

**PROPOSED CONSTRUCTION OF A RENEWABLE PHOTOVOLTAIC
SOLAR POWER PLANT, OKAHANDJA, OTJONZONDJUPA
REGION, NAMIBIA.**

EUVI ENERGYTECHNOLOGIES cc

ENVIRONMENTAL MANAGEMENT PLAN

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ABBREVIATIONS AND ACRONYMS

EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
PV	Photovoltaic
MET	Ministry of Environment and Tourism
NamPower	Namibian Power Corporation
DWA	Department of Water Affairs
ECO	Environmental Control Officer
DEA	Department of Environmental Affairs
ENC	Environmental Coordinator
EO	Environmental Officer
EIA-C	Environmental Impact Assessment Consultant
I&Aps	Interested and Affected Parties
EAs	Environmental Assessments

1 INTRODUCTION AND BACKGROUND

This Environmental Management Plan (EMP) provides guidance for managing the construction, operation and decommissioning of a renewable photovoltaic solar power plant in farm Portion 11 of Farm Omuramba, N0. 341 in the Otjozondjupa Region. The EMP is a working document which consists of a set of mitigation measures that will be implemented to eliminate, offset or reduce adverse environmental impacts to acceptable levels during the various phases (i.e. construction, operations and decommissioning).

The construction, operation and decommissioning involve:

- The construction of the new renewable photovoltaic solar power plant.
- Construction of an office for administrative work.
- Installation of the solar power plant's electricity grids.
- Connection of the plant's grid to the main electricity grid.
- Removal of the solar panels, steel rods and dispensing equipment.
- Removal of associated buildings and other infrastructure.

This environmental management plan (EMP) aims to take a pro-active route by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigating measures might be included if necessary.

All Contractors and sub-Contractors taking part in any of the phases should be made aware of the contents of the EMP and of the Environmental Impact Assessment (EIA), so as to plan their activities accordingly in an environmental sound manner.

1.1 PROJECT DESCRIPTION

EUVI ENERGYTECHNOLOGIES cc is proposing to construct a renewable photovoltaic solar power plant within the farm Portion 11 of Farm Omuramba, N0. 341 in the Otjozondjupa Region. The proposed solar power plant will supply electricity to Nampower which will then be distributed nationwide. The rationale for the development project is based upon the increase in the demand for electricity in the country due to the rapid industrial expansion. The boom in business activities in the country has lead to a demand in electrical services which have grown at a faster rate than expected. The project will be situated

within farm Portion 11 of Farm Omuramba, N0. 341 in the Otjozondjupa Region because of high sun hours, which is in the central part of the country, Otjozondjupa region.

1.2 SUMMARY OF THE PROPOSED ACTIVITIES

The environmental issues related to construction of a renewable photovoltaic solar power plant are mostly local and are common in most construction operations. These issues include visual impacts, impact on biodiversity, land and soil disturbance and also social impacts.

During the process of site clearance for the construction phase there will be some land and soil disturbance which results in localised loss of flora as well as any other fauna that may be depended on such specific flora.

1.3 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

The Environmental Management Plan (EMP) is the tool that can provide the assurance that the proponent has made suitable provisions for mitigation. The EMP describes the methods and procedures for mitigation and monitoring the impacts identified in the EIA report. The aim of the EMP is to:

- Ensure that the project complies with the goals of the Namibian Environmental Management Act 2007, (No. 7 of 2007), and;
- Provide a framework for implementing the management actions recommended in the EIA for construction, operational and decommissioning phases of the activities associated with the development of the proposed fuel retail facility.

The following legislation governs the EIA/EMP process in Namibia, pertaining to the proposed development.

1.4 The Namibian Constitution

Article 95 of Namibia's constitution provides that:

“The State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at the following:

(l) management of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable

basis for the benefit of all Namibians, both present and future; in particular the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian territory.”

This article recommends that a relatively high level of environmental protection is called for in respect of pollution control and waste management.

1.5 Environmental Management Act of Namibia (2007)

The Act provides a broad definition to the term “environment” - land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values. NOTE: this definition of “environment” was used throughout this report.

This Act provides a list of projects requiring an EIA. The proposed development is also listed as a project requiring an EIA under this Bill.

1.6 National Heritage Act No. 27 of 2004

The Heritage Act of 2004 makes provision for the developer to identify and assess any archaeological and historical sites of significance. The existence of any such sites should be reported to the Monuments Council as soon as possible. The Council may serve notice that prohibits any activities as prescribed within a specified distance of an identified heritage/archaeology site.

1.7 Environmental Assessment Policy of Namibia

The Environmental Assessment Policy of Namibia requires that all projects, policies, programmes, and plans that have detrimental effect on the environment must be accompanied by an EIA. It further provides a guideline list of all activities requiring an impact assessment. The proposed development is listed as a project requiring an impact assessment as per the following points in the policy:

- Transportation of hazardous substances & radioactive waste.
- Storage facilities for chemical products.
- Industrial installation for bulk storage of fuels.

The policy provides a definition to the term “environment” - broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes and plans. Cumulative impacts associated with proposed developments must be included as well as public consultation. The policy further requires all major industries and mines to prepare waste management plans and present these to the local authorities for approval.

Apart from the requirements of the Environmental Assessment Policy, the following sustainability principles needs to be taken into consideration, particularly to achieve proper waste management and pollution control.

1.7.1 Cradle to Grave Responsibility

This principle provides that those who manufacture potentially harmful products should be liable for their safe production, use and disposal and that those who initiate potentially polluting activities should be liable for their commissioning, operation and decommissioning.

1.7.2 Precautionary Principle

There are numerous versions of the precautionary principle. At its simplest it provides that if there is any doubt about the effects of a potentially polluting activity, a cautious approach should be adopted.

1.7.3 The Polluter Pays Principle

A person who generates waste or causes pollution should, in theory, pay the full costs of its treatment or of the harm, which it causes to the environment.

1.7.4 Public Participation and Access to Information

In the context of environmental management, citizens should have access to information and the right to participate in decisions making.

1.8 Electricity Act No. 4 of 2007

The Act stipulates the establishment of the Electricity Board and for its powers and functions. It further provides for the requirements and conditions for obtaining licences for the provision of electricity, and for the powers and obligations of licensees and to provide for incidental matters.

The objective of the Act is laid down in its Section 3 which is to exercise control over and regulate the provision, use and consumption of electricity in Namibia

through the Electricity Control Board (ECB) as well as to oversee the efficient functioning and development of the electricity industry and security of electricity provision. The Act under its Section 21 states that the applicant has to submit an Environmental Impact Assessment study indicating the extent of any potential damage to or pollution of the environment and the steps proposed to prevent such damage or pollution and to restore the environment generally and in terms of existing environmental legislation. It is for this reason that EUVI ENERGYTECHNOLOGIES cc has appointed Centre for Geosciences Research cc to undertake the EIA study for the proposed renewable solar power plant at farm Portion 11 of Farm Omuramba, N0. 341.

2 ROLES AND RESPONSIBILITIES

This section describes the roles and responsibilities of the key stakeholders involved in the development, implementation and review of the EMP. The contractor in this report refers to EUVI ENERGYTECHNOLOGIES cc and its appointed contractors.

2.1 Competent Authority

The Department of Environmental Affairs: Ministry of Environment and Tourism is responsible for the review of the EMP documents.

2.2 The applicant (EUVI ENERGYTECHNOLOGIES cc)

The role of the applicant is as follows:

- Review report, implement the EMP and make payments to the Contractor if the EMP is being implemented in a satisfactory manner.
- Give warnings and imposes fines and penalties to the Contractor if the Contractor neglect to implement the EMP satisfactorily.

2.3 EUVI ENERGYTECHNOLOGIES cc (Project Manager)

The Applicant will appoint the Project Engineer. The role of the project manager will be:

- Liaising directly with the relevant authorities with respect to the preparation and implementation of the EMP and meeting the conditions documented in the environmental clearance certificate.
- Bear the overall responsibility for managing the project contractors and for ensuring that the environmental management requirements are met.
- Inform the contractors of the EMP and Environmental clearance certificate obligations.
- Approve all decisions regarding environmental procedures and protocols that must be followed.

- Have the authority to stop any construction in contravention with the EMP and RoD.
- In consultation with the Environmental Control Officer (ECO) has the authority to issue fines for transgressions of basic conduct rules and/or contravention of the EMP.
- Maintain open and direct lines of communication between the proponent, Contractor and Interested and Affected Parties (I&APs) with regards to environmental matters.
- Attend regular site meetings and inspections where required.

2.4 EUVI ENERGYTECHNOLOGIES cc (Environmental Control Officer)

An Environmental Control Officer (ECO) should be employed by the Contractor. This person should be available for the duration of the construction period and should have appropriate training and experience in the implementation of the EMP and overseeing construction process. This ECO will implement EMP at all levels and sections (sub-contractors) during the construction of the PV plant. During operation of the PV plant the City's Environmental Management Division will take over the role of ECO. The responsibilities of the ECO include the following:

- Assist the Project Manager and Contractor in finding environmentally responsible solutions to challenges that may arise.
- Conduct environmental monitoring as per EMP requirements.
- Monitor performance of the contractors and ensuring compliance with the EMP and associated method statements.
- Maintenance, update and review of the EMP.
- Liaison between the contractors, authorities and other key stakeholders on all environmental concerns.
- Validating regular site inspection reports which are prepared by the Contractor's Environmental Officer (EO).
- Checking the EO's record of environmental incidents as well as corrective and preventative actions taken.

- Checking the EO's public complaints register in which all complaints are registered and actions taken thereof.
- Issuing site instructions to the contractors ECO for corrective actions required.
- Assisting with the resolution of conflict.
- Communicating all amendments of the EMP to the relevant stakeholders.
- Conducting monthly audits to ensure that the system for implementing the EMP is effective.

2.5 Contractor's Safety Officer

- Implement the recommendations in the EIA and satisfy the conditions in the RoD.
- Ensure that safety is practiced for all activities on site.
- Prepare and implement safety procedures
- Communicate all safety related issues.

2.6 Contractors

The contractor should appoint the Contractor's representative who is suitably qualified to implement the EMP. The responsibilities of the Contractor include:

- Compliance with the relevant legislation and the EMP.
- Preparation and submission to the proponent through Project Manager the following Management Plans prior to commencing work:
 - Environmental Awareness Training and Inductions;
 - Emergency Preparedness and Response;
 - Waste Management; and
 - Health and Safety.
- Environmental awareness presentations (inductions) to be given to all site personnel prior to work commencement; the ECO is to provide the course content and the following topics, at least but not limited to, should be covered:

- The importance of complying with the relevant Namibian, International and Best Practice Legislation.
- Roles and Responsibilities, including emergency preparedness.
- Basic Rules of Conduct (Do's and Don'ts).
- EMP: aspects, impacts and mitigation;
- Fines for Failure to Adhere to the EMP;
- Health and Safety Requirements.
- Record keeping of all environmental awareness training and induction presentations; and
- Attend regular site meetings and environmental inspections.

3 ENVIRONMENTAL MANAGEMENT PLAN

In this EMP, distinction is made between the construction, operational and the decommissioning phases. The contractor in this report refers to EUVI ENERGYTECHNOLOGIES cc and its appointed contractors.

Before commencement of any construction work, the Contractor shall brief his or her staff on the content of the EMP and the EIA. The Contractor has the responsibility for implementing the EMP and ensuring their staff complies with the guidelines. Daily audits must be carried out; and corrective action implemented when needed. EUVI ENERGYTECHNOLOGIES cc should promote the implementation of this EMP.

3.1 Protection of flora, fauna and natural features

The Contractor is responsible for ensuring that the impacts on the environment around the renewable PV solar power plant are minimised. The Contractor shall not deface, paint, damage or mark any natural features (e.g. endangered plant species) situated in or around the new renewable PV solar power plant. Land disturbance should be minimised.

No flora shall be removed, damaged or disturbed outside the designated working areas. Removal, damage or disturbance to flora in the designated working areas is to be minimised. Sensitive, protected and endangered plant species is to be avoided during the removal of vegetation.

In order to protect the environment and achieve sustainable development of the environment, it is necessary to incorporate sound environmental management objectives and targets for the designated renewable PV solar power plant.

According to the Namibian legislation, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an EIA. The following legislations govern the process of EIA in the country pertaining to the proposed development:

3.2 Access routes and work sites

Equipments to the site will be transported on the situated 120 km down the C31 motorway from Okahandja town Walvis bay to farm Portion 11 of Farm Omuramba, N0. 341. No new tracks shall be established and only existing roads maybe used.

3.3 Site Management

Areas outside this designated working zone shall be considered “no go” areas. The renewable PV solar power plant must be demarcated when offloading equipments to enhance safety around the proposed development.

3.4 Staff management

The Contractor must ensure that their employees have suitable personal protective equipment, are properly trained and that a fire fighting and a first aid officer is onsite.

3.5 Waste management

No on-site burning, burial or dumping of any waste materials, vegetation, litter or refuse shall occur at the renewable PV solar power plant.

The developer shall remove all waste off-site to designated licensed disposal sites. The Contractor must provide sufficient bins or containers on-site to store any solid or liquid waste produced. The bins and containers should be weatherproof and scavenger-proof.

4 MANAGEMENT OF ENVIRONMENTAL ASPECTS

4.1 Construction / Decommissioning Phase

This section details mitigation measures proposed for the implementation during the construction phase.

4.1.1 Dust

Identified Impact	Description	Mitigation	Monitoring	Responsible body
Dust	Dust may be generated during the construction/decommission phase and might be aggravated when strong winds occur. These are expected to be site specific and will potentially pose a nuisance to the neighbouring properties. The construction of the proposed facility should have minimal impact on the surrounding air quality.	It is recommended that regular dust suppression be included in the construction phase, when dust becomes an issue.	Regular visual inspection	EUVI ENERGYTECH NOLOGIES cc

4.1.2 Noise

Identified Impact	Description	Mitigation	Monitoring	Responsible body
Noise	Noise pollution due to construction equipment and machinery on site	Ensure engines are fitted with mufflers. Equipment and machinery operators should be equipped with ear protection equipment	Strict operational times. Regular inspection.	EUVI ENERGYTECH NOLOGIES cc

4.1.3 Safety and Security

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Safety and Security	During the construction and decommissioning phase, earthmoving equipment will be used on site. This	The responsible contractor must ensure that all staff members are briefed about the potential risks of	Security System monitoring. Safety	EUVI ENERGYTECH NOLOGIES cc

	increases the possibility of injuries. Presence of equipments may encourage criminal activities	injuries onsite. The contractor is further advised to ensure that adequate emergency facilities including first aid kit are available on site.	Procedures. First aid Training	
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4.1.4 Nuisance Pollution

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Nuisance pollution	Aesthetics and inconvenience caused to persons trying to access/exit immediate neighbouring buildings and/or destinations.	Take cognition when parking vehicles and placing equipments and infrastructure.	Regular visual inspection	Oka Investments (Pty) Ltd

4.1.5 Groundwater Contamination

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Groundwater contamination	Groundwater contamination can occur during the decommissioning phase from the toxic substances that are contained in the solar panels such as cadmium and arsenic. This are extremely harmful substances and can be extremely dangerous if they get into the ground water .Minimal groundwater contamination can be caused by leakages of fuel from machinery and heavy-duty vehicles during construction and decommissioning phase.	Recycle the solar panels during the decommissioning phase. Dispose the panels properly during the decommissioning phase. Prevent spillages of any chemical.	Regular visual inspection	EUVI ENERGYTECH NOLOGIES cc

4.1.6 Generation of Waste

Identified Impact	Description	Mitigation	Monitoring	Responsible body
Generation of waste	This can be in a form of contaminated soil and building rubble, wires, and	Ensure that no excavated soil, refuse or building rubble generated on site are placed	Housekeeping procedure monitoring,	EUVI ENERGYTECH NOLOGIES cc

	human waste	or dumped on surrounding properties or land. This includes road reserves e.t.c . Provide adequate waste bins in litter prone areas on the site and dispose the solid waste in the Okahandja dumping site. Clear dumping area with Okahandja Municipality or the Local Authority in the area	Observation of site appearance by the facility manager.	
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4.1.7 Economic impacts

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Economic Impacts	The number of jobs that might be created. More than 100 people will be employed during construction phase.	Locals should be highly considered when hiring for temporary or permanent jobs.	Inspections should be done during the recruitment process	EUVI ENERGYTECH NOLOGIES cc

4.2 Operational Phase

This section details mitigation measures proposed for the implementation during the operational phase. Main responsible party in this section is

4.2.1 Visual Impacts

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Visual impacts	the change to the existing visual environment (i.e. views) caused by the intervention and the extent to which that change compromises (negative impact) or enhances (positive impact) or maintains the visual quality of the scene as perceived by people visiting, working or living in the area. The visual impact will thus be more negative than positive in this scenario but minimal as there are already existing solar panels in Farm Omuramba, NO. 341	Re-vegetate the area; grow palm trees around the renewable photovoltaic solar power plant at a distance of 50 m away from the power plant. This will reduce the visibility of the solar panels in the power plant.	Visual inspection.	EUVI ENERGYTECH NOLOGIES cc

4.2.6 Health and Safety

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Health and safety	Even though photovoltaic solar panels are safe and effective, there are potential health and safety hazards associated with the full cycle of photovoltaic's. Chemicals used to produce the panels can cause health hazards. Minimal hazards can also occur during events of fire, if any was to occur.	Adequate measures must be brought in place to ensure safety of staff on site, and includes <ol style="list-style-type: none"> 1) Proper training of operators 2) First aid treatment 3) Medical assistance 4) Emergency treatment 5) Protective clothing 	Monitoring should be carried out on a regular basis, Including accident reports.	EUVI ENERGYTECH NOLOGIES cc

4.2.11 Ecological Impacts

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Ecological Impacts	No conservation worthy vegetation and fauna exists at the site	Some vegetation should be planted at the site to minimize surface run-off. Some vegetation should be planted on site to reduce visual impacts.	Visual inspection	EUVI ENERGYTECH NOLOGIES cc

4.2.12 Economic Impacts

Identified Impact	Description	Mitigation	Monitoring	Responsible Body
Economic Impacts	The number of jobs that might be created , the project is estimated to create jobs for 20-30 people during its operational phase	Locals should be highly considered when hiring for temporary or permanent jobs	Regular inspections	EUVI ENERGYTECH NOLOGIES cc

5 CONCLUSION

The above Environmental Management Plan, if properly implemented, will help to minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

The Environmental Management Plan should be used as an on-site reference document during all phases of the proposed project, and auditing should take place in order to determine compliance with the EMP for the proposed site, and Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.