

INTRODUCTION

CHAPTER 1

Eskom Holdings Limited is proposing to establish a commercial wind energy facility on a site in the Western Cape Province. This development is proposed to comprise a cluster of up to 100 wind turbines (typically described as a wind energy facility or a wind farm) to be constructed over an area of approximately 25km² in extent. A broader site of ~37 km², off-set at a distance of 2 km from the coastline, is proposed for further investigation through an Environmental Impact Assessment (EIA) process. The nature and extent of this facility, as well as potential environmental impacts associated with the construction of a facility of this nature is explored in more detail in this Final Scoping Report.

1.1. The Need for the Proposed Project

Internationally there is an increase in the deployment of renewable energy technologies for the generation of electricity due to concerns such as climate change and exploitation of non-renewable resources. The South African Government has set a 10-year target for renewable energy of 10 000 GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. This amounts to ~4% (1 667 MW) of the total estimated electricity demand (41 539 MW) by 2013. In order assist Government in meeting its target, Eskom is investigating potential renewable energy projects, which include a Concentrated Solar Thermal project in the Northern Cape, as well as the proposed Wind Energy Facility.

In responding to the growing electricity demand within South Africa, the need for diversifying Eskom's energy mix, as well as the country's targets for renewable energy, Eskom has undertaken initiatives to establish **renewable** forms of electricity generation capacity. Eskom embarked upon a research programme to investigate **South Africa's sources** of renewable energy, and identify appropriate alternative solutions to meet the electricity needs of the country. Through this research, the viability of a wind energy facility was investigated, and the potential to establish a wind energy facility at a site along the West Coast within the Western Cape identified.

1.2. Background to the Project

As a precursor to initiating an Environmental Impact Assessment (EIA) process, Eskom embarked on a wind resource research monitoring programme, as well as a site identification and selection process to determine areas suitable for wind energy development in South Africa. Meteorological conditions are critically

important when considering the siting of wind turbines and identifying ideal wind farm sites. Ultimately, the success of the facility is dependent on the available wind resource of a particular site – i.e. wind speed, turbulence, spatial and temporal variations in the wind climate, and how the wind resource is affected by terrain.

According to the South African Wind Resource Database compiled by the National Department of Minerals and Energy (DME), the Council for Scientific and Industrial Research (CSIR) and Eskom, the West Coast north of the Olifants River has been identified to experience some of the highest wind speeds in South Africa. Eskom studied this area further and established meteorological monitoring stations to determine potential for the wind resource on the West Coast north of the Olifants River to support the development of a Wind Energy Facility (i.e. the incidence of wind within the required velocity range). In addition, this area further supports other technical requirements for a wind energy facility in terms of land availability and accessibility, and accessibility of the electricity grid to meet transmission integration requirements.

In April 2007, Eskom embarked on a regional site identification and selection process (refer to Chapter 4 for details of the site identification process) to determine and delineate areas north of the Olifants River as suitable sites for commercial wind energy development. In order to assist in addressing the challenge of ensuring that wind energy projects meet economic (including technical), social and environmental sustainability criteria, the study was based on the Western Cape Provincial guidelines for locating wind energy projects and considered other local, provincial and national strategic environmental initiatives.

The regional site identification process aimed to determine and delineate areas suitable for wind energy development and included the consideration of sites/areas of special environmental importance and planning criteria, as well as issues relating to landscape character, value, sensitivity and capacity. These aspects were then balanced with technical constraining factors affecting the siting of a wind farm, including the wind resource (wind potential diminishing with distance from the coastline), land availability, accessibility and existing grid infrastructure.

It was acknowledged that a proactive identification of a location/site appropriate for the introduction of wind energy technology would enhance the viability of the project and inform the scope of the required Environmental Impact Assessment.

1.3. Project Overview

Through the regional site identification process, a broader area falling within the Matzikama Local Municipality and the DMA of Western Cape Municipal Area 1

(WCMA01) on the West Coast (depicted on Figure 1.1) was identified by Eskom (in conjunction with the EIA consultants) as being potentially suitable for wind energy development. This area was put forward for consideration within an EIA (refer to Chapter 4 for details of the site identification process). This area (~37 km² in extent) comprises the following farms:

- » Portion 5 of the farm Gravewaterkop 158 (commonly known as Skaapvlei)
- » A portion of Portion 620 of the farm Olifants River Settlement
- » A portion of Portion 617 of the farm Olifants River Settlement

The overarching objective for the wind energy facility planning process is to maximise electricity production through **exposure to the wind resource**, while minimising infrastructure, operational and maintenance costs, as well as **social and environmental impacts**. As **local level environmental and planning issues** were not assessed in sufficient detail through the regional level site identification process, these issues must now be considered within **site-specific studies** and assessments through the EIA process in order to delineate areas of sensitivity within the broader site and ultimately inform the placement of the wind turbines and associated infrastructure on a site.

The wind farm is proposed to accommodate up to **100 turbines**. The performance of the turbines is also determined by disturbances to the wind resource, which requires that they are appropriately spaced. The turbines and associated infrastructure is, therefore, required to be positioned over an area of approximately **25 km²**.

The construction of the facility is proposed to be **phased**, with the first commissioned phase of the project planned to generate an ~100 MW (approximately 50 2MW industry standard turbines). The subsequent phases would, however, not exceed 100 turbines for the total facility on the proposed site. The infrastructure associated with the total Wind Energy Facility would, therefore, include:

- » Up to 100 **wind turbine units** (approximately 80 m high steel tower and nacelle, with a hub height of 80 m; 90m diameter rotor (consisting of 3x45 m blades)).
- » A concrete **foundation** (of 15 m x 15 m) to support each turbine tower.
- » Underground electrical **cabling** between turbines and substations.
- » One or more **substations** (in the order of 80 m X 80 m footprint size) on the site in an appropriate position to receive generated power via underground distribution cabling from each wind turbine.



Figure 1.1: Locality map showing the study area for the establishment of a wind energy facility on the West Coast north of the Olifants River

- » Overhead **powerlines** (132 kV distribution lines) from the wind farm substation/s feeding into the electricity distribution network/grid at the Koekenaap Distribution Substation or the Juno Transmission Substation (near Vredendal).
- » An **access/haul road** to the site from the main R363 road at Koekenaap
- » **Internal access road** to each wind turbine (approximately 6 m in width)
- » Possibly a small office building and **visitors centre** at the facility entrance.

The scope of the proposed wind energy facility project on the West Coast, including details of all elements of the project (for the construction, operation and decommissioning phases) is discussed in detail in Chapter 7.

Specialist software is available to assist developers in selecting the optimum position for each turbine before the project is constructed. This layout will then inform the positioning of other infrastructure such as access roads and substation/s. The exact positioning or detailed layout of the components of this wind plant will be developed at the EIA phase of the project.

1.4. Requirement for an Environmental Impact Assessment Process

The proposed wind energy facility project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. The National Department of Environmental Affairs and Tourism (DEAT) is the competent authority for this project as Eskom is a statutory body. An application for authorisation has been accepted by DEAT (under Application Reference number 12/12/20/913). Through the decision-making process, DEAT will be supported by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the

competent authority with sufficient information in order for an informed decision to be taken regarding the project. Eskom appointed Savannah Environmental (Pty) Ltd to conduct the independent Environmental Impact Assessment (EIA) process for the proposed project.

An EIA is also an effective planning and decision-making tool for the project proponent. It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issue(s) reported on in the Scoping and EIA reports as well as dialogue with affected parties.

In terms of sections 24 and 24D of NEMA, as read with Government Notices R385 (Regulations 27–36) and R387, a Scoping and EIA are required to be undertaken for this proposed project as it includes the following activities listed in terms of GN R386 and R387 (GG No 28753 of 21 April 2006):

No & date of relevant notice	Activity No (in terms of relevant Regulation/notice)	Description of listed activity
Government Notice R387 (21 April 2006)	1(a)	The construction of facilities or infrastructure, including associated structures or infrastructure, for the generation of electricity where (i) the electricity output is 20 megawatts or more; or (ii) the elements of the facility cover a combined area in excess of 1 ha.
Government Notice R387 (21 April 2006)	1(l)	The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kV or more.
Government Notice R387 (21 April 2006)	2	Any development, activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be 20 ha or more.
Government Notice R386 (21 April 2006)	12	The transformation or removal of indigenous vegetation of 3 ha or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004).

No & date of relevant notice	Activity No (in terms of relevant Regulation/notice)	Description of listed activity
Government Notice R386 (21 April 2006)	14	The construction of masts of any material of type and of any height, including those used for telecommunications broadcasting and radio transmission, but excluding (a) masts of 15 m and lower exclusively used by (i) radio amateurs; or (ii) for lightening purposes (b) flagpoles; and (c) lightening conductor poles.
Government Notice R386 (21 April 2006)	15	The construction of a road that is wider than 4m or that has a reserve wider than 6m, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 m long.
Government Notice R386 (21 April 2006)	16(a)	The transformation of undeveloped, vacant or derelict land to residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 ha.
Government Notice R386 (21 April 2006)	7	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 m ³ but less than 1 000 m ³ at any one location or site.

This report documents the scoping evaluation of the potential environmental impacts of the proposed construction and operation of up to 100 wind turbines on a site on the West Coast north of the Olifants River. This Scoping Phase forms part of the EIA process and was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

1.5. Objectives of the Scoping Phase

The Scoping Phase of the EIA process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA Phase. This is achieved through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects, and a public consultation process with key stakeholders that includes both government authorities and interested and affected parties (I&APs).

In accordance with the EIA Regulations, the main purpose of the Scoping Phase is to focus the detailed environmental assessment studies (EIA Phase) in order to ensure that only potentially significant issues, and reasonable and feasible

alternatives are examined in the EIA Phase. The release of a Draft Scoping Report provided stakeholders with an opportunity to verify that the issues they had raised through the process to date had been captured and adequately considered, and provided a further opportunity for additional key issues for consideration to be raised. The Final Scoping Report incorporates all issues and responses raised during the public review of the Draft Scoping Report.

The Scoping Report consists of eleven sections:

Chapter 1 provides background to the proposed Wind Energy Facility project and the environmental impact assessment.

Chapter 2 provides the strategic context for energy planning in South Africa.

Chapter 3 describes wind energy as a power option and provides insight to technologies for wind turbines.

Chapter 4 provides a description of the processes followed in the determination of acceptable sites for the development of a Wind Energy Facility on the West Coast.

Chapter 5 outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation program that was undertaken and input received from interested parties.

Chapter 6 describes the existing biophysical and socio-economic environment.

Chapter 7 describes the activities associated with the project (project scope).

Chapter 8 presents the evaluation of environmental impacts.

Chapter 9 presents the conclusions of the scoping evaluation.

Chapter 10 describes the Plan of Study for EIA.

Chapter 11 provides a list of references and information sources used in undertaking this Scoping Study.

1.6. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by Eskom Holdings as an independent consultant to undertake an Environmental Impact Assessment (EIA) for the proposed project, as required by the NEMA EIA Regulations. Neither Savannah Environmental, nor any its specialist sub-consultants on this project are subsidiaries of or affiliated to Eskom Holdings Limited. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental

management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have acquired considerable experience in environmental assessment and environmental management over the last ten (10) years, and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa. Strong competencies have been developed in project management of environmental EIA processes, as well as strategic environmental assessment and compliance advice, and the identification of environmental management solutions and mitigation/risk minimising measures.

Karen Jodas and Jo-Anne Thomas, the principle authors of this Final Scoping Report, are both registered Professional Natural Scientists (in the practice of environmental science) with the South African Council for Natural Scientific Professions. They have gained extensive knowledge and experience on potential environmental impacts associated with electricity generation projects through their involvement in related EIA processes over the past ten (10) years. They have successfully managed and undertaken EIA processes for other power generation projects for Eskom Holdings Limited throughout South Africa. Curricula vitae for the Savannah Environmental project team consultants are included in Appendix A.

In order to adequately identify and assess potential environmental impacts, Savannah Environmental has appointed several specialist consultants to conduct specialist studies, as required. Details of these specialist studies are included in Chapter 5. The curricula vitae for the EIA specialist consultants are also included in Appendix A.