity and other energy use sources and storage supply system.

ABG SOE Company manages electricity quality through supply side power generation to reduce effluent levels-both emissions and oily waste. ABG SOE Company and market have fuel and oil import quality testing and analysis caried out against relevant standards and regulations to prevent contaminations in fuels to ensure high burning efficiency and reduction of waste levels through emissions and fluid waste.

Metric(s)	Source	Notes
Number of fuels tests reflect number of all fuel import and subsequent market release to consumer.	BPC, BEO Annual OIR Audit	Bougainville have an approved fuel specification, and has a fuel test room approved to Industry standards
Recorded Carbon emissions for Bougainville meets targets	BPC and BEO	Emissions recorded through Power generation, transport, and terminals
Recorded energy losses within PPA set benchmark	BPC, PPA	BPC to work within Regional Industry benchmark
SFC above 4kWhr/litre for thermal generated power	BPC, PPA	BPC to work within Regional Industry benchmark
Recorded volume of fluid Oily waste trend	BPC , CEPA	BPC to work within Industry standards and regulations

ABG SOE, industries and market efficiently manage changes and plans to harness industry risks to support timely investments, maintenance, decisions on technology innovations and retirement of energy assets.

Metric(s)	Source	Notes
Access to reliable Market data to make decision	BEO, BPC, Automotive dealers, climate Change Office	Industry standards can be a guide to timeline for retirement of energy assets

ABG have legal framework to control imported vessels and vehicle age and end of life both vessel and vehicle life policy to prevent and control transport energy use which affects propagation of effluents-emissions and oily waste levels. Reward and penalty should apply.

Metric(s)	Source	Notes
Access to established legislation and Regulations on Vehicle and ships import and maintenance, and Penalties	BOP, Ministry Technical Services & Chief Secretary	5 years old vehicles and vessels minimum age vessels
Access to number of low energy emission vehicles, both Solar and electric vehicles data for decision making	Vehicle Registry and BEO and Automotive Dealers	Energy data register within BEO, supported by legislation
Access to number of low carbon vessels imported data for decision making	Ministry of Technical services and BEO	Energy data register within BEO, supported by legislation

Outcome 5: Efficient and timely investment in energy infrastructure.

Investment solutions are optimal across all resources.

Metric(s)	Source	Notes
Social service and economics pressure, culminated with transition process to Nationhood by 2027	Bougainville Strategic Action Plan and BEP 2022	showing a case of project investment viability and through valid Land use agreements.
Progress on delivering an Actionable integrated energy system plan.	Bougainville Strategic Action Plan and BEP 2022	Start with short term low cost investment to start up as you develop investment portfolios on long term developments.
Number and $ value of non-network solutions selected in Rural and Outer Island electrification plans	Bougainville Strategic Action Plan and BEP 2022	Look at outer Islands and isolated rural areas where normal main grid is not viable. Identify funding sources and what level of contributions is required and related to demand management innovation allowance or a donor fund placed in Bougainville Energy Development Bank for consumer loan and set up system to run as an example.

Efficient regulation on electricity network.

Metric(s)	Source	Notes
Regulated rate of return for new network investment over a typical industry 15-20 years	Regulatory determination	Look at PPP regulations as a safeguard stop gap
Network productivity, utilization, and reliability	BEO and BEAC	Look at PPP regulations as a safeguard stop gap

Energy networks to be efficient platforms for energy services.

Metric(s)	Source	Notes
Progress towards implementing a Distributed Energy Resources Coordination Framework	BEO and Commerce and Ministry of Technical Services	Buin is privately operating from Arawa and Buka. The need for JV Hydro systems in future and IPP or PPP, a need for coordinated effort is required.

Outcome 6: Effective development of open and competitive markets.

Wholesale and retail markets are competitive and deliver efficient outcomes for consumers.

Metric(s)	Source	Notes
Extent to which level of service is identified as issue to consumer in electricity and Transport-Airline, Sea transport and Public Road Transport	BEO, Consumer Affairs Ministry, Community level government, CASA, Ministry of Technical services, DOMER	Discuss issues of frequent power outages and demand growth **Discuss the access to low emissions electricity sources, as high initial startup investments but long-term energy and cost yields could be justified.** Discuss issues relating to low mobility of people due to lack of transport and high cost of travel
Extent to which competition in retail and wholesale in petroleum market is identified as issue	BEO, Consumer Affairs Ministry, Community level government	Discuss issues of frequent failures in fuel distribution assets

Access to efficiently priced fuel and transport

Metric(s)	Source	Notes
Transparency over fuel supply security and prices (fuels and LPG)	Platts Benchmark-MOPS (FOB-mean of Platts Singapore) ARAMCO LPG benchmark	Use of Platts benchmark on import fuel and Saudi Arabia -Aramco benchmark. Include discussion on transport costs, at import and domestic road and sea freight

Innovation to enable value from new and efficient technologies.

Metric(s)	Source	Notes
Extent to which rules and regulations support innovative technologies to meet consumer and market needs.	IMO, SPREP,SPC and CEPA and SAE	Discuss matters relating Climate Change impacts and related technology change directions. Eg. IMO sulfur levels for vessel bunkers and engine manufacturers push on low sulfur on high and medium speed engines, and national regulations on carbon emissions goals and regulations.

Outcome 7: Strong Leadership and governance in energy

Developed enabling legislative frameworks and financial strength for energy development, access, and growth of energy through land use, technology change and skilled people. Relevant energy institutions are established immediately.

Metric(s)	Source	Notes
Bougainville energy Policy published workplans and statement of expectation	BEP 2022, BEO	Assesses transparency and accountability
Market Bodies outcomes to align with license intents	Commerce and BEO	Assess whether market bodies actions align with goals
Extent to which regulatory costs are minimized	BEO and Commerce qualitative assessment	Look at the cost of compliance. Cost of regulatory obligations
Level of government subsidies in energy sector	BEO, COMMERCE and TAX	Stock take subsidies quarterly and report to BEO commerce

Attachment B - Energy Development Budget Plan

Action	Description	Budget estimates
Accessibility and Affordability to Consumers (Access to Energy and Satisfied Consumers)		
BESP-2016, Marsol Consultants-Energy Documents Review-2021, Recommendations – To install energy supply & Distribution systems to Consumers throughout Bougainville	To install power generation and distribution infrastructure at entire Bougainville consumers- Urban Grids to be improved and upgraded and Rural Electrification Plan to installed and delivered to provided access of electricity by 30% of rural and 70% of Urban consumers accessed to power from current 2-5% consumers accessed by 2030	$ 3,411,550.00
ABG Reforms to support electricity & consumer action	The Bougainville Power Infrastructure and electricity supply. A joint initiative between PNG Power Limited and ABG -MOU 2021 to set up a Bougainville Power Company	
	The Bougainville Energy Policy [BEP] is sanctioned policy document to improve energy access and affordability by 30% for Rural and Outer Islands and 70% for Urban consumers	
Security [Secure Petroleum System]		
Fuel Import Supply Security	The Bougainville Energy Policy [BEP] is sanctioned policy document to improve energy access and affordability by 30% of PNG IPP price through direct import	$7,611,500.00
Fuel Receipt and storage security	Investigations into access and ownership to former BCL fuel storage tanks at Loloho	
Fuel Price security	Bougainville fuel price regulatory framework is set up to base on full cost recovery basis through optimized cost and benefit to Operator and consumer	
Action	**Description**	**Budget Estimate**
Security [Secure Electricity System]		
Land security	The Bougainville Energy Policy [BEP] is a BEC sanctioned policy document to improve energy access and affordability by 30% for Rural and Outer Islands and 70% for Urban consumers through secure agreements for land use	$18,986,155.00
Fuel Security	The Bougainville Energy Policy [BEP] is a BEC sanctioned policy document to improve energy access and affordability by 30% for Rural and Outer Islands and 70% for Urban consumers	

Plant Asset Security	MOU between ABG and PNGPL to access the PNGPL assets in Arawa and Buka to reform the integrity of assets and transition to ABG control	
Power Tariff Security	Bougainville power tariff regulatory framework is set up to base on full cost recovery basis through optimized cost and benefit to Operator and consumer	
Reliability [Reliable and Low emissions Energy]		
System Security & Reliability Action Plan -Electricity & Low Emissions Energy (Renewable Energy) service	***Power Operator Reliability***. The Bougainville Electricity Operator Obligation and Duty of Care , must have system reliability mechanism in place to sustain both supply side and distribution side of electricity 24 hours 7 days a week.	$34,111,550.00
	Intervention Mechanism and System Strength Management. The Bougainville Power Operator shall have a system to evaluate the effectiveness of the interventions framework considering new installation load demands and increasing load change to manage system security and related system strength frameworks.	
	Resilience and Disaster Risk Planning Management. The Bougainville Power Company have a system where it responds ably and capably to any disaster and emergency faced in electricity infrastructure, supply side and distribution side of providing electricity service that consumer is happy.	
System Security & Reliability Action Plan -Petroleum service	***Operator Infrastructure integrity and security***. The operator has a system for all petroleum infrastructure to remain operational, that supply security is not impacted.	
	Resilience and Disaster Risk Planning Management. Bougainville Petroleum Company shall have a system where it responds ably and capably to any disaster and emergency faced in petroleum infrastructure and supply import and distribution in providing service to consumer.	
Action	**Description**	**Budget Estimate**
Investment in Energy Network [Efficient and Timely Investment in Networks and Resources]		
Integrated System Plan	The separate Energy Integrated System Plans. Action plans for Electricity, Petroleum, and Energy Transport use which develops a regulatory framework that will deliver an optimized portfolio of energy network investments to install new infrastructure, and to maintain the Accessibility, Reliability, and affordability of the energy system.	$20,466,930.00

Electricity Networks Economic Regulatory Framework **set up**	Study to provide a blueprint for how the network regulation can evolve to efficiently optimize distributed energy resources in a manner that ***optimizes*** cost for all consumers and operator.	
Transport Energy Use Reforms	***Better Regulation of Transport Energy Use*** to address deficiencies in Air and Sea Transport consumers and restrict monopoly fuel pricing.	
Petroleum Networks Economic Regulatory Framework **Set Up**	Study to provide a blueprint for how the network regulation can evolve to efficiently optimize distributed fuels in a manner that ***optimizes*** cost for all consumers and operator.	
Energy Human Capacity Plan	Study to provide a blueprint for how the energy network human capacity road map and regulation can evolve to efficiently manage energy resources production in a manner it matches the energy technology requirements.	
Open and Competitive Markets (Effective Development of Open and Competitive Markets)		
Prior– 2027 Market Design	This review will assess if the Bougainville Electricity Market can introduce PPP's to provide additional services necessary for it to remain secure, reliable, optimum cost and still serve the best interest of Stakeholders.	
Hydro Power Strategy	Development of a Bougainville strategy to map the development of Hydro Power in whole Bougainville. The development comes post major feasibility study on all hydro power potential sites and resources	$6, 822, 310.00
Energy Efficient Appliances and Machinery	Development of a Bougainville strategy to map the development of use of energy efficient appliance and machinery in whole Bougainville and be able to provide tax and other incentives to improve technology.	
Strong and but agile Governance		
Approval for BEO to be operational	Bougainville Energy Office set up	$1,150,000.00
Approval for BPC operational	Bougainville Power Company set up	
Approval for BEAC Operational	Bougainville Energy Advisory Council set up	

ACRONYMS/ABBREVIATIONS

ABG	Autonomous Bougainville Government
AROB	Autonomous Region of Bougainville
BEAC	Bougainville Energy Advisory Council
BEDS	Bougainville Energy Development Strategy 2015-2030
BEDSC	Bougainville Energy Development Steering Committee
BEDP	Bougainville Economic Development Policy, 2010
BEO	Bougainville Energy Office (yet to set up)
BEP	Bougainville Energy Policy , October 2022
BOUGAIR	Bougainville Air (Former Bougainville Airline)
BPC	Bougainville Power Company (under MOU with PNG PL)
BSDP	Bougainville Strategic Development Plan, 2018-2022
CACC	Central Agencies Coordinating Committee
DOMER	Department of Minerals and Energy Resources, 2017
EE	Energy Efficiency
EIA's	Environment Impact Assessment's
EPU	Energy Planning Unit, within Department of Technical Services
FOB	Free On Board(Free on Board Singapore Mean Price allocated by Platts)
GHG	Green House Gas
JV	Joint Venture
KW	Kilo Watts
kWhr	Kilo Watt Hour
MOPS	Mean of Platts Singapore (A platts Benchmark fuel price derived for FOB Singapore)
MOU	Memorandum of Understanding
MW	Mega Watts
MWhr	Mega Watts per Hour
PIC	Pacific Island Countries
PNG PPL	Papua New Guinea Power Limited
PPA	Pacific Power Association
PV	Solar Photovoltaic
RE	Renewable Energy
SAE	Society of Automotive Engineers
SE4ALL	Sustainable Energy For All
SFC	Specific Fuel Consumption (kWhr/litre)
SPC	South Pacific Community
SPREP	South Pacific Regional Environment Program
SOE	State Own Enterprise