PROPONENT:
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Puros Solar Mini-grid

Environmental Management Plan

EMP - Puros Solar Mini-grid

For the establishment of a

Solar Mini-grid

to electrify the community of Puros in the Kunene, Namibia

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CONSULTANT:
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Terminology / Abbreviations

TERM	MEANING
EIA	Environmental Impact Assessment
EMP	Environmental and Social Management Plan
ESMP	Environmental and Social Management Plan
GRN	Government of the Republic of Namibia
IAP	Interested and Affected Parties
kV	kilovolt
MEFT	Ministry of Environment, Forestry and Tourism
MoHSS	Ministry of Health and Social Services
MME	Ministry of Mines and Energy
NAMPOL	Namibian Police
NEST	National Electricity Support Tariff
NORED	Northern Regional Electricity Distributor
PPM	Pre-Payment Meter
SME	Small Medium Enterprise

Revision	Changes	Updated By
2023-10-23	Original Document	RDJ Consulting (D. Jarrett)

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Indicator	Description
Nature of Activity (Project)	Electricity production and distribution
Location	Puros, Kunene
Nearest Town/Village	Sesfontein, Kunene
GPS Coordinates	**18.7737° S** **12.9507° E**
Current Land Use	Sand dune, Open area
Relocation of persons and displacement of livelihoods	None required
Cemeteries Impacted	None
Historical sites impacted	None
Biodiversity	None Impacted

Map of Namibia

Figure 1 Map of Namibia indicating Puros project.

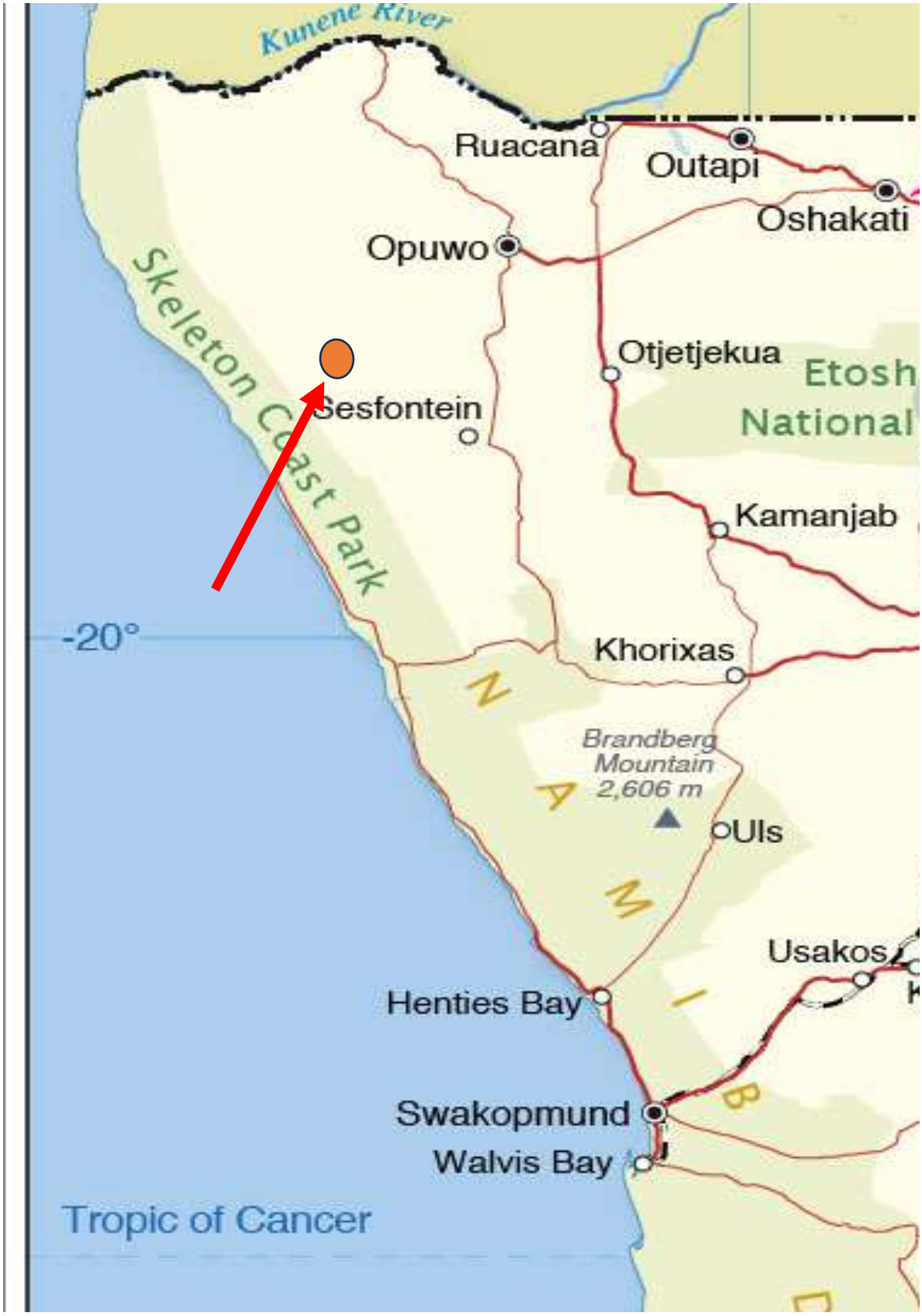

Figure 2 Map of Namibia indicating Puros project.

Project Background

Preamble

This Environmental Management Plan (EMP) is a guidance document to measure and achieve compliance with the environmental protection and mitigation requirements of the proposed project. An Environmental Impact Assessment (EIA) in accordance with the Namibian Environmental Management Act of 2007 has been conducted.

The Proponent, Northern Regional Electricity Distributor (**NORED**) is a state-owned electricity distribution company in Namibia, responsible for the distribution of electricity in the northern regions of the country. NORED plays a crucial role in supplying electricity to its designated service areas in northern Namibia.

The Northern Regional Electricity Distributor serves several regions in northern Namibia, including Ohangwena, Oshikoto, Omusati, Oshana, and **parts of Kunene** and Kavango East regions. These regions collectively constitute the primary service area for NORED. NORED's primary function is to distribute and supply electricity to consumers within its designated regions. The company is responsible for managing the electricity distribution network, maintaining infrastructure, and ensuring a reliable power supply to its customers.

Due to the nature of our (NORED's) business, customer and personnel safety will always be of highest priority.

The framework contained within provides a highlight of key activities and their potential mitigation measures to known or anticipated risks.

Figure 3 Locality map (Kunene)

Project Overview

The Solar-Powered Mini-Grid Project in Puros, aims to provide clean and reliable electricity to the area of Puros, Sesfontein Constituency in the Kunene Region, Namibia.

This project aligns with the global shift towards sustainable energy solutions and contributes significantly to the United Nations Sustainable Development Goals (SDGs), specifically Goal 7 (Affordable and Clean Energy). Namibia's commitment to renewable energy, as articulated in the National Renewable Energy Policy of 2007, emphasizes the importance of such projects in the country's energy landscape.

The project will be located at Puros [**GPS Coordinates 18.7737° S, 12.9507° E**], and it will have a total installed capacity of **0.5 megawatts or less**.

Figure 4 Minigrid layout for Puros (plant and lines)

The Project will be composed of a 100 – 300 kWp solar powered power plant, inclusive of energy storage (lithium batteries) and limited emergency backup from diesel up to 30 kWp. This energy will be provided through a step-up substation to an 11 kV minigrid network designed to 33 kV level and standards as per NORED and ECB requirements. Customers will then be fed via 25 kV step-down transformers and pre-payment (PPM) metering.

The solar power park will be in the kW class with the substation and station building sited on approximately 1 hectare of the donated land by the Puros Community. MV Lines will be aligned with planned or potential road reserves. Implementation of the recommended strategies and investments can contribute to a brighter future for the residents of Puros and the Kunene Region as a whole.

The Puros Mini-Grid Project is NOT a groundbreaking way to provide clean and reliable electricity to Puros as other such systems exist in Otjozondjupa in Namibia such as Tsumkwe, Gam, Rooi Dag Hek and others, addressing the pressing need for sustainable energy access in Namibia.

Figure 5 Solar Park - Elephant Lodge (Private sector)

Figure 6 Lodge: Generator Building BESS

The project is expected to be operational from January 2025 although with support from development partners, this could occur before. The Ministry will be notified if this should materialise.

1 Environmental Impact Assessment (EIA)

We have conducted an Environmental Impact Assessment (EIA) in accordance with the Namibian Environmental Management Act of 2007. The EIA report, which is attached herewith as [**Appendix A**], provides a detailed analysis of the environmental impacts of the project.

The findings indicated that there were 164 dwelling units, of which nearly all were improvised housing units. One of the key findings of the EIA indicate serious challenges for revenue generation by the community due in part to a lack of access (roads and efficient telecommunications) and electricity for productive use. In addition, most households in Puros (89) were headed by females, compared to (73) male headed households.

The Kunene region had a comparable level of stick/mud/dung dwelling units or shacks. Corrugated iron sheets was a common material used for roofing in the Kunene Region. This was similar in Puros. In terms of water supply points in Puros, only one exists. The use of firewood was common in rural households (87.8%) whereas electricity from mains was prominent in urban areas (52.6%). It is no surprise then that Puros relies on firewood (estimated 98%) and has no access to electricity mains.

Regionally, electricity from mains as the central source of energy used for lighting stands at 45.6% for all households in Namibia. However, in Kunene about 62% of rural households used battery lamps and torch cellphones for lighting.

A notable proportion, 42.6% of households countrywide have no toilet facilities (uses bush, riverbeds, and fields), and this is common in rural areas (64.6 %) compared to urban areas (22.6 %). Sanitation is also a major issue in Puros.

1.1 Environmental Objectives

The following environmental objectives have been established for this project:

a) To minimize the environmental footprint of the mini-grid project.
b) To ensure the responsible use of natural resources.
c) To protect local biodiversity and ecosystems.
d) To mitigate potential air, water, and soil pollution.
e) To promote community engagement and awareness regarding environmental conservation.

2 Project Impacts

The development of this project will impact the community and of its environment in the following ways:

2.1 Benefits:

a) Clean power supply, generated from solar irradiation via solar photovoltaic panels.
b) Reduced use of candles and paraffin for lighting

c) Improved health for residents
d) Improved economic opportunities due to productive use of electricity for cooling and communication services amongst others.

2.2 Potential negative impacts – Construction Phase:

a) Dust pollution due to construction activities
b) Increased traffic particularly in the face of a normally minimal vehicle movement
c) Impact and constraint on local water supply
d) Construction activities can lead to soil erosion
e) Construction waste
f) Potential oil/fuel spills from equipment being used for construction
g) Noise pollution from machinery used during construction.

2.3 Potential negative impacts – Operations Phase:

a) Waste material such as solar panel cleaning activities
b) Potential oil/fuel spills from equipment being used for backup power

3 Environmental Management Measures

This EMP has been drafted in accordance with the Namibian Environmental Management Act (No. 7 of 2007) and its Environmental Impact Assessment Regulations (2012).

To achieve the above objectives, the following environmental management measures will be implemented:

Key Activity	Actions to be taken
Solar Array Design and Placement	The solar arrays will be thoughtfully designed and strategically placed to minimize shading, habitat disruption, and visual impact. This includes a conscientious consideration of the local ecosystem and its dynamics.
Waste Management	Proper waste disposal and recycling practices will be maintained on-site to prevent pollution and promote resource efficiency.
Erosion and Soil Management	Erosion control measures will be systematically implemented to shield soil quality from degradation, preserving its long-term viability.
Water Conservation	Water, a precious resource, will be utilized judiciously, and every effort will be made to responsibly source water, thereby ensuring responsible water management.
Stakeholder Engagement	Engaging with local communities is an integral aspect of our project, aimed at raising environmental awareness, addressing concerns, and establishing a sense of shared ownership in the project's environmental goals.

3.1 Responsibilities

Implementation of the EMP is ultimately the Proponent's responsibility (NORED. Due to the project's technical nature, it may be necessary to outsource certain aspects of the development process. When implementing the EMP, the following roles and responsibilities apply.

Each role player's responsibilities are described below.

3.1.1 Proponent's Representative

NORED shall appoint an employee of a senior position or contracted party to manage and oversee all contracts.

4 Monitoring and Reporting

We will implement a robust monitoring and reporting system to track the environmental performance of the mini-grid project. Regular environmental audits and assessments will be conducted to ensure compliance with environmental regulations, identify areas for improvement, and maintain transparency.

4.1 Construction and Operation

The responsible Department of NORED will appoint for the Construction Phase a **Responsible Person (RP)** for the works. This RP shall realize a monthly report to send to NORED Head Office office (a template of this report will be provided at a later stage). In addition, each Contractor assigned to the project will appoint an RP, either internal or external, for its scope of works.

Every week, a meeting will be held between each RP of each Contractor and NORED's RP, stating the main issues encountered onsite and outlining an action plan for the following week. The minutes of those meetings will be sent to NORED's Management team, where they will be reviewed.

The RP will also take part in the weekly Coordination meetings with the Contractors, where he will outline the main issues onsite. Minutes of those meetings will be recorded and sent to NORED's management team.

4.2 Stakeholder Engagement Plan

As it is detailed in the Stakeholder Engagement Plan, all the determined stakeholders of the project will be informed about the project's activities and annually reporting will be done to them.

A grievance mechanism has been created for the project (see Stakeholder Engagement Plan), for the local population to present their grievances in a formal way to NORED. The grievance mechanism will be presented during the implementation public meeting, to be held before construction starts.

The contact for those grievances is going to be the RP of the project.

4.3 Social Impact Mitigation

All the workers must be informed of Environmental Management Plans through an induction process. This process must include that:

- Conflict between workers and local population is avoided as much as possible;

- Alcohol usage is strictly prohibited;
- They should maintain good behavior with the local population; and
- They are aware of possible contagious diseases and are careful to avoid and prevent such diseases.

5 Key Actions

Potential Impact and Relevant Management Plan Objectives	Mitigation Measures	Responsible Person for Ensuring Commitment of Implementation	Target and Evaluation Criteria
General Impacts During Construction	Solar mini-grid must be constructed according to the project documentation. Construction site organization plan should define areas for temporary storage of materials, waste collection area, septic tanks, vehicle manipulation and parking area so the impact on the environment is reduced as much as possible. All workers must be aware of the EMP measures. This shall be implemented through the induction process and through the regular meetings on site.	During the Contract Period the Contractor shall be responsible for the construction site, and for its Subcontractors.	The construction site organization Implementation of Environmental Management Plans Number of workers who have followed the induction process. Daily monitoring and monthly audit
Environmental & Social Impacts	Implementation of the Environmental Management Plan Providing trainings to the workers to increase the awareness of being Eco-friendly and the Environmental Management Plans	Contractor's Responsible	Implementation of Environmental Management Plans Daily monitoring and monthly audit
Security	Experienced and licenced security personnel are onsite	NORED Security Manager	The contract with the Security Manager
Pollution	Comply with Management Plan Taking the necessary mitigation measures (sprinkling water, etc.) to avoid dust pollution. Reducing engine speed (from 30 km/h to 20 km/h) to avoid dust production, setting boards on the roads onsite to indicate the speed limit.	Contractor's Responsible	The construction site organization project Implementation of the Management Plan

Potential Impact and Relevant Management Plan Objectives	Mitigation Measures	Responsible Person for Ensuring Commitment of Implementation	Target and Evaluation Criteria
	Maintaining of construction vehicles to reduce emission. Providing respiratory masks and protective glasses against dust. Using dedicated areas with spill kit for oil filling to avoid ground pollution. Decreasing drop heights of transferring materials where possible to decrease dust production Not leaving engines running when it is not necessary.		
Waste Management	Comply with Management Plan Contractors prepare a specific construction waste management plan including amounts of waste. The location of dedicated waste storage area is known by all workers. Waste incineration is prohibited on project site. Store, collect and dispose the waste separately depending on the type and local collection availability Removing all the waste from the project site before the end of construction	Contractor's Responsible	Operate in accordance with Management Plan The construction site organization project Temporary waste storages marked Waste reports according to the regulation
Noise	Comply with Noise Management Plan Noisy works carried out during the day and only in exceptional cases, if required, during the evening Providing earplug for workers Limiting as much as possible the use of all noisy equipment at the same time	Chief site manager and Contractor's responsible	Develop noise monitoring and management plan Operate in accordance with Noise management plan
Accidents	Record every near-miss accident, incidents, and accidents, along with the	managers of contractors	Accident/incident records

Potential Impact and Relevant Management Plan Objectives	Mitigation Measures	Responsible Person for Ensuring Commitment of Implementation	Target and Evaluation Criteria
	circumstances of these events, and report weekly to the EHS Manager Realize an assessment of the causes of the accident. In case of an accident, investigate the reason and take the necessary measures		
Social Impacts	All the workers maintain good relationship with the local population All the workers and local population informed about prevention of contiguous illnesses	managers of contractors	Grievance mechanism
There is no indigenous peoples around the project site	Public meetings Resettlement Compensate Grievance mechanism	NORED	No need for mitigation or evaluation for now
There is no cultural heritage can be affected by project activities	Comply with Cultural Heritage and Chance Find Procedure Make all workers aware of the measures to follow in case of archaeological findings (proof of training presenting the Chance Find Procedure to be provided to the E&S Manager)	Chief site managers from contractors	Operate in accordance with the Cultural Heritage and Chance Find Procedure

5.1 Emergency Response Plan

An emergency response plan will be developed and communicated to all project personnel. This plan will outline the actions to be taken in the event of environmental incidents.

6 Compliance and Regulatory Requirements

This project places a paramount emphasis on adherence to all relevant environmental laws, regulations, and standards in Namibia. Conforming to the Namibian Environmental Management Act of 2007 and other applicable legislation is fundamental to our operational ethos and underscores our dedication to environmental stewardship and corporate responsibility.

The project's compliance will be continuously monitored and maintained through ongoing dialogue with regulatory authorities and active involvement in the local environmental community.

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