CEN INTEGRATED ENVIRONMENTAL MANAGEMENT UNIT

Environmental and Rural Development Specialist

FINAL Scoping Report for the Proposed Construction and Operation of a 55 MW Photovoltaic Solar Farm and associated infrastructure on Portion 2 of the Farm Kraan Vogel Kuil No 50, Pearston, Eastern Cape

March 2012

Project Title:
FINAL Scoping Report for the Proposed Construction and Operation of a 55 MW Photovoltaic Solar Farm and associated infrastructure on Portion 2 of the Farm Kraan Vogel Kuil No 50, Pearston, Eastern Cape

Project Applicant: Imveloyethu Power Company (Pty) Ltd

NEAS Reference Number: DEA/EIA/0000855/2011
DEA Reference Number: 12/12/20/2657

Environmental Assessment Practitioner:
CEN Integrated Environmental Management Unit
36 River Road
Walmer, Port Elizabeth. 6070
South Africa
Phone (041) 581-2983 • Fax 086 504 2549
E-mail: steenbok@aerosat.co.za

Document prepared by: Dr Belinda Clark
Document reviewed by: Dr Mike Cohen

Executive Summary

CEN Integrated Environmental Management Unit was appointed by Imveloyethu Power Company (Pty) Ltd to undertake an environmental assessment (Scoping and EIA), for the proposed construction and operation of a 55 MW Photovoltaic Solar Farm and associated infrastructure on Ptn 2 of the Farm Kraan Vogel Kuil No 50 in Pearston in the Eastern Cape.

The environmental decision making authority for the EIA is the National Department of Environmental Affairs and an environmental impact report is required in terms of the Regulations promulgated under Section 24(5) read with Section 44 of the National Environmental Management Act 107 of 1998 as amended (Government Notice R.543 in Government Gazette 33306 of 10 December 2010).

Terms of Reference

The Terms of Reference established for the environmental assessment of the proposed development are:

- Conduct the necessary environmental investigations in order to produce the required scoping report for the proposed development and associated activities
- Identify potential significant negative and positive environmental impacts associated with the proposed development
- Identify and describe reasonable and feasible project alternatives
- Engage the public and relevant stakeholders throughout the environmental assessment process and incorporate all comments in the Scoping Report

Site Description

The proposed site for development is Ptn 2 of the Farm Kraan Vogel Kuil No 50 in Pearston in the Eastern Cape. The site is situated approximately 2.2 km west of the village of Pearston and south of the R337 at approximate GPS co-ordinates

32°35'59.85"S 25°06'44.16"E, and is currently zoned for agricultural purposes. It is proposed to use four areas of the farm for the solar plant with a disturbance footprint of ~138 ha (refer to the figure below). The site has been specifically located in close proximity to the existing powerlines and access roads to avoid constructing additional infrastructure.

The terrain is undulating with low stony ridges and outcrops of plinthite with shallow often gravelly soils interspersed by flats where soils are deeper. No drainage lines intercept these areas, the ground falling off to drainage lines to the south and north. The vegetation on the site is mostly low shrubs and some grass with scattered taller shrubs and small bushclumps in the more rocky areas (Jacobsen, 2011).

Existing structures in close proximity to the site include an Eskom power line, a telephone line, roads, a windmill and reservoir, and farm fences. The site is currently mostly grazed by sheep.

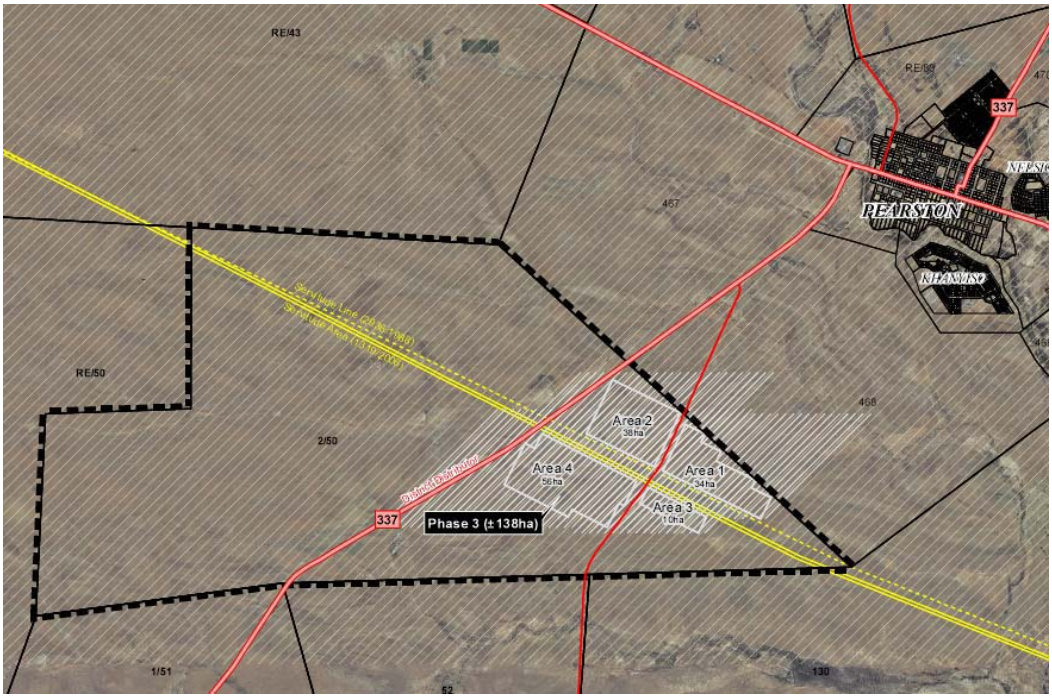

Figure: An aerial image showing the relative location of the 4 areas selected for the solar farm.

The Development Proposal

It is proposed to construct and operate a 55 MW photovoltaic solar farm. The proposed development will consist of Polycrystalline Fixed Solar Panels; using the photovoltaic approach to generate electricity from the sun. Photovoltaic (PV devices) or “solar cells” change sunlight directly into electricity. PV, like a fuel cell, relies upon chemical reactions to generate the electricity. PV cells are small, square shaped semiconductors manufactured in thin film layers from silicon and other conductive materials. When sunlight strikes the PV cell, chemical reactions release electrons, generating electric current. The small current from individual PV cells, which are installed in modules, can power individual homes and businesses or can be plugged into the bulk electricity grid.

Structures and associated infrastructure include:

- PV solar panels/modules arranged in arrays
- Poles to support PV modules – these will likely be rammed into the soil at a depth of 1 to 2 m, and will be ~60 cm above ground level
- A 55 MW substation
- Transmission lines (<33 KV) from the substation to the on-site powerline and a possible link between proposed solar facilities on neighbouring sites,
- Primary and secondary cable paths
- String boxes and inverters
- Transformer cabin/inverter
- Electricity distribution boxes
- Earthing systems
- Guardhouse
- Security fence and security system along perimeter of site
- Internal gravel roads for along the boundary of the site and between PV lines

Listed Activities

National Environmental Management Act (Act 107 of 1998)

The Minister of Environmental Affairs and Tourism has in terms of sections 24 and 24D of the National Environmental Management Amendment Act (Act No. 107 of 1998), listed the activities that require an environmental assessment.

In terms of the Environmental Impact Assessment Regulations, 2010, made under section 24(5) of the Act and published in Government Notice R.543 in Government Gazette 33306 of 10 December 2010 the following activities are subject to an assessment.

No. R. 544	**10 December 2010 – Listing 1**
Activity number	**Activity description**
11	The construction of: (i) Buildings exceeding 50 m^2 in size (ii) Infrastructure or structures covering 50 m^2 or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
No. R. 545	**10 December 2010 – Listing 2**
Activity number	**Activity Description**
1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more
8	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.
15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more
No. R.	**10 December 2010 – Listing 3**

546	
Activity number	**Activity description**
4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres (a) In the Eastern Cape (ii) outside urban areas (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans
13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority
14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (a) In the Eastern Cape (i) all areas outside urban areas
16	The construction of: (iii) buildings with a footprint exceeding 10 square metres in size; or (iv) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse (a) In the Eastern Cape (ii) outside urban areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans

Methodology

The specific methodology adopted in identifying and assessing impacts and project alternatives is described in Chapter 5 of the Scoping Report. The Environmental Impact Assessment Regulations (2010) clearly state the requirements that need to be fulfilled by all role-players involved in the Environmental Assessment Process. In this regard, Regulations 28 to 33 list the requirements that an EAP must fulfill in order

to compile a comprehensive Environmental Impact Report and Management Programme. The methodology was designed to meet the requirements of the EIA Regulations (2010) and guidelines published in support of the regulations.

Alternatives

The 'no-go' option

The no-go alternative assumes the status quo remains – i.e. the site is used for stock grazing purposes.

According to CARA (Conservation of Agricultural Resources Act 43 of 1983) the official carrying capacity for the area is 17 ha per large stock unit. CARA seeks to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader species. According to Veld types of South Africa by J.P.H Acocks the site falls in zone no. 31 (Succulent Karoo) that consists mainly of short karoo bushes, succulent plants, scrubs and grasses. The estimated area needed for the 55 MW plant will is ± 138 ha which will mean a loss of only 8.1 Large Stock Units or 54 Small Stock Units. It will not be a total loss as this area can still be utilized by sheep and / or goats. The solar plant will be fully compatible with veld management systems where they are farming with sheep. The intervention of the solar plant will be minimal (extracted from a letter of support for the project written by the Eastern Cape Department of Agriculture, Rural Development and Agrarian Reform – Mr A Snyman).

The Integrated Development Plan for the Blue Crane Route Municipality highlights the need for energy and the upgrading of electrical infrastructure, as well as local economic development. The proposed solar farm will contribute to meeting these needs. Significant employment opportunities are expected in construction and operational phases. The applicant proposes to supply alternative energy to local schools and provide financial aid through educational scholarships to the local community. The solar farm project is a registered project in the municipalty's Integrated Development Plan and is supported by the municipality and the Blue Crane Route Development Agency.

Mucina and Rutherford (2006) classify the vegetation type as Eastern Lower Karroo which is considered to be least threatened and there are no megaconservancies that traverse the site according to the regional Subtropical Thicket Ecosystem Plan (STEP). However, the site is classified as a Broad Land Management Class 2 in the East Cape Biodiversity Conservation Plan which implies that the site is suited for limited development in non-sensitive areas, and should ideally be maintained in a near-natural state. The site is currently farmed and although substantial floral species richness still occurs, vegetation has been transformed from its original status and overgrazing is evident.

It is therefore believed that the site and project activity are not fatally flawed from consideration and assessment for the proposed solar farm. The 'no-go option will however be used as a baseline throughout the assessment process against which potential impacts will be compared in an objective manner.

Site alternatives

As a starting point, the applicant considered various aspects to determine a suitable location for a solar farm in the Pearston area including, but not limited to, irradiation levels, the distance to the power grid, site accessibility, founding conditions, fire risk and current land uses. The Farm Kraan Vogel Kuil just west of Pearston met these criteria. A 10 MW solar farm has been approved north of the R337 in the north-eastern portion of the farm and an application has been submitted for a second 10 MW solar farm on commonage land directly east of and adjacent to the proposed site for this application (refer to blue stars in the Figure below).

The selected farm was then scanned and aspects such as hydrology, sensitive vegetation and other habitats, and proximity to existing infrastructure were used to determine the selected areas (i.e. Area 1 to 4 as shown in the Figure below). The selected blocks are adjacent to existing powerlines and are close by to the approved 10 MW solar plant north of the R337 and the proposed plant east of the site, providing opportunities of shared infrastructure and increased efficiency. Drainage features (blue lines in the Figure below) were also avoided. A Level 1 Archaeological Impact Assessment was done for the selected area and the specialist concluded that it is of low cultural sensitivity and that development can proceed as planned. The archaeological specialist noted panels must be constructed within 20 metres of the

concentration of Later Stone Age stone tools (GPS reading: 32.36.019S; 25.06.379E) (refer to Appendix 5). An ecological specialist report was done of the selected area. The vegetation has been subjected to overgrazing with the result that species composition has changed from its original state. However, the area still exhibits substantial floral species richness, and a single occurrence of a threatened species, *Duvalia parviflora*, was recorded. The location of this species, and others that were not found in large numbers in the area (e.g. *Aloe longistyla, Astroloba foliolosa, Haworthia nigra, Duvalia* sp. cf *parviflora, Adromischus subdistichus, Aloe claviflora*) was demarcated using a hand-held GPS and indicated on a map to the applicant to be protected with a 10 m buffer around each recording. The agricultural specialist (report attached as Appendix 3) recommended that no panels or other development occur within 100 m of the drainage line that occurs south of Area 3 and 4 (refer to blue line in the Figure below). These recommendations were given to the applicant to use in the preferred layout plan. This will be presented in the EIA.

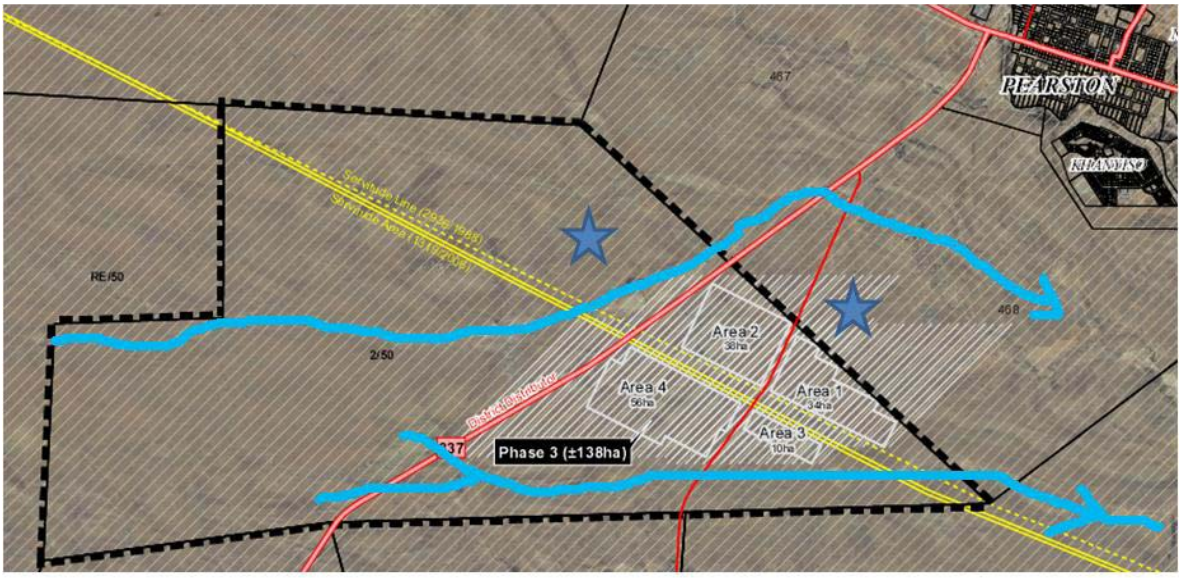

Figure: Site alternative selection.

Activity Alternatives

The current land use activity is agriculture (specifically grazing), while the proposed activity is for the establishment of a PV Solar Farm. The local Municipality is the provider of electricity within Blue Crane Route. The formal supply of electricity ranges from a full connection and prepaid system to a ready board system. The majority of consumers have access to either electricity or paraffin as a source of power and heat while street lighting is provided to all urban neighbourhoods except for high mast

lighting in Aeroville, Old Location, New Brighton and Francesvale (Somerset East Urban Area). A major capital outlay is however envisaged to upgrade both urban and rural networks. The overhead line from Somerset East to Pearston and other areas is currently running at full capacity. A new transformer is to be installed as an emergency measure. Electricity has been included in the infrastructure analysis because of the importance of this basic service in the lives of all individuals, especially in this area. The Blue Crane Route Municipality has a good infrastructure base but upgrading is needed in order for the service to be provided effectively. A need for energy provision and infrastructure upgraded is therefore evident.

Of the entire Blue Crane Route population a mere 35% of the economically active population is employed and over 40% is not economically active. This puts a great amount of pressure on the employed population to support those that are not employed or economically active and creates a large dependency ratio on the employed percentage. The unemployment rate in the area is approximately 24% (SDF 2006). The photovoltaic plant will create a number of job opportunities for local staff in both the design and "permitting" phase and primarily in the operational phase. There will be a training programme for locals interested in skilled work such as maintenance work. Furthermore, local businesses will also benefit from the proposed development since materials will be purchased locally where available. The BCRM SDF and IDP have highlighted the need for local economic development initiatives.

According to the Department of Agriculture the proposed site consists of non-arable low potential grazing land. The Department of Agriculture has determined the grazing capacity for this area as 26-30 ha/AU. The proposed solar farm will occupy ~135 ha, therefore a loss of grazing capacity for ~ 5 animal units is expected if the solar farm is approved. The number of employment opportunities and/or economic potential for the municipal area that will accrue from agriculture in this instance is substantially less than for the proposed PV Solar Farm. From an economic and social upliftment perspective, the solar farm is therefore the preferred activity.

Technology Alternatives

Two alternative technologies were considered for the solar farm: Crystalline Silicone PV Modules and Thin Film PV Modules. The applicant has selected a crystalline silicone PV module Installation for the following reasons:

While thin film PV modules are more cost effective than Polycrystalline Fixed Solar Panels, thin film modules are less efficient in terms of electricity generation. A much greater number of cells must be used to generate the same amount of electricity as can be generated from crystalline cells. This can result in additional racking and installation costs and more space and mounting hardware would be required to produce the same amount of output.

Potential Impacts

The following potential impacts have been identified for further study in the EIR:

Potential Impact	**Development Phases**
Loss of Biodiversity	Construction and Operational
Potential Pollution	
• Noise	Construction
• Air (dust and traffic)	Construction (mostly) and Operational
• Surface Water	Construction (mostly) and Operational
• Groundwater	Construction (mostly) and Operational
• Soil	Construction (mostly) and Operational
Soil erosion	Construction (and operational if rehabilitation is not successful or if stormwater is not properly managed)
Socio-Economic Impacts	Construction and Operational
Visual impacts	Operational
Loss of Agricultural Land	Operational
Archaeological Impacts	Construction (unlikely)
Climate change impacts	Operational
Cumulative Impacts:	
Loss of biodiversity	Construction and Operational
Socio-Economic Impacts	Construction and Operational

Specialist Studies

The following specialist studies will be done as part of the EIR:

- Ecological Specialist Study
- Agricultural Specialist Study
- Level 1 Archaeological Impact Assessment
- Socio-economic Impact Assessment

Public Participation

Public participation was done in accordance with Chapter 6 (Regulations 54 to 57) of the EIA Regulations (2010) and Guideline 4 published in assistance of interpretation of these regulations. Adverts were placed in *The Herald* and *Die Burger* and the *Somerset East Budget,* and two notices were placed on site and at the Pearston municipal offices inviting interested parties to register and make comment on the proposed development. Background Information Documents detailing the proposed development were distributed to identified stakeholders (e.g. government, municipal and non-government organisations; neighbours and organisation representatives). Below is a "comments and response sheet" including all issues raised by Interested and Affected Parties as well as the response by the Environmental Assessment Practitioner.

The Draft Scoping report was submitted to the National Department of Environmental Affairs for review purposes. The Provincial Department of Economic Development and Environmental Affairs received a copy of the report for commenting. All registered parties were sent an electronic copy of the Executive Summary and were notified of the importance of commenting and identifying any issue which CEN IEM Unit may have overlooked and which they feel needs to be addressed in the EIA. A full copy of the Draft Scoping Report was made available in electronic format to all those that requested it.

The period for stakeholder comment has expired and no comments were submitted by any Interested and Affected Parties.

I&AP	Comment	EAP response
K Moolman	Request to be registered	Registered and will be kept updated of the process
L. Mongoato (Director: Land Use and Soil Management)	This serves as a notice of receipt and confirms that your application has been captured in our electronic AgriLand tracking and management system. Reference number issued	Reference number noted. Will be kept updated of the process
B. Smith	Request to be registered and am in favour of the development	Registered and will be kept updated of the process
M. Kane	Request to be registered and am in favour of the development	Registered and will be kept updated of the process
G. Mintoor	Request to be registered and am in favour of the development	Registered and will be kept updated of the process
J. Martin	Request to be registered and am in favour of the development	Registered and will be kept updated of the process

Structure of the Report

Chapter 1 of the report presents a background to the Scoping procedure. **Chapter 2** describes the proposed development property**. Chapter 3** describes and explains the project proposal and places it in context with relevant planning guidelines. **Chapter 4** describes the receiving environment and details relevant environmental planning guidelines. **Chapter 5** identifies and describes project alternatives. **Chapter 6** describes the methodology that will be followed in deriving and assessing impacts and alternatives, and ensuring the report is in compliance the relevant legislation,

regulations and guidelines. **Chapter 7** lists and describes potential environmental issues and impacts that will be considered further in the EIR. **Chapter 8** presents a Plan of Study for EIA. **Chapter 9** details the public participation phase up to the Scoping Phase. **Chapter 10** is a reference list.