ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED WIND AND SOLAR (PHOTOVOLTAIC) ENERGY FACILITIES NEAR SPRINGBOK, NORTHERN CAPE

DEA REF. NO. 14/12/16/3/3/2/346 (WIND), 14/12/16/3/3/2/342 (SOLAR), NEA REF NO. DEA/EIA/0001222/2012 (WIND), DEA/EIA/0001217/2012 (SOLAR)

MAINSTREAM RENEWABLE POWER SOUTH AFRICA
A joint venture with Genesis Eco-Energy

JUNE 2012

aurecon

SUMMARY DOCUMENT: DRAFT SCOPING REPORT

Background

South Africa Mainstream Renewable Power Developments (Pty) Ltd (Mainstream) proposes to construct a 750 MW wind energy facility and a 250 MW solar photovoltaic energy facility on farms near Springbok in the Northern Cape. Aurecon South Africa (Pty) Ltd (Aurecon) has been appointed to undertake the requisite environmental process as required in terms of the National Environmental Management Act (No. 107 of 1998), as amended, on behalf of Mainstream.

The proposed project would take place on the farms Kangnas (Farm No. 77 Portion 3 and the Remainder), Koeris (Farm No. 78 Portion 1), Areb (Farm No. 75 Portion 0) and Smorgenschaduwe (Farm No. 127 Portion 0) in the Northern Cape (see **Figure 1**). These farms are located approximately 48 km east of Springbok and are accessed via the N14. The five farms cover an area of approximately 46 535 ha.

Proposed Projects

The proposed projects entail the generation of electricity from wind and solar resources. The construction period will entail approximately 36 months for the proposed wind energy facility and 24 months for the proposed solar photovoltaic energy facility. Between 185 and 500 wind turbines are proposed of 1.5-4 MW capacity. The proposed solar energy facility (250 MW of photovoltaic (PV) and/or Concentratred PV (CPV)) may include tracking systems and would have an approximate footprint of 1 000 hectares (ha). An onsite connection is proposed via an existing 220 kilovolt Eskom line. It is proposed to construct one main substation linking the proposed energy facilities and the Eskom line. There could be up to four satellite substations on the site that would link sectors of the facility to the main substation with overhead lines.

Purpose of this document

This document provides a summary of the Draft Scoping Report (DSR) and Plan of Study for the proposed wind and solar energy facilities near Springbok, Northern Cape. It provides a brief background and overview of the proposed project, a description of the public participation process undertaken thus far, the list of project alternatives and potential impacts (together with proposed specialist studies where applicable) that are proposed to be investigated further in the EIA phase.

In addition, you are also invited to attend a Public Meeting where the findings of the DSR will be presented and discussed on **Tuesday, 3 July 2012, 17h00-19h00** at the Springbok Exhibition Hall (Skousaal) **, Springbok**. I&APs are requested to RSVP by 25 June 2012 and should the number of RSVP's be insufficient the meeting would be cancelled and I&APs would instead be contacted telephonically/electronically to discuss any issues and concerns they may have.

Please review this Summary Document and, preferably, the full Scoping Report, and submit your comments on the proposed project by **Monday, 23 July 2012**. To comment, write a letter, call or e-mail the Public Participation office. All EIA documents will be available on the Aurecon (Pty) Ltd (Aurecon) website (www.aurecongroup.com follow the public participation links).

Aurecon
Corlie Steyn or Louise Corbett
PO BOX 509, George, 6530
Tel: (044) 805 5421
Fax: (044) 805 5454
Email: cornelia.steyn@aurecongroup.com / louise.corbett@aurecongroup.com

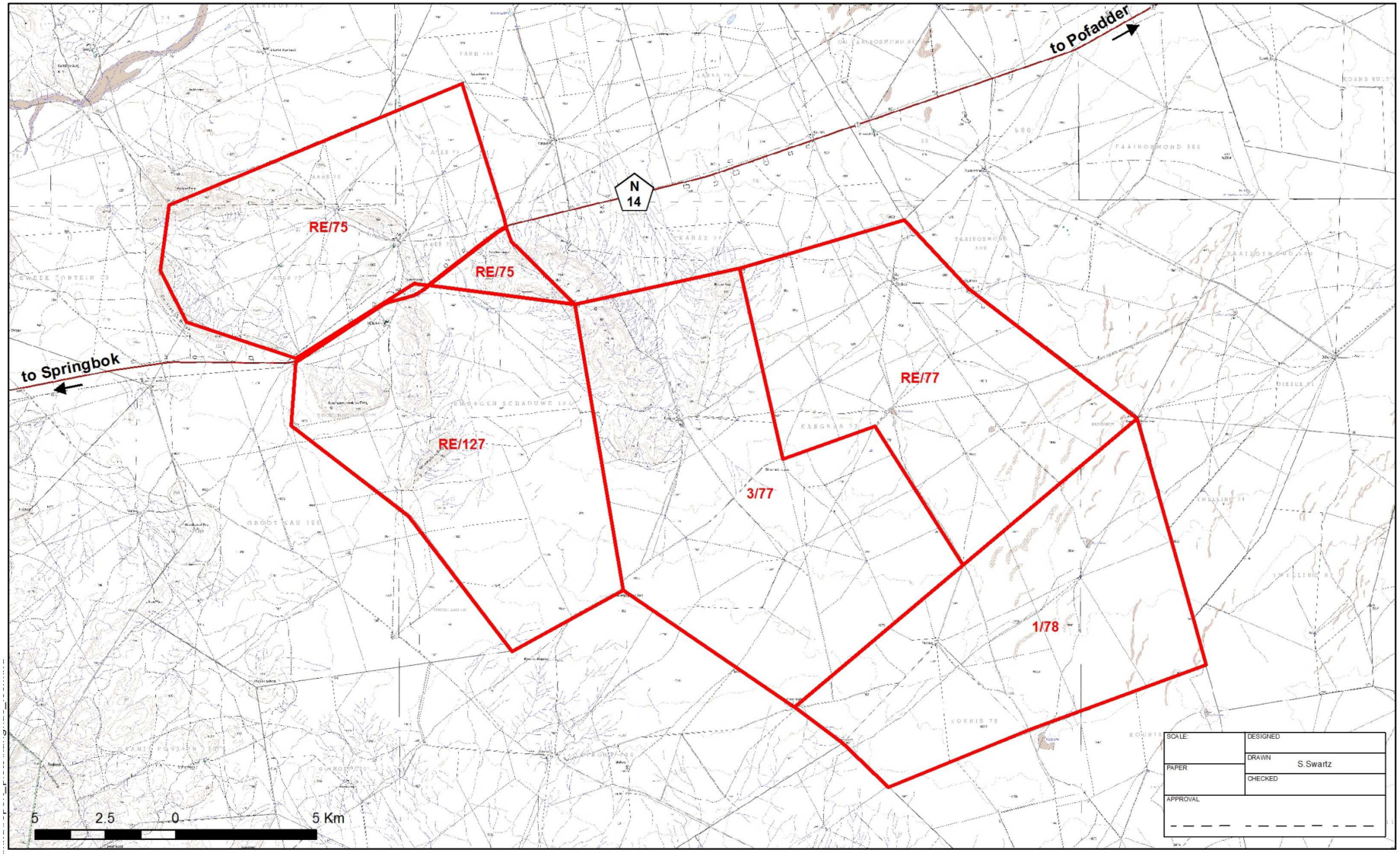

Figure 1: Location of proposed wind and solar (PV) energy facilities near Springbok in the Northern Cape

Wind turbines can rotate about either a horizontal or a vertical axis. Turbines used in wind farms for commercial production of electricity are usually horizontal axis, three-bladed and pointed into the wind by computer-controlled motors. Horizontal axis machines have high efficiency, and low torque ripple, which contribute to good reliability. The blades are usually colored light grey and range in length from 20 - 60 m. The tubular steel towers range from 60 - 120 m tall. The blades rotate at 10 - 22 revolutions per minute. A gear box is commonly used for stepping up the speed of the generator. Some models operate at constant speed, but more energy can be collected by variable-speed turbines. All turbines are equipped with protective features to avoid damage at high wind speeds, by feathering (turning) the blades into the wind which ceases their rotation, supplemented by brakes.

Horizontal axis wind turbines have the main rotor shaft and electrical generator at the top of a tower in a nacelle. Conventional horizontal axis turbines can be divided into three components.

- The rotor component, which includes the blades for converting wind energy to low speed rotational energy.
- The generator component, which includes the electrical generator, the control electronics, and most likely a gearbox component for converting the low speed incoming rotation to high speed rotation suitable for generating electricity.
- The structural support component, which includes the tower and rotor yaw mechanism (which turns the rotor into the wind).

The final foundation design of turbines is dependent on geotechnical investigation, however it is likely that for the proposed project foundations would be made of reinforced concrete. The foundations would be approximately 20 m x 20 m and an average of 3 m deep. The foundation would be cast *in situ* and could be covered with top soil to allow vegetation growth around the approximately 6 m diameter steel tower. A flat prepared hard standing for a crane will be compacted in gravel and approximately 20 m x 40 m would be constructed adjacent to each turbine. Access roads of 6 – 10 m would also be required between each turbine.

PV systems convert sunlight into energy. The smallest unit of a PV installation is a cell. A number of solar cells electrically connected to each other and mounted in a support structure or frame is called a PV module. A number of cells form a module, and finally a number of modules form an array. Modules are arranged in section sizes of approximately 40x5m called tables and are installed on racks which are made of aluminum or steel. Modules are designed to supply electricity at a certain voltage. The current produced is directly dependent on how much light strikes the module. The arrays are arranged into rows that form the solar field. The arrays and racks are founded into the ground through either concrete, screw or pile foundations. The arrays are wired to inverters that convert direct current (DC) into alternate current (AC) that can be fed into a national grid system.

The fundamental difference between PV and CPV technology is that CPV uses optics such as lenses to concentrate a large amount of sunlight onto a small area of solar PV materials to generate electricity. The basic components are similar as described above for PV.

Panels can be mounted on tracking systems which follow the path of the sun to maximize the benefit of each ray of sunlight and allowing for the land underneath being utilized as well.

A summary of the two proposed facilities is as follows:

Proposed wind energy facility:

- Construction of between 185 and 500 wind turbines of 1.5-4 MW capacity;
- Associated infrastructure including:
    - Hard standings of 20 m x 40 m alongside turbines;
    - Access roads of 4 – 10 m wide between turbines;
    - Overhead transmission lines connecting turbines;
    - One main substation connecting the proposed energy facilities to the Eskom line; and

- Four satellite substations that would link sectors of the facility to a main substation with overhead lines.

Proposed solar energy facility:

- Construction of 250 MW of PV and/or CPV;
- Associated infrastructure including:
  - Access roads of 4 – 10 m wide to the PV plant; and
  - Four satellite substations that would link sectors of the facility to a main substation with overhead lines.

Site description

The proposed site is mostly low-lying flat country with granite inselbergs (isolated rocky hills rising abruptly from a flat plain) occurring in the northwest and this area is considered to be of botanical importance. The predominant vegetation type on the site is Bushmanland Arid Grassland, which is widespread in the Bushmanland Bioregion of the Nama Karoo. This vegetation is characterized by 'white grasses' of the *Stipagrostis* genus, but also includes low shrubs with *Salsola* sp. Numerous non-perennial drainage channels and low-lying pans cross the site.

The predominant land use for the general area in which the site is located is livestock grazing, while mining also plays an important role in the local economy. Due to climatic and environmental restraints, formal agricultural fields are limited to specific nodes, none of which occur on the proposed site. A third important sector is tourism, especially during spring, when flower tourists visit the general area for an eight to ten week period.

EIA Process

EIA Regulations (Regulations 544, 545 and 546) promulgated in terms of NEMA, identify certain activities, which "could have a substantial detrimental effect on the environment". These listed activities require environmental authorisation from the competent environmental authority, i.e. the Department of Environmental Affairs (DEA) in the case of energy applications, prior to commencing.

This proposed project triggers a number of listed activities in terms of NEMA and accordingly requires environmental authorisation from DEA via the EIA process outlined in Regulation 543 of NEMA.

Aurecon has been appointed to undertake the required environmental authorisation and licencing processes on Mainstream's behalf.

The EIA process consists of an Initial Application Phase, a Scoping Phase and an EIA Phase. The purpose of the Initial Application Phase is to commence the project *via* the submission of the relevant department's application forms. The purpose of the Scoping Phase, the current phase, is to identify and describe potential positive and negative environmental impacts, (both social and biophysical), associated with the proposed project and to screen feasible alternatives to consider in further detail.

The purpose of the EIA Phase is to comprehensively investigate and assess those alternatives and impacts identified in the Scoping Report and propose mitigation to minimise negative impacts.

The acceptance of the Scoping Report and the Plan of Study for EIA by DEA would allow the process to continue to the EIA phase.

How you can get involved

Public participation is a key component of this EIA process and will take place at various stages throughout the project. The public participation process to date has involved the following aspects:

- Distribution of the Background Information Document on 24 May 2012 to inform Interested and Affected Parties (I&APs) of the project and to invite I&APs to register on the database;
- Advertisements were placed in a local newspaper, the Plattelander, notifying the broader public of the initiation of the EIA and inviting them to register as I&APs from 25 May November 2012 to 15 June 2012; and
- A site notice was erected at the entrance to Smorgenschaduwe Farm, Kangnas Farm and Springbok Library on 28 May 2012.

Only two comments were received, from SAHRA with regards to the requirement to undertake the necessary heritage studies in terms of the NHRA and from WESSA commenting on the process that WESSA will follow.

All written comments received are included as an annexure to the Draft Scoping Report (DSR). All issues raised via written correspondence have been summarised into a Comments and Response Report with responses from the project team and are included as an annexure to the DSR.

Project alternatives

The following feasible alternatives have been identified for further consideration in the Environmental Impact Assessment Report (EIAR):

Proposed wind energy facility:

Location alternatives:

- One location for the proposed wind energy facility;

Activity alternatives:

- Wind energy generation via wind turbines; and
- "No-go" alternative to wind energy production.

Site layout alternatives:

- One layout alternative per site;
- One main substation location, with four satellite substations.

Technology alternatives:

A minimum and maximum tipheight of 100 – 180m

Proposed solar energy facility:

Location alternatives:

- One location for the proposed PV plant..

Activity alternatives:

- Solar energy generation via a PV plant; and
- "No-go" alternative to solar energy production.

Site layout alternatives:

- One layout alternative (250 MW with 1000 ha footprint)

Technology alternatives:

- Two technology alternatives in terms of the solar panel type (PV vs CPV); and
- Mounting system: trackers vs. fixed mount.

Identified impacts

The proposed wind and solar energy facilities could impact on a range of biophysical and socio-economic aspects of the environment. Impacts can result from the construction phase as well as the operational phase. While the construction phase impacts are usually short term, some may have longer lasting effects. A construction phase Environmental Management Programme (EMP) will be compiled to be implemented during the construction phase to manage these aspects.

The operational phase impacts are usually considered to be the long term impacts associated with the project and these will be considered by a suite of specialists during the EIA phase. The specialists will also consider ways to manage these potential impacts and these mitigation measures will be included in an operational phase EMP.

Specifically the following potential environmental impacts have been identified for further consideration in the EIAR:

- Operational phase impacts on the biophysical environment:
  - Impact on flora;
  - Impact on fauna (including avifauna and bats); and
  - Impact on surface water.
- Operational phase impacts on the socio-economic environment:
  - Impact on heritage resources (including palaeontology);
  - Visual impacts;
  - Impact on energy production;
  - Impact on local economy (employment) and social conditions;
  - Impact on agricultural land; and
  - Impact of noise.
- Construction phase impacts on the biophysical and socio-economic environments

The following specialist studies and specialists will be commissioned to provide more detailed information on those environmental impacts which have been identified as potentially being of most concern, and/or where insufficient information is available, namely:

- *Botanical assessment:* Dr Dave MacDonald, *Bergwind Botanical Tours and Surveys*;
- *Avifauna assessment:* Mr Doug Harebottle, Private Consultant;
- *Bat assessment:* Mr Werner Marais, *Animalia Zoological and Ecological Consultation*;
- *Heritage Impact Assessment:* Mr Jayson Orton, *ACO Associates* (archaeology component) and Dr John Almond, *Natura Viva cc* (palaeontology component); and
- *Visual Impact Assessment:* Mr Stephen Stead, *Visual Resource Management Africa*
- *Socio-economic Impact Assessment:* Ms Alex Kempthorne, *Urban-Econ Development Economists*
- *Noise Impact Assessment:* Mr Morne de Jager, *M2 Environmental Consulting*
- *Agricultural Potential Assessment:* Mr Kurt Barichievy, *SiVEST*
- *Aquatic Ecology Impact Assessment:* Ms Antony Belcher, Private Consultant
- *Meteorite Impact Assessment*: Dr Chris Harris, University of Cape Town

Way forward

Copies of the DSR have been lodged in the Springbok Public Library and on the Aurecon website (**www.aurecongroup.com,** change "Current Location" to South Africa and click on Public Participation).

I&APs are also invited to attend a Public Meeting where the findings of the DSR will be presented and discussed on Tuesday, 3 July 2012, 17h00-19h00 at the Springbok Exhibition Hall (Skousaal), Springbok. I&APs are requested to RSVP (see Contact Details below) by 25 June 2012 and should the number of RSVP's be insufficient the meeting would be cancelled and I&APs would instead be contacted telephonically/electronically to discuss any issues and concerns they may have.

I&APs have 30 days, until **23 July 2012**, to submit their written comments on the DSR. Cognisance will be taken of all comments in compiling the final report, and the comments, together with the project team and proponent's responses thereto, will be included in the final report. Where appropriate, the report will be updated.

Once the final Scoping Report has been completed and all I&AP comments have been incorporated into the report, and the client has approved the report, it will be submitted to DEA and the Northern Cape Department of Environmental Affairs and Nature Conservation for their review and comment, respectively. DEA will either reject the application or instruct the applicant to proceed to the EIA Phase, either as proposed in the Plan of Study for EIAR, or direct that amendments are made before continuing.

List of Acronyms

DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
FSR	Final Scoping Report
Ha	Hectare
I&AP	Interested and Affected Party
Km	Kilometer
Kv	Kilovolt
MW	Megawatts
NEMA	National Environmental Management Act

Contact Details

Corlie Steyn / Louise Corbett
Tel: (044) 805 5421
Fax: (044) 805 5454

Email: cornelia.steyn@aurecongroup.com /
louise.corbett@aurecongroup.com

PO Box 509
George
6530