

**Pilot Electrification project implementing Mini Grids in isolated areas of the
Amazon Region of Loreto, Peru**

Title of the program	Pilot electrification project implementing mini grids in isolated areas of the Amazon Region of Loreto, Peru		
Sector (subtemas)	<i>Micro-grid (MG)</i> <i>Small scale hybrid power plant (eg. Solar + gas as backup + ESS)</i>		
Country	Perú	Location	Loreto.
Project duration	30 months	Budget	USD 8 200 000
Association with other projects			

BID (office in the selected country)	
Name	(details to be provided when selected)
Position	
Email	
Telephone	

Partner Country's Implementing Organization(s)

Partner Country Contact	
Name	(details to be provided when selected)
Position	
Organization	Electro Oriente
E-mail	

1. PROJECT BACKGROUND

Current situation

Loreto is Perú's northernmost region, covering almost one-third of Peru's territory, Loreto is by far the nation's largest region; it is also one of the most sparsely populated territory due to its remote location in the Amazon Rainforest. Its capital is Iquitos.

The population is approximately 900,000 people, and a third of this population lives in mostly isolated rural areas. It has a high deficit of basic services, according to the 2017 census, electrification coverage in rural areas only reached about 40% of the population. Electro Oriente is the electrical distribution company in charge of providing electrical service in the Loreto Region. The company in coordination with the Ministry of Energy is interested in providing better energy services to the off grid systems which now receive services with polluting thermal energy sources and with only two or three hours a day, this intention is accompanied by the interest of incorporating smart grids in to the urban systems.

In order to reduce the gap of electrification, Electro Oriente has identified two zones to be electrified: Pampa Hermosa and Tamanco.

Pampa Hermosa has 425 houses approximately, with a population of 2,125 inhabitants; being located 119.34 km from the closest point (SEP Picota) belonging to the SEIN (National Interconnected Electric System), as well as 442.75 km from the closest point belonging to the SEAI (Iquitos Isolated Electric System). Therefore, the population has access to electricity through the generation of thermal groups (Diesel), operating in an isolated manner through precariously installed networks.

Tamanco has 414 houses approximately, with a population of 2070 inhabitants; being located 361 km from the closest point belonging to the SEIN (National Interconnected Electric System), as well as 213 km from the closest point belonging to the SEAI (Iquitos Isolated Electric System); Therefore, the population has access to electricity through the generation of thermal groups (diesel) operating in an isolated manner through precariously installed networks.

Both of them are areas of the country tends to be remote and isolated also in terms of roads and communications, offering few productive opportunities to the population, which translates into low average consumption, low payment capacity, high delinquency, logistical challenges that make it difficult and more expensive to operation and maintenance.

Despite state intervention (through various mechanisms) the supply of electrical energy using Thermal Generation, in localities such as Pampa Hermosa and Temanco, tends not to be sustainable. Therefore, the use of modern Generation and Control & Automation sources is required to provide this essential service in a sustainable way.

2. PROJECT OBJECTIVES

This project proposes the development of a sustainable technical and financial model with Hybrid Generation, for the reliable delivery of energy in the Non-Interconnected areas of Loreto (Isolated System).

Other objectives expected to be achieved with the proposed project are:

- Have an environmentally, technically and financially sustainable model for expanding energy coverage with Hybrid Generation that can be replicated within the area of influence of Electro Oriente S.A.
- Contribute to the achievement of the different sustainable development goals in Loreto.
- Strengthen the relationship and transfer of knowledge between Peru and Korea.
- Reduce greenhouse gas emissions and contribute to Peru's achievement in the framework of COP 21.

3. PROJECT COMPONENTS

3.1 Feasibility and design studies (US\$250,000.00):

This component will finance feasibility studies and engineering designs for hybrid generation solutions for access to energy for the users, with a sustainable business model that guarantees the operation of the project for a period of 20 years.

During the feasibility and design phase, the consultant in charge of the studies should collect the necessary information that includes at a minimum:

- The location of the communities without access to energy, identifying those located in "Strategic Priority Investment Zones".
- The potential of Solar Energy in different areas that could benefit from the project, which would have solar panels, batteries and a backup thermal group

The results of the feasibility phase must define at least the following aspects:

- The technical conditions of the service that will be provided
- The number of beneficiaries.
- The installed capacity of the projects and their technical characteristics, including the storage system and/or Diesel generators as backup or complementary systems.
- Capital Expenditures and Operating Expenses, estimated for the project.
- Financial model and rate scheme.
- Environmental and social analysis identifying possible barriers and environmental and social measures that must be implemented to reduce negative impacts and comply with Peruvian and international regulations.

Once the feasibility studies are completed, the consultant must start the design phase, developing at least the following project activities:

- Topographic studies.
- Electrical and structural plans.
- Budget.
- Archaeological permits

- Environmental permits and/or socializations.
- Sustainable financial and operating model and rate scheme.
- Equipment technical specifications.
- Design report and supporting calculations.
- Construction schedule.

3.2 Construction and commissioning of Hybrid Generation (US\$7,150,000):

This component will finance the construction and commissioning of self-generation.

Once the design studies have been approved, the construction of the hybrid generation plant will be contracted. In this component, the EPC contractors will implement the hybrid generation plant according to the designs that were made in component 3.1.

Once the project has been implemented, EPC will test them, ensuring that they operate according to the technical parameters established during the design phase, and will officially deliver the projects to their operators according to the business model established in component 3.1.

3.3 Supervision Engineer (US\$550,000):

This component includes the hiring of a consultant who will supervise and monitor all the technical, financial, legal, and regulatory aspects that will be developed in components 3.1 and 3.2.

3.4 Coordination and Institutional Strengthening (US\$250,000):

This component will finance the Project Management Unit (PMU) to develop hybrid generation in isolated systems. It will have technical, financial, legal, archaeological, environmental, and social experts who will prepare the terms of reference for the contracting of the different studies and activities of components 3.1 and 3.2.

4. Project Location, Period and estimated cost

Period: 10.2022 - 03.2025 (30 months). The project is scheduled to start in october 2022 with the preparation of the terms of reference for the different studies; develop the feasibility and design studies during 2022 and 2023, and construction of the project in 2024.

The schedule of the different components that make up the project is shown below:

Componentes	2022			2023												2024												2025		
	Oct	Nov	Dic	Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Set	Oct	Nov	Dic	Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Set	Oct	Nov	Dic	Ene	Feb	Mar
Estudios de Viabilidad y diseño																														
Construcción y puesta en servicio																														
Ingeniero de supervisión																														
Coordinación y fortalecimiento institucional																														

Budget: Total US\$ 8.2 million (USD) associated with four different components (costs related to the Project, including engineering, equipment acquisition, construction, training, etc.), which are shown in the following chart

Components	Budget (USD)
1. Feasibility and design studies	US\$250,000
2. Construction and start-up of the Hybrid Gene	US\$7,150,000
3. Supervising Engineer	US\$550,000
4. Coordination and institutional strengthening	US\$250,000

Location: The Hybrid Generation will be developed in the isolated electrical system of Pampa Hermosa, district of Pampa Hermosa, province of Ucayali, department of Loreto and in the isolated system of Tamanco, province of Requena, department of Loreto.

5. Project Implementing Organization

The Project will be implemented by Electro Oriente, that is a electric distribution enterprise. Electro Oriente is a state owned enterprise, that has the responsability to supply energy in Loreto Region, and for that has to be aligned with the objectives of Ministry of Energy and Mines.

6. Required coordination at National/Regional Level

This Project has to be coordinated with Ministry of Energy and Mines this could be a model that could be replicated in others electrification projects in isolated areas

It will also be necessary to coordinate with local and regional authorities to obtain some permits.

7. Risks and Opportunities

The risks associated with the project are:

- Delay in obtaining permits (environmental and cultural), may affect the project schedule.
- Difficulties in selecting the land (due to dimensions, type of soil, geological/geotechnical order, etc.) where the Power Plant and associated facilities will be built, may affect the project's budget and schedule.
- Difficulties in obtaining skilled labor to work in the remote area of the Amazon, may affect the budget and schedule of the project.
- Logistical difficulties due to the non-existence of roads can affect the timely delivery of supplies, modifying the project schedule.

The opportunities associated with the project are:

- To provide a better electric service for this isolated populations.
- This model will be replicated in others rural electrification projects by Electro Oriente or Ministry of Energy of Mines.