1. Introduction

1.1 This document

This Non-Technical Summary (NTS) provides an overview of the Environmental Impact Assessment (EIA) process for the proposed Lichtenburg 1 ('the Project'), a photovoltaic (PV) facility, near Lichtenburg, North West Province. The EIA was undertaken in compliance with the National Environmental Management Act (Act 107 of 1998), as amended, and the EIA Regulations, as amended.

The NTS describes the project proposal, and the potential impacts the Project may have on the biophysical and socio-economic environments. It also addresses the measures that the Project will implement to reduce significant negative impacts and to enhance potential social benefits, and how environmental and social issues will be managed during the construction, operation and decommissioning phases. The NTS is a short document written in non-technical language that can be used to share the findings of the EIA process to the public.

1.2 Overview of Project

ABO Wind Lichtenburg 1 PV (RF) (Pty) Ltd intends to develop a photovoltaic solar facility and associated infrastructure Portion 06 of the Farm Zamenkomst No. 04, Registration Division IP, North West Province situated within the Ditsobotla Local Municipality and the greater Ngaka Modiri Molema District Municipality. The solar facility will have a generating capacity of up to 100MW. The project location is located approximately 12km north of the town Lichtenburg and 5.5km south-east of Bakerville. The total development footprint of the project will approximately be 300 hectares. A single 88/132kV overhead powerline will connect the Project to a proposed collector substation on Portion 2 (Remaining Extent) of the Farm Zamenkomst 4 Registration Division IP. From the collector substation, a 132kV powerline will connect the Project to the existing 275kV Watershed Main Transmission Substation (MTS).

Figure 1: Project Location

1.3 Project Justification

The proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. The Project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other appropriate energy generation programmes / opportunities. These Programmes aim to secure the generation of electricity from Renewable energy sources (Wind, Solar and Hydro), while simultaneously diversifying South Africa's electricity mix.




SOLA

2. How does a Typical PV Facility work?

2.1 Project Justification

Solar Panels capture light energy from the sun to generate electricity through a process known as the Photovoltaic effect, where light energy energise the electrons to produce electricity. Each PV cell is made of silicon which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the electric current which is transmitted along power lines to nearby substations and ultimately distributed to the consumers as indicated in Figure 2.

Figure 2: The Solar Energy process (source: https://www.eeweb.com/solar-power-plant-working-and-benefits/)

2.2. Key components of the Project

PV Panel Array: To produce up to 100MW the facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility.

Inverters: The inverter is a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.

Connection to grid to transform voltage from 33kV to 132kV: Connecting the array to the electrical grid requires the transformation of the voltage from 33kV to 132kV.

Grid Connection: The onsite substation will be required on site to step the voltage, after which the power will be evacuated into a proposed nearby collector substation which will evacuate electricity into the national grid via the a new 132kV powerline from the collector substation to the 275kV Watershed Main Transmission Substation (MTS).

Electrical reticulations network: The internal network will be laid ~2.4m underground as far as practically possible.

Supporting infrastructure: The following auxiliary building will be required on site and will include water and electricity: Operations & maintenance building, Switchgear and relay room, Staff lockers and changing rooms, security control, permanent laydown area and temporary batching plant.

Roads: Access will be obtained via the existing R505 road which traverses the eastern half of the project site in a north-west to south-east direction. Internal site road network will also be required to provide access to the solar field.

Fencing: For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farms. The project will have permanent security on site for 24hrs per day, 7 days a week.

2.3 Services Provision

Water: Water for the development will most likely be obtained from the local municipality, or alternatively from ground water resources.

Sanitation: Portable chemical toilets will be utilised, that will be serviced privately or by the local municipality.

Waste: Waste will be disposed of at a licensed landfill site.

Electricity: During construction, electricity will either be generated on site through a small solar system or using generators or the existing Eskom supply on the affected property will be utilised.

Decommissioning: The operating period will be up to 30 years from the commencement date of the operation phase. Thereafter two rights of renewal periods of 40 years and 30 years will be relevant.

3. Alternatives

3.1 No-go Alternative

This alternative considers the option of 'do nothing' and maintaining the status quo. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged.

3.2 Location Alternatives

No other properties were secured by ABO Wind Lichtenburg 1 PV (RF) (Pty) Ltd in the Lichtenburg area to potentially establish the solar energy facility. From a local perspective, Portion 06 of the Farm Zamenkomst No. 04, is preferred due to its suitable climatic conditions and solar resource, topography, environmental conditions, proximity to a feasible grid connection point, as well as site access.

3.2 Design/Layout Alternatives

Two alternative layouts/development areas were assessed in the EIA and are described below:

- **Alternative 1 (the technically preferred option):** With an area of 280 hectares is in the western extent of the project site. This alternative was the technically preferred as it represented a single and contiguous area.
- **Alternative 2:** Alternative 2, entails locating the development footprint in the eastern extent of the project site. It comprises a development site of 280ha in extent. This alternative is less preferred since it is further from the access points / routes and the grid connection would be longer to the connect to the national grid which increases the costs of the project.

3.3 Activity Alternative

The Scoping and EIA process also considered if the development of a solar PV facility would be the most appropriate land use for the site. Solar PV technology is appropriately suited to the site, given the high irradiation values for the Lichtenburg area.

3.4 Technical Alternatives

Possible technical alternatives for the development of a solar PV facility needs to be considered during the BA process. These include:

Grid Connection: Two on-site substation and three grid connection corridor locations were assessed. The technically preferred substation location for the project is in the western extent of the site, whereas the preferred grid connection corridor includes an overhead 33/132kV powerline that would be routed adjacent to and follow the same routing as Eskom's existing power.

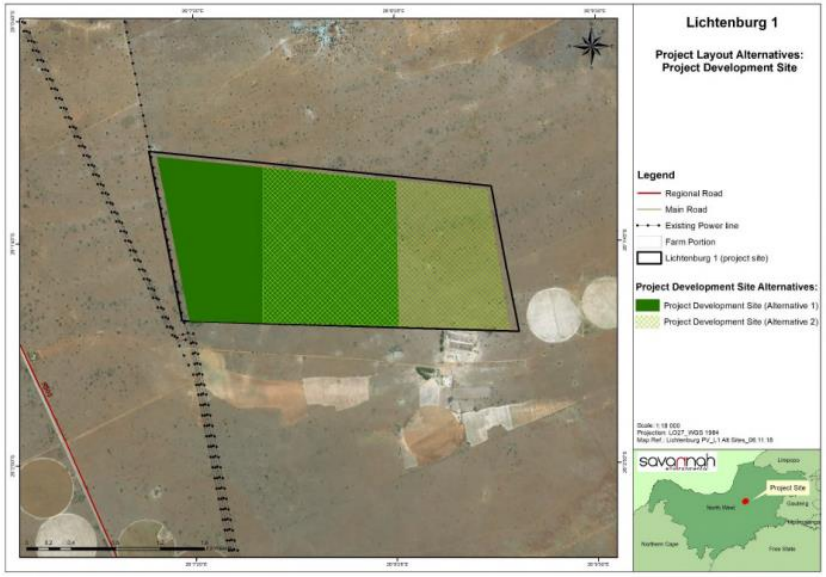

Figure 4: Alternative development areas for the project

SOLA

4. Legal Framework & Public Participation

4.1 Environmental Management Act

Environmental decision making with regards to solar PV facilities and associated infrastructure is based on numerous policy and legislative documents. The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an Environmental Authorisation (EA) from the relevant competent authority. Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an environmental assessment process which can be either a Basic Assessment Process or a full Scoping and Environmental Impact Assessment process.

The EIA Regulations No. 324, 325, and 327 outline the activities that may be triggered and therefore require EA. The activities triggered under Listing Notice 1, 2 and 3 for the project implies that the development is considered as potentially having an impact on the environment and therefore require the implementation of appropriate mitigation measures. Based on the nature of the activities associated with the project, the process followed was a full Scoping and EIA process, as well as a timeframe of 107 days for the processing of the Application for Environmental Authorisation by the Department of Forestry, Fisheries and the Environment (DFFE).

4.2 Public Participation

Public participation is an integral part of the full Scoping and EIA process and aims to involve I&APs in the process by notifying them of the proposed project and encouraging them to voice their issues and concerns.

Through the full Scoping and EIA process of the project, the process was transparent and allowed I&APs to comment on the project or raise concerns, which were included in the EIA Report and are taken into consideration during the authorities' assessment of the project. The DFFE issued an Environmental Authorisation for the project on 3 July 2019.

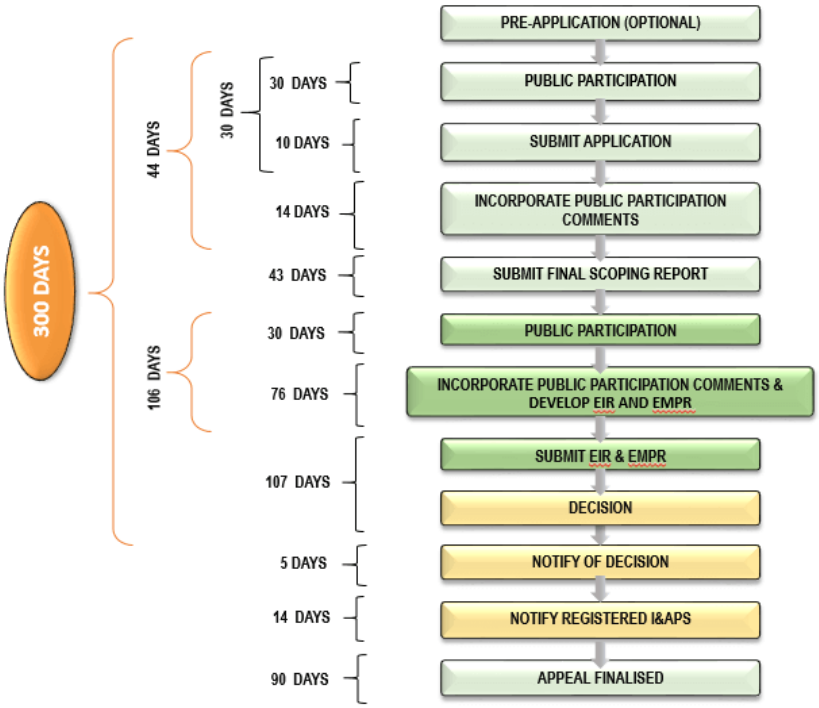

Figure 5: Scoping and EIA Timeline

SOLA

5. Key Baseline Conditions

5.1 Biophysical Environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential and land capability, vegetation and landscape features, climate, biodiversity, heritage features (in terms of archaeology and palaeontology), the visual landscape and the social environment to be affected.

5.1.1 Geology, soils and terrain

The soils present on the site are homogenous and dominated by shallow, rocky soil forms, where nominal soil formation has occurred. There are four soil forms present within the site and these include Mispah/Glenrosa/Shallow Hutton/Rock outcrops, Hutton, Clovelly and Glencoe.

5.1.2 Agriculture potential, Land capability, erosion potential and existing agricultural activities

The capability has been determined as low-moderate and moderate-high (associated with the deeper arable soils present). The moderate-high land capability areas are located mainly within the centre of the site, as well as the very north-eastern section.

5.1.3 Vegetation

The site is located within the Grassland biome and the Dry Highveld Grassland Bioregion. The vegetation in and surrounding the site is the Carletonville Dolomite Grassland. This vegetation type has been described by Mucina and Rutherford (2006) as species-rich grasslands forming a complex mosaic pattern across slightly undulating plains dissected by prominent rocky chert ridges. Key species associated with the grassland include *Anthospermum rigidum subsp. Pumilum, Aristida congesta, Acalypha angustata* and *Boophane disticha*.

5.1.4 Surface water resources

There are no wetlands, watercourses nor any other surface water resources present on the site.

5.1.5 Climate

The climate for Lichtenburg is given, as it is the closest town with weather data available. Rainfall for the region is relatively low and occurs mainly in summer with very dry winters. Mean annual rainfall is above 601mm with January being the wettest month. The average annual temperature for the region is 16.9 °C with January being the warmest month.

5.1.6 Biodiversity (Mammals, Reptiles & Avifauna)

The diversity of mammals occurring within the broader area is high, with as many as 98 terrestrial mammals potentially occurring. Due to the high level of disturbances linked to anthropogenic activities – agricultural activities and traffic on the R505 road, the biodiversity within the project site itself is moderate.

Due to the relatively homogenous nature of the site, the diversity of reptiles within the site is moderate. Of the species that have a distribution within the site, 1 species is regarded as conservation important – the *Python natalensis* and the *Pyxicephalus adspe*

5.1.7 Visual landscape

Farm settlements or residences occur at irregular intervals throughout the area. Some of these near the site include, Brakpan, Grasfontein and Sesnako. There are also large existing powerlines associated with the existing Watershed Substation located in the surrounding area of the site.

5.1.8 Socio-Economic conditions

North West Province is the sixth biggest province of South Africa in terms of size, and mining as well as primary agriculture are the key economic sectors.

The Ngaka Modiri Molema District Municipality is the biggest district in the province, covering an area of 28 206km2. Between 2001 and 2011, the district experience a positive population growth rate of 1%, while the Ditsobotla Local Municipality experienced a growth rate of 1.3%. The Ditsobotla LM, Ngaka Modiri DM and the Province's age structure consist predominantly of the economically active population between the ages of 15 – 64. There are relatively low education levels within the area, with most residents having received some secondary schooling.

5.1.9 Cultural and Heritage aspects

The town of Lichtenburg ('Town of Light') was established in 1873 and was occupied by both Boers and Britons for short spells during the Second Boer War (1899 – 1902). The site has been disturbed and transformed by agricultural activities. Pre-existing agricultural plough fields, grazing areas and farm buildings were identified. In addition, throughout the farming areas, several heaps of rocks that were removed from the agricultural fields were identified. There are no archaeological resources – graves or burial grounds identified within the site for the project.

SOLA

6. Mitigation Summary

Field	Main Impacts	Mitigation measure
Terrestrial Biodiversity	Habitat destruction, fragmentation, soil erosion, pollution, spread of alien invasive species, fauna mortalities	Avoid peripheral impacts, sensitive habitats must be avoided, activities restricted to specific areas, environmental training of employees, animal safety to be promoted, poisons and control of animals to be avoided, limit pesticide use, monitoring of activities, rehabilitation of disturbed areas, use of existing infrastructure, minimise land disturbance, protect sloping areas, repair erosion damage, stormwater control and management, store hazardous chemicals on impervious surfaces, implement speed limit, control alien invasive species, no staff accommodation on site, avoid travelling at night.
Avifauna	Loss of species, disturbance, degradation & modification of receiving environment, collisions with PV panels and power lines, electrocution on infrastructure	Minimise construction footprint, preserve indigenous vegetation, control pollution, use designated roads, rehabilitate with indigenous vegetation, roosting areas and nests (where present) must not be disturbed, power lines to be fitted with bird flight diverters.
Visual	Visual impact of construction activities, visual impact on sensitive receptors, lighting impacts, sense of place impacts,	Retain natural vegetation, plan placement of the laydown area, reduce and control dust, limit construction between 07:00 and 18:00, rehabilitate disturbed areas, maintain general appearance, plan lighting impacts and design to minimise lighting impact.
Soils and Agricultural	Loss of land capability	Vegetate/cover all soil stockpiles, spill kits must be available, no cleaning or servicing of vehicles to be undertaken, implement action plans for spills, leaks and impacts to aquatic systems.
Heritage	Loss or damage to heritage sites, features or objects	Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately, all discoveries shall be reported immediately to a heritage practitioner, artefacts must not be removed, destroyed or interfered with.
Palaeontology	Destroy or permanently seal-in fossils	If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented.
Social	Employment and skills development, economic multiplier effect, loss of farmland, in-migration of people, safety and security impacts, impacts on daily movement patterns, nuisance impacts, impact on tourism	Adopt a local employment policy, source labour locally, promote gender equality, site to be fenced off, engage local community representatives, provide transportation for workers, implement a grievance mechanism, appoint a security company, access in an out of the site must be strictly controlled, all vehicles must be road worthy, implement penalties for reckless driving, avoid movement of heavy vehicles over the weekends and public holidays, implement dust suppression, implement a firebreak.
Wetland	Compaction, erosion, watercourse disturbance, pollution	Compaction to be limited, reseed with indigenous grasses, implement erosion control mechanisms, disturbance to wetlands in power line route to be minimised, minimise impact on natural flow regime, perform scheduled maintenance, use existing roads, contain dirty water, provide appropriate sanitary facilities, rehabilitate disturbed areas.

SOLA