Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Final Environmental Impact Assessment Report

SECTION A:
Final Environmental Impact Assessment Report

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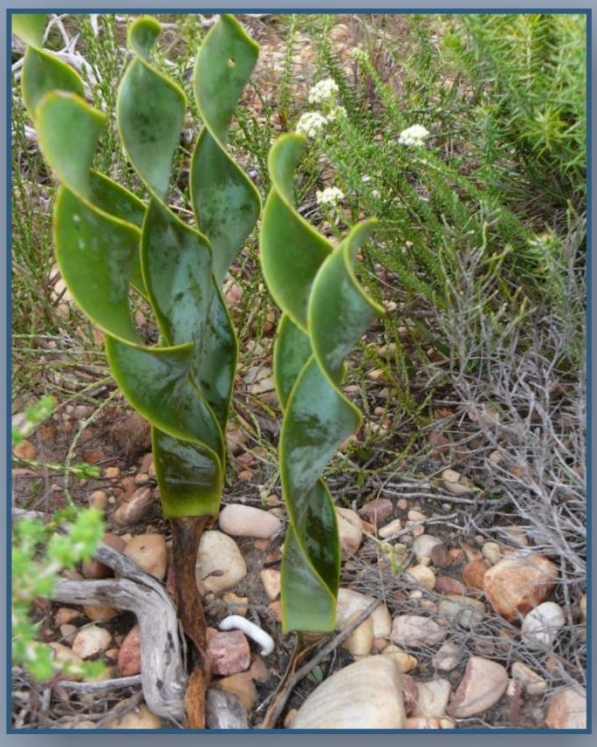
Chapter 1: Introduction



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CHAPTER 1. INTRODUCTION

1.1 BACKGROUND

WKN-Windcurrent SA (Pty) Ltd (referred to as "WKN-Windcurrent") is proposing the construction of a 100 MW wind energy facility on the Farms Zuurbron and Vlakteplaas near Jeffrey's Bay in the Kouga Municipal area, Eastern Cape Province. The proposed project is referred to as the Ubuntu Wind Energy Project.

The proposed Ubuntu project will be located on the farms Zuurbron and Vlakteplaas in the Kouga Municipality approximately 4 km to 7 km north north west of the town of Jeffrey's Bay as follows (see locality maps in Figures 1.1):

- Remainder of Farm 830, Kransplaas, (Farm Zuurbron);
- Portions 2/3/4/5/6/7 of Farm 854 (Farm Vlakteplaas);
- Farms 307/5; Div Humansdorp;
- 307/6; Div Humansdorp;
- 307/7 Div Humansdorp; and
- Farm 845, Div Humansdorp.

The proposed project will be undertaken in two phases, both of which are covered in this EIA:

- Phase 1 (2013): Installed capacity up to 50 MW
- Phase 2 (2013): Additional installed capacity of up to 50 MW, bringing the total installed capacity up to 100 MW.

Phase 1 will have a total capacity of up to 50 MW, which can readily accommodated by the existing transmission infrastructure without the need for any upgrades and would consist of up to a maximum of 25 turbines.

Phase 2 consists of additional turbines, identical to the turbines used in the Phase 1, to bring the total capacity of the wind farm from both phases up to 100 MW. The capacity of the turbines that are considered ranges from 2 MW to 3.2 MW. The total number of turbines could therefore vary from 31 turbines of 3.2 MW to 50 turbines if a 2 MW turbine is used. The size of the turbine will be finalised pending the availability of turbines from the local manufacturing market.

The existing 132 kV overhead transmission line will be used to connect between the wind farm and the transmission system (Eskom grid). A new 132 kV substation will be built on site to connect to the existing 132 kV transmission line.

Figure 1.1a: Locality map of the proposed Ubuntu Wind Energy Project near Jeffrey's Bay in the Eastern Cape

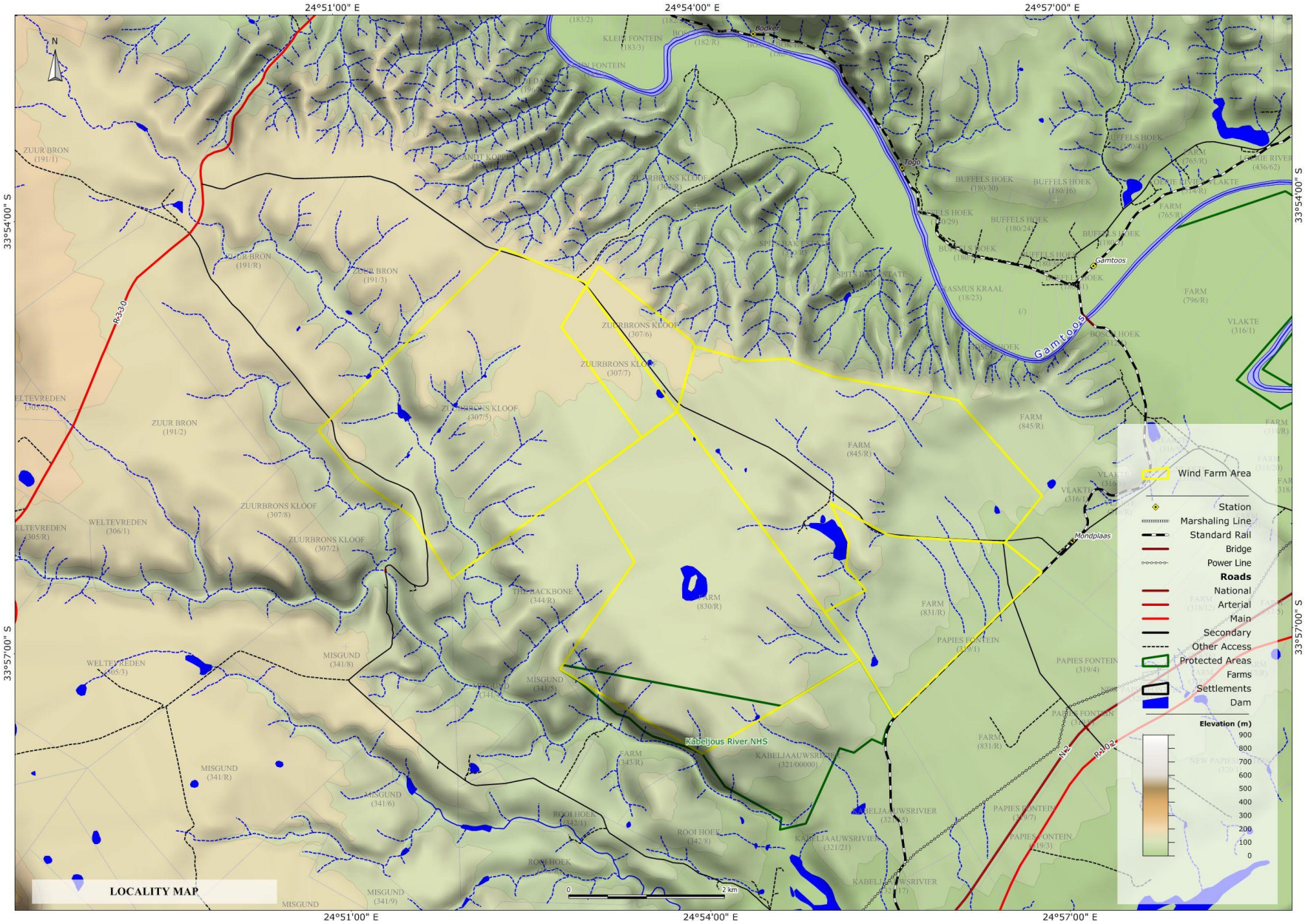

Figure 1.1b: Locality map of the proposed Ubuntu Wind Energy Project near Jeffrey's Bay in the Eastern Cape

A separate Basic Assessment (Department of Environmental Affairs Reference number: 12/12/20/1753) was undertaken from January to June 2010 for the establishment of a wind monitoring mast on Farm Zuurbron prior to the development of the wind farm. This application was undertaken under the NEMA EIA Regulations published in GN R 385, 386 and 387 on 21 April 2006. Subsequently Amended NEMA EIA Regulations (Notices GN R. 543, 544, 545, and 546) were published in the Government Gazette No. 33306 of 18 June 2010, and came into effect from 2 August 2010 (referred to as the 2010 EIA Regulations). A wind monitoring mast is no longer a listed activity in terms of the 2010 EIA Regulations. The monitoring mast has subsequently been erected and is 80 m high.

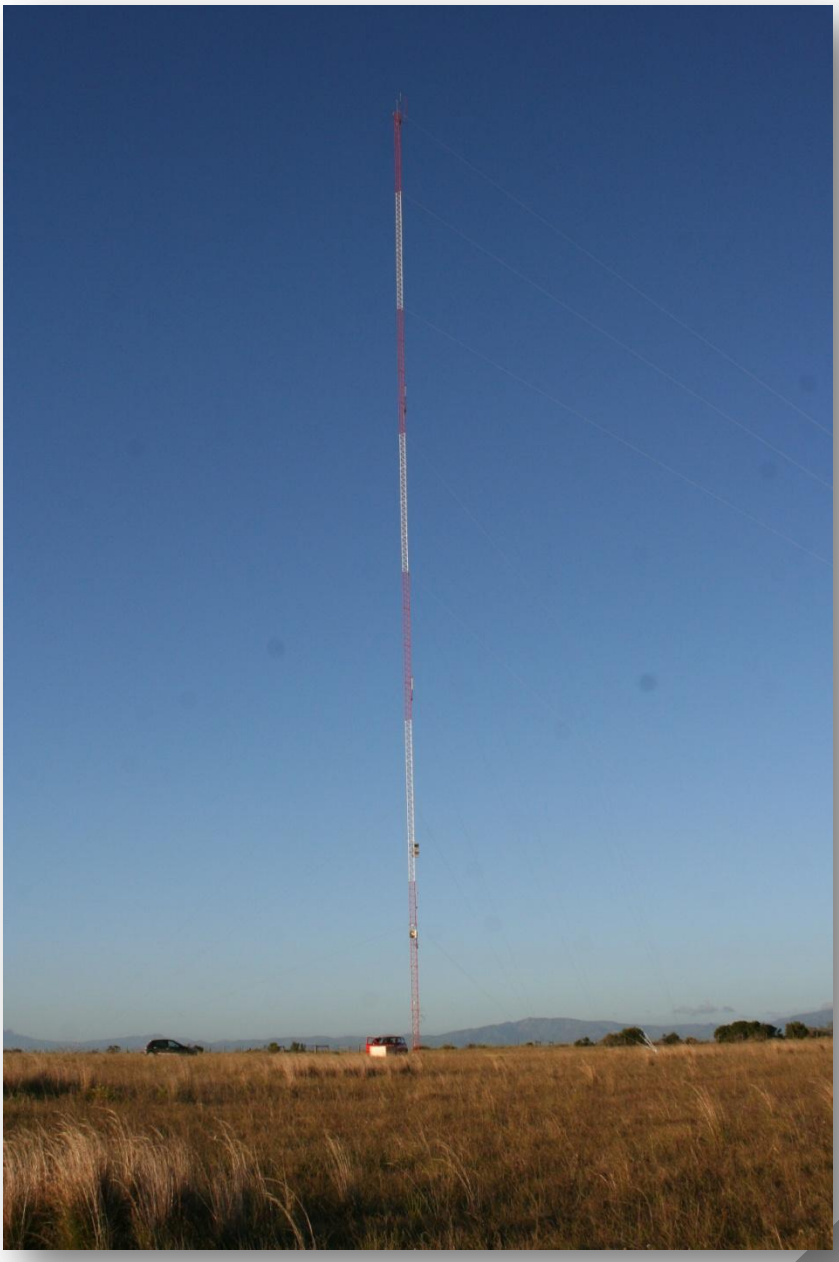

Figure 1.2: Wind monitoring mast (80 m high) on Farm Zuurbron

1.2 ABOUT THE PROJECT PROPONENT

WKN Windkraft Nord AG (WKN) was founded in 1990 and is one of the pioneers of the German wind energy market. WKN has international experience in development, financing, erection and operation of wind farms, and has, as of 2010, a realised capacity of 1052.3 MW wind power. Windcurrent SA (Pty) Ltd is a local company which has been developing renewable energy projects since 2009 in South Africa. The Joint Venture Company which was formed is a South African based renewable energy company that develops, builds and operates renewable energy projects.

1.3 NEED AND JUSTIFICATION FOR THE PROJECT

The aim of this project is to generate electricity that will be fed into the national or the provincial grid by erecting a wind farm of 100 MW. In mid-2011, the South African government indicated a change in pricing strategy for renewable energy. Instead of applying a predetermined renewable-energy feed-in tariff (Refit), as previously indicated, the government would conduct a selection process that would involve both price and non-price elements. This requires bidders to propose their price per MWh for the energy output to be generated, along with full or partial inflation indexation. The price indication would be for the first 20 years of operation, or for the duration of the power purchase agreement (PPA). On 3 August 2011, the Department of Energy (DoE) released the qualification and proposal documentation for South Africa's first renewable energy independent power producer (IPP) tender process, and announced that it has allocated a total of 3 725 MW capacity across various renewables technologies, with 1 850 MW set aside for onshore wind, 200 MW for concentrated solar thermal, a further 1 450 MW for solar photovoltaic solutions, 12.5 MW for both biomass and biogas, 25 MW for landfill gas capacity, 75 MW for small hydro, and a further 100 MW for small-scale IPP projects of less than 5 MW. This allocation to wind energy is an increase on the 1 025 MW set out for the first procurement round in the Integrated Resource Plan (IRP) 2010-2030 (Source: Engineering News, 4 & 5 August 2011).

At a national scale, renewable energy (in particular, wind energy) has the potential to play an important role in meeting South Africa's energy demand through diversifying the sources of power generation whilst reducing the country's carbon footprint from power generation. Currently, approximately 93% of South Africa's power generation is derived from coal. The proposed Ubuntu project of 100 MW could offset over 200 000 tonnes of CO_2 per year, or 4 000 000 tonnes of CO_2 over the lifetime (20 years) of the project[1],[2]. Wind farms have a relatively short construction lead time and could therefore be quickly developed to meet South Africa's power need. Coal fired power stations used approximately 292 million cubic metres of water, or 1.5% of national water consumption, for electricity generation during 2005. The future availability and treatment costs of water therefore present a serious challenge for the economic sustainability of South Africa's current (coal-based) electricity supply.

The Eastern Cape Province is reliant on electricity imports from other provinces yet houses significant industrial and rural development potential. Power from the national grid is largely generated from coal power stations, and transmitted considerable distances to the Eastern Cape (e.g. from Mpumalanga). This leads to significant transmission losses and local grid instabilities. Electricity supply to the Eastern Cape Province is further constrained by transmission

[1] http://www.iea.org/co2highlights/

[2] http://www.sunearthtools.com/dp/tools/CO2-emissions-calculator.php?lang=de#txtCO2_3

infrastructure. Eskom currently supplies approximately 1 400 MW of electricity to the Eastern Cape Province.

Against the background of international commitments to generation of "green energy" with low or zero CO_2 emissions, the intention of this project is to generate additional electricity that will be fed into the national grid by installing a wind farm with a capacity of 100 MW. The objective of the WKN-Windcurrent project is to support the growing demand for electricity by means of renewable energy and to lower the emissions of carbon dioxide (CO_2) into the atmosphere. Electricity generated by wind energy, that replaces the use of fossil fuels, results in greenhouse gas emission reductions. Wind energy is a national imperative. A constrained national energy supply and South Africa's commitments to meeting its 2013 CO_2 reduction target and to the Kyoto Protocol require the rapid deployment of renewable energy, of which wind power has the greatest commercial potential.

The **Integrated Resource Plan for Electricity** (IRP)[3] for South Africa is a subset of the **Integrated Energy Plan** (IEP) for the Republic of South Africa which was published on 19 March 2003. Its Draft Executive Summary and **Medium Term Risk Mitigation Plan**[4] were published by the Department of Energy on 8 October 2010. The objective for the IRP is to develop a sustainable electricity investment strategy for generation and transmission of electricity in South Africa for the next 25 years. After public participation during November/December 2010, the IRP was revised and released as the Policy-Adjusted IRP on 28 March 2011 by the Department of Energy.

At a provincial level, the project aims to assist the Eastern Cape in achieving improved energy stability and security. The local wind climate in the Humansdorp region creates the potential for a wind energy project to generate electricity, thereby contributing towards the provision of sustainable renewable energy.

Further information on **energy planning and strategic initiatives** in South Africa, and the consequent need for the development of wind energy projects, is provided in Section 1.7. Further information on the **objectives** of the proposed project is provided in Section 2.3.

1.4 REQUIREMENTS FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

In terms of the regulations promulgated under Chapter 5 of the National Environmental Management Act (Act 107 of 1998) ("NEMA") published in GN R 385, 386 and 387 on 21 April 2006, Scoping and Environmental Impact Assessment (EIA) is required for this project. The need for Scoping and EIA is triggered by, amongst others, the inclusion of activities listed in GN R 387, in particular:

[3] *Executive Summary of the Draft Integrated Electricity Resource Plan for South Africa - 2010 to 2030*. Available online: http://www.doe-irp.co.za/content/Executive_Summary_Draft_IRP2010_8Oct2010.pdf. Department of Energy. Accessed 1 December 2010.

[4] *Medium Term Risk Mitigation Plan (MTRM) for Electricity in South Africa - 2010 to 2016*. http://www.doe-irp.co.za/content/Medium_Term_Risk_Mitigation_Project_Phase_1.pdf. Department of Energy. Accessed 1 December 2010.

1) The construction of facilities or infrastructure, including associated structures or infrastructure, for –

(a) 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 hectare.

Chapter 4 of this Final EIA Report contains a list of activities contained in GN R 386 and GN R 387 that are triggered by the various project components and form part of this Scoping and Environmental Impact Assessment process. These listed activities require authorisation from the National Department of Environmental Affairs (DEA). The environmental assessment needs to show the responsible authority, DEA, and the project proponent, WKN-Windcurrent, what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can be managed.

It is noted that **Amended NEMA EIA Regulations** (Notices GN R. 543, 544, 545, and 546) were published in the Government Gazette No. 33306 of 18 June 2010, and came into effect from 2 August 2010 (referred to as the ***2010 EIA Regulations***). This EIA application by WKN-Windcurrent was initiated in December 2009, prior to the enactment of the Amended Regulations, and will therefore be dealt with in terms of GN R 385, 386 and 387. However, in line with Regulation 76 (3) of the Amended EIA Regulations regarding transitional arrangements, any impacts associated with listed activities which are included in the Amended listing notices, which were not listed under the listing notices GN R386 and 387, would need to be assessed as part of this EIA process. CSIR has therefore checked the new listed activities and have included the ones relevant to this project in Table 4.1 of Chapter 4.

1.5 EIA TEAM

The CSIR has been appointed by WKN-Windcurrent to undertake the EIA required for this project.

The EIA team involved in this EIA is listed in Table 1.1. Most of the specialists are familiar with the area and have been involved in other specialist studies in the area.

1.6 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

The EIA Project Team is being led by Paul Lochner, who has 16 years experience in environmental assessment and management studies, primarily in the leadership and integration functions (refer to Appendix A for his CV). This has included Strategic Environmental Assessments (SEAs), Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs). He has been a certified Environmental Assessment Practitioner for South Africa (EAPSA) since July 2003; and has conducted several EIA processes both in South Africa and internationally. Examples of EIAs include the EIA for the 180 MW Jeffrey's Bay Wind Project proposed by Mainstream, EIA for the BioTherm wind energy project near Swellendam, EIA for the InnoWind wind energy projects in the Western Cape, EIA for the Electrawinds wind energy project at Coega in the Eastern Cape, Coega Aluminium Smelter EIA, EIA for the expansion of the container terminal and construction of an administration craft harbour at the Port of Ngqura, Thesen Island EIA at Knysna, Century City Wetlands EIA in Cape Town, and ESIA for a proposed alumina refinery at Sosnogorsk in the Komi Republic of Russia. He has also

prepared various EMPs, such as the EMP for the Rietvlei Wetland Reserve (Cape Town), EMP for Century City wetlands in Cape Town, EMP for Eskom Wind Energy Project (Klipheuwel near Stellenbosch in the Western Cape) and the EMP for the Coega Aluminium Smelter. He has authored several Guidelines, such as the "Overview of Integrated Environmental Management" information document for DEAT in 2004; and the "Guideline for EMPs" published in 2005 by the Western Cape government.

Paul will be supported by a CSIR Project Manager, Minnelise Levendal (refer to Appendix A for her CV). Minnelise managed the Basic Assessment Process for the national Department of Energy for the erection of 10 wind monitoring masts as part of the national wind atlas project. From 2009 until 2010 she was also part of the Project Implementation Team for South Africa's Second National Communication (SNC) in terms of climate change. SA needs to report on meeting its obligations specified in the Kyoto Protocol. This process was led by the South African Botanical Institute (SANBI), and the CSIR has been appointed by SANBI to manage the process. Minnelise is currently managing the BioTherm wind energy project near Swellendam. She has also conducted a number of Basic Assessments for the erection of wind monitoring masts.

Table 1.1: EIA Team

EIA Management Team		
Paul Lochner	CSIR	**Project Leader (EAP-SA)**
Minnelise Levendal	CSIR	**Project Manager**
Specialist Team		
Jamie Pote	Private Consultant	**Ecology (Flora and Fauna)**
Chris van Rooyen	Chris van Rooyen Consultants	**Avifauna (birds)**
Stephanie Dippenaar **Anna Doty**	Private Consultant Nelson Mandela Metro University	**Bats**
Henry Holland	Mapthis	**Visual impacts**
Brett Williams	SafeTech	**Noise**
Dr Hugo van Zyl	Independent Economic Researchers	**Economics**
Dr Johan Binneman	Albany Museum	**Archaeology**
Dr John Almond	NaturaViva	**Palaeontology**
Public Participation Process		
Sandy Wren	**Public Process Consultants**	**Public Participation Process**

1.7 OBJECTIVES OF THE DRAFT AND FINAL EIA REPORTS

The Draft EIA Report was preceded by a comprehensive scoping process that led to the submission of a Final Scoping Report (and Plan of study for the EIA) to DEA for approval on 8 April 2011. Approval dated 7 July 2011 was received which marked the end of the Scoping phase (Appendix B), after which the EIA process moved into the impact assessment and reporting phase. For background on the scoping process, the reader is referred to the Final Scoping Report for the proposed Ubuntu wind energy project (CSIR, 2010).

The primary objective of this EIA Report is to present the competent authority, DEA, with an overview of the predicted impacts and associated management actions required to avoid or mitigate the negative impacts; or to enhance the benefits of the proposed project.

In terms of legal requirements, a crucial objective of the EIA Report is to satisfy the requirements of Sections 32, 33 and 34 of the NEMA 2006 EIA Regulations. These sections regulate and prescribe the content of the EIA Report and specify the type of supporting information that must accompany the submission of the report to the authorities. An overview of where the requirements are addressed in this report is presented in Table 1.2.

Furthermore, this process is designed to satisfy the requirements of Regulations 57, 58 and 59 of the NEMA 2006 EIA Regulations relating to the public participation process and, specifically, the registration of I&APs and recording of submissions from interested and affected parties. All I&APs on the current database for this EIA (Appendix C) were informed of the release of the draft EIA Report for comment. All comments received were recorded and addressed in the Final EIA Report (Appendices G and I respectively).

The **draft Environmental Management Plan** (EMP) required as part of the EIA process is provided in **Part B** of this EIA Report.

Table 1.2: Summary of where requirements of an Environmental Impact Assessment Report (in terms of Sections 32(2), 33 and 34 of the NEMA 2006 EIA Regulations) are provided in this EIA Report

Section	Requirement for EIA Report	Where this is provided in this EIA Report
(2) (a) (i)	The EAP who compiled the report	**Chapter 1, Appendix A**
(2) (a) (ii)	The expertise of the EAP to carry out an environmental impact assessment	**Chapter 1, Appendix A**
(2) (b)	A detailed description of the proposed activity	**Chapter 2**
(2) (c)	A description of the property on which the activity is to be undertaken and the location of the activity on the property	**Chapter 3 (overview), with more detail in Chapters 5 to 12**
(2) (c) (i)	A linear activity, a description of the route of the activity	**Not applicable**
(2) (c) (ii)	An ocean-based activity, the coordinates where the activity is to be undertaken	**Not applicable**
(2) (d)	A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	**Chapter 3 (overview), with more detail in Chapters 5 to 12**
(2) (e)	Details of the public participation process conducted in terms of sub-regulation	**Chapter 4**
(2) (e) (i)	Steps undertaken in accordance with the plan of study	**Chapter 4**
(2) (e) (ii)	A list of persons, organisations and organs of state that were registered as interested and affected parties	**Appendix C**
(2) (e) (iii)	A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments	**Refer to Final Scoping Report for comments from scoping phase. Comments on the Draft EIA Report will be included in the Final EIA Report.**
(2) (e) (iv)	Copies of any representation, objections and comments received from registered interested and affected parties	**To be included in the Final EIA Report.**
(2) (f)	A description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity including	**Chapters 1 and 4**

Section	Requirement for EIA Report	Where this is provided in this EIA Report
	advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	
(2) (g)	An indication of the methodology used in determining the significance of potential environmental impacts	**Chapter 4**
(2) (h)	A description and comparative assessment of all alternatives identified during the environmental impact assessment process	**Chapter 4**
(2) (i)	A summary of the findings and recommendations of any specialist report or report on a specialised process	**Summary**
(2) (j)	A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures	**Chapters 5 to 12**
(2) (k)	An assessment of each identified potentially significant impact	**Chapters 5 to 12, Part B (EMP)**
(2) (k) (i)	Cumulative impacts	**Chapters 5 to 12, Part B**
(2) (k) (ii)	The nature of the impact	**Chapters 5 to 12, Part B**
(2) (k) (iii)	The extent and duration of the impact	**Chapters 5 to 12, Part B**
(2) (k) (iv)	The probability of the impact occurring	**Chapters 5 to 12, Part B**
(2) (k) (v)	The degree to which the impact can be reversed	**Chapters 5 to 12, Part B**
(2) (k) (vi)	The degree to which the impact may cause irreplaceable loss of resources	**Chapters 5 to 12, Part B**
(2) (k) (vii)	The degree to which the impact can be mitigated	**Chapters 5 to 12, Part B**
(2) (l)	A description of any assumptions, uncertainties and gaps in knowledge	**Chapter 1 and Chapters 5 to 12 (for specialist studies)**
(2) (m))	An opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	**Chapter 14 (Conclusions and Recommendations)**
(2) (n) (i)	A summary of the key findings of the environmental impact assessment	**Chapter 14, Executive Summary**
(2) (n) (ii)	A comparative assessment of the positive and negative implications of the proposed activity	**Chapter 14 (Conclusions and Recommendations)**
(2) (o)	A draft Environmental management plan that complies with regulation 35	**Part B (EMP)**
(2) (p)	**Copies of any specialist reports and reports on specialised processes complying with regulation 33**	**Integrated into Chapters 5 to 13**

1.8 ENERGY PLANNING CONTEXT AND STRATEGIC INITIATIVES FOR SOUTH AFRICA

1.8.1 Current energy context: coal-based power generation

South Africa has an energy intensive economy, highly reliant on fossil fuels, and regards economic growth based on energy intensive industries as a key means to development. Eskom plays a central role in energy generation in South Africa, producing 95% of its total power. Currently Eskom has a total installed generating capacity of some 42 000 MW (net 36 200 MW, peak 34 200 MW) with new peak capacity in demand since 2007. Approximately 93% of its power production capacity is coal-based, 5% nuclear and 2% hydro-electric. Several small power

stations and back-up gas-turbines represent less than 1% of the national output, and another 3% is used for own consumption by independent power producers.

Coal, though currently appearing to be cheaper per kWh than renewable energy sources, introduces a host of so-called externality costs which are not factored into its monetary value. These costs arise across the lifecycle of coal consumption, from extraction to disposal (also known as the chain of custody) and can cause irreparable environmental damage, such as deforestation, land erosion and the emission of greenhouse gasses due to underground coal fires. One of the most insidious impacts of coal mining is acid mine drainage containing carcinogens such as benzene and toluene, which drain from mines into surface and ground water sources. Coal burning releases oxides of sulphur and nitrogen as well as mercury into the atmosphere, which cause adverse impacts on the natural environment (e.g. acid rain).

A wind energy project, such as the proposed Ubuntu wind energy project aims to generate, at full capacity 100 MW of electricity with zero atmospheric emissions.

1.8.2 Policy context for promotion of renewable energy

A substantive body of policy and legislation (at international, national and provincial levels) supports the development of renewable energy in South Africa, for example:

- Kyoto Protocol
- The Constitution of the Republic of South Africa (Act 108 of 1996)
- White Paper on the Energy Policy of South Africa (December 1998)
- National Integrated Energy Plan for the RSA (March 2003)
- White Paper on Renewable Energy (November 2003)
- DME Energy Efficiency Strategy (March 2005)
- National Environmental Management Act (No. 107 of 1998) (NEMA)
- National Environmental Management: Air Quality Act
- National Strategy for Sustainable Development (DEAT, 2006)
- The Long term mitigation scenarios of the Department of Environmental Affairs (2008)
- Electricity Regulations Amendments (August, 2009)
- Renewable Energy Feed in Tariff Guidelines (NERSA, March 2009).

1.8.3 Integrated Strategic Energy Planning for South Africa

Integrated Strategic Electricity Planning is the way in which Eskom assesses by how much the demand for electricity is likely to grow and how best to meet and manage that demand. The most likely future, based on long-term southern African economic scenarios, is forecasted and provides the framework for Eskom to investigate a wide range of new supply-side and demand-side technologies and options. Nationally the Department of Energy is embarking on an Integrated Resource Planning process to develop a country energy plan for the next 20 years of which renewable energy will form part of the proposed energy mix. The demand for electricity is growing continuously and is projected to continue growing in the foreseeable future (as shown in Figure 1.3, which includes three growth scenarios).

Considering the economic development of South Africa an additional 40 000 MW production capacity has been planned by Eskom over the next 20 years due mainly to upcoming large mining and metal industry. Therefore by 2020, South Africa will need several new sources of

power to provide for the growing demand (see Figure 1.3). In order to meet this future demand, Eskom is actively investigating and installing new energy-generating facilities.

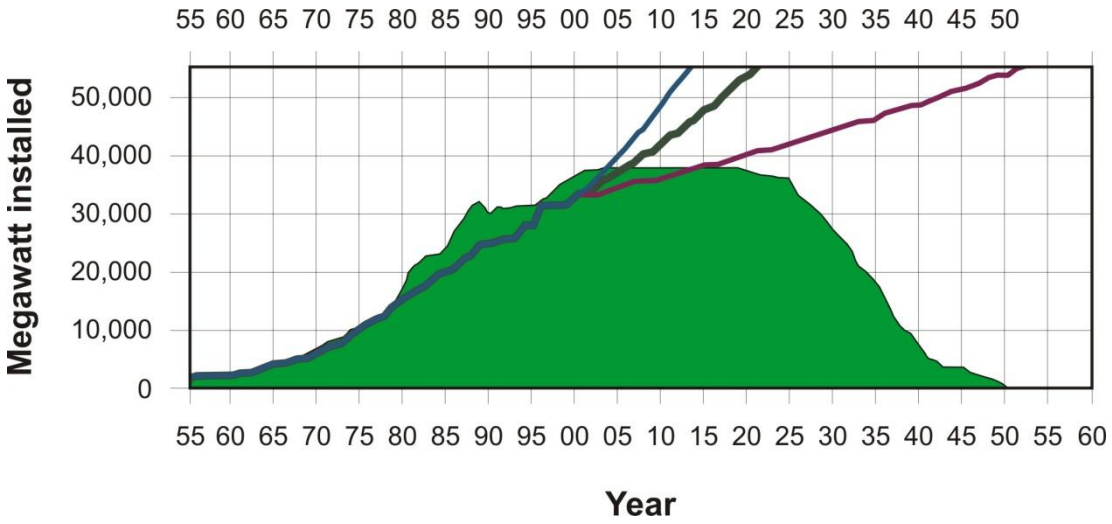

Figure 1.3: Eskom's installed generating capacity profile from 1955 to 2060.

The green shaded area shows Eskom's energy-generating capacity, which grows as new power stations are built. If no new power stations are built, the generating capacity will begin to decline from 2020 as existing power stations are decommissioned. The three lines show how energy consumption could grow in future via low, medium and high-growth scenarios.

All countries rely on a range of energy sources and generation technologies. In all probability the future energy needs of southern Africa will be supplied from a wide variety of sources, such as coal, gas, nuclear, hydro (electric), oil and renewable sources, as suggested in Figure 1.4. This figure incorporates Eskom's forecasting scenario whereby the current generating capacity of coal-fired power stations will decline from 2020. Electricity generating capacity from renewable sources will increase. Among the renewable sources which are being explored, wind energy has been identified to contribute to the energy mix.

Figure 1.4/…

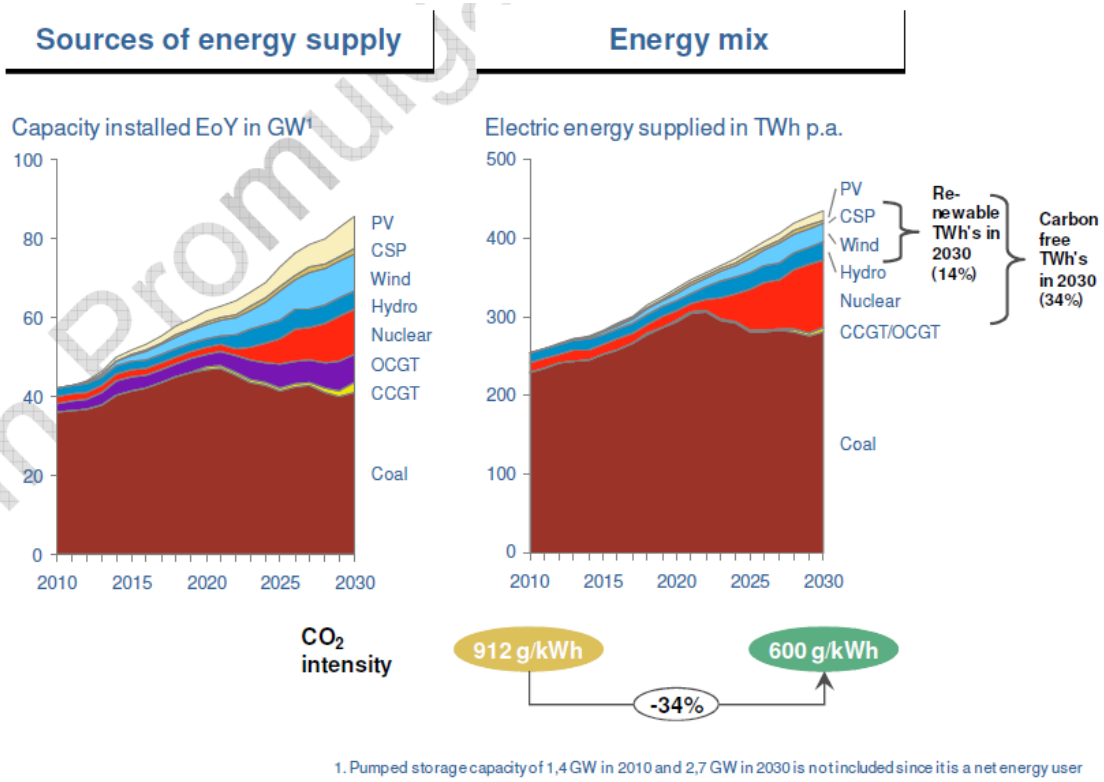

Figure 1.4: Predicted future regional electricity mix for southern Africa (IRP 2010-2030 Rev2 Final Report)