PROPOSED INYANDA - ROODEPLAAT WIND ENERGY PROJECT
SUNDAYS RIVER VALLEY MUNICIPALITY, CACADU DISTRICT,
EASTERN CAPE PROVINCE OF SOUTH AFRICA

DEA Reference Number: 14/12/16/3/3/2/464

ENVIRONMENTAL SCOPING REPORT

DRAFT

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<th>Prepared for:</th>
<th>Prepared by:</th>
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<tr>
<td>Inyanda Energy Projects (PTY) LTD</td>
<td>Coastal &amp; Environmental Services</td>
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<td>South Africa</td>
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October 2013
# CES Report Revision and Tracking Schedule

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<th><strong>Document Title</strong></th>
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<td><strong>Client Name &amp; Address</strong></td>
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<td><strong>Status</strong></td>
<td>Draft</td>
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<td><strong>Issue Date</strong></td>
<td>October 2013</td>
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| **Report Distribution** | **Circulated to** | **No. of hard copies** | **No. electronic copies** |
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This report should be cited as follows: Coastal & Environmental Services, October 2013: Draft 
EXECUTIVE SUMMARY

Background

Inyanda Energy Projects (PTY) LTD (Inyanda Energy), a renewable energy company, plans to develop a wind energy facility (or ‘wind farm’ to be named the Inyanda - Roodepoort WEF) between the towns of Patensie and Kirkwood, within the Sundays River Valley Municipality, Eastern Cape Province, South Africa (Figure 1 overleaf). According to Inyanda, available wind data in South Africa shows this area to have favourable wind conditions sufficient to support a wind farm. This has been confirmed by on site wind monitoring that has been ongoing since June 2012. The proposed project area consists of approximately 12 000 ha located on 24 property portions illustrated in the table below (Table 1).

Table 1: Farm name and property portions of the Proponent

<table>
<thead>
<tr>
<th>Farm Number</th>
<th>Property Portion</th>
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<tbody>
<tr>
<td>170</td>
<td>Portion 3</td>
</tr>
<tr>
<td>245</td>
<td>Portion 1</td>
</tr>
<tr>
<td>246</td>
<td>Portion 1 and Remaining Extent</td>
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<tr>
<td>247</td>
<td>Portion 1</td>
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<tr>
<td>248</td>
<td></td>
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<tr>
<td>277</td>
<td>Portion 1, Remaining Extent</td>
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<tr>
<td>278</td>
<td>Portion 1, 2, 3, 4 and remaining Extent</td>
</tr>
<tr>
<td>279</td>
<td>Portion 3, 4 and remaining Extent</td>
</tr>
<tr>
<td>280</td>
<td>Portion 1</td>
</tr>
<tr>
<td>346</td>
<td>Remaining Extent</td>
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<tr>
<td>347</td>
<td>Portion 3</td>
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<tr>
<td>348</td>
<td>Portion 1</td>
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<tr>
<td>350</td>
<td>Portion 5 and 6</td>
</tr>
<tr>
<td>364</td>
<td>Portion 2 and 3</td>
</tr>
<tr>
<td>588</td>
<td>Portion 1 and 2</td>
</tr>
</tbody>
</table>

The proposed Inyanda - Roodepoort WEF will consist of approximately 35 turbines each generating 1.8 - 6.15 Mega Watts (MW) of power depending on the model and size of turbine selected. The turbine footprints and associated facility infrastructure (internal access roads, substation, construction compound, batching plant and operations building) will potentially cover an area of approximately 60 ha depending on final layout design should the project proceed. An investigation of the wind regime of the site will decide the model of turbines to be installed. The facility will have a maximum generating output of approximately 140 MW.

Project motivation

Most of South Africa’s energy comes from non-renewable sources like coal, petroleum, natural gas, propane, and uranium; however the proponents of renewable energy sources like biomass, geothermal energy, hydropower, solar energy, and wind energy is a major factor that the South African sector need to consider greatly. It is estimated that approximately only 1% of the country’s electricity is currently generated from renewable energy sources. The energy sector in South Africa alone emits approximately 380 988Gg CO₂e (DEA 2011). South Africa’s total emissions were estimated to be 461 million tonnes CO₂ equivalent in the year 2000. Approximately 83% of these emissions were associated with energy supply and consumption (380 988 Gg CO₂e), 7% from industrial processes, 8% from agriculture, and 2% from waste.
Figure 1: Locality Map indicating the study area property portions of the proposed Inyanda wind energy project relative to the surrounding towns of Uitenhage and Hankey.
Eskom currently generates 95% of the electricity used in South Africa with an approximate 40.87 GW net maximum installed capacity. By the year 2020 an additional 20 GW generation capacity would be required and up to 40 GW by 2030 to sustain the energy demands in the country. National energy policy has called for a change in the energy mix to reduce the dependency of the economy on fossil fuels and facilitate the uptake of renewable energy resources. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997, South Africa has put in place a long term mitigation scenario (LTMS) by which the country aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. During this period (2003-2050) South Africa will aim to take action to mitigate GHG emissions by 30% to 40% by the year 2050. This is a reduction of between 9000 tons and 17 500 tons of CO$_2$ by 2050. In January 2010, South Africa pledged to the UNFCCC, a 34% and 42% reduction against business as usual emissions growth trajectory by the year 2020 and 2025 respectively.

South Africa’s current electricity generation and supply system is currently struggling to meet demand. Under the IPP Producer Procurement Programme, South Africa will seek to procure the first 3725 MW of renewable capacity by 2016 (1850 MW of on-shore wind) to meet the renewable energy target of 4000 MW by 2014 and 9000 MW by 2030. Fossil fuels supply 90% of South Africa’s energy needs with demands on energy supply increasing by 3.5% in the next 20 years. The establishment of the proposed Inyanda Wind Energy Project will contribute to strengthening the existing electricity grid for the project area and is aligned with the policy objective of a 30% share of all new power generation being derived from Independent Power Producers (IPP).

The purported benefits of “green” electricity produced by wind turbines, as opposed to that of traditional coal powered stations, is the reduction of Carbon Dioxide (CO$_2$) and Sulphur Dioxide (SO$_2$) emissions and no water required for the operation thereof. Localised electricity production can also compensate for voltage losses resulting from transmitting this power over long distances from Mpumalanga Province where most coal fired power stations are located (and the bulk of South Africa’s energy generation capacity resides). In addition to the above-mentioned potential benefits, the proposed project site was selected due to:

- Good wind resources suitable for the installation of a large wind energy facility.
- The proposed project site has a strong localised wind resource potentially intensified by a funnelling effect caused by surrounding topographical features.
- Proximity to available grid connection opportunities such as substations or High Voltage/Medium Voltage (HV/MV) overhead lines.
- The site is easily accessible from the R75 that will facilitate the transportation of wind turbines and construction traffic to the site.
- The immediate surrounding area is not densely populated.
- The land parcels constituting the project study area, which have been historically utilised for agriculture and livestock production, is gradually being turned over to conservation land uses. Inyanda Energy (and its associate members), have purchased the majority of these property portions and intends to fund conservation initiatives through the proposed WEF. It is the developer's intent to provide an unbroken land parcel corridor between the eastern and western portions of the Groendal Nature Reserve that adjoins sections of the study area. It is the developer’s contention that the project will support strategic conservation objectives in the area through the establishment of this connectivity corridor.
- There is potential within the Sundays River Valley Local Municipality to engage with new technologies, industries and development opportunities.

Upgrading of the infrastructure (electrical grid and roads) will allow for connection of the Inyanda - Roodeplaat WEF, providing additional electricity and greater grid stability to the region. The local Municipality is the provider of electricity within Sundays River Valley Municipality and has recognised the supply of electricity as a priority issue in its Integrated Development Plan (IDP) based on the following identified weaknesses below:
Scattered households impede electrification
Some of the areas are inaccessible
Limited substations, many areas far from the grid
Load shedding by Eskom
Electricity increases will affect affordability
Over-subsidizing of consumers

Inyanda Energy intends to promote local economic growth and development through direct and indirect employment, as well as the identification and implementation of social development schemes during the project’s operational phase. A local community trust or organisation is intended to directly benefit from the project.

Although historically utilised for agricultural and livestock production purposes, these land portions have mostly been purchased by Mr Ronnie Watson (one of Inyanda Energy’s associates), who is gradually converting these portions to game farming land uses. Mr Watson is investigating setting aside some of these portions as conservancy areas to offset the impact of the wind energy facility. In theory, the addition of these property portions to the disparate Groendal Nature Reserve portions will create a connection corridor between these two portions which would be desirable from a conservation perspective. Clearly, the potential, or even viability of this proposal, will need to be discussed with relevant parks and conservation bodies, at national and provincial level. It is intended to commence these focus group meetings in the Scoping phase and key stakeholders have been identified to initiate these discussions. Should the proposal be viable it would have to be subject to a biodiversity offset assessment process in the EIA phase of this reporting process.

Legal Requirements

The EIA process is guided by regulations made in terms of Chapter 5 of the National Environmental Management Act No. 107 of 1998 (NEMA). The regulations (GNR. 543) set out the procedures and criteria for the submission, processing and consideration of and decisions on applications for the environmental authorisation of activities. Three lists of activities, published on 02 August 2010, as Government Notice Numbers R.544 to 546, define the activities that require, either a Basic Assessment (applies to activities with limited environmental impacts (GN.R. 544) or within a prescribed geographical area – province (GN.R. 546)), or a Scoping and Environmental Impact Assessment (applies to activities which are significant in extent and duration) (GN.R. 545). The activities triggered by the proposed development are listed in Table 2 below.

Table 2: Listed activities potentially triggered by the proposed Inyanda Wind Energy Facility

<table>
<thead>
<tr>
<th>The number and date of the relevant notice:</th>
<th>Activity No (s) (in terms of the relevant notice):</th>
<th>Description of each listed activity as per project description¹:</th>
</tr>
</thead>
<tbody>
<tr>
<td>LISTING NOTICE 1</td>
<td>(10) The construction of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;</td>
<td>A substation will be constructed on site which will collect power generated by the turbines, step up the voltage, and then transfer this power via an overhead power line to Eskom infrastructure (either a substation or a transmission line).</td>
</tr>
<tr>
<td>Listing notice 1 of GNR 544 EIA regulations dated 18 June 2010.</td>
<td>(18) The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a watercourse.</td>
<td>The project will involve the construction of roads and underground electrical cables which are likely to cross drainage lines or watercourses.</td>
</tr>
<tr>
<td>Listing Notice 1 of GNR 544 EIA regulations dated 18 June 2010.</td>
<td>(38) The expansion of facilities for the</td>
<td>Wherever practical underground cabling</td>
</tr>
</tbody>
</table>

¹ Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.
<table>
<thead>
<tr>
<th>R544 EIA Regulations dated 18 June 2010.</th>
<th>transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.</th>
<th>will link the turbines with an on-site substation proposed to be constructed as part of the facility. An overhead line will then link this substation with an Eskom substation or overhead line.</th>
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<tbody>
<tr>
<td><strong>LISTING NOTICE 2</strong></td>
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<tr>
<td>Listing notice 2 of GNR 545 EIA regulations dated 18 June 2010.</td>
<td>(1) The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.</td>
<td>The exact amount of power to be produced by the facility will be specified in the EIR.</td>
</tr>
<tr>
<td>Listing Notice 2 of R545 EIA Regulations dated 18 June 2010.</td>
<td>(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.</td>
<td>Wherever practical underground cabling will link the turbines with an on-site substation proposed to be constructed as part of the facility. An overhead line will then link this substation with the nearest Eskom substation or overhead line.</td>
</tr>
<tr>
<td>Listing notice 2 of GNR 545 EIA regulations dated 18 June 2010.</td>
<td>(15) Physical alteration of undeveloped, vacant or derelict land for commercial and industrial use where the total area to be transformed is 20 hectares or more.</td>
<td>The exact construction phase footprint and operation phase footprint will be specified in the EIR.</td>
</tr>
<tr>
<td><strong>LISTING NOTICE 3</strong></td>
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<tr>
<td>Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010.</td>
<td>(4) The construction of a road wider than 4 metres with a reserve less than 13.5 metres.</td>
<td>Roads will need to be constructed that will link the turbines and other infrastructure components.</td>
</tr>
<tr>
<td></td>
<td>(a) In the Eastern Cape:</td>
<td>Parts of the site are identified as focus areas for the expansion of National Parks. Parts of the site are identified as a CBA 1. The site is within 10 kilometers of the Groendal Nature Reserve.</td>
</tr>
<tr>
<td></td>
<td>ii. Outside urban areas in:</td>
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<tr>
<td></td>
<td>(bb) National Protected Areas Expansion Strategy Focus Areas</td>
<td></td>
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<tr>
<td></td>
<td>(ee) Critical Biodiversity Areas as identified in systematic biodiversity plans</td>
<td></td>
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<tr>
<td></td>
<td>(gg) Areas within 10 kilometers of National Parks</td>
<td></td>
</tr>
<tr>
<td>Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010.</td>
<td>(14) The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.</td>
<td>Vegetation will be cleared during the construction of access roads, hard standing areas, the substation and the turbine foundations. This is likely to amount to more than 5 hectares.</td>
</tr>
<tr>
<td></td>
<td>(a) In the Eastern Cape.</td>
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<tr>
<td></td>
<td>i. All areas outside urban areas.</td>
<td></td>
</tr>
<tr>
<td>Listing Notice 3 of R546 EIA Regulations dated 18 June 2010.</td>
<td>(16) The construction of: 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.</td>
<td>Parts of the site are identified as focus areas for the expansion of National Parks. Parts of the site are identified as a CBA 1. The site is within 10 kilometers of the Groendal Nature Reserve.</td>
</tr>
<tr>
<td></td>
<td>(a) In Eastern Cape:</td>
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<td></td>
<td>ii. Outside urban areas.</td>
<td></td>
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<tr>
<td></td>
<td>(bb) National Protected Areas Expansion Strategy Focus Areas</td>
<td></td>
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<tr>
<td></td>
<td>(ff) Critical Biodiversity Areas as identified in systematic biodiversity plans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(hh) Areas within 10 kilometers of National Parks</td>
<td></td>
</tr>
<tr>
<td>Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010.</td>
<td>(19) The widening of a road by more than 4 metres, or the lengthening of a road by</td>
<td>Existing farm roads will be utilised where possible to minimise the project footprint.</td>
</tr>
</tbody>
</table>
Because the proposed development triggers listed activities from GNR.545, it will require a full Scoping and EIA. This process is regulated by Part 3 of Chapter 3 of the 2010 EIA Regulations and described in detail in this report. It is important to note that, in addition to the requirements for an authorisation in terms of the NEMA, there may be additional legislative requirements that need to be considered prior to commencing with the activity, for example: the National Heritage Resources Act (Act No 25 of 1999), the National Water Act (Act No 36 of 1998), Civil Aviation Act (Act No 74 of 1962) as amended, National Environmental Management Biodiversity Act 10 of 2004, National Forests Act 84 of 1998 and the Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974 to name the most relevant.

The Environmental Impact Assessment

Coastal & Environmental Services (CES), a well-established specialist environmental consulting firm with offices in Grahamstown, East London, Port Elizabeth, Cape Town and Maputo, Mozambique. CES have been appointed by Inyanda Energy to conduct the Environmental Impact Assessment (EIA).

The competent authority that must consider and decide on the application for authorisation in respect of the activities listed in Table 1 is the Department of Environmental Affairs (DEA), as the Department has reached agreement with all Provinces that all electricity-related projects, including generation, transmission and distribution, are to be submitted to DEA, irrespective of the nature of the applicant. This decision has been made in terms of Section 24(C)(3) of the NEMA (Act No 107 of 1998). The decision is effective for all projects initiated before, and up until, approximately 2015.

The EIA process is divided into two key phases - Scoping and Environmental Impact Assessment. This Draft Environmental Scoping Report (DSR) presents the outcomes of the first phase of the environmental impact assessment process. The Scoping Process has been undertaken to identify and describe:

• The nature of the proposed project;
• The legal, policy and planning context for the proposed project;
• Important biophysical and socio-economic characteristics of the affected environment;
• Potential environmental issues or impacts, so they may be addressed in the EIA phase;
• Feasible alternatives that must be assessed in the EIA phase;
• The Plan of Study (POS) for the EIA phase.

Provision has been made in the Scoping Phase for the involvement of Interested and Affected Parties (I&APs) in the forthcoming EIA process.

Project Description

The term wind energy describes the process by which wind turbines convert the kinetic energy in the wind into mechanical power and a generator can then be used to convert this mechanical power into electricity. Typical turbine subsystems include:

<table>
<thead>
<tr>
<th>Regulations dated</th>
<th>more than 1 kilometre.</th>
<th>These roads will need to be upgraded (widened and re-surfaced) to allow access for large trucks transporting turbine components.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 June 2010.</td>
<td>(a) In the Eastern Cape:</td>
<td>(ii) Outside urban areas in: (bb) National Protected Areas Expansion Strategy Focus Areas (ee) Critical Biodiversity Areas as identified in systematic biodiversity plans (gg) Areas within 10 kilometers of National Parks</td>
</tr>
<tr>
<td></td>
<td>i. Within urban areas in:</td>
<td>Parts of the site are identified as focus areas for the expansion of National Parks. Parts of the site are identified as a CBA 1. The site is within 10 kilometers of the Groendal Nature Reserve.</td>
</tr>
</tbody>
</table>
• A rotor or blades – the portion of the wind turbine that collects energy from the wind and converts this wind energy into rotational shaft energy to turn the generator.

• A nacelle (enclosure) containing a drive train, usually including a gearbox (some turbines do not require a gearbox) and a generator which converts the turning motion of a wind turbine’s blades (mechanical energy) into electricity.

• A tower, to support the rotor and drive train - the tower on which a wind turbine is mounted is not only a support structure, but it also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations.

• Electronic equipment such as controls, electrical cables, ground support equipment, and interconnection equipment.

• Turbine step-up transformer that can be externally sited, depending on the turbine model.

The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of turbines with 3 blades each up to 65m in length, therefore rotor diameters of up to 130 meters, mounted atop an 80 - 120 meter high steel or hybrid steel/concrete tower. The electricity will be fed into the national Eskom grid.

Typically, the development of the wind energy facility is divided into various phases:-

- **Pre-feasibility**: Inyanda conducts surveys and consultations to determine project permitting and feasibility study requirements. This includes visits to local authorities, civil aviation authorities, identifying local communities, wind resource evaluation from existing data, grid connectivity, environmental impact assessment requirements, logistical and project phasing requirements.

- **Feasibility**: Inyanda will firm up and carry out thorough investigations to establish the actual costs, and economic viability of the project by designing the financial model with financial institutions, verifying wind resources by onsite measurement, ensuring grid connection is economical and feasible in the time frames of the project.

- **Wind Measurement**: Prior to the establishment of the full facility, it will be necessary to erect a number of wind measurement masts to gather wind speed data and correlate these measurements with other meteorological data in order to produce a final wind model of the proposed project site. The measurement campaign will last not less than 12 months in order to ensure verifiable data is used for the economics of the project.

- **Implementation**: Building of a wind farm comprises-
  
  **Civil works**:
  1. Roads: An internal road network will be constructed for access to each turbine and to the substation during the construction phase by construction vehicles and equipment (bulldozers, trucks, cranes etc.).
  2. Platforms: An area of approximately 40mx30m (depending on the turbine type) will be established for each turbine to allow the turbine lifting and enough spacing for the cranes.
  3. Turbine foundations: These will be of approximately 20mx20mx5m.
  4. Cabling: Underground 22kV or 33kV electrical cables will be entrenched adjacent to the access roads wherever practical (about 1m in depth) to connect the turbines to the electrical substation to be constructed on site.
  5. Civil works for the 22/132kV or 33/132kV electrical substation, including relevant buildings.

**Erection/commissioning**:  
1. Wind turbine erection: Each turbine will be erected by utilising suitable cranes.
2. Electrical equipment: Step-up transformer, switchgears, busbars and ancillary equipment will be installed in the electrical substation.
3. Commissioning and start-up: Once connected to the Eskom distribution grid, the commissioning of the wind farm with all relevant functional tests will be carried out up until the final start-up of the whole wind farm.

Commercial operation

During the period when the turbines are operational, there are only a few crews who carry out routine maintenance requiring only light vehicles to access the site. Only major breakdowns would necessitate the use of cranes and trucks.

- **Timing Estimation:**
  The overall wind farm construction schedule will be about 18-24 months, dependant on the procurement and delivery times of the turbine components and main equipment. Described below is a typical schedule:
  - Platforms/Roads/cables laydown = 35 weeks;
  - Turbines foundations = 10 weeks for each foundation (including 8 weeks to let the foundation concrete dry – these activities are conducted simultaneously for multiple turbine foundations);
  - Civil works for the substation = 16 weeks;
  - Wind turbines/electrical substation erection = 2 turbines/week (in good low wind weather conditions);
  - Substation erection = 8 weeks; and
  - Commissioning and electrical connection = 20 weeks.

- **Refurbishment and rehabilitation of the site after operation:** Current wind turbines are designed to last for 20-25 years and this is the figure that has been used to plan the life span of a modern wind farm. If refurbishment is economical, the facility life span could be expanded by another 20-25 years. If required, decommissioning of the wind energy facility at the end of its lifespan will be undertaken in agreement with the landowners and according to the land use agreement and relevant legislation.

The Affected Environment

**Climate**

The Eastern Cape Province of South Africa has a complex climate due to its location at the confluence of several climatic regimes, namely temperate and subtropical. As a result there are wide variations in temperature, rainfall and wind patterns, mainly as a result of movements of air masses, altitude, mountain orientation and the proximity of the Indian Ocean.

Rainfall is distributed equally over the year with the highest rainfall generally occurring in March and November. The average annual rainfall is 451 mm with the southern slopes being wetter (average annual rainfall: 461 mm) than the northern slopes (435 mm). Thunderstorms are frequent. Temperatures as high as 44°C are not uncommon, occurring as a result of warm winds from the high plateau. In low lying areas, the average maximum temperature recorded is 32°C in January and 18°C in July. The average minimum temperature is 15°C in January and 5°C in July. Frost is experienced in winter.

**Geology and topography**

The Eastern Cape Province contains a wide variety of landscapes, from the stark Karoo (the semi-desert region of the central interior) to mountain ranges and gentle hills rolling down to the sea. The climate and topography gives rise to the great diversity of vegetation types and habitats found in the region.
The site characterised by a steep hills arranged on an east-west axis, with slopes facing north and south. The elevation ranges between 280 and 1400 meters above sea level. The study area is has steep hills with high summits. The site is transected by three rivers which flow in an easterly direction across the site. Furthest south is the Elands River. In approximately the centre of the site is the Kwazungu River. Furthest north is the Kariega River. The rivers are fed by numerous streams draining off the surrounding slopes.

The dominant geological feature in this area is the east-west trending Cape Fold Belt. These mountain ranges consist mostly of the folded strata of the Cape Supergroup. The study area is found to be underlain by the Table Mountain and Bokkeveld Groups, these being groups within the Cape Supergroup sequence of rocks. The coarse textured rocks of the Table Mountain Group, typically found in sharply folded mountain systems, combined with steep slopes and a high percentage of quartz sand gives rise to coarse, unstructured, shallow and nutrient poor soils.

**Current land use**

The study area is currently predominantly utilised for agricultural, animal husbandry and game farming purposes. The majority owner of the study area land portions in question has removed livestock from his property to stock game, and consequently, the vegetation is in fairly good condition, as indicated by the resurgence of antelope species that have begun to recolonize the area.

**Vegetation and flora**

The vegetation of the Eastern Cape is complex and is transitional between the Cape and subtropical floras and many taxa of diverse phytogeographical affinities reach the limits of their distribution in this region. The region is best described as a tension zone where four major biomes converge and overlap (Lubke et al. 1988). The dominant vegetation is Succulent Thicket (Spekboomveld or Valley Bushveld), a dense spiny vegetation type unique to this region. While species in the canopy are of subtropical affinities, and generally widespread species, the succulents and geophytes that comprise the understorey are of karroid affinities and are often localised endemics.

There are three main vegetation classifications for the area. These are Mucina and Rutherford (2006), the Subtropical Thicket Ecosystem Project (STEP) and the Succulent Karoo Ecosystem Plan (SKEP). There are five Mucina and Rutherford (2006) and six STEP Vegetation types for the general project area. Mucina and Rutherford vegetation types include: Sundays Thicket, Albany Alluvial Vegetation, Kouga Grassy Sandstone Fynbos, Kouga Sandstone Fynbos and Groot Thicket. STEP vegetation types for the area include: Baviaans Spekboom Thicket, Cockscomb Mountain Fynbos Thicket, Zuurberg Forest Thicket, Sundays Spekboomveld, Sundays Doringveld and Kromme Fynbos/Renosterveld Mosaic

**Fauna**

Amphibians and reptiles are well represented in sub-Saharan Africa. However, distribution patterns in southern Africa are uneven both in terms of species distribution and in population numbers (du Preez and Carruthers, 2009). Climate, centres of origin and range restriction are the three main factors that determine species distribution. The eastern coast of South Africa has the highest amphibian diversity and endemicity while reptile diversity is generally highest in the north eastern extremes of South Africa and declines to the south and west (Alexander and Marais, 2010).

The Eastern Cape is home to 133 reptile species including 21 snakes, 27 lizards and eight chelonians (tortoises and turtles) (Branch,1998). The majority of these are found in Mesic Succulent Thicket and riverine habitats.
Consultation of the Animal Demography Unit historical records indicates that 15 species of reptiles are likely to occur in the project site. One of these (*Bradypodion taeniabronchum* – Elandsberg Dwarf Chameleon) is classified as Critically Endangered IUCN Red Data List.

According to historical records, 12 species of frog have been documented in the Quarter Degree Squares that the project area falls in. No species of conservation concern occur in the project area.

Nine bird species are endemic to South Africa, but there are no Eastern Cape endemics. However, there are 62 threatened species within the Eastern Cape Province (Barnes, 2000). Most of these species occur in grasslands or are associated with wetlands, indicating a need to conserve what is left of these ecosystems (Barnes, 2000). Historical records indicate that there is one *Endangered* species, three *Vulnerable* species and three *Near Threatened* Species likely to be found in the area.

Large game makes up less than 15% of the mammal species in South Africa and a much smaller percentage in numbers and biomass. In developed and farming areas, this percentage is greatly reduced, with the vast majority of mammals present being small or medium-sized. The conservation status of South African mammals has recently been re-assessed and a number of species have been downgraded, for example, the African wild cat, Aardvark, Blue duiker, and Honey badger are no longer considered threatened.

Of conservation importance in the Bavianskloof Mega Reserve is the presence of leopard populations. Internationally this species is classified as *Near Threatened*. In South Africa this species is listed by NEM:BA (2004) as vulnerable meaning that it faces “a high risk of extinction in the wild in the medium-term future, although they are not critically endangered”.

The Centre for African Conservation Ecology (ACE) estimate that there are between 10-17 individuals living in the BMR and that one of the major threats to this population is its vulnerability to becoming genetically isolated. Recent studies on leopard populations in the south eastern and western region of South Africa suggest that at least 21 individuals occur in the Cape Fold Mountains with nearly half of these originating between Addo Elephant National Park in the east and Uniondale in the west (Jeanine McManus pers. comm.; 2013). The data collected from this study raises concerns that further habitat fragmentation in this area will result in further isolating these populations, especially since leopards are territorial animals with large home ranges (30 000ha for males and 15 000 for females).

According to NEM:BA, three protected mammal species and one vulnerable species have distributions that coincide with the project area. Based on habitat availability it is likely that all four of these species are likely to occur on site (Stuart and Stuart, 2007).

**Socio-economic description**

The proposed Inyanda Wind Energy Facility is to be developed in the Sundays River Valley Municipality situated within the Cacadu District Municipality, Eastern Cape Province. The Sundays River Municipality is located approximately 80 km north and east of the Nelson Mandela Bay Municipality and includes the coastal zone between Alexandria and the Sundays River Mouth as well as inland areas that extend to the Klein Winterhoek and Zuurberg Mountains. The main activities in the area include high intensity irrigation farming, eco-tourism and game farming.

The population in this region is diversified across race groups and cultures, and is characterised by varying socio-economic levels of development. These statistics show a predominantly black population with the majority of the population being employed or not economically active. Children constitute 26.1 % of Sunday’s River Valley population, the economically active population is at 65.8 % and persons aged 65 and older is at 5.6 %.

The Cacadu District Municipality Integrated Development Plan (IDP) and the Sundays River Municipality IDP both recognize that although the electricity network within the District is generally
regarded as reasonable, there are slight disparities that exist between the different local municipalities due to their location. While the majority of the communities of most Local Municipalities have direct access to electricity there are backlogs with respect to electricity provision that need to be addressed. It is noted in the IDP that significant capital outlays will be required to upgrade both the urban and rural networks if they are to meet their target of ensuring universal access to electricity by 2014. The Sundays River Municipality recognises the need to develop alternative energy sources to meet these requirements.

The Public Participation Process

During the Scoping Phase a public participation process (PPP) will be undertaken to allow Interested and Affected Parties (I&APs) to voice their concerns and raise issues regarding the proposed project. The key elements of the process include:

- Development and distribution of a Background Information Documents (BID);
- Informing I&APs of the proposed development through newspaper advertisements, site notice boards and notification letters,
- A public meeting will be held during the 40 day public review of the Draft ESR. The availability of the report for review will be advertised in The Herald, Die Burger and the UD News, and all registered I&APs will be notified in writing of the review period and of the public meeting to be held.

Throughout this process, a register of I&APs will be compiled and maintained, together with a record of their comments and responses from the project proponent and the Environmental Assessment Practitioner. The Draft ESR will be made available to DEA and all I&APs to provide I&APs with an opportunity to review and comment on the report before it is finalised. This Draft ESR will take into account any comments received during the review period, and these will be included in the Final ESR that will be submitted to the DEA.

Issues and Concerns

Any issues identified and raised during the public consultation process, and responses thereto by the EAP, will be provided in Chapter 6 of the final scoping report.

Identification of Alternatives

Since the core business area of the project proponent is wind farm development for the generation of electricity, the fundamental alternative of a development other than to construct and operate a wind farm is not viable in this case, and will not be considered further in the EIA. Modifications or variations to the design of the wind farm that will facilitate the reduction or minimisation of environmental impacts i.e. incremental alternatives will be investigated, including modifications to the design or layout, technology and operational aspects of the proposed project.

The EIA Phase will also examine the impact of no development (i.e. the “No Go” option). The no-go alternative will be used as a baseline throughout the environmental assessment process against which potential impacts will be compared in an objective manner and will be fully assessed in the EIR.

The Way Forward – EIA Phase

This Draft Scoping Report (DSR) includes the outline of a Plan of Study (PoS) for the EIA phase, which includes Terms of Reference (ToR) for specialist studies as they are currently envisaged and the methodology that will be used to assess impacts and rate their significance. Consultation with DEA will be on going throughout this EIA. However, it is anticipated that DEA will provide relevant comment with respect to the adequacy of this Plan of Study for the EIA, as it informs the content of the Environmental Impact Report (EIR) and sufficiency thereof. The following specialist studies are
proposed for the EIA Phase of the assessment:

- Avifaunal Assessment (and 12 month/4 season preconstruction monitoring)
- Bat Assessment (and 12 month/4 season preconstruction monitoring)
- Noise Impact Assessment
- Visual Impact Assessment
- Heritage Impact Assessment
- Archaeological Impact Assessment
- Paleontological Impact Assessment
- Ecological Impact Assessment (incorporating flora and fauna)
- Agricultural Assessment
- Socio-economic Assessment
- Water-use general authorisation

The significance of impacts will be assessed based on specialist input using a standardised rating methodology. “Significance” includes the spatial and temporal scales of impacts, the likelihood of impacts occurring, and the severity of impacts or potential benefits.

An EIR will be prepared that will describe the nature of the proposed project and its environmental setting, summarise the results of the specialist studies, and recommend practical and reasonable mitigation measures to avoid, minimise or offset any negative impacts from the development. In this regard the EIA Phase will actively engage and contribute to the planning process so as to mitigate environmental impacts through improved design and layout. The overall objective of the EIR is to provide DEA with sufficient information about the proposed project and its associated environmental and social impacts on which to make an informed decision.

An Environmental Management Programme (EMP) will be prepared that provides practical and actionable management, monitoring and institutional measures to be undertaken during the construction, operation and decommissioning of the proposed wind energy facility. Such measures are designed to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The public participation process initiated in the Scoping Phase will continue throughout the EIA Phase.

In this regard a critical milestone of the EIA phase will be the Draft EIR and Draft EMP. These reports will be released for public review and comment, and will also be presented to I&APs during public meetings, before they are finalised and presented to DEA. An environmental authorisation may be granted or rejected by the authority based on the review of these reports. The decision will be advertised, and registered I&APs will also be informed in writing and given the opportunity to engage in the appeal process.
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BID</td>
<td>Background Information Document</td>
</tr>
<tr>
<td>CES</td>
<td>Coastal and Environmental Services</td>
</tr>
<tr>
<td>CITES</td>
<td>Committee for International Trade in Endangered Species</td>
</tr>
<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<tr>
<td>DWA</td>
<td>Department of Water Affairs</td>
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<tr>
<td>EAP</td>
<td>Environmental Assessment Practitioner</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
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<td>EMP</td>
<td>Environmental Management Programme</td>
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<tr>
<td>ESR</td>
<td>Environmental Scoping Report</td>
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<td>GNR</td>
<td>Government Notice Regulation</td>
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<td>ha</td>
<td>Hectare</td>
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<tr>
<td>I&amp;APs</td>
<td>Interested and Affected Parties</td>
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<tr>
<td>IPP</td>
<td>Independent Power Producer</td>
</tr>
<tr>
<td>kV</td>
<td>Kilovolt</td>
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<tr>
<td>Ltd</td>
<td>Limited</td>
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<tr>
<td>MW</td>
<td>Mega Watts</td>
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<tr>
<td>NERSA</td>
<td>National Energy Regulator of South Africa</td>
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<tr>
<td>PNCO</td>
<td>Provincial Nature Conservation Ordinance</td>
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<tr>
<td>PoS</td>
<td>Plan of Study</td>
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<tr>
<td>PPA</td>
<td>Power Purchase Agreement</td>
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<td>PPP</td>
<td>Public Participation Process</td>
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<tr>
<td>RDB</td>
<td>Red Data Book</td>
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<tr>
<td>REFIT</td>
<td>Renewable Feed In Tariff</td>
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<tr>
<td>SSC</td>
<td>Species of Special Concern</td>
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<tr>
<td>ToR</td>
<td>Terms of Reference</td>
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<td>WT</td>
<td>Wind Turbine</td>
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1. INTRODUCTION

1.1. BACKGROUND TO THE STUDY

Inyanda Energy Projects (PTY) LTD - Inyanda Energy - a renewable energy company, plans to develop a wind energy facility (or ‘wind farm’ to be named the Inyanda - Roodeplaat WEF) between the towns of Patensie and Kirkwood, within the Sundays River Valley Municipality, Eastern Cape Province, South Africa (Figure 1 overleaf). According to Inyanda, available wind data in South Africa shows this area to have favourable wind conditions sufficient to support a wind farm. This has been confirmed by on site wind monitoring that has been ongoing since June 2012. The proposed project area consists of approximately 12 000 ha located on 24 property portions illustrated in the table below (Table 1-1).

Table 1-1: Farm name and property portions comprising the study area

<table>
<thead>
<tr>
<th>Farm Number</th>
<th>Property Portion</th>
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<tbody>
<tr>
<td>170</td>
<td>Portion 3</td>
</tr>
<tr>
<td>245</td>
<td>Portion 1</td>
</tr>
<tr>
<td>246</td>
<td>Portion 1 and Remaining Extent</td>
</tr>
<tr>
<td>247</td>
<td>Portion 1</td>
</tr>
<tr>
<td>248</td>
<td>Portion 1, Remaining Extent</td>
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<tr>
<td>277</td>
<td>Portion 1, Remaining Extent</td>
</tr>
<tr>
<td>278</td>
<td>Portion 1, 3, 4 and remaining Extent</td>
</tr>
<tr>
<td>279</td>
<td>Portion 3, 4 and remaining Extent</td>
</tr>
<tr>
<td>280</td>
<td>Portion 1</td>
</tr>
<tr>
<td>346</td>
<td>Remaining Extent</td>
</tr>
<tr>
<td>347</td>
<td>Portion 3</td>
</tr>
<tr>
<td>348</td>
<td>Portion 1</td>
</tr>
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<td>350</td>
<td>Portion 5 and 6</td>
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<tr>
<td>364</td>
<td>Portion 2 and 3</td>
</tr>
<tr>
<td>588</td>
<td>Portion 1 and 2</td>
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</tbody>
</table>

The proposed Inyanda - Roodeplaat WEF will consist of approximately 35 turbines each capable of generating 1.8 – 6.15 Mega Watts (MW) of power depending on the model and size of turbine selected. The turbine footprints and associated facility infrastructure (internal access roads, substation, construction compound, batching plant and operations building) will potentially cover an area of approximately 60 ha depending on final layout design should the project proceed. An investigation of the wind regime of the site will decide the model of turbines to be installed. The facility will have a maximum generating output of up to 140 MW.

In accordance with the requirements of the National Environmental Management Act No. 107 of 1998, and relevant Environmental Impact Assessment (EIA) regulations made in terms of this Act (Government Notice No R.543) promulgated in 2010, the proposed project requires a full Scoping and EIA process to be conducted. Coastal & Environmental Services (CES) have been appointed by Inyanda Energy to conduct the EIA process.

1.2. THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The EIA process is guided by regulations made in terms of Chapter 5 of the National Environmental Management Act No. 107 of 1998 (NEMA), published as Government Notice No R.543 in Government Gazette No 33306 of 2 August 2010. The regulations set out the procedures
and criteria for the submission, processing and consideration of and decisions on applications for the environmental authorisation of activities.

Three lists of activities, published on 2 August 2010, as Government Notice Numbers R.544, R.545 and R.546, define the activities that require, respectively, a Basic Assessment (applies to activities with limited environmental impacts), or a Scoping and Environmental Impact Assessment (applies to activities which are significant in extent and duration).

The activities triggered by the proposed Inyanda - Roodeplaat wind energy project are listed in Table 1-2 below.

### Table 1-2: Listed activities potentially triggered by the proposed Inyanda - Roodeplaat Wind Energy Project

| Listing notice 1 of GNR 544 EIA regulations dated 18 June 2010. | Activity No (s) (in terms of the relevant notice): | Description of each listed activity as per project description:

(10) The construction of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; A substation will be constructed on site which will collect power generated by the turbines, step up the voltage, and then transfer this power via an overhead power line to Eskom infrastructure (either a substation or a transmission line).

(18) The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a watercourse. The project will involve the construction of roads and underground electrical cables which are likely to cross drainage lines or watercourses.

(38) The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase. Wherever possible underground cabling will link the turbines with an on-site substation proposed to be constructed as part of the facility. An overhead line will then link this substation with an Eskom substation or overhead line.

Listing notice 2 of GNR 545 EIA regulations dated 18 June 2010. | Activity No (s) (in terms of the relevant notice): |

(1) The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more. The exact amount of power to be produced by the facility will be specified in the EIR.

(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. Wherever possible underground cabling will link the turbines with an on-site substation proposed to be constructed as part of the facility. An overhead line will then link this substation with the nearest Eskom substation or overhead line.

(15) Physical alteration of undeveloped, vacant or derelict land for commercial and industrial use where the total area to be transformed is 20 hectares or more. The exact construction phase footprint and operation phase footprint will be specified in the EIR.

Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010. | Activity No (s) (in terms of the relevant notice): |

(4) The construction of a road wider than 4 metres with a reserve less than 13.5 metres. Roads will need to be constructed that will link the turbines and other infrastructure components.

---

2 Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.
### Volume 1: Environmental Scoping Report – Introduction

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
</table>
| 18 June 2010. | (a) In the Eastern Cape:  
ii. Outside urban areas in:  
(bb) National Protected Areas Expansion Strategy Focus Areas  
(ee) Critical Biodiversity Areas as identified in systematic biodiversity plans  
(gg) Areas within 10 kilometers of National Parks |

Parts of the site are identified as focus areas for the expansion of National Parks. Parts of the site are identified as a CBA 1. The site is within 10 kilometers of the Groendal Nature Reserve.  

**Refer to Figure 1-1 overleaf.**

<table>
<thead>
<tr>
<th>Date</th>
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</table>
| 18 June 2010. | (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. |

Vegetation will be cleared during the construction of access roads, hard stand areas, the substation and the turbine foundations. This is likely to amount to more than 5 hectares.  

**Refer to Figure 1-1 overleaf.**

<table>
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</table>
| 18 June 2010. | (16) The construction of:  
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 Eastern Cape:  
i. Outside urban areas.  
(bb) National Protected Areas Expansion Strategy Focus Areas  
(ff) Critical Biodiversity Areas as identified in systematic biodiversity plans  
(hh) Areas within 10 kilometers of National Parks |

Parts of the site are identified as focus areas for the expansion of National Parks. Parts of the site are identified as a CBA 1. The site is within 10 kilometers of the Groendal Nature Reserve.  

**Refer to Figure 1-1 overleaf.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Details</th>
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</table>
| 18 June 2010. | (19) The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.  
(a) In the Eastern Cape:  
i. Outside urban areas in:  
(bb) National Protected Areas Expansion Strategy Focus Areas  
(ee) Critical Biodiversity Areas as identified in systematic biodiversity plans  
(gg) Areas within 10 kilometers of National Parks |

Existing farm roads will be utilised where possible to minimise the project footprint. These roads will need to be upgraded (widened and re-surfaced) to allow access for large trucks transporting turbine components.  

Parts of the site are identified as focus areas for the expansion of National Parks. Parts of the site are identified as a CBA 1. The site is within 10 kilometers of the Groendal Nature Reserve. 

Because the proposed development triggers a number of listed activities from GNR.545, it will require a full Scoping and EIA. This process (Figure 1-2) is regulated by Chapter 3 of Part 3 of the EIA regulations and described in detail in Appendix A of this report.

The competent authority that must consider and decide on the application for authorisation in respect of the activities listed in Table 1-1 is the Department of Environmental Affairs (DEA), as the Department has reached agreement with all Provinces that all electricity-related projects, including generation, transmission and distribution, are to be submitted to DEA, irrespective of the nature of the applicant. This decision has been made in terms of Section 24(C)(3) of the National Environmental Management Act (Act No 107 of 1998). The decision is effective for all projects initiated before, and up until, approximately 2015.
Figure 1-1: Protected Areas, National Protected Expansion Strategy Areas and Critical Biodiversity Areas found within or near the project site and which trigger Listing Notice 3. Note Groendal Nature Reserve that adjoins the project study area on the eastern and western boundaries.
Volume 1: Environmental Scoping Report – Introduction

**Contextualise Proposed Development**

**Pre-Application Planning (Screening)**
(*Determine assessment process using NEMA, 1998 and associated GNR 543-546 of 2010*)

**Adopt the Scoping & Environmental Impact Assessment Process**

- Submit Application to Relevant Authority
- Conduct Public Participation Process

**Compile Scoping Report and Plan of Study for EIA**

- Public Review of Scoping Report and Plan of Study of EIA

**Authority Review of Scoping Report and Plan of Study of the EIA**

- Request Amendments
- Accept

**Conduct Environmental Impact Assessment**

- Compile EIR and EMP

- Public Review of EIR and EMP

- Authority Review of EIR and EMP

- Request Amendments
- Accept

**Issue Environmental Authorisation and notify applicant of conditions and appeal provisions**

- Notify I&APs of Environmental Authorisation & appeal provisions

- Consider Appeals if any

**Figure 1-2: The EIA process under current legislation (NEMA 1998)**
In addition to the requirements for an authorisation in terms of the NEMA, there may be additional legislative requirements that need to be considered prior to commencing with the activity, for example: the National Heritage Resources Act (Act No 25 of 1999), the National Water Act (Act No 36 of 1998), Civil Aviation Act (Act No 74 of 1962) as amended, National Environmental Management Biodiversity Act 10 of 2004, National Forests Act 84 of 1998 and the Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974 to name the most relevant. These are discussed in detail in Chapter 3 of this report.

1.3. MOTIVATION FOR ACTIVITY

According to regulation 28 (1) of the EIA regulations (2010), A scoping report must include –

   a) a description of the need and desirability of the proposed activity

   b) a description of the need and desirability of the proposed activity

Electricity supply

According to the project proponent, the establishment of the proposed WEF will contribute to strengthening the existing electricity grid for the area and will aid the government in achieving its goal of a 30% share of all new power generation being derived from Independent Power Producers (IPPs). In addition to the above-mentioned potential benefits, the proposed project site was selected due to:

- Good wind resources suitable for the installation of a large wind energy facility.
- The proposed project site has localised wind potentially intensified by a funnelling effect caused by surrounding topographical features.
- The site is accessible from gravel roads off the R75 which will assist in the transportation of wind turbine components to the site.
- The surrounding area is not densely populated.
- There is potential and a desire within the Sundays River Valley Local Municipality to engage with new technologies and industries.

The Inyanda - Roodeplaat WEF will provide additional electricity and greater grid stability. Upgrading of the local electricity supply infrastructure may be required depending on the actual maximum installed capacity of the WEF. The local Municipality is the provider of electricity within Sundays River Valley Municipality and has identified the supply of electricity as a priority issue in its Integrated Development Plan (IDP) based on the weaknesses specific to electricity supply below:

- Scattered households impede electrification
- Some of the areas are inaccessible
- Limited substations, many areas far from the grid
- Load shedding by Eskom
- Electricity increases will affect affordability
- Over-subsidizing of consumers

Climate change

Most of South Africa’s energy comes from non-renewable sources like coal, petroleum, natural gas, propane, and uranium; however the proponents of renewable energy sources like biomass, geothermal energy, hydropower, solar energy, and wind energy is a major factor that the South African sector need to consider greatly. It is estimated that approximately 1% only of the country’s electricity is currently generated from renewable energy sources. The energy sector in South Africa alone emits approximately 380 988.41 Green House Gases (GHGs) (Eastern Cape Climate Change Conference, 2011). South Africa’s total emissions was estimated to be 461 million tonnes CO₂ equivalent in the year 2000. Approximately 83% of these emissions were associated with energy supply and consumption (380 988.41 GHGs), 7% from industrial processes, 8% from agriculture, and 2% from waste. Eskom currently generates 95% of the electricity used in South Africa with an approximate 40.87 GW net maximum installed capacity.
By the year 2020 an additional 20 GW generation capacity would be required and up to 40 GW by 2030 to sustain the energy demands in the country. National energy policy has called for a change in the energy mix to reduce the dependency of the economy on fossil fuels and facilitate the uptake of renewable energy resources. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997. South Africa has put in place a long term mitigation scenario (LTMS) by which the country aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. During this period (2003-2050) South Africa will aim to take action to mitigate GHG emissions by 30% to 40% by the year 2050. This is a reduction of between 9000 tons and 17 500 tons of CO₂ by 2050. In January 2010, South Africa pledged to the UNFCCC, a 34% and 42% reduction against business as usual emissions growth trajectory by the year 2020 and 2025 respectively.

Due to concerns such as climate change, and the on-going exploitation of non-renewable resources, there is increasing international pressure on countries to increase their share of renewable energy generation. The South African Government (White Paper on Renewable Energy, 2003) has recognised the country’s high level of untapped renewable energy potential and the equally high level of current fossil-fired power generation, and has placed targets of 10 000 GWh of renewable energy (biomass, wind, solar and small hydro) by 2013 in order to begin to redress the balance..

South Africa’s current electricity generation and supply system is over stretched with the Eastern Cape Province constrained by the availability and stability of electricity supply reliant on the import of power. Under the IPP Producer Procurement Programme, South Africa will seek to procure the first 3725 MW of renewable capacity by 2016 (1850 MW of on-shore wind) to meet the renewable energy target of 4000 MW by 2014 and 9000 MW by 2030. Fossil fuels supply 90% of South Africa’s energy needs with demands on energy supply increasing by 3.5% in the next 20 years. The establishment of the proposed Inyanda - Roodeplaat WEF will assist in strengthening the existing electricity grid for the area and contribute to government achieving its goal of a 30% share of all new power generation being derived from Independent Power Producers (IPP).

Social and economic development

Inyanda Energy intends to promote local economic growth and development through direct and indirect employment, as well as the identification and implementation of social development schemes during the projects operational phase. A local community trust or organisation is intended to directly benefit from the project.

Conservation potential

As noted above, the proposed wind energy facility is located within an area designated as a National Protected Areas Expansion Strategy Area (PAES). The project study area forms a contiguous corridor linking two disparate sections of the adjacent Groendal Nature Reserve (Figure 1-1). Although historically utilised for agricultural and livestock production purposes, these land portions have mostly been purchased by Mr Ronnie Watson (one of Inyanda Energy’s associates), who is gradually converting these portions to game farming land uses. Mr Watson is investigating setting aside some of these portions as conservancy areas to offset the impact of the wind energy facility. In theory, the addition of these property portions to the disparate Groendal Nature Reserve portions will create a connection corridor between these two portions which would be desirable from a conservation perspective. The potential, or even viability of this proposal, will need to be discussed with relevant parks and conservation bodies, at national and provincial level. It is intended to commence these focus group meetings in the Scoping phase and key stakeholders have been identified to initiate these discussions. Should the proposal be viable it would have to be subject to a biodiversity offset process assessment in the EIA phase of this reporting process.
1.4. SCOPING PHASE

The proposed project is currently in the Scoping Phase. The aim of this phase is to determine, in detail, the scope of the EIA required for the proposed activities. The principal objectives of the Scoping Phase in accordance with the regulatory requirements are to:

- Describe the nature of the proposed project;
- Enable preliminary identification and assessment of potential environmental issues or impacts to be addressed in the subsequent EIA phase;
- Define the legal, policy and planning context for the proposed project;
- Describe important biophysical and socio-economic characteristics of the affected environment;
- Undertake a public participation process that provides opportunities for all Interested and Affected Parties (I&APs) to be involved;
- Identify feasible alternatives that must be assessed in the EIA phase; and
- Define the Plan of Study (PoS) for the EIA phase.

1.5. THE SCOPING REPORT

This report is the first of a number of reports that will be produced in the EIA process (see Figure 1-2 above). The scoping report has been produced in accordance with the requirements as stipulated in Section 28 of the EIA regulations (GNR 543), which clearly outlines the content of a scoping report, and Sections 54-57 which cover the activities necessary for a successful Public Participation Process (PPP). Section 1.5.1 below provides the detailed structure of this scoping report and section 1.5.2 that follows outlines the limitations and assumptions under which this report was compiled.

1.5.1. Structure

The structure of the report is as follows:

**Chapter 1 - Introduction:** Provides background information on the proposed project, a brief description of the EIA process required by NEMA and its associated regulations, and describes the key steps in the EIA process that have been undertaken thus far, and those that will be undertaken in the future. The details and expertise of the Environmental Assessment Practitioner (EAP) who prepared this report are also provided in this Chapter.

**Chapter 2 – Project description:** Provides a description of the proposed development, the property on which the development is to be undertaken and the location of the development on the property. The technical details of the process to be undertaken are also provided in this Chapter.

**Chapter 3 – Relevant Legislation:** Identifies all the legislation and guidelines that have been considered in the preparation of this scoping report.

**Chapter 4 – Description of the affected environment:** Provides a brief overview of the biophysical and socio-economic characteristics of the site and its environs that may be affected by the proposed development compiled largely from published information, but supplemented by information from a site visit.

**Chapter 5 – Public Participation Process:** Provides details of the public participation process conducted in terms of Regulation 28(a) including:

- The measures undertaken thus far to notify I&APs of the application;
- Proof that notice boards, advertisements and notices notifying potential I&APs of the application have been displayed, placed or given;
- A list of all persons and organisations that were identified and registered in terms of Regulation 57 as I&APs in relation to the application.
Chapter 6 – Issues identified during Scoping: Provides a description of the key issues that have been identified by the project team and through discussions with I&APs thus far in the Scoping Phase, and that will be assessed in the EIA phase.

Chapter 7 - Alternatives: Provides a brief discussion of the feasible and reasonable alternatives to the proposed project that have been identified and considered, some of which will be investigated further in the EIA Phase.

Chapter 8 - Plan of Study: Sets out the proposed approach to the environmental impact assessment of the proposed project including:

- A description of the scope of work that will be undertaken as part of the EIA phase, including any specialist reports or specialised processes, and the manner in which the described scope of work will be undertaken;
- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed methodology for assessing the environmental issues and alternatives, including the option of not proceeding with the proposed development;
- Particulars of the public participation process that will be conducted during the EIA phase; and
- Any specific information required by the authority.

References: Cites any texts referred to during preparation of this report.

Appendices: Containing all supporting information

1.5.2. Assumptions and Limitations

This report is based on currently available information and, as a result, the following limitations and assumptions are implicit in it:

- Descriptions of the natural and social environments are based on limited fieldwork and available literature. More information will be provided in the EIA phase based on the outcomes of the specialist studies.
- The report is based on a project description taken from preliminary design specifications and site layouts for the proposed wind energy facility that have not yet been finalised and are likely to undergo a number of iterations and refinements before they can be regarded as definitive. All potential turbine array alternatives will, however, be contained within the property boundaries of the study area.
- The preliminary turbine site layout and associated infrastructure will be presented in the EIA phase and subject to the necessary specialist assessments. It is anticipated that this preliminary layout will be further refined as per the outcomes of these studies and overall EIA findings.

1.6. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

According to regulation 17 of the EIA regulations (2010), An EAP must –
(a) be independent; and
(b) have expertise in conducting environmental impact assessments, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity

In fulfilment of the above-mentioned legislative requirement, provided below are the details of the Environmental Assessment Practitioner (EAP) that prepared this final scoping report as well as the expertise of the individual members of the study team.

1.6.1. Details of the Environmental Consultant

Coastal and Environmental Services (CES)
1.6.2. Expertise of the Consultancy and Environmental Assessment Practitioner (EAP)

CES is a specialist environmental consulting firms in southern Africa. Established in 1990, and with offices in Grahamstown, East London, Port Elizabeth, Cape Town and Maputo, they primarily specialise in assessing the impacts of development on the natural, social and economic environments. CES’s core expertise lies in the fields of strategic environmental assessment, environmental management plans, environmental management systems, ecological/environmental water requirements, environmental risk assessment, environmental auditing and monitoring, integrated coastal zone management, social impact assessment and state of environment reporting. In addition to adhering to all relevant national legislative requirements, CES is often required to review and summarise for specific projects, acquisition of equity funding from the majority of financial institutions demands that developments must meet certain minimum standards that are generally benchmarked against the Policy and Performance Standards of the International Finance Corporation and the World Bank Operational Directives and Policies. CES has worked on large projects in throughout Africa and the Indian Ocean islands.

Provided below are short *curriculum vitae* (CVs) of each of the team members involved in the proposed project EIA to date, as well as the EAP and Project Leader, Marc Hardy.

**Dr. Kevin Whittington-Jones**  
*(Role: Report Review)*  
Kevin holds a PhD in Environmental Biotechnology and an MSc in Zoology (marine ecology) and is a Director at CES. His professional interests include environmental business risk, management systems, waste management and climate change. Prior to joining CES he held various academic posts at Rhodes University, including that of Senior Lecturer at the Rhodes Investec Business School. Kevin has consulted extensively on environmental issues throughout Africa, including South Africa, Namibia, Swaziland, Mozambique, Sierra Leone, Kenya, Madagascar and Egypt. In additional to routine environmental impact assessments, waste management specialist studies and environmental due diligence and site contamination assessments, he has been actively involved in a number of climate change-related projects. These include the climate change risk assessment for all South African ports, the Greenhouse Gas Assessments for two biofuel projects and a heavy mineral mining operation and the climate change strategy for the Eastern Cape Province of South Africa. He has also been involved in EIAs for numerous wind farm projects around South Africa.

**Mr Marc Hardy**  
*(Role: Project Leader and Environmental Assessment Practitioner - EAP)*  
Marc holds a M. Phil (Environmental Management) from the University of Stellenbosch’s School of Public Management and Planning. His professional interests include environmental impact reporting for linear, energy and bulk infrastructure projects, strategic environmental policy development and reporting, compliance monitoring and environmental auditing. Before entering the consulting field he gained extensive experience in the EIA regulatory field whilst in the employ of the Gauteng Department of Agriculture, Conservation and Environment being responsible for the review of infrastructure projects such as the Gautrain Rapid Rail Link and representing the Department on various spatial and environmental planning project steering committees. Prior to joining CES Marc has been project manager for, amongst others, the Dinokeng EMF (Gauteng), the Milnerton Refinery to Ankerlig Power Station Liquid Fuels Transportation Infrastructure Project (on behalf of Eskom Generation – Cape Town), numerous Eskom Transmission and Distribution power line and substation EIAs countrywide, mining EMPR compliance audits, the Return-To-Service compliance audits for Camden, Grootvlei and Komati Power Stations (Mpumalanga Province) and the new high hazard waste management facility for the Coega Development
Corporation (Coega IDZ). He is currently managing the EIA processes for numerous large infrastructure, renewable energy and mining developments throughout Africa.

**Ms Amber Jackson**
*(Role: Project Manager and report production)*
Ms Amber Jackson, has an M.Phil in Environmental Management from the University of Cape Town. Topics covered included environmental management theory, social and ecological systems, climate change and environmental law. With a dissertation in food security that investigated the complex food system of soft vegetables produced in the Philippi Horticultural Area and the soft vegetables purchased at different links, both formal and informal, in the food system. Prior to this she obtained a BSc degree in Zoology and ‘Ecology, Conservation and Environment’ and a BSc (Hons) in ‘Ecology, Conservation and Environment’ from the University of the Witwatersrand. Her honours thesis title was: Landscape Effects on the Richness and Abundance of the Herpetofauna in the Kruger National Park.

**Ms Tarryn Martin**
*(Role: Report Production and botanical specialist)*
Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and a MSc with distinction in Botany from Rhodes University. Tarryn’s Master’s thesis examined the impact of fire on the recovery of C₃ and C₄ Panicoid and non-Panicoid grasses within the context of climate change. She conducts vegetation assessments including vegetation and sensitivity mapping to guide developments, thereby minimising their impacts on sensitive vegetation. Her experience includes local South African Projects as well as international projects in Mozambique.

**Mr Justin Green**
*(Role: Public Participation and report production)*
Justin has a B.Sc. degree in Zoology and Entomology as well as a Post Graduate Diploma in Enterprise Management from Rhodes University. Justin’s research interests include a broad range of environmental conservation focussing on African mammalogy and estuarine ecology with the main focus on invertebrate faunal community structure. Justin is currently employed in the Grahamstown office of CES.
2. PROJECT DESCRIPTION

According to regulation 28 (1) of the EIA regulations (2010), a scoping report must include –
(b) a description of the proposed activity;
(d) a description of the property on which the activity is to be undertaken and the location of the activity on
the property, or if it is –
(i) a linear activity, a description of the route of the activity; or
(ii) an ocean-based activity, the coordinates where the activity is to be undertaken

This chapter identifies the location and size of the site of the proposed Inyanda-Roodeplaat WEF,
and provides a description of its various infrastructure components and arrangements on the site.

2.1. LOCATION AND SITE DESCRIPTION OF THE PROPOSED PROJECT

The proposed wind farm is located in the Sundays River Valley Municipality within the Cacadu
District Municipality, Eastern Cape Province, South Africa (Figure 2-1 and 2-2). The project has a
study area of approximately 12 000 ha located on 24 property portions which are listed in Table 1-1.
These farms are currently used for animal husbandry and agriculture, primarily the grazing of
domestic and game animals, as well as for conservation and tourism. A more detailed description
of the activities associated with the proposed wind energy facility is contained in Section 2.2.

Figure 2-1: Location of the proposed Inyanda-Roodeplaat wind energy project.
Figure 2-2: The property portions and turbine locations of the proposed Inyanda-Roodeplaat WEF. Road and cable layouts still need to be defined but will follow the turbine arrays as closely as possible. Road access to the project area is from the north (R75).
2.2. DETAILED DESCRIPTION OF THE PROPOSED PROJECT

The wind energy facility which will be spread over 24 adjacent property portions in the project area. These land portions are planned to host up to 35 turbines, each with a nominal power output ranging between –1.8 – 6.15 Mega Watts (MW). The maximum total potential output of the wind farm would be up to 140 MW, which will serve to further support the regional and national power balance. The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of 3 blades each up to 65m in length therefore creating rotor diameters of up to 130 meters mounted atop a 80 - 120 meter high steel (or hybrid steel/concrete) tower. Other infrastructure components associated with the proposed wind energy facility are *inter alia*:

- Concrete or rock adaptor foundations to support the wind turbine towers.
- Internal access roads to each turbine - approximately 6 meters wide.
- Underground cables connecting the wind turbines wherever practical.
- 132kV electrical substation.
- Possible upgrading of existing roads for the transportation of the turbines to the wind energy facility.
- Buildings to house the control instrumentation, as well as a store room for the maintenance equipment.
- Construction compound and batching plant

2.2.1. Production of electricity from wind

Wind energy is a form of solar energy. Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth’s surface, and rotation of the earth. Wind flow patterns are modified by the earth’s terrain, bodies of water, and vegetation. This wind flow or motion energy (kinetic energy) can be used for generating electricity. The term “wind energy” describes the process by which wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power and a generator can then be used to convert this mechanical power into electricity. A typical wind turbine consists of (refer to Figure 2-3):
Figure 2-3: Illustration of the main components of a typical wind turbine. Note that certain models have an internal transformer.

- A rotor, with 3 blades, which react with the wind and convert the energy into rotational motion;
- A nacelle which houses the equipment at the top of the tower;
- A tower, to support the nacelle and rotor;
- Electronic equipment i.e. controls, transformers, electrical cables and switchgear, ground support equipment, and interconnection equipment; and
- Turbine step-up transformer which can be externally sited to the turbine (refer to Plate 2-1), alternatively, depending on the turbine model this may be inside the turbine structure.

The amount of energy which the wind transfers to the rotor depends on the density of the air (the heavier the air, the more energy received by the turbine), the rotor area (the bigger the rotor diameter, the more energy received by the turbine), and the wind speed (the faster the wind, the more energy received by the turbine). Provided in the sections that follow, is a detailed discussion on the various components of the proposed project.

Plate 2-1: Photographs illustrating the external turbine step-up transformer

2.2.2. Stages of wind farm development

Typically, the development of a wind farm is divided into four phases namely:-

- Pre-feasibility