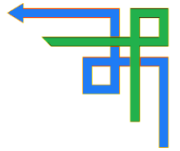


SECRETARIADO
DO FUNDO ESPECIAL
DE DESENVOLVIMENTO DE ATAÚRO



GOVERNMENT POLICY PRIORITIES (GPP) ***Prioridades Política Governu (PPG)***

PROPOSAL

**Development of Electricity, Roads and
Bridges in Ataúro**

PPG Nú. 21

Contents

1. Executive Summary	1
2. Definition of the Policy Problem	4
2.1 Problem Statement	4
2.2 Strategic Alignment	8
2.2.1 Timor-Leste Strategic Development Plan 2011–2030	8
2.2.2 Programme of the IX Constitutional Government 2023–2028	9
2.2.5 Institutional and Departmental Alignment	11
2.2.7 Constitutional Obligations	11
2.2.8 International Commitments	12
3. Objectives and Expected Results	13
3.1 Policy Objectives	13
Objective 1: Improve the financial and operational sustainability of electricity services	13
Objective 2: Expand reliable and affordable electricity access	14
Objective 3: Increase renewable energy and assess geothermal viability	14
Objective 4: Establish an integrated roads, bridges and drainage asset-management system	15
Objective 5: Improve priority roads, bridges and drainage while strengthening maintenance	16
Objective 6: Improve procurement, governance and value for money	16
3.2 Expected Results	17
3.2.1 Short-Term Outputs: 2027–2028	17
3.2.2 Medium-Term Outcomes: 2029–2031	18
3.2.3 Long-Term Impacts	19
3.3 Key Performance Indicators (KPIs)	20
4. Options Analysis	21
4.1 Options Considered	21
Option 1: Current Situation	21
Option 2: Minimum Intervention	22
Option 3: Integrated Electricity, Renewable Energy, Roads and Bridges Programme ..	23

Option 4: Alternative Delivery Model	25
4.2 Cost-Benefit and Cost-Effectiveness Analysis	26
4.3 Rationale for the Preferred Option	29
5. Programme and Implementation Plan.....	31
5.1 Scope and Activities	31
Component 1: Programme Governance, Baselines and Integrated Planning	31
Component 2: Electricity Efficiency, Cost Recovery and Customer Services.....	32
Component 4: Renewable Energy and Geothermal Investigation	33
Component 5: Roads, Bridges and Drainage Asset Management	34
Component 6: Priority Roads, Bridges, Culverts and Drainage Works	35
Component 7: Capacity Development, Safeguards and Monitoring.....	36
5.2 Delivery Model	37
Public-Sector Responsibilities	37
Outsourced Specialist Services.....	37
Partnership Arrangements	38
Selective Alternative Delivery Mechanisms	38
5.3 Implementation Timeline, 2027–2031	39
5.4 Governance and Oversight.....	40
6. Budget Request	42
6.1 Multi-Year Cost Summary	43
6.2 Budget Assumptions	44
Inflation and Price Basis	44
Staffing.....	44
Electricity Demand and Investment	44
Roads, Bridges and Drainage	45
Operating and Maintenance Costs	45
6.3 Funding Sources	46
Existing Baseline Funding	46
New GPP Funding	46
Reallocation and Efficiency Savings.....	46

External Contributions.....	47
7. Risk Assessment	48
7.1 Risk Register	48
7.2 Risk Management Arrangements	50
7.3 Overall Residual Risk	50
8. Monitoring, Evaluation and Reporting	51
8.1 Monitoring Framework.....	51
8.2 Evaluation Plan	52
Mid-Term Evaluation	52
Final Evaluation	53
Evaluation Methodology	53
9. Legal and Other Considerations	55
9.1 Constitutional Compliance.....	55
9.2 Applicable Legislation	55
9.3 Possible Need for New or Amended Regulation	56
9.4 Citizen Expectations.....	56
9.5 Other Considerations	57
Environmental and Cultural Protection	57
Social Inclusion	57
Local Employment and Capacity.....	57
Climate and Disaster Resilience.....	57
Fiscal and Asset Sustainability	57
10. Annexes	59
The annexes provide supporting financial, technical, institutional and results information for PPG No. 21. All cost estimates, baselines and targets will be updated after the 2027 technical studies, consultations and detailed designs.....	59
Annex 1: Detailed Cost Table	59
Annex 2: Evidence Base	60
Annex 3: Coordination Comments	61
Annex 4: Summary of Stakeholder Consultations.....	62
Annex 5: Logic Model and Theory of Change	63

Theory of Change	63
Logic Model	63
Key Assumptions	64
External Factors	64

1. Executive Summary

Prioridades Política Governu (PPG) No. 21 responds to the high and increasing fiscal cost of electricity, roads and bridges while protecting the important economic and social benefits created by earlier public investment. Nationally, electricity cost recovery is approximately 25%, energy represents about 12% of government expenditure, and around USD 0.7 billion was spent on electricity subsidies between 2021 and 2025. Road expenditure reached approximately USD 0.6 billion over the same period, but the balance between new construction, rehabilitation and maintenance remains inadequate. GPP Option No. 21 therefore calls for electricity cost recovery to move closer to 50% within five years and for an updated roads and bridges master plan based on disciplined multi-year investment and contracting. The estimated national fiscal impact is a net saving of approximately USD 230 million over the Forward Estimates.

These challenges are particularly significant in Ataúro because of its geographic isolation, dispersed settlements, difficult terrain, dependence on maritime fuel supply and limited technical capacity. Electricity is supplied mainly by diesel generators and is generally available for approximately 18 hours per day. Fuel-delivery delays may cause interruptions of 24–72 hours, while several remote communities remain outside the main distribution network. Ataúro’s approximately 114-kilometre road network is largely unsealed and includes sections with inadequate bridges, culverts, drainage, slope protection and coastal protection. Several western communities continue to experience incomplete or unreliable road access.

PPG No. 21 proposes an integrated five-year programme for **2027–2031** to improve electricity affordability, reliability and fiscal sustainability and to establish a safer, climate-resilient and properly maintained roads and bridges system. The programme supports the Timor-Leste Strategic Development Plan 2011–2030, the Programme of the IX Constitutional Government 2023–2028, the Ataúro Strategic Development Plan 2026–2030, relevant legislation, the constitutional provisions concerning Ataúro’s special administrative and economic treatment, and the Sustainable Development Goals, particularly SDGs 7, 9, 11 and 13.

The principal policy objectives are to:

- improve electricity cost recovery toward the national target of 50% while protecting vulnerable households;
- increase electricity access to at least 95% of registered households and all priority public facilities by 2031;
- progress toward reliable 24-hour electricity service;

- increase renewable energy to at least 25% of electricity supplied;
- reduce diesel use, electricity losses and fuel-related service interruptions;
- assess Ataúro's geothermal potential through phased scientific, environmental and economic studies;
- establish a complete asset register for roads, bridges, culverts, drainage and protection structures;
- rehabilitate and maintain priority transport corridors; and
- strengthen procurement, lifecycle costing, maintenance planning and public accountability.

The preferred approach is **Option 3: the Integrated Electricity, Renewable Energy, Roads and Bridges Programme**. This option provides the best value for money because it addresses the underlying causes of high expenditure rather than financing isolated construction projects. It combines targeted capital investment with improved metering, billing and collection; renewable-energy development; preventive maintenance; asset management; climate-resilient design; multi-year contracting; independent quality assurance; and environmental and social safeguards. The status quo and minimum-intervention options were rejected because they would maintain high diesel and subsidy dependence and reactive road maintenance. A fully private delivery model was also rejected as the principal approach because Ataúro's small market and dispersed demand may create affordability, contingent-liability and commercial-viability risks. Selective private and partnership arrangements may nevertheless be used where they demonstrate clear value for money.

The programme will be delivered through seven components:

1. programme governance, baselines and integrated planning;
2. electricity efficiency, cost recovery and customer services;
3. electricity generation, distribution and access;
4. renewable energy and phased geothermal investigation;
5. roads, bridges and drainage asset management;
6. priority road, bridge, culvert, drainage and protection works; and
7. capacity development, safeguards, monitoring and evaluation.

Geothermal development will follow a strict stage-gated process. Available scientific evidence confirms structurally controlled hydrothermal activity and provides a basis for

further investigation, but it does not establish a commercially viable geothermal reservoir. Exploratory drilling or pilot development will proceed only where geological, geochemical, geophysical, hydrogeological, environmental, social, technical and financial assessments justify further investment.

The programme will use a hybrid delivery model. The Ministry of Public Works will provide overall leadership, while EDTL will lead electricity-system planning, operation and customer services. AAA and FEDA will coordinate local implementation, consultations and field monitoring. ADN I.P., IGTL, environmental and land authorities, development partners, research institutions and qualified private contractors will provide technical appraisal, specialised studies, construction, supervision and independent verification. A Programme Steering Committee will provide strategic oversight, supported by a Programme Management Unit and technical working groups.

The preliminary five-year programme envelope is **USD 58.35 million**, comprising:

- **USD 50 million** in indicative existing baseline funding for electricity, renewable energy, roads, bridges and drainage; and
- **USD 8.35 million** in new GPP funding for programme personnel and coordination, metering and billing systems, electricity and geothermal studies, asset inventories, technical designs, safeguards, capacity development, audits and evaluation.

This estimate is preliminary and will be refined after the 2027 baselines, feasibility studies, detailed engineering, environmental assessment and procurement planning. It does not include construction of a commercial geothermal power plant, which would require a separate submission following a positive feasibility and investment decision.

By 2031, the programme is expected to deliver broader electricity access, improved service reliability, stronger billing and collection, lower diesel consumption, increased renewable-energy use, faster electricity connections, a complete infrastructure asset register, scheduled maintenance for priority roads, improved bridges and drainage, shorter travel times and safer all-weather access. These results will support health, education, water supply, tourism, fisheries, agriculture, emergency services and local businesses while reducing long-term pressure from subsidies, emergency repairs and repeated reconstruction.

The programme's initial risk is assessed as high because of its technical complexity, geothermal uncertainty, remote-island logistics, institutional coordination requirements and significant capital expenditure. With phased implementation, protected maintenance funding, independent technical review, transparent procurement, targeted consumer protection and effective safeguards, the overall residual risk is expected to be moderate.

Performance will be monitored through monthly operational data, quarterly physical and financial reports, annual fiscal-efficiency reviews, a mid-term evaluation in 2029 and a final evaluation in 2031. Major assets will not be accepted unless they have an identified owner, an asset-register entry, an operating and maintenance budget, trained personnel and defined performance-monitoring arrangements.

2. Definition of the Policy Problem

2.1 Problem Statement

Timor-Leste has invested substantially in electricity, roads and bridges, expanding electricity access, reducing outages and improving national connectivity. These investments have created important foundations for economic and social development. However, the current expenditure model is increasingly difficult to sustain because of high electricity subsidies, low cost recovery, dependence on imported diesel, inefficient infrastructure management and an inadequate balance between new construction and maintenance.

The electricity sector currently recovers only about **25% of its operating costs**. Energy accounts for approximately **12% of total government expenditure**, compared with an ASEAN average of around 2%. Between 2021 and 2025, approximately **USD 0.7 billion** was spent on electricity subsidies, with annual transfers to EDTL generally reaching about USD 150 million. While these subsidies have supported broad access, the existing system provides limited incentives for efficient consumption, accurate metering, stronger billing and collection, demand management and gradual reduction of subsidy dependence.

A similar challenge exists in the roads and bridges sector. Approximately **USD 0.6 billion** was spent on roads between 2021 and 2025, with annual expenditure increasing from around USD 68 million in 2021 to USD 183 million in 2025. Although this investment has established essential economic infrastructure, spending remains heavily focused on capital construction. The balance between new construction, rehabilitation, routine maintenance, periodic maintenance and lifecycle replacement remains inadequate. As a result, roads, bridges, culverts, drainage systems and protection structures may deteriorate prematurely and require repeated, costly reconstruction.

These national challenges are particularly serious in Ataúro because of its geographical isolation, difficult terrain, dispersed settlements, dependence on maritime transport and limited technical and institutional capacity. The central policy problem is therefore:

Electricity, roads and bridges are essential to Ataúro's development, but the existing infrastructure remains incomplete, unreliable and vulnerable, while the current investment and operating model risks increasing public expenditure without ensuring

affordability, adequate maintenance, improved cost recovery or sustainable service delivery.

Electricity constraints in Ataúro

Ataúro's electricity supply depends mainly on diesel generators in Vila Maumeta. The system generally operates for approximately **18 hours per day**, rather than providing reliable 24-hour service. Distribution lines reach only parts of Vila Maumeta, Beloi, Biqueli and Macadade, while several remote communities remain outside the main network or rely on small solar systems, kerosene and other limited energy sources.

Diesel must be transported from Dili by sea. Delays in fuel delivery can interrupt electricity supply for approximately **24 to 72 hours**, exposing the system to maritime conditions, logistical disruption, fuel-price volatility and high transport costs. Health facilities, tourism operators, government offices and other businesses often maintain their own backup generators, increasing costs and duplicating investment.

Small solar photovoltaic systems have improved access to basic lighting and phone charging, but many cannot support broader household, institutional or productive uses. Maintenance is constrained by limited access to trained technicians and replacement parts. Damaged batteries and solar equipment also create environmental risks when they are not properly collected, stored or disposed of.

The Ataúro Strategic Development Plan estimates that electricity demand may reach approximately **5–10 MW over the next decade**, driven by population growth, tourism, expanded public services, water pumping, telecommunications, cold storage, fisheries processing and other productive activities. Meeting this demand mainly through diesel generation would further increase operating costs, fuel dependence, subsidies and exposure to supply interruptions.

Ataúro also has potential renewable-energy resources, including solar, wind and possible geothermal or hydrothermal energy. Thermal springs and recent geological research provide a scientific basis for further geothermal investigation. The 2026 geochemical study identifies structurally controlled hydrothermal processes associated with major NW–SE and NE–SW fault systems, including a central hydrothermal–epithermal corridor extending through Maquedade, Makili, Maumeta and Adara.

However, this evidence does not confirm the existence of a commercially viable geothermal reservoir. Important information is still lacking on reservoir temperature, depth, pressure, permeability, sustainable flow, fluid chemistry, generation capacity, drilling costs, environmental impacts and financial viability. Geothermal development must therefore begin with phased geological, geochemical, geophysical, hydrogeological, environmental, social and economic studies before any major capital investment is considered.

Roads, bridges and drainage constraints in Ataúro

Ataúro has an estimated road network of approximately **114 kilometres**, including around 91 kilometres of rural roads and 23 kilometres of urban roads. Much of the network remains unsealed and lacks adequate drainage, culverts, retaining structures, slope protection and safe crossings. Many sections are vulnerable to erosion, landslides, coastal damage and heavy-rain runoff.

Road connectivity is concentrated mainly in the eastern, northern and southern parts of the island. Several western communities—including Maquer, Atecru, Adara, Iliana and Fatu'u—have historically had limited or incomplete road access and continue to depend partly on local boats and footpaths. When sea conditions are unsafe, these communities may become temporarily isolated.

Poor road conditions increase travel time, transport costs and vehicle operating expenses. They restrict access to schools, health facilities and markets, make it more difficult for farmers and fishers to transport their products and reduce the reliability of emergency services.

Bridges, culverts and drainage structures must be treated as integral parts of the road network. In Ataúro's steep and erosion-prone environment, roads constructed without properly designed drainage, slope protection and water crossings can deteriorate rapidly. The absence of a complete and regularly updated asset register covering roads, bridges, culverts, drainage channels, retaining walls and coastal protection structures also limits rational prioritisation and lifecycle planning.

The challenge is therefore not simply to build more roads. Ataúro requires an efficient and climate-resilient road programme that:

- prioritises investments according to population served, access to essential services and economic importance;
- balances new construction with rehabilitation and preventive maintenance;
- incorporates bridges, culverts, drainage and slope protection into road design;
- applies appropriate engineering standards and quality assurance;
- uses multi-year contracting where it improves value for money; and
- assigns adequate funding and institutional responsibility for maintenance after construction.

Integrated nature and urgency of the problem

Electricity and transport infrastructure are closely connected. Unreliable electricity constrains water pumping, cold storage, telecommunications, health services, schools, tourism facilities and local businesses. Poor roads and bridges increase the cost of transporting fuel, construction materials, equipment, technicians and replacement parts needed to operate the electricity system. Road construction and maintenance also depend on reliable electricity, communications and logistics.

The problem must therefore be addressed through an integrated investment and efficiency strategy rather than through separate and uncoordinated projects. New infrastructure must be supported by lifecycle costing, maintenance arrangements, environmental and social safeguards, clear institutional responsibilities and measurable service standards.

The urgency is increasing as Ataúro's population, tourism activity, public services and productive sectors grow. Delayed action would increase diesel consumption, electricity subsidies, infrastructure deterioration, emergency repair costs and economic losses caused by unreliable electricity and poor transport access.

Accordingly, the Government should act during the next five-year period to:

- establish a more efficient and financially sustainable electricity system;
- improve metering, billing, collection and cost recovery while protecting vulnerable households;
- expand priority electricity connections;
- reduce long-term dependence on diesel;
- determine the technical, environmental and commercial viability of geothermal and other renewable-energy options;
- establish a complete asset inventory for roads, bridges and drainage infrastructure; and
- implement an asset-based road programme that gives greater priority to rehabilitation, preventive maintenance, drainage, climate resilience and value for money.

2.2 Strategic Alignment

PPG No. 21 is aligned with Timor-Leste's national development, infrastructure, fiscal-sustainability, decentralisation, environmental and climate commitments. It translates these commitments into an integrated programme for Ataúro that combines improved electricity efficiency and renewable-energy diversification with prioritised investment in roads, bridges, culverts, drainage and associated protection structures.

The proposal is not intended merely to increase infrastructure expenditure. It supports a transition from fragmented, high-cost and construction-focused spending toward an investment model based on service reliability, cost recovery, lifecycle asset management, preventive maintenance, climate resilience and measurable value for money.

2.2.1 Timor-Leste Strategic Development Plan 2011–2030

The **Timor-Leste Strategic Development Plan 2011–2030**, particularly Part 3 on Infrastructure Development, provides the principal long-term national policy basis for this proposal.

Electricity

The Strategic Development Plan recognises reliable electricity as fundamental to improved living standards, employment creation, private investment and national economic development. It calls for the expansion of electricity access and the development of renewable-energy solutions for areas that cannot be efficiently connected to the main national grid.

Ataúro is specifically relevant to this policy direction because of its geographical separation from the mainland electricity network. The Plan identifies geographically isolated areas, including Ataúro, as priorities for renewable-energy development and rural electrification. This supports the proposed combination of:

- improved generation and distribution infrastructure;
- increased electricity access and reliability;
- stronger operational efficiency and cost recovery;
- solar, wind and other technically feasible renewable-energy systems;
- investigation of geothermal potential;
- reduced dependence on imported diesel; and
- reliable electricity for health, education, water supply, telecommunications, tourism and productive economic activities.

The proposed geothermal component is therefore consistent with the Plan's renewable-energy direction. However, it will be implemented initially as an exploration and feasibility programme because the available scientific evidence does not yet confirm a commercially viable geothermal reservoir.

Roads and bridges

The Strategic Development Plan prioritises the rehabilitation and repair of existing roads to standards that can be properly maintained. It also supports new road construction where the investment serves important economic and social objectives. The Plan emphasises routine and periodic maintenance, all-weather access, bridges, drainage, slope protection, bridge approaches and protection of bridge foundations, piers and abutments.

These principles directly support the proposed Ataúro roads and bridges programme, particularly its emphasis on:

- prioritising economically and socially important connections;
- rehabilitating existing roads before they deteriorate beyond repair;
- providing all-weather access to isolated communities;
- treating bridges, culverts and drainage as integral road components;
- incorporating retaining walls, slope stabilisation and coastal protection where required;
- applying appropriate engineering and climate-resilience standards; and
- establishing long-term maintenance arrangements after construction.

The Strategic Development Plan also identifies rural connectivity in Ataúro among its infrastructure priorities, reinforcing the case for completing links between the island's sucos, aldeias, public facilities, markets and productive areas.

2.2.2 Programme of the IX Constitutional Government 2023–2028

The **Programme of the IX Constitutional Government 2023–2028** reinforces the national commitment to reliable electricity, renewable energy, road and bridge rehabilitation, infrastructure quality and regular maintenance.

Electricity and renewable energy

The Government Programme identifies regular and reliable electricity as a foundation for economic growth and improved public services. Its commitments include:

- expanding reliable electricity access;
- upgrading generation, transmission and distribution systems;

- increasing renewable-energy use;
- improving electricity-sector operational and economic efficiency;
- reviewing tariff and subsidy arrangements;
- extending rural electrification; and
- conducting technical and economic feasibility studies before major investment decisions.

The Programme specifically recognises that a feasibility study has not yet been undertaken for a sustainable electrification plan for Ataúro. PPG No. 21 responds directly to this gap by proposing an integrated electricity plan covering demand forecasts, generation options, distribution expansion, operational costs, cost recovery, renewable-energy resources and long-term service sustainability.

The geothermal programme is also consistent with the Government's commitment to assess renewable-energy opportunities. It will begin with geological, geochemical, geophysical, hydrogeological, environmental, technical and financial investigation rather than proceeding directly to capital construction.

Roads, bridges and drainage

The Government Programme commits to the construction, rehabilitation and maintenance of national, municipal and rural roads in accordance with appropriate quality and safety standards. It also calls for:

- regular road-condition surveys;
- monitoring, rehabilitation and maintenance of bridges;
- construction of bridges in critical areas;
- improved flood protection;
- retaining walls and gabions;
- adequate drainage infrastructure;
- improved construction quality; and
- regular maintenance of completed public assets.

PPG No. 21 operationalises these commitments in Ataúro through a prioritised, asset-based roads and bridges programme. The proposed approach will assess the condition and importance of each road, bridge, culvert and drainage structure before allocating funding. It will also strengthen quality assurance, contract management and maintenance planning.

2.2.5 Institutional and Departmental Alignment

The proposal is consistent with the responsibilities assigned to the **Ministry of Public Works**, which include electricity policy, operation and maintenance of electricity generation and distribution infrastructure, expansion of the electricity network and coordination of renewable-energy development. EDTL operates under the Ministry's sectoral oversight.

The Ministry also has responsibilities for planning, constructing, conserving and repairing roads, bridges and related infrastructure, including river, coastal and flood-protection works. These responsibilities provide the institutional basis for the roads, bridges, drainage and protection components of PPG No. 21.

The Ministry of Finance will have an important role in programme budgeting, fiscal analysis, subsidy reform and assessment of economy, efficiency and effectiveness. Institutions responsible for strategic planning and infrastructure investment will support project appraisal, Infrastructure Fund coordination, engineering quality and monitoring of major capital works.

At the local level:

- **Decree-Law No. 82/2023** establishes the Ataúro Administrative Authority;
- **Decree-Law No. 83/2023** regulates the Ataúro Special Development Fund; and
- the relevant ministerial diplomas establish the organisational arrangements of the Authority and FEDA.

The FEDA General Council includes representation from relevant national ministries and has responsibilities for reviewing and approving annual plans and budgets. This structure provides a mechanism for coordination between local priorities and national sector institutions.

2.2.7 Constitutional Obligations

PPG No. 21 supports several obligations and national objectives established by the Constitution of the Democratic Republic of Timor-Leste.

Special treatment of Ataúro. Section 5(3) provides that Ataúro shall receive special administrative and economic treatment. Section 71(3) further recognises that Ataúro should enjoy an appropriate economic status. These provisions support differentiated infrastructure responses reflecting the island's isolation, higher service-delivery costs and specific development needs.

National development and equitable distribution. Section 6 establishes fundamental objectives that include economic development, promotion of science and technology, protection of the environment and natural resources, harmonious and integrated

development of sectors and regions, and fair distribution of national wealth. The proposal advances these objectives by linking infrastructure investment with regional inclusion, economic diversification and responsible use of public resources.

2.2.8 International Commitments

The proposal contributes directly to implementation of the **United Nations 2030 Agenda for Sustainable Development**.

Its primary alignment is with:

- **SDG 7 – Affordable and Clean Energy:** universal access to affordable and reliable energy, increased renewable energy, improved energy efficiency and expanded sustainable-energy infrastructure;
- **SDG 9 – Industry, Innovation and Infrastructure:** development of reliable, sustainable and resilient infrastructure that supports economic development and equitable access;
- **SDG 11 – Sustainable Cities and Communities:** safer and more accessible transport, reduced disaster impacts and improved resilient infrastructure;
- **SDG 12 – Responsible Consumption and Production:** particularly Target 12.c on rationalising inefficient fossil-fuel subsidies while protecting poor and affected communities; and
- **SDG 13 – Climate Action:** strengthened resilience and adaptation to climate-related hazards and integration of climate considerations into planning and investment.

Supporting alignment is also provided by SDG 8 on productive employment, SDG 10 on reduced inequality, SDG 16 on accountable institutions and SDG 17 on partnerships and financing.

Timor-Leste ratified the **Paris Agreement** in 2017. Its updated **Nationally Determined Contribution 2026–2035** prioritises cost-effective investment in renewable energy, energy efficiency, sustainable transport infrastructure, climate resilience and employment-supporting low-carbon development. PPG No. 21 contributes to these commitments through renewable-energy investigation, reduced diesel dependence, energy-efficiency measures and climate-resilient transport infrastructure.

The proposal is also consistent with the **Sendai Framework for Disaster Risk Reduction 2015–2030**. Risk-informed road and bridge design, adequate drainage, slope stabilisation, coastal protection, asset-condition monitoring and preventive maintenance will reduce infrastructure damage and disruption caused by heavy rainfall, erosion, landslides, flooding and coastal hazards.

Overall, PPG No. 21 provides a practical mechanism for translating national plans, constitutional responsibilities and international commitments into a financially sustainable and locally responsive programme for Ataúro.

3. Objectives and Expected Results

PPG No. 21 will establish an integrated five-year programme for **2027–2031** to improve the affordability, reliability and fiscal sustainability of electricity services and to strengthen the planning, construction and maintenance of roads, bridges, culverts and drainage infrastructure in Ataúro.

The programme will combine targeted capital investment with improved cost recovery, renewable-energy development, lifecycle asset management, preventive maintenance, climate-resilient engineering and stronger institutional accountability.

The targets below are indicative planning targets. Baselines that are not currently available will be established during 2027 and confirmed through technical studies, asset inventories, household registration, engineering assessments and consultations with EDTL, the Ministry of Public Works, AAA and FEDA.

3.1 Policy Objectives

Objective 1: Improve the financial and operational sustainability of electricity services

By December 2031, improve the efficiency and financial sustainability of electricity services in Ataúro while maintaining affordable access for vulnerable households and contributing to the national objective of increasing electricity-sector cost recovery from approximately **25% toward 50% within five years**.

This objective will be achieved through:

- complete registration and classification of electricity customers;
- installation or verification of functioning meters;
- accurate and timely billing;
- stronger revenue collection;
- reduction of technical and non-technical electricity losses;
- transparent reporting of generation costs, revenues and subsidies;
- targeted protection for vulnerable households; and
- gradual reduction of inefficient general subsidies.

The objective does not require immediate full-cost tariffs. Tariff and subsidy reforms will be gradual, evidence-based and accompanied by social-protection measures to ensure that low-income households retain access to essential electricity services. The national baseline of approximately 25% cost recovery demonstrates the need for stronger efficiency and revenue measures.

Objective 2: Expand reliable and affordable electricity access

By December 2031, provide reliable electricity through grid-connected or technically appropriate off-grid systems to at least **95% of registered households and all priority public facilities**, while progressively extending supply toward 24-hour service.

Intermediate targets will include:

- at least **80% electricity access by 2029**, consistent with the PEDA target;
- reliable 24-hour electricity for Vila Maumeta and other principal service centres by 2030;
- electricity connections or appropriate off-grid systems for all health facilities, schools, water systems, government facilities and priority productive enterprises by 2030; and
- elimination of prolonged electricity interruptions caused solely by preventable fuel shortages by 2030.

Ataúro currently receives approximately 18 hours of electricity per day, with incomplete distribution coverage and significant exposure to maritime fuel-delivery disruptions.

Objective 3: Increase renewable energy and assess geothermal viability

By December 2031, increase renewable energy to at least **25% of electricity supplied in Ataúro**, subject to technical and financial feasibility, while reducing dependence on imported diesel.

The renewable-energy programme will include:

- solar photovoltaic generation and battery storage;
- renewable systems for public facilities and water pumping;
- assessment of wind and aquavoltaic options;
- grid-stability and energy-storage studies;
- maintenance and safe disposal arrangements for batteries and equipment; and
- phased investigation of geothermal potential.

For geothermal energy, the programme will:

1. complete geological, structural, thermal-spring and fluid-geochemistry assessments by 2028;
2. conduct geophysical, hydrogeological, reservoir-temperature and environmental studies by 2029;
3. make a formal **go/no-go decision** on exploratory drilling and pilot development by 2030; and
4. prepare a pilot project, financing plan and environmental approvals by 2031 only where the resource is demonstrated to be technically, environmentally and commercially viable.

The scientific evidence identifies hydrothermal activity and structurally controlled fluid circulation, including the Maquedade–Makili–Maumeta–Adara corridor. However, it does not confirm a commercially viable geothermal reservoir.

Objective 4: Establish an integrated roads, bridges and drainage asset-management system

By December 2027, complete a georeferenced inventory and condition assessment covering the approximately **114-kilometre road network** and all associated bridges, culverts, drainage channels, retaining structures, coastal protection works and critical crossings.

Using this information, the Government will approve by 2028 a five-year asset-management and investment plan that:

- classifies assets by condition, safety and economic importance;
- identifies routine, periodic and emergency maintenance requirements;
- prioritises links to communities, schools, health facilities, markets and productive areas;
- determines lifecycle costs;
- assigns institutional responsibility for each asset;
- establishes annual maintenance schedules; and
- integrates climate and disaster-risk assessments.

Ataúro's road network consists of approximately 91 kilometres of rural roads and 23 kilometres of urban roads, much of which remains unsealed and vulnerable to erosion and inadequate drainage.

Objective 5: Improve priority roads, bridges and drainage while strengthening maintenance

By December 2031, rehabilitate or improve the approved priority road corridors and critical bridge, culvert and drainage structures required to provide safer and more reliable all-weather access among Ataúro's five sucos and priority public facilities.

All major works will:

- include properly designed drainage, culverts and water crossings;
- incorporate slope stabilisation, retaining structures and coastal protection where required;
- comply with approved engineering, safety and accessibility standards;
- undergo independent technical verification and quality assurance;
- include environmental and social safeguards;
- provide maintenance obligations and defect-liability arrangements; and
- be selected using transparent economic, social, safety and climate-resilience criteria.

By 2031, routine maintenance will cover all priority roads and critical structures, and maintenance expenditure will be planned separately from new construction expenditure.

Objective 6: Improve procurement, governance and value for money

By December 2028, ensure that all major electricity, road and bridge investments under PPG No. 21 are supported by feasibility studies, lifecycle costing, procurement plans, environmental and social assessments, maintenance arrangements and measurable service standards.

The programme will progressively introduce:

- multi-year and performance-based contracts where appropriate;
- standard designs and technical specifications;
- independent engineering supervision;
- contract-performance monitoring;
- transparent project and financial reporting;
- community grievance and consultation mechanisms; and
- annual assessment of expenditure efficiency and fiscal impact.

By 2031, all new major assets will have an identified owner, operating budget, maintenance plan, asset register entry and accountable institution before final acceptance.

3.2 Expected Results

3.2.1 Short-Term Outputs: 2027–2028

The programme is expected to deliver the following immediate outputs:

1. **Programme governance established**, including a Steering Committee, Programme Management Unit and technical working groups for electricity, geothermal energy, roads, bridges and drainage.
2. **Electricity baseline completed**, covering customer numbers, household access, public facilities, demand, generation capacity, fuel consumption, outages, technical losses, metering, billing, collection and subsidies.
3. **All electricity customers registered**, with vulnerable households identified for targeted assistance.
4. **Ataúro least-cost electricity and renewable-energy plan approved**, covering demand for 2027–2036, generation options, network expansion, storage, operating costs and cost-recovery measures.
5. **Priority electricity connections initiated**, including connections for health facilities, schools, water systems, government facilities and productive economic activities.
6. **Geothermal Phase I assessment completed**, including geological and structural mapping, thermal-spring inventory, temperature measurement, fluid sampling, geochemical analysis and initial environmental screening.
7. **Road, bridge and drainage inventory completed**, covering the approximately 114-kilometre network and associated structures.
8. **Five-year roads and bridges asset-management plan approved**, including project priorities, maintenance schedules, condition ratings and financing requirements.
9. **Engineering and procurement standards adopted**, including requirements for drainage, culverts, bridges, retaining structures, climate resilience, quality assurance and maintenance.
10. **Initial priority road and drainage works commenced**, focusing on unsafe, isolated and economically important locations.

11. Multi-year contracting arrangements introduced for suitable construction and maintenance packages.

3.2.2 Medium-Term Outcomes: 2029–2031

The expected medium-term outcomes are:

Electricity outcomes

- At least 80% electricity access by 2029 and at least 95% by 2031.
- Progress toward 24-hour electricity service.
- Reduced frequency and duration of outages.
- Reliable electricity for all priority public facilities.
- Increased use of renewable energy.
- Reduced diesel consumption per unit of electricity generated.
- Improved customer registration, metering, billing and revenue collection.
- Reduced technical and non-technical losses.
- Improved cost recovery and reduced subsidy requirements per unit of electricity supplied.
- Faster and more transparent processing of new connection applications.
- Improved availability of trained technicians, spare parts and maintenance services.

Geothermal outcomes

- A scientifically credible understanding of Ataúro's geothermal resource potential.
- Identification and ranking of possible exploration areas.
- Completion of environmental, social, technical and economic screening.
- A formal decision on whether to stop investigation, continue exploration or develop a small pilot project.
- Avoidance of premature capital investment where the resource is not commercially viable.

Roads and bridges outcomes

- Improved all-weather connectivity among sucos, aldeias and priority public facilities.
- Reduced travel time and transport costs on upgraded corridors.

- Safer access to schools, health facilities, markets, ports and productive areas.
- Improved reliability of emergency transport and public-service delivery.
- Reduced premature deterioration caused by inadequate drainage.
- Increased proportion of expenditure allocated to preventive and periodic maintenance.
- Reduced dependence on expensive emergency repair and reconstruction.
- Stronger engineering supervision, contract management and quality assurance.
- Improved road safety and resilience to erosion, flooding, landslides and coastal hazards.

3.2.3 Long-Term Impacts

The programme is expected to contribute to the following long-term impacts:

1. **Greater fiscal sustainability**, through improved electricity cost recovery, reduced inefficient subsidies, better procurement and lower lifecycle infrastructure costs.
2. **Reduced dependence on imported diesel**, contributing to energy security and protection from fuel-price and maritime-supply disruptions.
3. **Lower greenhouse-gas emissions**, through renewable-energy development, energy efficiency and reduced unnecessary fuel consumption.
4. **More resilient infrastructure**, capable of withstanding heavy rainfall, erosion, coastal hazards and other climate-related risks.
5. **Inclusive economic development**, through improved electricity and transport access for tourism, fisheries, agriculture, cold storage, telecommunications and small businesses.
6. **Improved public services**, particularly health, education, water supply, sanitation, emergency response and government administration.
7. **Reduced geographic inequality**, particularly for remote western communities and vulnerable households.
8. **Stronger public confidence**, resulting from transparent project selection, reliable services, improved construction quality and clearer accountability.

3.3 Key Performance Indicators (KPIs)

No.	Key Performance Indicator	Baseline	Target
1	Electricity-sector cost recovery	Approximately 25% nationally; Ataúro-specific baseline to be established in 2027	Progress toward 50% nationally by 2031; annual improvement demonstrated for Ataúro
2	Registered electricity customers	Incomplete register; baseline to be confirmed in 2027	100% of customers registered by 2028
3	Customers with functioning meters	Baseline to be established in 2027	At least 95% by 2029 and 100% of new connections
4	Electricity access among registered households	Incomplete coverage; baseline to be established in 2027	At least 80% by 2029 and 95% by 2031
5	Priority public facilities with reliable electricity	Baseline to be established in 2027	100% by 2030
6	Average daily electricity availability	Approximately 18 hours per day	At least 22 hours by 2029 and progress toward reliable 24-hour service by 2030–2031
7	Outages exceeding 24 hours caused by preventable fuel shortages	Fuel delays can cause interruptions of 24–72 hours	Zero by 2030
8	Renewable share of electricity supplied	Baseline to be established in 2027	At least 15% by 2029 and 25% by 2031
9	Diesel consumption per kWh generated	Baseline to be established in 2027	At least 20% reduction by 2031, subject to demand and generation mix
10	Average time to process a standard new electricity connection	Baseline to be established in 2027	Reduced by at least 50% by 2031
11	Geothermal resource-assessment status	No commercially viable geothermal resource confirmed	Technical assessment completed by 2029 and formal go/no-go decision by 2030
12	Road, bridge and drainage assets registered and condition-rated	No complete integrated register	100% by December 2027
13	Five-year roads and bridges asset-management plan	No integrated approved plan	Approved and funded by 2028
14	Priority roads receiving scheduled routine maintenance	Baseline to be established in 2027	100% by 2029 and maintained annually thereafter
15	Critical bridges, culverts and crossings inspected for structural and operational safety	Incomplete information	100% inspected and condition-rated by 2028
16	Critical drainage and slope-protection deficiencies addressed	Baseline to be established through 2027 inventory	At least 80% of identified high-risk deficiencies addressed by 2031
17	Priority communities with reliable all-weather road access	Several remote and western communities have limited access	All five sucos and identified priority communities connected by reliable road or appropriate alternative access by 2031
18	Average travel time on upgraded priority corridors	Baseline survey in 2027	At least 30% reduction by 2031
19	Major contracts incorporating lifecycle costing and maintenance obligations	Not applied consistently	100% of new major contracts from 2028

20	Major projects independently verified for quality and compliance	Inconsistent baseline	100% before final acceptance
21	Quarterly physical and financial reports produced on time	No integrated PPG reporting system	Four reports each year from 2027
22	Annual public performance report	No integrated annual report	One report published annually from 2028
23	Mid-term and final evaluations completed	Not applicable	Mid-term evaluation in 2029 and final evaluation in 2031

4. Options Analysis

The options were assessed against six criteria: fiscal sustainability, electricity reliability and access, road and bridge serviceability, climate resilience, implementation feasibility and value for money. The analysis also considers Ataúro's geographic isolation, limited technical capacity, incomplete infrastructure coverage and potential renewable-energy resources.

A detailed financial and economic appraisal will be completed during programme preparation. The analysis below provides the preliminary basis for selecting the preferred policy option.

4.1 Options Considered

Option 1: Current Situation

Under this option, the Government would continue existing electricity, road and bridge arrangements without major policy or institutional reform.

Electricity would remain largely dependent on diesel generation, general subsidies and maritime fuel delivery. Network expansion, renewable-energy investment, metering, billing and collection improvements would continue through separate annual initiatives, subject to available budgets.

Road expenditure would continue to focus mainly on individual construction and rehabilitation projects. Maintenance, drainage, bridge inspection and asset management would remain fragmented across annual budgets and institutional responsibilities.

Main advantages

- No major institutional restructuring or additional programme-management arrangements.
- Low immediate preparation cost.
- Existing projects could continue under current procedures.

Main disadvantages

- Electricity cost recovery would likely remain low.
- Dependence on diesel and public subsidies would continue.
- Electricity supply would remain exposed to fuel-delivery interruptions.
- Remote communities could remain outside reliable electricity and road networks.
- Roads and drainage structures would continue to deteriorate where regular maintenance is insufficient.
- Emergency repairs and repeated reconstruction could increase lifecycle costs.
- Geothermal potential would remain unassessed.
- The option would not adequately respond to GPP Option No. 21 or the national objective of rebalancing infrastructure expenditure.

Option 1 has the lowest immediate implementation burden but the highest long-term fiscal, service-delivery and asset-deterioration risk.

Option 2: Minimum Intervention

Under this option, the Government would make limited improvements to the existing system without establishing a fully integrated programme.

Electricity interventions would include selected meter replacement, minor distribution extensions, additional diesel-generation capacity, limited solar installations and modest improvements to billing and collection. Geothermal work would be restricted to desk studies and basic thermal-spring monitoring.

Road interventions would focus on emergency repairs, selected rehabilitation works, limited drainage improvements and maintenance of the most critical sections. A partial road-condition survey could be completed, but without a comprehensive asset-management system or long-term investment plan.

Main advantages

- Lower initial cost than the proposed comprehensive intervention.
- Could address the most urgent electricity and road failures.
- Easier to implement within existing institutional arrangements.
- Provides some short-term service improvements.

Main disadvantages

- Would not sufficiently address the structural causes of high electricity costs.
- Continued diesel dependence could offset savings from limited efficiency measures.
- Electricity access and reliability improvements would remain uneven.
- Geothermal and other renewable-energy options would not be assessed adequately.
- Road maintenance would remain reactive rather than preventive.
- A partial asset inventory would not provide a sufficient basis for lifecycle planning.
- Isolated communities could continue to experience poor access.
- Limited interventions could postpone rather than resolve major capital and maintenance requirements.

Option 2 would provide temporary improvements but would be unlikely to achieve the proposed 2031 targets for electricity access, renewable energy, cost recovery, all-weather connectivity or infrastructure resilience.

Option 3: Integrated Electricity, Renewable Energy, Roads and Bridges Programme

Under this option, the Government would implement the proposed five-year programme for 2027–2031. It would combine targeted investment with efficiency reforms, renewable-energy development, lifecycle asset management, preventive maintenance and stronger governance.

The electricity component would include:

- customer registration and metering;
- improved billing and revenue collection;
- gradual improvement in cost recovery with protection for vulnerable households;
- expansion of distribution lines and appropriate off-grid systems;
- improved generation reliability and fuel management;
- solar generation, battery storage and other feasible renewable-energy solutions;
- phased geothermal exploration and feasibility assessment;
- technical training, spare-parts management and environmental controls; and
- service standards for outages and new connections.

The roads and bridges component would include:

- a georeferenced inventory of roads, bridges, culverts, drainage and protection structures;
- condition and safety assessments;
- a five-year asset-management and investment plan;
- rehabilitation and construction of approved priority corridors;
- bridge, culvert, drainage, slope-protection and coastal-protection works;
- routine and periodic maintenance;
- climate-resilient engineering standards;
- independent supervision and quality verification; and
- multi-year or performance-based contracts where appropriate.

The programme would build on PEDAs electricity and infrastructure priorities while updating project sequencing, technical standards and financing arrangements. Geothermal investigation would be based on available evidence of hydrothermal activity but would remain subject to confirmation of technical and commercial viability.

Main advantages

- Addresses electricity, roads and bridges as an integrated policy and fiscal problem.
- Supports progress toward electricity cost recovery of approximately 50%.
- Expands access while protecting vulnerable consumers.
- Reduces long-term diesel and subsidy dependence.
- Provides a structured basis for geothermal and renewable-energy decisions.
- Balances new road construction with rehabilitation and maintenance.
- Reduces premature infrastructure deterioration.
- Improves climate resilience, safety and emergency access.
- Supports tourism, agriculture, fisheries, public services and local businesses.
- Strengthens procurement, reporting and institutional accountability.
- Provides the clearest contribution to the expected fiscal savings under GPP Option No. 21.

Main disadvantages

- Requires significant initial preparation and investment.
- Demands strong coordination among national and local institutions.
- Requires technical expertise that may not currently be available in Ataúro.
- Benefits from geothermal exploration are uncertain.
- Cost-recovery reforms may face public resistance unless introduced gradually and transparently.

These risks can be managed through phased implementation, independent technical review, social-protection measures and clear decision points before major capital commitments.

Option 4: Alternative Delivery Model

Under this option, a greater share of service delivery would be transferred to private operators, public-private partnerships, independent power producers, energy-service companies or long-term contractors.

Possible electricity arrangements could include:

- a private or mixed operator for generation and distribution;
- independent renewable-energy producers selling electricity to EDTL;
- build–operate–transfer arrangements;
- solar and battery service contracts;
- energy-service contracts linked to verified savings; or
- concession arrangements for selected mini-grids.

Possible road and bridge arrangements could include:

- design–build–maintain contracts;
- performance-based road-maintenance contracts;
- long-term output- and performance-based road contracts;
- availability-payment arrangements; or
- public-private partnerships for economically viable corridors.

Main advantages

- May mobilise private finance and specialist expertise.
- Could transfer selected construction, operating and performance risks.
- Long-term contracts may improve maintenance discipline.
- Payment linked to service performance could improve accountability.
- Could reduce immediate capital pressure on the Government.

Main disadvantages

- Ataúro's small market and dispersed demand may not be commercially attractive.
- Electricity revenue may be insufficient to support a fully private operating model.
- Government guarantees or availability payments could create significant contingent liabilities.
- Private finance may be more expensive than direct public financing.
- Weak contract preparation or regulation could reduce value for money.
- Road projects may not generate sufficient direct revenue for conventional public-private partnerships.
- Long-term contracts could reduce flexibility if technical and demand assumptions prove inaccurate.

Option 4 is therefore more suitable as a **selective delivery mechanism** within Option 3 than as a complete replacement for public-sector leadership.

4.2 Cost-Benefit and Cost-Effectiveness Analysis

Preliminary comparison

Assessment criterion	Option 1: Status quo	Option 2: Minimum intervention	Option 3: Integrated programme	Option 4: Alternative delivery
Initial public cost	Low	Moderate	High	Potentially moderate, but may create future liabilities
Long-term fiscal sustainability	Low	Low-moderate	High	Moderate, depending on contract quality
Electricity access and reliability	Limited improvement	Partial improvement	Substantial improvement	Variable
Electricity cost recovery	Unlikely to improve significantly	Modest improvement	Progress toward 50%	Potentially strong, but affordability risk
Renewable-energy development	Limited	Small-scale	Structured expansion	Possible where commercially viable
Geothermal decision quality	No assessment	Preliminary only	Full phased assessment	Dependent on investor interest

Road and bridge maintenance	Reactive	Selected maintenance	Comprehensive asset-based system	Potentially strong under performance contracts
Climate resilience	Low	Partial	Integrated into all major works	Contract-dependent
Equity and remote access	Weak	Partial	Strong	Risk of prioritising profitable service areas
Implementation complexity	Low	Moderate	High but manageable	High
Overall value for money	Low	Moderate in short term	Highest over the asset lifecycle	Suitable selectively

Quantified benefits

Subject to confirmation through the 2027 baseline and detailed feasibility studies, Option 3 is expected to deliver the following measurable benefits by 2031:

- electricity access increased to at least **95% of registered households**;
- reliable electricity provided to **100% of priority public facilities**;
- average electricity availability increased from approximately 18 hours toward **24-hour service**;
- renewable energy increased to at least **25% of electricity supplied**;
- diesel consumption per unit of electricity generated reduced by at least **20%**;
- average processing time for standard electricity connections reduced by at least **50%**;
- complete registration and condition assessment of approximately **114 kilometres of roads** and all associated structures;
- scheduled maintenance covering **100% of priority roads**;
- at least **80% of identified high-risk drainage and slope-protection deficiencies** addressed;
- average travel time on upgraded priority corridors reduced by at least **30%**; and
- all major contracts incorporating lifecycle costing, maintenance obligations and independent quality verification.

Further quantified financial benefits are expected from:

- reduced electricity subsidies per unit supplied;
- improved billing and revenue collection;
- lower diesel transport and generation costs;

- reduced use of backup generators by public institutions;
- avoided emergency road repairs;
- reduced frequency of road reconstruction;
- lower vehicle operating costs;
- shorter travel times; and
- reduced losses and delays affecting tourism, fisheries, agriculture and local trade.

The monetary value of these benefits will be calculated during detailed programme preparation using demand forecasts, avoided-cost analysis, lifecycle costing and economic appraisal.

Non-monetary benefits

Option 3 would also generate significant benefits that may not be fully captured in financial calculations:

Equity and inclusion. Remote communities, vulnerable households, women, children, older persons and persons with disabilities would benefit from improved access to electricity, health services, education, markets and emergency transport.

Public-service quality. Reliable electricity and roads would improve water pumping, vaccine refrigeration, communications, school operations, public administration and disaster response.

Safety. Improved bridges, drainage, road crossings and slope protection would reduce transport and infrastructure risks.

Climate resilience. Renewable energy would reduce diesel dependence, while improved drainage and engineering standards would reduce exposure to erosion, heavy rainfall, landslides and coastal hazards.

Legal and policy compliance. The programme would support constitutional obligations concerning equitable development, special treatment for Ataúro, environmental protection, fair access to public services and responsible use of public resources.

Evidence-based investment. Phased geothermal assessment would prevent premature investment while preserving the opportunity to develop a viable resource if one is confirmed.

Institutional strengthening. Asset registers, service standards, independent verification and public reporting would improve accountability and decision-making.

Principal risks and mitigation

Risk	Potential effect	Mitigation
Capital costs exceed estimates	Budget pressure and project delay	Independent design review, updated unit costs, contingencies, phased procurement and strict change control
Electricity tariff reform faces public resistance	Low collection and reputational risk	Gradual reform, consultation, transparent communication and targeted support for vulnerable households
Renewable generation is intermittent	Reduced reliability	Battery storage, hybrid systems, demand management and grid-stability studies
Geothermal resource is not commercially viable	Sunk exploration costs	Stage-gated studies, independent review and formal go/no-go decisions before drilling or construction
Limited local technical capacity	Delays and poor maintenance	Training, technical assistance, apprenticeships and mandatory knowledge transfer
Poor construction quality	Premature asset failure	Independent supervision, laboratory testing, performance security and defect-liability periods
Maintenance funding is not protected	Deterioration after construction	Separate maintenance budget, asset-management plan and multi-year maintenance contracts
Environmental or social impacts	Delays, disputes and ecosystem damage	Early screening, licensing, consultation, grievance mechanisms and environmental-management plans
Multi-year contracts create inflexibility	Reduced value for money	Clear performance indicators, review clauses, termination provisions and independent contract management
Weak institutional coordination	Duplication and slow decisions	Steering Committee, PMU, defined reporting lines and joint annual work plans

After mitigation, the overall residual risk of Option 3 is expected to be **moderate**, compared with a **high long-term fiscal and service-delivery risk** under Option 1.

4.3 Rationale for the Preferred Option

Option 3—the Integrated Electricity, Renewable Energy, Roads and Bridges Programme—is the preferred option.

It provides the best value for money because it addresses the underlying causes of high expenditure rather than financing isolated infrastructure projects. It combines essential capital investment with cost recovery, renewable-energy diversification, preventive maintenance, lifecycle planning and institutional reform.

Option 3 is preferred because it:

1. **Protects earlier public investment.** Regular maintenance and asset management will extend the useful life of electricity and transport infrastructure.
2. **Reduces long-term fiscal pressure.** Improved billing, collection, energy efficiency, renewable generation and maintenance should reduce subsidies, fuel costs and repeated reconstruction.
3. **Maintains and expands access.** Fiscal reform will be implemented without withdrawing essential services from vulnerable or remote communities.

4. **Supports evidence-based geothermal decisions.** Investment will proceed only after the resource is shown to be technically, environmentally and commercially viable.
5. **Balances construction and maintenance.** Road priorities will be determined by condition, safety, population served, economic importance and lifecycle cost.
6. **Improves climate resilience.** Drainage, bridges, culverts, slope protection and coastal measures will be incorporated into infrastructure planning and design.
7. **Supports economic diversification.** Better electricity and transport services will benefit tourism, fisheries, agriculture, telecommunications, small businesses and public services.
8. **Allows selective private participation.** Performance-based maintenance, renewable-energy supply and design–build–maintain contracts may be used where they demonstrate better value than conventional delivery.

Reasons for rejecting the alternatives

Option 1 was rejected because it would preserve an unsustainable expenditure model, continued diesel dependence, weak cost recovery and inadequate maintenance. Its low immediate cost would be outweighed by higher long-term subsidies, asset deterioration and emergency reconstruction.

Option 2 was rejected because limited repairs and efficiency measures would not address the scale of Ataúro's electricity, connectivity and maintenance challenges. It would provide short-term relief but would be unlikely to achieve the programme's access, reliability, renewable-energy and fiscal targets.

Option 4 was not selected as the principal option because Ataúro's small market, uncertain demand, affordability constraints and limited commercially bankable road projects reduce the feasibility of a fully private or concession-based model. It could also create contingent liabilities and regulatory risks. However, appropriate elements of Option 4 will be incorporated selectively into Option 3 where performance-based or partnership arrangements demonstrate clear value for money.

5. Programme and Implementation Plan

PPG No. 21 will be implemented as an integrated five-year programme from **2027 to 2031**. It will combine electricity-sector efficiency reforms, expansion of reliable electricity access, renewable-energy development, phased geothermal investigation and an asset-based programme for roads, bridges, culverts and drainage.

The programme will build on Ataúro's existing infrastructure priorities while introducing stronger feasibility assessment, lifecycle costing, preventive maintenance, environmental and social safeguards, quality control and performance reporting. The PEDAs identifies electricity, renewable energy, roads, bridges and associated infrastructure as central to improving connectivity and inclusive development across the island.

5.1 Scope and Activities

PPG No. 21 will be implemented through seven integrated components. Each component identifies the principal deliverables, responsible institutions and delivery approach.

Component 1: Programme Governance, Baselines and Integrated Planning

Deliverables

- Programme Steering Committee and Programme Management Unit.
- Technical working groups for electricity, renewable energy and geothermal, and roads, bridges and drainage.
- Consolidated programme baseline, results framework and risk register.
- Stakeholder engagement and communication plan.
- Environmental and social safeguards framework.
- Five-year implementation, procurement and financing plans.
- Integrated geographic information and document-management system.

Lead and supporting institutions

The Ministry of Public Works will lead, supported by EDTL, the Ministry of Finance, the Ataúro Administrative Authority, FEDA, ADN I.P. and other competent institutions.

Delivery approach

A dedicated Programme Management Unit will coordinate planning, budgeting, procurement, safeguards, contract administration, monitoring and reporting. Baseline studies will be completed in 2027 before major investment decisions are finalised.

Component 2: Electricity Efficiency, Cost Recovery and Customer Services

Deliverables

- Complete registration and classification of electricity customers.
- Verification, repair and installation of functioning meters.
- Improved billing, collection and customer-service systems.
- Assessment and reduction of technical and non-technical losses.
- Transparent calculation of generation, distribution and subsidy costs.
- Service standards for new connections, complaints and outages.
- Targeted protection for vulnerable households.
- Annual cost-recovery and subsidy-performance reports.

Lead and supporting institutions

EDTL will lead implementation under the policy oversight of the Ministry of Public Works. The Ministry of Finance will assess fiscal impacts, while AAA and suco authorities will support customer registration, communication and identification of vulnerable households.

Delivery approach

Regulatory, billing and customer-management functions will remain under public control. Specialist metering, information-technology, loss-reduction and financial-analysis services may be outsourced. Cost-recovery reforms will be gradual, transparent and supported by consultation and targeted social-protection measures.

Component 3: Electricity Generation, Distribution and Access

Deliverables

- Assessment and rehabilitation of existing diesel-generation and distribution assets.
- Improved fuel planning, storage and supply management.
- Expansion and upgrading of distribution lines.
- New household, public-facility and productive-use connections.
- Reliable electricity for health facilities, schools, water systems, telecommunications and government facilities.
- Mini-grid or off-grid systems where grid connection is not viable.
- Spare-parts inventory, maintenance facilities and technician training.

- Safe collection and disposal of damaged batteries and electrical equipment.

Lead and supporting institutions

EDTL will be responsible for system planning, operation and maintenance. Construction and equipment contracts will be competitively procured and independently supervised. AAA and FEDA will support local coordination, consultations, site access and monitoring.

Delivery approach

An Ataúro least-cost electricity plan will determine the appropriate mix of diesel efficiency, network expansion, solar generation, battery storage and off-grid systems. All investments will be supported by demand forecasts, lifecycle costing and confirmed operation and maintenance arrangements.

Component 4: Renewable Energy and Geothermal Investigation

Deliverables—renewable energy

- Solar-resource and demand assessments.
- Solar photovoltaic and battery-storage systems.
- Renewable-energy systems for public facilities, water pumping and productive activities.
- Assessment of wind and aquavoltaic options.
- Grid-stability, storage and hybrid-generation studies.
- Operation, maintenance and equipment-disposal arrangements.

Deliverables—geothermal energy

The geothermal programme will proceed in phases covering:

1. thermal-spring inventory and monitoring;
2. geological and structural mapping;
3. fluid and gas sampling and geochemical analysis;
4. geophysical and hydrogeological surveys;
5. reservoir temperature, depth, permeability and flow assessment;
6. environmental and social baseline studies;
7. technology, grid and economic assessment;
8. exploratory drilling only where justified; and

9. a formal decision to stop, continue exploration or prepare a pilot project.

Available scientific evidence indicates fault-controlled hydrothermal activity, including the Maquedade–Makili–Maumeta–Adara corridor, but does not confirm a commercially viable geothermal reservoir.

Lead and supporting institutions

The Ministry of Public Works and EDTL will commission the studies. IGTL and qualified national or international geoscience institutions will provide technical expertise. Accredited consultants and drilling contractors will be engaged where specialised capacity is required.

Delivery approach

A stage-gated process will be applied. Each phase will require independent technical review and formal approval before proceeding. No geothermal power facility will be procured until technical, environmental, social and financial viability has been demonstrated.

Component 5: Roads, Bridges and Drainage Asset Management

Deliverables

- Georeferenced inventory of approximately 114 kilometres of roads.
- Inventory of bridges, culverts, crossings, drainage channels, retaining walls, slope-protection works and coastal-protection structures.
- Engineering condition and safety assessments.
- Traffic, population-access and economic-use data.
- Climate and disaster-risk screening.
- Asset classification and prioritisation system.
- Five-year investment and maintenance plan.
- Annual routine, periodic and emergency maintenance programmes.
- Standard designs, specifications and inspection procedures.

Lead and supporting institutions

The Ministry of Public Works will lead technical implementation. AAA and FEDA will support data collection, community consultation and field coordination. ADN I.P. will provide technical appraisal or verification in accordance with its mandate.

Delivery approach

Qualified survey, engineering and asset-management specialists will support the initial inventory and condition assessment. The responsible public institution will maintain and update the asset register after every construction, rehabilitation, inspection and maintenance intervention.

Component 6: Priority Roads, Bridges, Culverts and Drainage Works

Deliverables

- Rehabilitation and upgrading of urban and rural roads.
- Completion of critical links to isolated communities.
- Construction and rehabilitation of bridges and safe crossings.
- Installation and replacement of culverts.
- Construction and rehabilitation of drainage systems.
- Slope stabilisation and retaining structures.
- Erosion and coastal-protection works.
- Road-safety facilities and signage.
- Routine and periodic maintenance.

Priority corridors will be selected from PEDA and updated technical plans, including links serving Maquer, Atecru, Adara, Berau, Bite, Maquili, Oenan, Fatu'u, Ilina and other isolated or economically important communities.

Lead and supporting institutions

The Ministry of Public Works will act as contracting authority. Contractors will execute the works under independent engineering supervision. AAA, FEDA, suco authorities and affected communities will support consultation, land-access arrangements and local monitoring.

Delivery approach

Projects will be packaged according to location, technical similarity and market capacity. Delivery methods may include construction-only, design-build, design-build-maintain or performance-based maintenance contracts.

Each major project will require:

- approved feasibility and detailed engineering studies;

- environmental and social assessment;
- land and compensation arrangements where necessary;
- drainage and climate-resilience measures;
- quality-testing requirements;
- maintenance obligations;
- defect-liability provisions; and
- independent completion verification.

Component 7: Capacity Development, Safeguards and Monitoring

Deliverables

- Training for EDTL technicians, engineers, contract managers and local operators.
- Training in road and bridge inspection, drainage maintenance and asset management.
- Occupational health and safety systems.
- Environmental and social management plans.
- Community consultation and grievance mechanisms.
- Quarterly physical and financial monitoring.
- Annual public performance reports.
- Mid-term and final independent evaluations.
- Financial, procurement and technical audits.

Lead and supporting institutions

The Programme Management Unit will coordinate this component, supported by training institutions, technical consultants, environmental specialists, auditors and independent evaluators.

Delivery approach

Training and knowledge transfer will be incorporated into major consultancy, supply and construction contracts. Monitoring will use the Section 3 KPI framework, supported by site inspections, administrative records, household surveys, electricity-system data and road-condition assessments.

5.2 Delivery Model

PPG No. 21 will use a **hybrid delivery model** combining public-sector leadership, competitive outsourcing, institutional partnerships and selective private-sector participation.

Public-Sector Responsibilities

The Government will retain responsibility for:

- policy and strategic planning;
- budget approval and fiscal oversight;
- electricity tariff and subsidy policy;
- consumer-protection arrangements;
- infrastructure prioritisation;
- procurement decisions;
- environmental and social compliance;
- ownership of public assets;
- public reporting; and
- monitoring of service standards.

EDTL will remain responsible for electricity-system operation and customer services. The Ministry of Public Works will retain responsibility for roads, bridges and associated public infrastructure.

Outsourced Specialist Services

Competitive procurement will be used for:

- feasibility studies and detailed designs;
- geophysical and geothermal investigations;
- exploratory drilling, where approved;
- environmental and social assessments;
- engineering surveys;
- construction and equipment supply;
- independent supervision and materials testing;

- metering and information-technology systems;
- asset-management systems; and
- independent audits and evaluations.

Partnership Arrangements

Partnerships may be established with:

- IGTL and universities for geological and geothermal research;
- development partners for technical assistance and concessional financing;
- training institutions for technical and vocational development;
- communities for consultation, local monitoring and minor maintenance;
- renewable-energy developers or independent power producers; and
- private operators for specialised maintenance and energy services.

Selective Alternative Delivery Mechanisms

Performance-based maintenance, design–build–maintain contracts, energy-service contracts and independent power arrangements may be used where a value-for-money assessment demonstrates clear advantages over conventional procurement.

No long-term partnership or concession will proceed without:

- demonstrated affordability;
- transparent risk allocation;
- clear performance standards;
- appropriate review and termination provisions;
- acceptable contingent liabilities; and
- protection of access for low-income and remote communities.

5.3 Implementation Timeline, 2027–2031

The implementation schedule is indicative and will be refined after baseline studies, feasibility assessments, detailed costing and procurement planning.

Legend: ■ Main implementation period ■ Continuing or follow-up activity ◆ Key milestone

Phase and activity	2027	2028	2029	2030	2031	Key milestone
● Phase 1: Governance and Programme Preparation						
Establish the Steering Committee, PMU and technical working groups	■	■	■	■	■	◆ Governance operational in 2027
Complete electricity, road, bridge and drainage baselines	■					◆ Baselines approved in 2027
Prepare integrated electricity and road asset-management plans	■	■				◆ Plans approved by 2028
Prepare safeguards, procurement and financing plans	■	■	■	■		Plans reviewed and updated annually
● Phase 2: Feasibility Studies and Detailed Design						
Complete electricity-demand, network and least-cost supply studies	■	■				◆ Electricity plan approved in 2028
Complete renewable-energy and storage feasibility studies	■	■	■			Priority projects selected
Geothermal Phase I: mapping, spring inventory and geochemistry	■	■				◆ Phase I completed in 2028
Geothermal Phase II: geophysics, hydrogeology and resource assessment		■	■			◆ Technical assessment completed in 2029
Complete road, bridge and drainage surveys and detailed designs	■	■	■	■		Designs completed before procurement
● Phase 3: Procurement and Early Implementation						
Procure metering, billing and customer-management improvements	■	■				◆ New system operational by 2028
Procure electricity rehabilitation and priority connections	■	■	■			Contracts awarded in phased packages
Procure renewable-energy and battery-storage projects		■	■	■		Phased commissioning completed
Procure road, bridge, drainage and maintenance contracts	■	■	■	■		Multi-year contracts operational
● Phase 4: Major Infrastructure Implementation						
Improve customer registration, metering and cost recovery	■	■	■	■	■	Annual performance improvement reported
Expand electricity networks and off-grid access	■	■	■	■	■	◆ 95% household access by 2031
Install renewable-energy generation and storage		■	■	■	■	◆ 25% renewable-energy share by 2031
Undertake geothermal exploratory drilling, if approved			■	■	■	◆ Go/no-go decision by 2030
Rehabilitate and upgrade priority roads	■	■	■	■	■	Priority corridors completed in phases
Construct or rehabilitate bridges and culverts		■	■	■	■	Critical structures completed
Improve drainage, slope stability and coastal protection	■	■	■	■	■	High-risk deficiencies progressively addressed
Implement routine and periodic maintenance	■	■	■	■	■	Annual maintenance coverage achieved
● Phase 5: Monitoring, Evaluation and Programme Improvement						
Conduct quarterly physical, financial and safeguards monitoring	■	■	■	■	■	Four monitoring reports issued annually
Conduct annual performance and fiscal-efficiency reviews	■	■	■	■	■	Annual performance report issued
Conduct an independent mid-term evaluation			■			◆ Mid-term evaluation completed in 2029

Phase and activity	2027	2028	2029	2030	2031	Key milestone
Implement corrective actions and programme adjustments			■	■		Adjustments approved following review
Conduct final evaluation and prepare the next-phase strategy					■	◆ Final evaluation completed in 2031

5.4 Governance and Oversight

Programme Steering Committee

A Programme Steering Committee, chaired by the Ministry of Public Works, will provide strategic oversight. Membership will include senior representatives from EDTL, the Ministry of Finance, AAA, FEDA, ADN I.P., relevant environmental, land and geoscience institutions, and other entities designated by the Government.

The Committee will:

- approve annual work plans and budgets;
- review technical, financial and fiscal performance;
- approve major changes in programme scope or sequencing;
- resolve inter-institutional issues;
- review geothermal stage-gate decisions;
- ensure alignment with GPP Option No. 21; and
- submit strategic recommendations to the Government.

It will meet quarterly and may convene extraordinary meetings when required.

Programme Management Unit

A Programme Management Unit within the Ministry of Public Works will manage daily implementation. It will include, at minimum:

- a Programme Director;
- electricity and renewable-energy specialist;
- roads and bridges engineer;
- geothermal or geoscience coordinator;
- procurement and contract-management specialist;
- financial-management specialist;

- environmental and social safeguards specialist;
- monitoring and evaluation officer; and
- Ataúro coordination officer.

The PMU will prepare annual work plans, consolidate budgets, manage procurement and contracts, maintain the risk register and results framework, and produce physical and financial reports.

Technical Working Groups

Four technical working groups will support the PMU:

1. **Electricity Efficiency and Access Working Group**, led by EDTL, covering generation, distribution, metering, billing, customer services, losses and cost recovery.
2. **Renewable Energy and Geothermal Working Group**, covering solar, storage, wind and geothermal studies, technical reviews and go/no-go recommendations.
3. **Roads, Bridges and Drainage Working Group**, covering asset inventories, technical standards, project prioritisation, maintenance and quality control.
4. **Environmental, Social and Community Working Group**, covering licensing, consultation, land access, compensation, inclusion, grievances and safeguard compliance.

Local Coordination

AAA and FEDA will coordinate implementation in Ataúro by:

- supporting surveys and consultations;
- coordinating with suco and aldeia authorities;
- identifying local priorities and vulnerable groups;
- supporting land-access and compensation processes;
- monitoring field implementation;
- communicating construction schedules and service interruptions; and
- referring complaints to the responsible institution.

Contract Management and Reporting

The reporting line will be:

Contractor or service provider → Supervising engineer or technical consultant → Component manager → Programme Management Unit → Programme Steering Committee → Government and Ministry of Finance

Contractors will submit monthly progress reports. Supervising engineers will verify completed works, quantities, quality, safeguards compliance and payment claims. Component managers will consolidate technical information for the PMU.

The PMU will produce:

- monthly internal implementation reports;
- quarterly physical and financial reports for the Steering Committee and Ministry of Finance;
- annual performance reports for the Government; and
- public summaries of progress, expenditure, results and major risks.

Independent Oversight and Asset Acceptance

Independent oversight will include:

- technical appraisal and verification;
- financial and procurement audits;
- environmental and social compliance reviews;
- independent materials and construction testing;
- a mid-term evaluation in 2029; and
- a final evaluation in 2031.

6. Budget Request

The proposed budget covers the five-year implementation period **2027–2031**. It combines existing infrastructure allocations with a targeted new funding request for programme management, efficiency reforms, technical studies, asset management, safeguards and evaluation.

The estimates are preliminary and expressed in nominal US dollars. They will be refined following the 2027 baselines, feasibility studies, detailed engineering designs, environmental assessments and procurement planning.

6.1 Multi-Year Cost Summary

Budget component	Funding classification	2027	2028	2029	2030	2031	Five-year total
Roads and internal transport infrastructure	Existing PEDAs baseline	\$10,000,000	\$10,000,000	\$10,000,000	\$5,000,000	—	\$35,000,000
Electricity and renewable-energy infrastructure	Existing PEDAs baseline	\$5,000,000	\$5,000,000	\$5,000,000	—	—	\$15,000,000
PMU personnel	New GPP funding	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,000,000
PMU operations and programme coordination	New GPP funding	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Electricity efficiency, metering and customer systems	New GPP funding	\$650,000	\$450,000	\$200,000	\$100,000	\$100,000	\$1,500,000
Least-cost electricity, renewable-energy and geothermal studies	New GPP funding	\$800,000	\$1,000,000	\$700,000	\$400,000	\$100,000	\$3,000,000
Road, bridge and drainage inventories, surveys and designs	New GPP funding	\$500,000	\$300,000	\$100,000	\$50,000	\$50,000	\$1,000,000
Capacity development, safeguards, audits and evaluation	New GPP funding	\$200,000	\$200,000	\$250,000	\$200,000	\$250,000	\$1,100,000
Programme contingency	New GPP funding	\$150,000	\$150,000	\$100,000	\$50,000	\$50,000	\$500,000
Annual programme total		\$17,550,000	\$17,350,000	\$16,600,000	\$6,050,000	\$800,000	\$58,350,000

Funding Summary

Funding category	Five-year amount
Existing indicative PEDAs baseline	\$50,000,000
New GPP funding request	\$8,350,000
Total programme envelope	\$58,350,000

The PEDAs-related baseline comprises indicative allocations of **USD 35 million for roads and internal transport connections** and **USD 15 million for electricity and renewable energy**. These allocations must be confirmed through the annual budget and Infrastructure Fund processes and should not be duplicated in the new GPP request.

The new request of **USD 8.35 million** focuses on the reforms and enabling measures required to improve the efficiency of the larger infrastructure envelope. It includes **USD 1 million for PMU personnel** and USD 250,000 for programme operations.

The budget does not include construction of a commercial geothermal power plant. Exploratory drilling or pilot generation will require a separate costed submission following a positive technical, environmental, social and financial go/no-go decision.

6.2 Budget Assumptions

The preliminary estimate is based on the following assumptions:

Inflation and Price Basis

- Costs are expressed in nominal US dollars.
- Personnel and recurrent costs assume approximately **3% annual inflation or salary escalation**.
- Civil works and equipment costs will be updated before procurement using current market prices.
- Detailed estimates will account for Ataúro's maritime transport, mobilisation, storage and remote-site logistics.
- A contingency of approximately **7.5% of new non-personnel funding** is included for approved cost and implementation risks.

Staffing

The programme will finance approximately five or six core PMU positions. The full range of functions identified in Section 5.4 will be covered through a combination of:

- funded PMU personnel;
- staff seconded from the Ministry of Public Works, EDTL, AAA and FEDA;
- institutional technical focal points; and
- competitively recruited specialist consultants.

The personnel allocation excludes the normal salaries of existing civil servants and EDTL staff already funded through institutional budgets.

Electricity Demand and Investment

- Electricity demand will be confirmed through the 2027 least-cost electricity study.

- Planning will test the estimated requirement of approximately **5–10 MW over the next decade**, but the five-year programme will finance only the capacity justified for 2027–2031.
- Investments will be phased according to demand, affordability, network capacity and the targets of 95% household access and a 25% renewable-energy share.
- Capital investment will proceed only where operating, maintenance and replacement costs are affordable.
- No geothermal construction will proceed until the resource has been proven viable.

Roads, Bridges and Drainage

- The USD 35 million road envelope will operate as an expenditure ceiling pending completion of the road, bridge and drainage asset inventory.
- Projects will be reprioritised using population served, essential-service access, safety, economic importance, asset condition and climate risk.
- A defined share of annual road funding should be protected for routine and periodic maintenance, drainage, culverts and slope protection.
- Unit costs will be confirmed through surveys, detailed designs, Bills of Quantities and competitive procurement.
- Major scope changes will require Steering Committee and Ministry of Finance approval.

Operating and Maintenance Costs

Operation and maintenance costs will be identified separately from capital expenditure. Before asset acceptance:

- EDTL must confirm electricity operating and maintenance funding;
- the Ministry of Public Works must confirm road and bridge maintenance funding;
- spare-parts and replacement requirements must be budgeted; and
- each asset must have a responsible owner and lifecycle maintenance plan.

6.3 Funding Sources

Existing Baseline Funding

Existing or indicative baseline funding will finance the main electricity, renewable-energy, road, bridge and drainage capital works. Potential sources include:

- the Infrastructure Fund;
- Ministry of Public Works sector budgets;
- EDTL capital and operational budgets;
- FEDA and AAA allocations; and
- other approved national budget programmes.

Existing allocations must be reviewed to identify commitments, unspent balances, implementation capacity and possible overlap with other programmes.

New GPP Funding

The requested **USD 8.35 million** will finance activities not adequately covered by existing capital budgets, particularly:

- PMU personnel and programme coordination;
- electricity metering, billing, customer registration and loss reduction;
- cost-recovery and subsidy analysis;
- least-cost electricity and renewable-energy planning;
- phased geothermal investigation;
- road, bridge and drainage asset inventories;
- environmental and social safeguards;
- technical capacity development;
- independent audits and evaluations; and
- programme contingency.

Reallocation and Efficiency Savings

Reallocation within existing budgets should prioritise:

- preventive maintenance over repeated reconstruction;
- bridges, drainage, culverts and slope protection;

- rehabilitation of existing assets before lower-priority new construction;
- metering, billing and loss reduction;
- solar generation and storage where lifecycle costs are lower than diesel;
- improved fuel management; and
- essential electricity connections with clear economic and social benefits.

Savings from reduced diesel consumption, improved electricity collection, avoided emergency repairs and deferred low-priority construction should be redirected toward maintenance and sustainable service delivery.

External Contributions

External financing may include:

- grants for geothermal studies, safeguards, capacity development and technical assistance;
- climate and renewable-energy financing for solar generation, storage and resilient infrastructure;
- concessional loans for economically justified long-life assets;
- university and research partnerships for geothermal investigation; and
- private-sector participation in renewable generation, energy services or performance-based maintenance.

Private financing will be used only where value for money, affordability and appropriate risk allocation have been demonstrated and where no unacceptable government guarantees or contingent liabilities are created.

The financing strategy supports GPP Option No. 21 by using the existing capital envelope more efficiently rather than relying solely on additional expenditure. The programme's annual fiscal review will quantify savings from improved cost recovery, reduced subsidies, lower diesel use and better road maintenance against the national fiscal-rebalancing objective.

7. Risk Assessment

PPG No. 21 involves complex electricity, renewable-energy, geothermal, road, bridge and drainage investments. Risks will be managed through phased implementation, independent technical review, competitive procurement, strong financial controls, environmental and social safeguards, and regular reporting.

Risk ratings are defined as:

- **High:** could significantly delay the programme, increase costs or prevent key objectives from being achieved.
- **Moderate:** may affect performance but can be controlled through active management.
- **Low:** limited effect and manageable through normal procedures.

7.1 Risk Register

Category	Principal risk	Potential consequence	Mitigation strategy	Residual risk
Delivery	Weak coordination among the Ministry of Public Works, EDTL, AAA, FEDA, ADN I.P. and other institutions	Delayed decisions, duplicated activities and unclear accountability	Establish the Steering Committee, PMU, technical working groups, defined reporting lines and joint annual work plans	Moderate
Delivery	Insufficient baseline information and incomplete asset records	Poor project selection, unrealistic costing and weak monitoring	Complete electricity, customer, road, bridge and drainage baselines in 2027 before major investments are approved	Low
Delivery	Limited technical and contract-management capacity	Delays, weak supervision, poor construction quality and inadequate maintenance	Recruit specialist staff, provide training, use independent supervision and require knowledge transfer in major contracts	Moderate
Delivery	Procurement delays or limited contractor competition	Late implementation and increased prices	Prepare multi-year procurement plans, package contracts appropriately, conduct market assessments and use clear technical specifications	Moderate
Delivery	Poor construction or equipment quality	Premature asset failure, safety risks and repeated expenditure	Apply independent design review, materials testing, performance securities, defect-liability periods and completion verification	Low–Moderate
Delivery	Maritime transport, weather and logistical disruption	Delayed delivery of fuel, equipment, materials and specialist personnel	Schedule procurement around seasonal conditions, maintain essential stocks and require logistics plans from contractors	Moderate
Delivery	Renewable-energy systems do not perform as expected	Reduced reliability and continued diesel dependence	Undertake resource and demand studies, use proven technologies, include storage and require performance guarantees	Low–Moderate
Delivery	Geothermal resource is not technically or commercially viable	Sunk study costs and inability to develop geothermal generation	Apply stage-gated studies, independent review and formal go/no-go decisions before drilling or construction	Moderate

Delivery	Insufficient routine and periodic maintenance	Rapid deterioration of roads, bridges and electricity assets	Establish protected maintenance budgets, asset registers, annual maintenance plans and performance-based contracts	Moderate
Delivery	Environmental, social, land or compensation issues	Delays, disputes, ecosystem damage and community opposition	Conduct early screening, licensing, consultation, land verification, compensation planning and grievance management	Moderate
Financial	Capital costs exceed preliminary estimates	Budget pressure, reduced scope or delayed completion	Update designs and unit costs, use competitive procurement, include contingency and control variations strictly	Moderate
Financial	Operating and maintenance costs are unaffordable	Infrastructure cannot be operated or maintained after completion	Require lifecycle costing, affordability analysis and confirmed operating budgets before investment approval	Moderate
Financial	Electricity cost recovery improves more slowly than planned	Continued high subsidies and reduced fiscal savings	Strengthen metering, billing and collection; reduce losses; phase tariff reforms; and monitor annual cost-recovery performance	Moderate
Financial	Electricity demand is lower or higher than forecast	Overinvestment, insufficient capacity or inefficient asset use	Update demand forecasts annually and phase generation and network investment according to verified demand	Low–Moderate
Financial	Multi-year contracts create future fiscal commitments	Reduced budget flexibility or contingent liabilities	Require affordability assessment, Ministry of Finance review, expenditure ceilings and clear termination provisions	Moderate
Financial	External financing is delayed or unavailable	Delayed studies and capital works	Prioritise essential activities, identify alternative funding sources and avoid procurement before financing is confirmed	Moderate
Policy	Tariff, billing or subsidy reforms face public resistance	Non-payment, political pressure and delayed reform	Introduce reforms gradually, communicate clearly and provide targeted assistance to vulnerable households	Moderate
Policy	Investment priorities change during implementation	Projects are delayed, cancelled or repeatedly redesigned	Approve transparent selection criteria and require formal review for major scope or sequencing changes	Moderate
Reputational	Projects are perceived as costly, unfair or poorly selected	Reduced public confidence and stakeholder opposition	Publish selection criteria, budgets, progress reports and consultation outcomes	Low–Moderate
Reputational	Geothermal potential is overstated before confirmation	Unrealistic expectations and loss of credibility	Communicate that geothermal development remains conditional on scientific, environmental and financial feasibility	Low
Reputational	Construction disrupts communities or damages culturally or environmentally important sites	Complaints, delays and loss of public trust	Apply environmental and social management plans, community consultation and accessible grievance mechanisms	Moderate
Policy and compliance	Failure to comply with procurement, environmental, land or financial legislation	Legal challenge, project suspension or ineligible expenditure	Conduct legal and safeguards reviews, maintain complete records and undertake independent procurement and compliance audits	Low–Moderate
Rating	Meaning			

Low	The risk is unlikely to materially affect programme objectives and can be managed through routine controls.
Medium	The risk could affect cost, schedule, service quality or public confidence and requires active management.
High	The risk could seriously affect programme delivery, affordability, safety or Government credibility and requires senior-level oversight.
Very High	The risk could make a major component unviable or cause serious financial, safety, environmental or reputational consequences.

7.2 Risk Management Arrangements

The PMU will maintain a consolidated risk register and update it at least quarterly. Each risk will be assigned to a responsible institution or officer, with defined mitigation actions, deadlines and performance indicators.

Component managers will immediately report any risk that may:

- increase project costs beyond the approved budget;
- delay a major milestone by more than three months;
- create significant environmental or social harm;
- affect public safety;
- create an unapproved fiscal liability; or
- prevent achievement of a core programme target.

High or escalating risks will be referred to the Programme Steering Committee for corrective action. Significant changes in scope, budget or financing will also require review by the Ministry of Finance and approval through the applicable government procedures.

7.3 Overall Residual Risk

The programme's overall initial risk is assessed as **High** because of its technical complexity, institutional coordination requirements, uncertain geothermal potential, remote-island logistics and substantial infrastructure expenditure.

Following the proposed mitigation measures, the overall residual risk is expected to be **Moderate**. The most significant continuing risks will be:

- affordability of operations and maintenance;
- slower-than-planned improvement in electricity cost recovery;
- construction and logistics delays;
- limited technical capacity; and

- uncertainty regarding geothermal viability.

These risks are considered manageable provided that implementation remains phased, major investments are based on verified evidence, maintenance funding is protected and independent oversight is consistently applied.

8. Monitoring, Evaluation and Reporting

Monitoring and evaluation will assess whether PPG No. 21 delivers reliable and affordable electricity, improved cost recovery, increased renewable energy, safer and more resilient roads and bridges, and better value for public expenditure.

The 2027 baseline will confirm all indicators, definitions, data sources and targets. The PMU will maintain the consolidated results framework and report progress against the KPIs established in Section 3.

8.1 Monitoring Framework

Monitoring area	Main indicators and data sources	Frequency	Responsible unit
Electricity access	Customer register, household connections, public-facility connections and household surveys	Quarterly and annually	EDTL and PMU M&E Unit
Electricity reliability	Generation logs, daily supply hours, outage frequency and duration, fuel-stock records	Monthly	EDTL
Cost recovery	Electricity generated and sold, billing, collections, arrears, operating costs and subsidies	Quarterly and annually	EDTL, PMU Finance Unit and Ministry of Finance
Metering and losses	Meter register, technical and non-technical losses, illegal connections and meter functionality	Quarterly	EDTL
Customer services	Connection-processing time, complaints, disconnections and resolution time	Quarterly	EDTL Customer Services
Renewable energy	Installed capacity, electricity generated, battery performance, diesel use and renewable-energy share	Monthly and annually	EDTL and Renewable Energy Working Group
Geothermal investigation	Completion of studies, survey results, environmental compliance and stage-gate decisions	At each study phase	Renewable Energy and Geothermal Working Group
Road and bridge assets	GIS asset register, condition ratings, structural inspections and maintenance records	Six-monthly and annually	Ministry of Public Works and PMU
Construction progress	Contractor reports, site inspections, quantities completed, tests and certificates	Monthly	Supervising engineer and component manager
Maintenance performance	Kilometres maintained, structures inspected, drainage cleared and defects corrected	Quarterly	Ministry of Public Works, AAA and contractors
Road accessibility	Travel time, road closures, all-weather access and access to essential services	Six-monthly and annually	PMU M&E Unit and AAA

Financial performance	Budget execution, commitments, payments, variations and forecast final costs	Monthly and quarterly	PMU Finance Unit and Ministry of Finance
Procurement performance	Procurement milestones, competition, contract awards, delays and amendments	Quarterly	PMU Procurement Unit
Environmental and social compliance	Licences, management plans, incidents, land access, compensation and corrective actions	Monthly and quarterly	Safeguards Unit and supervising engineer
Citizen participation	Consultations, grievances received, resolution times and public disclosure	Quarterly	AAA, FEDA and PMU Safeguards Unit
Employment and inclusion	Local employment, training participation, gender balance and vulnerable-group access	Quarterly and annually	Contractors, PMU and AAA

Reporting Arrangements

The reporting cycle will comprise:

- **monthly reports** from contractors, supervising engineers and component managers;
- **quarterly consolidated reports** on physical progress, finances, procurement, safeguards, risks and KPIs;
- **annual performance and fiscal-efficiency reports** comparing results with budgets, targets and lifecycle costs;
- **annual public summaries** presenting progress, expenditure, service improvements, delays and corrective actions; and
- **immediate incident reports** for serious safety, environmental, social, financial or legal matters.

The PMU will submit quarterly reports to the Programme Steering Committee and the Ministry of Finance. The Steering Committee will review performance, approve corrective measures and refer major policy, budget or scope changes to the Government.

Data quality will be checked through source-document verification, site inspections, reconciliation of technical and financial records, sample surveys and independent audit. Indicators may be revised after the 2027 baseline, but changes must be documented and formally approved.

8.2 Evaluation Plan

Mid-Term Evaluation

An independent mid-term evaluation will be conducted in **2029**. It will assess:

- progress against outputs, outcomes and KPIs;

- electricity access, reliability, cost recovery and renewable-energy performance;
- progress and evidence from geothermal investigations;
- road, bridge, culvert and drainage conditions;
- budget execution and value for money;
- procurement and contract performance;
- environmental and social compliance;
- institutional coordination and technical capacity; and
- the continuing relevance and affordability of the 2030–2031 programme.

The evaluation will recommend whether activities should continue, be accelerated, redesigned, rephased or discontinued.

Final Evaluation

An independent final evaluation will be completed in **2031**. It will assess:

- achievement of the programme objectives;
- sustainability of electricity and transport services;
- fiscal effects, including cost recovery, subsidies and maintenance liabilities;
- economic and social benefits;
- environmental and climate outcomes;
- distribution of benefits among sucos, communities and vulnerable groups;
- quality and durability of infrastructure;
- institutional performance; and
- priorities for the next investment period.

Evaluation Methodology

The evaluations will use a combination of:

1. **Before-and-after analysis:** comparison of the 2027 baseline with mid-term and final results.
2. **Impact evaluation:** assessment of changes in electricity access, outages, travel time, service access, household welfare and productive activity. Comparison communities or matched groups may be used where feasible.

3. **Cost-effectiveness analysis:** calculation of costs per household connected, facility served, kilometre maintained, outage-hour avoided and high-risk structure improved.
4. **Cost-benefit analysis:** estimation of benefits from reduced diesel use, lower backup-generation costs, improved revenue collection, shorter travel times, reduced vehicle costs, avoided emergency repairs and extended asset life.
5. **Lifecycle-cost analysis:** comparison of construction, operation, maintenance, replacement and disposal costs over each asset's expected life.
6. **Fiscal-impact analysis:** assessment of changes in subsidies, revenues, recurrent expenditure, multi-year commitments and contingent liabilities.
7. **Equity and inclusion assessment:** analysis of benefits for remote communities, women, persons with disabilities, vulnerable households and productive sectors.
8. **Climate-resilience assessment:** review of renewable-energy contributions and the performance of roads, drainage and protection structures under climate and disaster risks.
9. **Process and institutional evaluation:** assessment of governance, procurement, safeguards, coordination, community participation and reporting.

Geothermal activities will also undergo independent technical review at each decision gate. Progression to exploratory drilling or pilot development will depend on verified resource evidence, environmental and social acceptability, affordability and economic viability. The available scientific study supports further investigation but does not confirm a commercially viable geothermal reservoir.

9. Legal and Other Considerations

9.1 Constitutional Compliance

PPG No. 21 will be implemented consistently with the Constitution of Timor-Leste, particularly provisions concerning:

- special administrative and economic treatment for Ataúro;
- equitable national and regional development;
- environmental protection and rational use of natural resources; and
- participation of local communities in addressing local development needs.

9.2 Applicable Legislation

Electricity

Electricity activities must comply with the legal framework governing the National Electricity System. Decree-Law No. 13/2003 establishes principles concerning universal electricity service, affordable access, financial and economic viability, equal treatment of consumers, appropriate energy sources and improved technical and economic efficiency.

Any changes to tariffs, subsidies, connection standards, customer protection, independent generation or power-purchase arrangements must be reviewed against the applicable electricity legislation and EDTL's statutory responsibilities.

Public Procurement and Contracting

Procurement of studies, equipment, construction and maintenance will comply with **Decree-Law No. 1/2025 approving the Public Procurement and Public Contracts Code**, as amended by **Decree-Law No. 25/2025**, and the implementing rules approved by **Government Decree No. 1/2026**. These requirements apply to public contracts for goods, services and works and include recordkeeping, transparency and procedural compliance. Multi-year, design–build–maintain, performance-based and partnership contracts will also require affordability analysis, proper approval of future commitments and clear allocation of performance and fiscal risks.

Ataúro Institutions

Implementation will respect the responsibilities of the Ataúro Administrative Authority and FEDA established under **Decree-Law Nos. 82/2023 and 83/2023**. Their roles should

complement, rather than duplicate, the statutory responsibilities of the Ministry of Public Works and EDTL.

9.3 Possible Need for New or Amended Regulation

No new primary legislation is assumed at the programme's commencement. However, a legal and regulatory review will be completed in 2027 to determine whether amendments or additional regulations are required for:

- gradual tariff and subsidy reform;
- targeted assistance for vulnerable consumers;
- service and connection standards;
- mini-grids and independent renewable-energy producers;
- power-purchase and grid-connection arrangements;
- geothermal exploration, drilling and resource rights;
- battery collection, recycling and disposal;
- multi-year performance-based contracts; and
- data protection for customer and metering systems.

Any proposed legal change must undergo government review, public consultation and formal approval before implementation.

9.4 Citizen Expectations

Citizens are expected to seek visible improvements in service quality while remaining concerned about affordability, land impacts, construction disruption and fair distribution of investment. The programme will therefore commit to:

- reliable and progressively longer electricity service;
- fair and transparent billing;
- protection of vulnerable households;
- faster and clearer connection procedures;
- equitable access for remote communities;
- safer and better-maintained roads and bridges;
- timely information on construction and service interruptions;
- meaningful consultation before decisions affecting land or livelihoods;

- fair compensation where legally required;
- accessible grievance mechanisms; and
- publication of budgets, progress and results.

Tariff or subsidy changes will be introduced gradually and communicated clearly. Citizens will be informed that geothermal electricity remains a potential option subject to scientific and commercial confirmation, not a guaranteed project.

9.5 Other Considerations

Environmental and Cultural Protection

Infrastructure design must protect coastlines, marine and terrestrial ecosystems, water sources, thermal springs, cultural heritage, sacred places and community resources. Avoidance of harm will take priority over compensation or restoration.

Social Inclusion

Planning, consultation and monitoring will consider gender, disability, age, poverty and geographic isolation. Designs should include safe access for pedestrians and persons with limited mobility where technically appropriate.

Local Employment and Capacity

Contracts will encourage lawful local employment, apprenticeships and knowledge transfer without compromising competitive procurement, technical quality or occupational safety.

Climate and Disaster Resilience

Roads, bridges, drainage and electricity facilities will be designed using appropriate climate, erosion, rainfall, slope and coastal-risk information. Emergency access and service-restoration arrangements will be incorporated into operation and maintenance plans.

Fiscal and Asset Sustainability

No major infrastructure asset will be approved or accepted without:

- a confirmed owner;
- entry in the relevant asset register;
- lifecycle-cost analysis;
- an operating and maintenance budget;

- trained personnel and spare-parts arrangements; and
- defined performance and reporting responsibilities.

This requirement will reduce the risk that new infrastructure creates unaffordable future liabilities or deteriorates prematurely.

10. Annexes

The annexes provide supporting financial, technical, institutional and results information for PPG No. 21. All cost estimates, baselines and targets will be updated after the 2027 technical studies, consultations and detailed designs.

Annex 1: Detailed Cost Table

Budget line	Cost category	Funding source	2027	2028	2029	2030	2031	Total
Roads, bridges, drainage and internal transport infrastructure	Capital works and maintenance	Existing indicative baseline	\$10,000,000	\$10,000,000	\$10,000,000	\$5,000,000	—	\$35,000,000
Electricity generation, distribution and renewable-energy infrastructure	Capital works and equipment	Existing indicative baseline	\$5,000,000	\$5,000,000	\$5,000,000	—	—	\$15,000,000
PMU personnel	Personnel	New GPP funding	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,000,000
PMU operations and coordination	Operations	New GPP funding	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Customer registration, metering, billing and loss reduction	Systems, equipment and services	New GPP funding	\$650,000	\$450,000	\$200,000	\$100,000	\$100,000	\$1,500,000
Least-cost electricity, renewable-energy and geothermal studies	Professional and technical services	New GPP funding	\$800,000	\$1,000,000	\$700,000	\$400,000	\$100,000	\$3,000,000
Road, bridge and drainage inventories, surveys and designs	Surveys and professional services	New GPP funding	\$500,000	\$300,000	\$100,000	\$50,000	\$50,000	\$1,000,000
Capacity development, safeguards, audits and evaluations	Training and professional services	New GPP funding	\$200,000	\$200,000	\$250,000	\$200,000	\$250,000	\$1,100,000
Programme contingency	Contingency	New GPP funding	\$150,000	\$150,000	\$100,000	\$50,000	\$50,000	\$500,000
Annual total			\$17,550,000	\$17,350,000	\$16,600,000	\$6,050,000	\$800,000	\$58,350,000

Funding Summary

Funding classification	Amount
Existing indicative infrastructure baseline	\$50,000,000
New GPP funding request	\$8,350,000
Total five-year programme envelope	\$58,350,000

The existing baseline is subject to confirmation through the annual State Budget and Infrastructure Fund processes. The new GPP request finances the institutional, technical and efficiency measures required to improve the performance of the broader capital programme.

The estimate does not include construction of a commercial geothermal power plant. Exploratory drilling beyond the approved investigation phase, pilot generation or commercial development would require a separate submission following a positive technical, environmental, social, economic and financial assessment.

Annex 2: Evidence Base

Evidence source	Relevance to PPG No. 21
GPP Option No. 21 fiscal analysis	Establishes the national policy problem: high electricity subsidies, low cost recovery, high road expenditure and the need to rebalance construction and maintenance.
Timor-Leste Strategic Development Plan 2011–2030	Supports reliable electricity, renewable energy, road rehabilitation, bridges, drainage, maintenance and improved access for isolated areas.
Programme of the IX Constitutional Government 2023–2028	Supports electricity reliability, renewable-energy assessment, road and bridge improvement, maintenance, infrastructure quality and feasibility planning for Ataúro.
Ataúro Strategic Development Plan 2026–2030	Provides the main local baseline and identifies electricity, renewable energy, roads, bridges, drainage and connectivity as priority infrastructure areas. It records approximately 114 kilometres of roads and was prepared through a participatory process involving communities, government institutions, civil society, partners and the private sector.
National and Ataúro expenditure and service data	Provides the working baselines for electricity cost recovery, subsidies, road expenditure, electricity availability, diesel dependence and infrastructure deficiencies.
Geochemical Framework of Ataúro Island, 2026	Provides the first systematic island-wide geochemical baseline and identifies structurally controlled hydrothermal processes. It supports further investigation but does not establish a commercially viable geothermal reservoir.
EDTL operational records	Required to confirm generation, fuel use, supply hours, outages, customers, metering, billing, collection, losses and subsidies.
Ministry of Public Works, FEDA, AAA and ADN I.P. records	Required to confirm road lengths, project status, engineering designs, costs, contracts, maintenance requirements and asset conditions.
Environmental, land and social data	Required for environmental licensing, land access, compensation, biodiversity protection and community safeguards.

Population and socioeconomic data	Required to assess household access, vulnerable groups, demand growth, productive use and equitable distribution of benefits.
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Priority Evidence Gaps

The following gaps must be addressed in 2027:

- complete electricity customer and asset registers;
- Ataúro-specific electricity cost-recovery and subsidy data;
- verified electricity demand forecasts;
- technical and non-technical electricity-loss estimates;
- road, bridge, culvert and drainage condition assessments;
- traffic, travel-time and accessibility baselines;
- renewable-energy resource and storage assessments;
- geothermal reservoir temperature, depth, permeability and flow data;
- detailed environmental and social baselines; and
- updated unit costs and lifecycle maintenance requirements.

Annex 3: Coordination Comments

PPG No. 21 requires coordinated implementation by national and Ataúro institutions. At the proposal stage, formal written comments should be obtained and annexed before final approval.

Institution	Principal coordination matter
Ministry of Public Works	Confirm programme leadership, technical standards, capital priorities, maintenance responsibilities and contracting authority.
EDTL	Confirm electricity baseline, investment plan, system operation, metering, billing, cost recovery, staffing and maintenance arrangements.
Ministry of Finance	Confirm fiscal impact, funding classification, affordability, multi-year commitments, subsidy reform and reporting requirements.
AAA	Confirm local priorities, coordination arrangements, public-service needs and community participation.
FEDA	Confirm alignment with existing Ataúro projects, annual plans, budgets and local infrastructure priorities.
ADN I.P.	Confirm technical appraisal, engineering verification, cost review and quality-assurance requirements.
IGTL and research institutions	Confirm geothermal methodology, scientific standards, data ownership and stage-gate review arrangements.
Environmental authority	Confirm project categorisation, environmental assessment, licensing and monitoring requirements.

Land authorities	Confirm land verification, access, acquisition, compensation and grievance procedures.
Suco and aldeia authorities	Validate community priorities, affected households, local access needs and communication arrangements.
Development partners	Identify possible technical assistance, grants, concessional finance and knowledge partnerships.

Unresolved comments will be recorded in a coordination matrix showing the issue, responsible institution, agreed action, deadline and final decision.

Annex 4: Summary of Stakeholder Consultations

PEDA 2026–2030 provides an initial consultation foundation because its preparation involved communities, local leaders, government institutions, civil society, development partners and private-sector representatives.

However, dedicated consultations on the detailed design of PPG No. 21 must be conducted during 2027. The consultation record will include dates, locations, participants, issues raised, government responses and resulting programme changes.

Stakeholder group	Matters for consultation
Households and electricity customers	Access, reliability, meters, billing, affordability, complaints and connection procedures.
Vulnerable households	Targeted tariff or subsidy protection and barriers to electricity and transport access.
Remote communities	Priority electricity connections, road access, bridges, drainage and alternative off-grid services.
Women, youth, older persons and persons with disabilities	Safety, affordability, accessibility, participation and distribution of benefits.
Suco and aldeia authorities	Project prioritisation, land access, community communication and grievance handling.
Health and education institutions	Electricity reliability, emergency access, road safety and service continuity.
Farmers, fishers and small businesses	Productive electricity use, cold storage, market access and transport costs.
Tourism operators	Reliable energy, road connectivity, environmental standards and future demand.
Landholders and affected communities	Site selection, avoidance of displacement, compensation and construction impacts.
Communities near thermal springs or exploration areas	Access restrictions, cultural values, environmental risks, water resources and benefit sharing.
Civil society and environmental organisations	Biodiversity, cultural heritage, transparency and safeguards.
Contractors and suppliers	Market capacity, logistics, packaging of contracts and local employment opportunities.

The principal consultation commitments will be:

- early disclosure of project information;

- consultation before site and design decisions are finalised;
- accessible information in appropriate languages;
- inclusion of women and vulnerable groups;
- documented responses to concerns;
- fair land and compensation processes;
- a functioning grievance mechanism; and
- continued consultation during construction and operation.

Annex 5: Logic Model and Theory of Change

Theory of Change

If the Government improves electricity efficiency and cost recovery, expands reliable access, develops viable renewable-energy options, assesses geothermal potential through a phased process, and manages roads, bridges and drainage according to condition, lifecycle cost and climate risk,

then Ataúro will receive more reliable and affordable electricity, safer all-weather connectivity and better-maintained infrastructure,

because investment decisions will be based on verified demand, technical evidence, preventive maintenance, accountable institutions and sustainable operating arrangements.

Logic Model

Level	Programme logic
Inputs	Government and partner financing; PMU personnel; EDTL and Ministry of Public Works staff; engineering and geoscience expertise; community participation; equipment, data and technical assistance.
Activities	Complete baselines; register customers and assets; improve metering, billing and collection; rehabilitate generation and distribution systems; install renewable energy and storage; undertake geothermal studies; inventory and assess roads and structures; prepare designs; construct, rehabilitate and maintain priority infrastructure; implement safeguards, training and monitoring.
Outputs	Functional governance system; electricity and road baselines; least-cost electricity plan; improved customer systems; expanded electricity connections; renewable-energy installations; geothermal assessment and go/no-go decision; complete road and structure

	register; approved five-year maintenance plan; rehabilitated roads, bridges, culverts and drainage; trained personnel and regular reports.
Short-term outcomes	Better planning and coordination; improved customer records and billing; fewer fuel-related disruptions; increased electricity access; improved infrastructure condition; stronger maintenance coverage and better contract performance.
Medium-term outcomes	Progress toward 24-hour electricity; higher cost recovery; lower diesel use per unit supplied; increased renewable-energy share; shorter connection and travel times; safer all-weather access; fewer emergency repairs and improved public services.
Long-term impacts	Improved fiscal sustainability; reduced subsidy and reconstruction pressure; resilient and inclusive infrastructure; lower emissions; stronger tourism, fisheries, agriculture and local business; reduced geographic inequality; improved quality of life across Ataúro.

Key Assumptions

The theory of change assumes that:

- approved funding is available on time;
- institutional responsibilities remain clear;
- electricity reforms protect vulnerable households;
- maintenance budgets are sustained;
- qualified contractors and specialists are available;
- communities support projects following meaningful consultation;
- environmental and land issues are resolved before construction;
- renewable-energy systems are technically suitable; and
- geothermal development proceeds only where the resource is proven viable.

External Factors

Results may be affected by fuel prices, maritime transport, extreme weather, construction-market capacity, national tariff decisions, population and tourism growth, technology costs and the availability of external financing. These factors will be monitored through the programme risk register and annual reviews.