Environmental Impact Assessment for the proposed Banna Ba Pifhu Wind Energy Project near Humansdorp, Eastern Cape: Final Environmental Impact Assessment Report

Chapter 10:

Economic Impacts

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CHAPTER 10. ECONOMIC IMPACTS

This Chapter presents the Economic Assessment conducted by Dr Hugo van Zyl of Independent Economic Research for the Banna Ba Pifhu wind energy EIA.

10.1 INTRODUCTION

10.1.1 Terms of reference

WKN Windcurrent SA (Pty) Ltd is proposing to construct a wind energy facility near Humansdorp in the Kouga Municipal area of the Eastern Cape Province. The proposed project, referred to as the Banna Ba Pifhu Wind Energy Project, will utilise wind turbines with a combined generation capacity of 30.6 MW.

The CSIR has been appointed as the lead consultant by the proponents to conduct the EIA process of the proposed development being done in terms of the NEMA regulations. This economic specialist study forms part of the assessment phase of the EIA process. Its brief is to:

- Describe the existing economic characteristics/context of the local area and broader region.
- Identify and assess potential economic impacts at local as well as wider scales as relevant. These are expected to include the following:
  - Broad level review of the need and financial viability/risks associated with the project.
  - Degree of fit with local, regional and national economic development visions and plans including renewable energy planning
  - Impacts on overall economic development potential in the area including impacts on commercial enterprises nearby the site (incl. agriculture, small businesses, tourism establishments and others).
  - Impacts associated with project expenditure on direct and indirect employment and household incomes. These impacts should be investigated through an examination of how the project and the spending injection associated with it may impact on the local, regional and national economy.
  - Impacts associated with environmental impacts that have economic implications. This should focus on positive impacts associated with renewable energy use as well as potential negative impacts on neighbouring land owners should they be relevant.

- Propose and implement additional ToR, if required, based on professional expertise, experience and compliance with the relevant specialist study guidelines and best practice.

10.1.2 Approach and information sources

The approach adopted involved the following steps in line with accepted EIA practice:

1. Investigate the existing economic context within which the project would be established.
2. Identify economic impacts.
3. Evaluate economic impacts including those of a cumulative nature.
4. Recommend mitigation measures.

Guidance on approach was taken from the Department of Environmental Affairs and Development Planning (Western Cape) guidelines on economic specialist input to EIA processes which are broadly based on a cost-benefit approach to assessment (van Zyl *et al*., 2005). They include guidance on the appropriate level of detail required for the assessment in order that it is adequate for informing decision-making without going into superfluous detail (i.e. superfluous detail in this report as well as superfluous detail when the briefs of other specialist studies forming part of the EIA are taken into account). While these guidelines were developed as part of a Western Cape government initiative, they are equally applicable to other parts of South African and were endorsed at a national level by the then Department of Environment Affairs and Tourism. Impact significance ratings were generated using CSIR guidelines for impact rating (see Appendix 10.1 for an outline of these guidelines). All ratings reflect a consideration of direct and cumulative impacts.

Information was gathered from the following sources in order to investigate the existing economic situation that would be affected by the project:

- Information generated during consultations with the public and authorities.
- Census 2001 and Community Survey 2007 data from the Statistics South Africa database.
- Local economic development and planning documents.

Details on the approaches used to assess impacts are contained in the individual sections dealing with the impacts.

10.1.3 Assumptions and limitations

- All technical, financial (i.e. market surveys, business plans and costs) and other information provided by the proponent and other official sources is assumed to be correct.
- The quantification of economic impacts in order to inform the assessment of the significance of impacts was not possible, nor considered necessary, for all impacts. Where possible, quantification focused on impacts considered to be most important in the overall assessment. Assessments of impact significance made without quantification (and based on a consideration of the

likely magnitudes of impacts and/or expert judgements) are, however, considered adequate unless otherwise specified.

- The assessment only considers the impacts of the proposed project and the no-go and does not make comparisons with other wind energy projects.
- The assessment borrows heavily from information gathered as part of the compilation of the economic specialist studies forming part of the EIAs of the Mainstream Jeffrey's Bay Wind Energy Project and the Windcurrent Ubuntu Wind Energy Project also near Jeffrey's Bay. This is done only where relevant and in order to avoid unnecessary duplication of effort.
- The findings of the assessment reflect the best professional assessment of the author drawing on relevant and available information within the constraints of time and resources thought appropriate and made available for the assessment. See Appendix 10.2 for the disclaimer associated with this report.

10.1.4 Expertise and declaration of independence

The report was compiled by Dr. Hugo van Zyl. Dr. van Zyl holds a PhD in economics from the University of Cape Town. He has fourteen years experience focusing on the analysis of projects and policies with significant environmental and development implications and has been involved in project appraisals of infrastructure projects, industrial and mining developments, mixed use developments, conservation projects and eco-tourism initiatives throughout Southern Africa. He has lead, participated in and co-ordinated research in economic impact assessment, environmental resource economics and project appraisal and has contributed specialist input to over 50 environmental assessments (EIAs and SEAs). Dr. van Zyl is also the lead author of the Western Cape Department of Environmental Affairs and Development Planning guidelines on economic specialist input into EIAs (van Zyl *et al*., 2005).

Declaration of Independence

I, Dr Hugo van Zyl, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed WKN Windcurrent SA (Pty) Ltd Wind Energy Project, application or appeal in respect of which I was appointed, other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

Dr Hugo van Zyl
(Independent Economic Researchers)

10.2 DESCRIPTION OF THE AFFECTED ECONOMIC ENVIRONMENT

The significance of impacts is often highly dependent on the economic environment or context within which they occur. For example, job creation in a small local community with a stagnating economy and high unemployment will be far more significant than it would be in a larger community with a healthy economy. In order to offer such baseline information to the impact assessment this section describes the economic environment. The main information sources used were Census 2001 data, Community Survey 2007 data, Integrated Development Plans (IDPs) and Demarcation Board data.

The site is between Humansdorp and St Francis Bay and forms part of the Kouga Municipality, which, in turn, forms part of the Cacadu District Municipality in the Eastern Cape.

According to the Kouga IDP, "The Regional settlement pattern in the study area is characterised by various nodes and urban areas that have different functions within the region. Humansdorp, with the highest population concentration in the region, has an established infrastructure and acts as a regional service centre, supplying the surrounding agricultural communities and the coastal towns with commodities and services. Commercial and industrial activities of the region are centred in Humansdorp. The coastal towns of Jeffrey's Bay (which is developing tremendously), St Francis Bay, Cape St Francis and Oyster Bay are important and well-established tourist destinations. The urban areas of Hankey and Patensie, situated in the Gamtoos River Valley, provide important services to the surrounding high-density agriculture industry. These two towns are characterised by agricultural related industries" (Kouga Municipality, 2007).

10.2.1 Current land uses

The proposed Banna Ba Pifhu Wind Energy Project would be situated adjacent to and directly west of the R330 roughly 2-3 km south of Humansdorp. The facility will extend over four land parcels collectively making up the land area of one operational farming unit of roughly 1,200 hectares.

At present the proposed site is zoned for Agriculture, and is mainly used for extensive cattle grazing forming part of a dairy and beef cattle operation. Similar farming operations are to be found on surrounding farms along with areas used for cultivation and game farming. The nearby town of Humansdorp acts as the key service centre for the area including its agricultural industry.

In terms of proximity to residential areas, the closest part of the proposed site is approximately 2 km south of the closest residential area of Humansdorp, 7 km north of the northern tip of St Francis Bay and 7.5 km west of the closest residential area of Paradise Beach. These areas and other towns along the coast have a strong tourism component with strong seasonal variations in population. Jeffrey's Bay is the largest of the coastal towns and aside from tourism is diversifying into light and medium industry. Other towns with a strong tourism and retirement focus include Aston Bay, Paradise Beach and St Francis Bay to the south of Jeffrey's Bay.

With regard to road infrastructure, the N2 is a main nearby freight and tourist route between Port Elizabeth and Cape Town. Other main roads are the R102 between Jeffrey's Bay and Humansdorp and the R330 between Humansdorp and St Francis Bay. A gravel road in the western part of the site links Humansdorp and Oyster Bay to the south west of the site.

10.2.2 Demographics

The 2007 Community Survey estimated that the total population in Kouga has grown slightly since 2001 to 73 274 and decreased slightly in the Cacadu District to 363 485 (StatsSA, 2008). Estimates in the Kouga IDP argue for a substantially higher population estimate of up to 86 000 people fuelled by a population growth rate of 2.4% per annum between 2000 to 2010 (Kouga Municipality, 2007).

The revised Kouga IDP (KLM, 2010) points out that Jeffrey's Bay is now reputed to be one of the fastest growing towns in South Africa and the current trend suggests a high growth rate at 2.5% per annum for the Jeffrey's Bay and 2% for Humansdorp. It predicts that the population of the municipality will reach 90,000 within four years (see Table 10.1). Population growth predictions for smaller towns such are generally 1% or lower with only Cape St Francis and St Francis Bay exceeding this estimate with 1.5% annual growth.

Table 10.1: Population numbers in the wider study area (2010 and onwards)

SETTLEMENT	GROWTH RATE	NO. OF HOUSEHOLDS	CURRENT POPULATION	EFFECTIVE POPULATION GROWTH RATE				
				YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
CAPE ST. FRANCIS & ST. FRANCIS BAY	1.5%	3,031	2,800	2,842	2,885	2,928	2,972	3,016
HANKEY	1%	3,039	11,721	11,838	11,957	12,076	12,191	12,319
HUMANSDORP	2%	5,617	23,991	24,471	24 960	25,459	25,968	26,488
JEFFREYS BAY	2.5%	11,356	40,203	41,208	42,238	43,294	44,377	45,486
LOERIE	0.5%	573	2,428	2,440	2,452	2,465	2,477	2,489
OYSTER BAY	1.0%	533	1,016	1,026	1,036	1,047	1,057	1,068
PATENSIE	1.0%	928	3,845	3,883	3,922	3,962	4,001	4,041
THORNHILL	0.5%	660	2,250	2,257	2,264	2,270	2,277	2,284

Source: KLM (2010)

10.2.3 Employment

As with the rest of the country, unemployment is a major challenge in the area. The 2007 Community Survey indicates that unemployment in the Kouga Municipality has stayed at 27% for 2007 little changed from the 2001 estimate (StatsSA, 2008). For the individual towns in the municipal area, Table 10.2 shows that unemployment was highest in the smaller towns of Patensie (39.7%), Hankey (32.5%), Thornhill (32.5%) and Loerie (32.5%). Jeffrey's Bay, Humansdorp, St. Francis Bay and Cape St. Francis fared better at roughly 20% unemployment.

Table 10.2: Unemployment in the towns within the Kouga Municipality (2006)

SETTLEMENT TYPE	ELIGIBLE WORK FORCE (19 - 65 YRS)	PERMANENT RESIDENTS WITHOUT JOBS	%	SEASONAL FARM WORKERS	TEMPORARY DOMESTIC WORKERS	PERMANENT FARM WORKERS	PERMANENT INDUSTRY WORKERS	PROFESSIONAL WORKERS
CAPE ST. FRANCIS & ST. FRANCIS BAY	1523	305	20	N/A	Unknown	N/A	N/A	Unknown
HANKEY	6388	2078	325	430	860	2364	430	227
HUMANSDORP	13051	2662	20.4	82	862	2513	6315	615
JEFFREYS BAY	21870	4462	20.4	0	459	0	15230	1720
LOERIE	1320	429	32.5	Unknown	Unknown	Unknown	Unknown	Unknown
OYSTER BAY	553	114	20.6	N/A	43	N/A	352	44
PATENSIE	2092	830	39.7	221	83	258	1070	92
THORNHILL	1224	398	32.5	Unknown	Unknown	Unknown	Unknown	Unknown

Source: KLM (2010)

Figure 10.1 shows that the number of jobs in the Kouga Municipality increased by the greatest degree in the construction sector between 1996 and 2001 reflecting rapid development of the area. The agriculture, forestry and fisheries sector shed the greatest number of jobs during the same period in keeping with trends such as increased mechanisation. Notwithstanding this, for the Cacadu and Kouga Municipal area, the dominant sector in terms of employment provision in 2001 was agriculture, forestry and fishing providing 36% and 33% of all employment opportunities in these areas respectively. Other important sectors in the Kouga Municipality include wholesale and retail trade (15% of employment in 2001) and community/social/personal services (14% of employment in 2001). By comparison with the wider Kouga municipal area, Humansdorp and Jeffrey's Bay have particularly high portions of workers in the wholesale and retail trade, services as well as construction sectors reflecting their status as service centres with high growth. In Patensie, Hankey, Thornhill, Loerie and KwaNomzamo, by contrast, far higher levels of employment are associated with the agriculture, forestry and fishing reflecting a high concentration of lower skilled jobs among its residents.

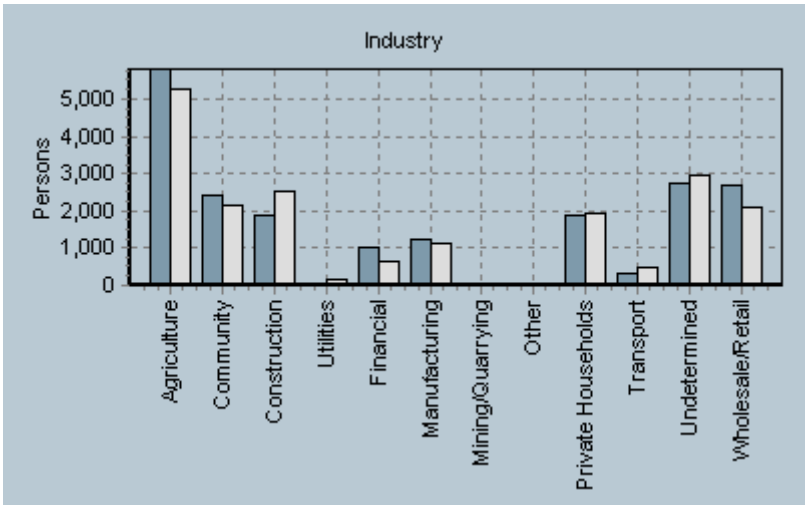

Figure 10.1: Jobs per sector for the Kouga Municipality (1996 – dark bars, 2001 – lighter bars)
Source: Demarcation Board using Census 2001 & 1996

Table 10.3 based on data from the ECSECC (Eastern Cape Socio-Economic Consultative Council) database provides a more recent detailed breakdown of employment per industry within the Kouga Municipality. It shows that the key proportional increases in employment relative to 2001 have come in business and personal services (6% of employment in 2001 up to 12% of employment in 2010) and the key proportional decreases have occurred in agriculture, forestry and fishing (33% of employment in 2001 down to 28% of employment in 2010).

Table 10.3: Employment per industry in the Kouga Municipality (2007 -2010)

	2007	2008	2009	2010	
Agriculture, forestry and fishing	11 479	9 463	7 457	9 856	28.3%
Mining and quarrying	23	28	32	27	0.1%
Food, beverages and tobacco	617	641	662	692	2.0%
Textiles, clothing and leather goods	197	183	173	210	0.6%
Wood, paper, publishing and printing	226	230	207	249	0.7%
Petroleum products, chemicals, rubber and plastic	145	155	154	160	0.5%
Other non-metal mineral products	303	292	239	294	0.8%
Metals, metal products, machinery and equipment	368	382	387	405	1.2%
Electrical machinery and apparatus	44	47	46	47	0.1%
Radio, TV, instruments, watches and clocks	20	20	21	21	0.1%
Transport equipment	269	284	271	307	0.9%
Furniture and other manufacturing	508	475	463	547	1.6%
Electricity	39	43	39	42	0.1%
Water	106	88	74	91	0.3%
Construction	4 359	3 587	2 961	4 121	11.9%
Wholesale and retail trade	4 421	4 079	3 700	4 682	13.5%
Catering and accommodation services	704	617	563	570	1.6%
Transport and storage	320	340	330	312	0.9%
Communication	62	61	60	50	0.1%
Finance and insurance	300	333	345	341	1.0%
Business services	3 368	3 880	3 954	3 854	11.1%
Community, social and personal services	4 396	4 468	4 423	4 909	14.1%
General government	2 699	2 791	2 867	2 984	8.6%
Total	**34 972**	**32 488**	**29 426**	**34 770**	**100.0%**

Source: Data from ECSECC database

10.2.4 Income levels and poverty measures

Table 10.4 below reports on household income levels in the study area. Approximately 44% of households in the Cacadu District and 33% in the Kouga municipal area had incomes below R9,600 per year in 2001. KwaNomzamo had a similar income pattern to the District (46% of

households with incomes below R9,600 per year) while Jeffrey's Bay and Humansdorp fared substantially better than the District and slightly better than the wider Kouga municipal area.

Table 10.4: Household incomes in the wider study area (2001)

	Cacadu District	Kouga Municipality	Humansdorp	Jeffreys Bay	KwaNomzamo
No income	14%	11%	9%	10%	17%
R1 - R4 800	7%	5%	3%	3%	8%
R4 801 - R9 600	23%	17%	13%	13%	21%
R9 601 - R19 200	23%	24%	20%	17%	29%
R19 201 - R38 400	15%	19%	26%	17%	18%
R38 401 - R76 800	8%	12%	15%	18%	5%
R76 801 - R153 600	5%	8%	9%	14%	1%
R153 601 - R307 200	2%	3%	4%	6%	0%
R307 201 - R614 400	1%	1%	1%	1%	0%
R614 401 - R1 228 800	0%	0%	0%	1%	0%
R1 228 801 - R2 457 600	0%	0%	0%	0%	0%
R2 457 601 and more	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Source: StatsSA, 2002

The 2007 Kouga IDP notes that the proportion of household living in poverty has increased by 6.4% in the past 10 years from 26.6% to 32.9%. The rate of increase in the Eastern Cape Province and Cacadu District ranges between 9% and 10% over the same period. Encouragingly the Human Development Index (HDI) for the Kouga area has improved in the past 10 years from 0.57 in 1996 to 0.62 in 2005 and remains better than the provincial and District HDI (KLM, 2007). The 2010 IDP review also notes the lower rates of poverty in Kouga than nationally, provincially or on a district level (see Figure 10.2). It further illustrates that since 2003 there has been a steady decline in poverty in Kouga (KLM, 2010).

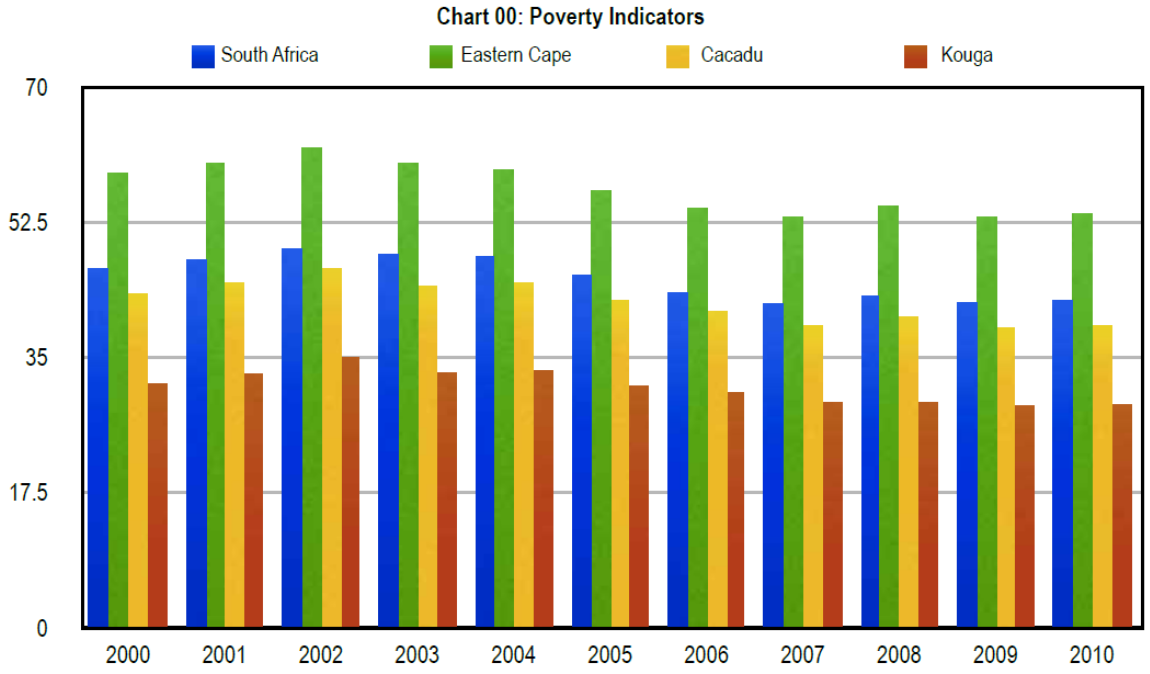

Figure 10.2: Poverty levels in the Kouga Municipality over time

Source: KLM (2010)

10.2.5 Economic growth and development

Economic development faces many challenges in the Kouga municipal area although its performance relative to other areas in the Cacadu District and Eastern Cape is encouraging. The Kouga IDP points out that municipal productivity is higher than the averages for the Cacadu District and province principally due to high growth in value creation relative to employment and labour remuneration. Growth in GDP and employment, from 1996 to 2004, and skills available to the local economy, are both higher than the provincial average. Kouga also has among the highest Formal Economy Performance scores in the province, with positive factors including the positive trade balance, a fairly diversified economy, low financial grant dependence, and strong GDP and employment growth performance. The Municipality fares well on Economic Absorption Capacity, considering high total disposable income, employment multiplier and informal sector capacity to generate economic opportunities relative to formal employment. The local economy claims a comparative advantage, for both employment and GDP contribution, in agriculture (centred on agriculture and hunting at 9.87% of GVA and 27.99% of employment) and construction (6.18% of GVA and 10.42% of employment). Kouga also claims GVA advantages in utilities (electricity supply and water), trade (centred on retail trade) and community services (dominated by public administration) (KLM, 2007).

With regard to tourism, the Municipality is home to a string of popular coastal tourist destinations from Jeffrey's Bay to Cape St Francis, and offers a wide range of activities and products including historical and heritage sites, the Kouga Cultural Centre, surfing, fishing, hiking, biking,

sandboarding, birding and game viewing, and various other outdoor and adventure activities (Kouga Municipality, 2007). Tourism in the region is predominantly linked to the natural environment and has shown strong growth.

10.3 IDENTIFICATION OF ISSUES

Aside from fit with planning and financial viability (and associated risks), the following impacts were identified as relevant for assessment based on the guidelines for economic specialist input (van Zyl *et al*., 2005), information from consultations with the public and nature of the project and receiving environment:

1. Impacts on land owners within the site boundaries;
2. Impact on surrounding land uses;
3. Impacts on tourism; and
4. Impacts on commercial activity associated with expenditure linked to the construction and operation of the development.

These impacts were rated using accepted EIA conventions for determining their significance. Significance ratings were not appropriate or necessary for planning fit and financial viability. A discussion regarding cumulative impacts is also provided.

The key environmental impacts that could result in economic costs (externalities) are assessed in the sections dealing with impacts on tourism, impacts on land owners on the site and impacts on surrounding land owners.

The economic implications of the loss of conservation worthy habitat are not expected o be significant. Further consideration of the strategic conservation importance of the site and impacts on its ecology has been covered in the ecological specialist study (Pote and Marshall, 2012). This study found that impacts on ecological functioning and value would be low with mitigation. This mitigation would need to include avoiding ecologically sensitive areas, limiting the footprint of the wind turbines and other facilities, relocating plants where necessary, etc. The specialist studies dealing with impacts on birds and bats also found that successful mitigation should be possible and that monitoring in the early stages of the project would help to clear up any uncertainties with regard to impacts and assist with mitigation (see Van Rooyen, 2012, Dippenaar 2011 and Natural Scientific Services, 2012).

10.4 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

This section provides an assessment of the impacts identified above and suggests management actions to avoid or reduce negative impacts; or to enhance positive benefits.

10.4.1 Need and Fit with policy and planning

The Banna Ba Pifhu Wind Energy Project's key strategic objectives can be summarised as providing additional generation capacity and grid stability in the Kouga area whilst meeting national renewable energy and climate change targets. This section assesses the likely impact of the project on achieving these objectives along with a wider consideration of the projects fit or compatibility with economic development planning objectives.

10.4.1.1 Energy policy imperatives and the environment

Historically, South Africa has relied heavily on non-renewable fossils fuels (primarily coal) for energy generation purposes. This reliance remains a key feature of the current energy mix with just over 90% of our electricity generation need met by non-renewables. Given our abundance of coal reserves relative to most other countries, it is not particularly surprising that our energy mix favours coal and it is to be expected that coal will remain dominant. However, relatively recent imperatives with regard to global warming, other environmental impacts associated with 'dirty' fuels and energy security have elevated renewable energy solutions to a far more prominent position both within energy policy and in the economic development arena in general. This has happened at a rapid pace particularly in response to the threats associated with global warming. Most governments in the global community now recognise that the roll-out of renewable energy at an unprecedented scale will be needed among a number of other actions to curb global warming. Targets for the promotion of renewable energy now exist in more than 58 countries, of which 13 are developing countries. In addition, the renewable energy industry is now a major economic player, with the industry employing over 2.5 million people worldwide. Renewable energy companies have grown significantly in size in recent years, with the market capitalisation of publicly traded renewables companies doubling from $50 billion to $100 billion in just two years from 2005 to 2007 (NERSA, 2009).

There may still be disagreement on the equitable sharing of responsibilities for cubing global warming among nations. However, proposals tabled at the 2009 UN Climate Change conference in Copenhagen by a group consisting of the United States, China, Brazil, South Africa and India indicate that key developing nations including South Africa recognise that they will not be able to avoid significant responsibilities. When one looks at the developing nations as a wider group, South Africa stands out as a country that is going to have to introduce particularly significant measures as it is characterised by high levels of Greenhouse Gas (GHG) emissions relatively to other countries at similar stages of development. Du Plooy (2009) points out the following in this regard:

- South Africa's CO_2 production doubled between1980 and 2004 and is higher than that of Brazil, which has more than four times the population, and only slightly lower than the UK.
- South Africa's economy is 5-10 times less carbon efficient (or its carbon intensity is 5-10 times higher) than the US, UK or Japan. Regarding total emissions, South Africa is not nearly as significant a contributor to climate change as China. However, South Africa is a far greater contributor to the world's CO_2 emissions than to the world's GDP and on this score just about exactly equalled China in 2003 at 2.8 tonnes of CO_2 for every $1000 of GDP generated, compared to the US at 0.55.
- South African emissions per capita are still half that of the US and slightly lower than Russia's, but three times higher than China's and nine times higher than India's.

South African energy policy has started to change from one that did very little to encourage renewable energy to one that actively encourages it. The Government's 2003 White Paper on Renewable Energy has set a target of 4% of electricity demand (equivalent to 10,000 Giga-watt hours (GWh)) from renewable energy sources in 2013 (DME, 2003).[1] Given South Africa's leading role in international climate change negotiations and increasingly widespread pressure for more renewable energy, it is a certainty that renewables targets will increase. Even if the renewables targets remain relatively modest at 16% by 2030 (the draft 2010 IRP revision has set this preliminary target[2]), meeting the target will require substantial investment given the extremely low base.

In order to facilitate the roll-out of renewable energy and meet ambitious targets, three key economic incentives have been initiated to encourage investment in renewable energy. Firstly, tax incentives in the form of accelerated depreciation allowances for renewable energy developments are in place. Secondly, a 2c/KWh tax on electricity generated from non-renewable resources was implemented by National Treasury with effect from July 2009 with the intention of helping to manage the current electricity supply shortage and protecting the environment. Thirdly, and probably most importantly, the national government recently (August 2011) launched the Independent Power Producers (IPP) Procurement Programme to replace the previously mooted Renewable Energy Feed-In Tariff (REFIT) programme, in which bidders would have been asked to bid for projects based on fixed tariffs. The IPP Procurement Programme has the following key features (Mail &Guardian, 2011):

- A two-phase tender system in which bidders must first meet qualification criteria (including legal, environmental and financial requirements) and will then be evaluated on bid price and economic-development objectives.
- A target of 3,725 megawatts (MW) from renewable energy sources by 2016, instead of 1,025MW as outlined in the draft Integrated Resource Plan unveiled in 2010.

[1] To put this into context, Europe as a whole has a renewable energy target of 20% by 2020.

[2] This target implies the installation of between 160 and 200 wind turbines as most turbines are able to generate 2 – 2.5 MW.

- Until 2016 onshore wind has been allocated 1,850MW; concentrated solar thermal - 200MW; solar photovoltaic - 1,450MW; biomass - 12.5MW; biogas - 12.5 MW; landfill gas, hydro - 75MW and small projects - 100MW.
- The programme's evaluation criteria will score 70% on price and 30% on a range of economic development requirements.
- The price caps for bids are as follows, wind: R 1,150/MWh, solar PV: R 2,850/MWh, CSP: R 2,850/MWh, biomass: R 1,070/MWh, biogas: R 800/MWh, landfill gas: R 600/ MWh, small hydro: R 1,030/MWh.
- There are five bidding windows: 4 November 2011, 5 March 2012, 20 August 2012, 4 March 2013 and 13 August 2013.
- Projects submitted for the first window must begin commercial operation before the end of June 2014, except concentrated solar power technologies, which must begin before the end of June 2015. All projects submitted for any other window must begin commercial operation before the end of 2016.

Within the renewable energy sector in South Africa, wind energy shows substantial promise despite there being very few commercial wind turbines in the country at present. By comparison, for example, Germany currently has 22,000 wind turbines installed that produce the equivalent power of half of all South Africa's fossil fuel and nuclear power stations (van der Merwe, 2009).

According to Marquad *et al*. (2008) who researched the cost of achieving a 2020 target of 15% renewable electricity generation for South Africa, "Wind power is one of the most mature new renewable technologies, is currently in widespread use throughout the world, and is still growing very rapidly, particularly in developing countries such as China and India: Within a very short time, the Chinese wind programme has accelerated to a point where almost 3,500MW of new wind power is being installed each year (with estimates of 50,000MW installed by 2015), and 40 local companies are involved in manufacturing 56% of the equipment (Global Wind Energy Council 2007). An additional 20,000MW was installed globally in 2007, almost one fifth of totally global installed capacity of close to 100,000MW. There is also a trend towards larger-scale installations – currently, wind farms of over 1,000MW are being planned in a number of locations."

In summary, the policy case for the urgent roll-out of renewable energy in South Africa has been made at a national government level using compelling arguments that are in line with international policy trends. Targets that include wind energy have been set (which may be revised upwards) and significant financial and other incentives have been offered to renewable energy developers in order to encourage projects and move decisively towards full-cost pricing of energy (i.e. prices which reflect global warming and other environmental impacts).

10.4.1.2 Energy security

As is noted in the Scoping Report for the project, "The Eastern Cape does not generate bulk power and is thus reliant on electricity imports from other provinces (e.g. Mpumalanga). The existing transmission capacity to the province is fully utilised, which restricts the province from realising its industrial and rural development potential. Due to the length of the Eskom power

lines from the power stations to the Kouga area and the inherent characteristics of the Kouga network, the area experiences power quality and voltage instability. The project could thus assist in stabilising energy supply to the Eastern Cape and in particular the Kouga Municipal area" (CSIR, 2011).

Aside from impacts on the achievement of national goals and policy imperatives outlined in the preceding section, the project therefore has the potential to contribute to:

- Greater energy supply stability in the area and
- Higher levels of energy security in the area

This will benefit local residential electricity consumers as well as farmers and businesses in the area. In simplified terms the project could produce enough electricity to power approximately 53,250[3] typical Eastern Cape households in a year when at full generation capacity (CSIR, 2011).

10.4.1.3 Fit with local development and spatial planning

Economic development imperatives inform spatial planning imperatives. A critical aspect of economic desirability is thus whether the proposed development complements economic planning as reflected in spatial development planning. Note that the importance of the role played by local municipalities throughout South Africa in fostering sustainable economic development has increased since 1994 and will continue to increase in the future in keeping with a clear shift towards more 'developmental' local government. Tools such as Integrated Development Plans (IDPs) and their accompanying Spatial Development Frameworks (SDFs) are likely to play a prominent role in facilitating this shift. SDFs in particular are central to economic development planning and are drawn up in order to guide overall development in a direction that local and provincial authorities see as desirable. Indeed, the basic purpose of an SDF is to specify the spatial implications of IDPs designed to optimise economic opportunities.[4] Specifically, a SDF has the following objectives and characteristics (Dennis Moss Partnership, 2003):

- It expresses government policy and the views and aspirations of all I&APs.
- Government departments and other authorities and institutions involved in future development and land use planning in the municipality will be bound by the SDF proposals.
- It provides certainty to the affected communities regarding future socio-economic and spatial development in the area.
- It provides a basis for co-ordinated decision-making and policy formulation related to future land use.

[3] Where a typical Eastern Cape household uses 1,500 KWh per annum. In South Africa, usage ranges from less than a 1,000 KWh per year to over 8,000 KWh per year.

[4] Note that studies such as the growth potential of towns in the Western Cape study (van der Merwe *et al*., 2005) also inform IDPs and economic planning.

- It creates opportunities for preparing development and action plans to which financial budgets can be linked.

The proposed development thus ideally needs to 'fit' with what is envisaged in SDFs, structure plans and other planning documents in order for it to clearly 'fit' with the optimal distributions of economic activity as envisaged in these plans. Or, if it doesn't obviously fit with existing planning, there need to be clear and compelling reasons why a deviation from planning should be considered.

The following provincial and regional planning documents were found to be of relevance and are reviewed in more detail in the study:

- Eastern Cape Provincial Spatial Development Framework (2005);
- Western Cape Provincial Urban Edge Guidelines (2005);
- Kouga Municipality IDP and SDF (2007 & 2011).

Considered as a whole these documents recognise the importance of integrated and diversified economic development that makes optimal use of each area's comparative advantages. The concept of a wind farm is thus broadly supported and the levels of support for wind projects in the area and other parts of South Africa indicates that interest in their potential to add to economic development is recognised.

With regard to specific spatial planning that applies to the site, the Kouga SDF is most relevant. A review of the SDF reveals that the site is situated significantly outside the reasonably anticipated Urban Edge of the nearest urban areas of Humansdorp implying no potential conflict in this regard. The medium and longer term expansion of Humansdorp is envisaged to take place gradually towards Jeffrey's Bay and in the area to the north of the Seekoei River which forms a natural southern boundary to urban expansion.

10.4.1.4 Wind energy development guidance

The 2006 DEA&DP Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape resulted in the publication of broad guidelines for the siting of wind farms in order minimize their potential to impact negatively on other land uses and sources of economic value (see CNdV, 2006). A key focus of the guidelines is on minimizing visual impacts on key receptors. The guidelines combine relevant elements of two assessment methodologies (i.e. criteria based assessment and landscape based assessment) in order to produce a consolidated 'Revised Regional Methodology' which provides the primary guidance regarding siting. Figure 10.3 provides a summary of how the landscape criteria in this methodology are to be used to conclude whether a site is likely to be suitable for wind energy developments or not. When applying this methodology to the proposed Banna Ba Pifhu site, the following factors indicate that it should probably be most accurately classified as 'suitable rural':

- The close proximity of coastal areas with relatively high levels of development;

- Its location relatively close to Humansdorp, Jeffrey's Bay and St. Francis Bay and therefore energy consumers; and
- The presence of infrastructure and other elements in the area such as major roads and powerlines.

It should, however, be borne in mind that site specific assessments are needed in order to establish suitability particularly from a visual perspective. These are provided in the visual specialist study (see Holland, 2012).

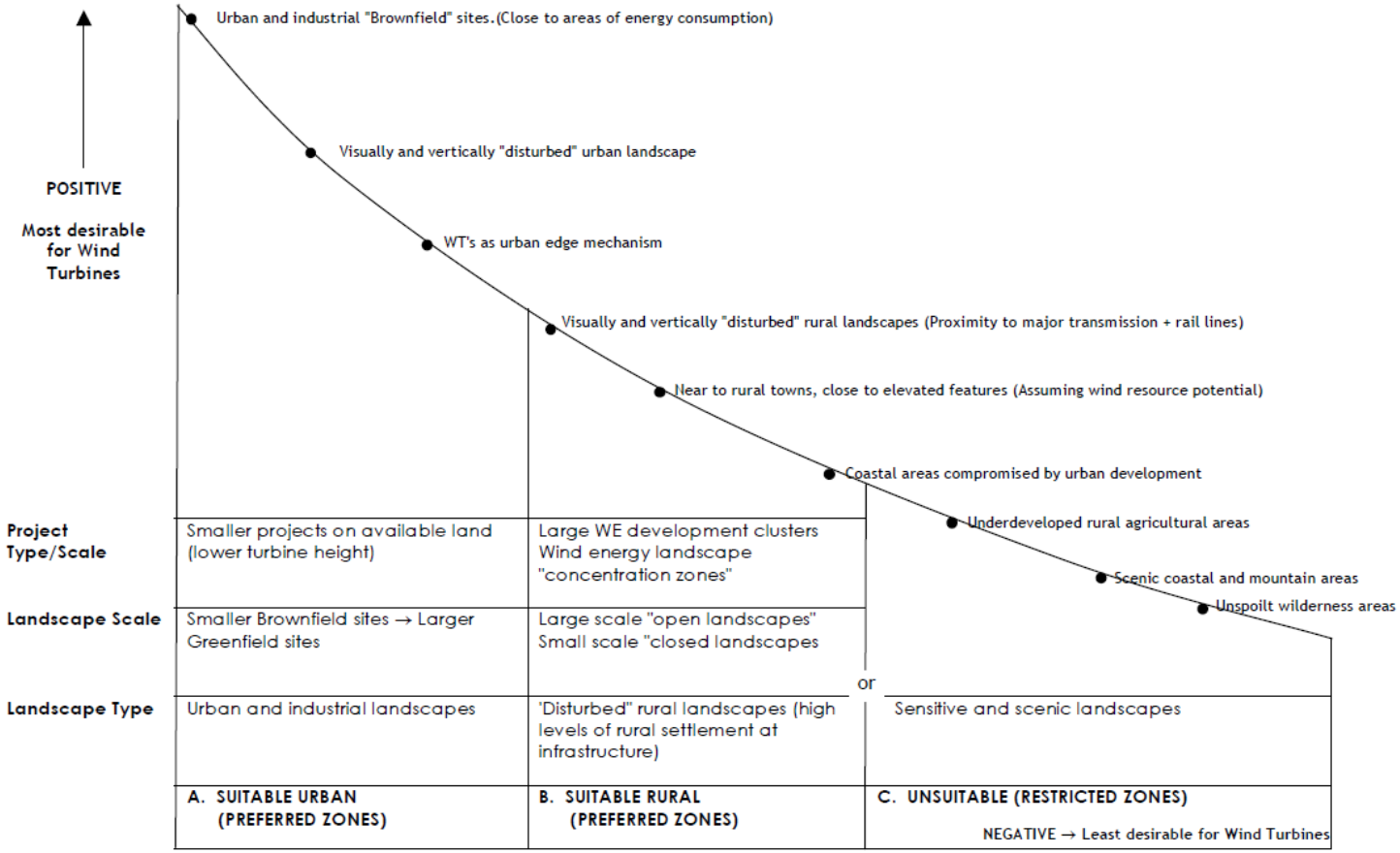

Figure 10.3: Framework for Location of Wind Energy Projects Based on Landscape Character

Source: CNdV Africa (2006)

A Strategic Environmental Framework (SEF) for the Optimal Placement of Wind Farms in the Coastal Provinces of South Africa (Environomics and MetroGIS, 2011) has also recently been produced for the National Department of Environmental Affairs (DEA). This document is intended as a national decision-making level framework to guide national decision-makers and especially the DEA. It recognises and draws on provincial or regional guidelines such as that referred to above and supports the use of relatively strict criteria in the wind farm approval process in order to avoid unnecessary risks including those related to tourism. One of its key points is that there are a large number of applications for wind farms which gives decision makers the 'luxury' of being in a position to pick only the ones with the greatest promise and minimal risks. This dynamic concerning decisions between wind farms and it implications are discussed further in Section 10.4.2.

10.4.2 Financial viability and risks

Long term positive economic impacts can only flow from a project that is financially sustainable (i.e. financially viable in the long term with enough income to cover costs). As with all other wind power and other renewables projects, the proposed project would not be financially viable without the gradual phasing out of implicit subsidies for non-renewables and coal in particular. This phasing out also needs to be combined with the phasing in of subsidies for renewable in order to 'level the playing field' as outlined in Section 10.4.1.1. In combination, the tax on non-renewables, the accelerated depreciation allowance and IPP Procurement Programme outlined previously have catalysed high levels of interest in establishing renewable energy projects such as the Banna Ba Pifhu Wind Project. These measures should essentially ensure relatively low levels of financial risks for appropriate renewables projects in order to encourage these types of projects. The Banna Ba Pifhu Wind Project is thus highly likely to prove financially viable assuming it is able to secure a long term contract through the IPP Procurement Programme - this has been confirmed with the proponent (D. Wolfromm, Windcurrent SA, pers com).

As mentioned previously, under the IPP Procurement Programme competitive bidding process, the relevant authorities will only be offering limited private wind power producers long term power purchase contracts. It is therefore likely that the project will have to compete with other private wind projects for long term contracts. This competition may prove intense. At the time when the Renewable Energy Feed-In Tariff (REFIT) system was still favoured by government, Groenewald (2010) speculated that "All the wind power projects under way (in application phase) at present might ultimately deliver 5,000 MW of power to Eskom's grid. This means that some start-up wind projects might not get in on the deal." At this stage it is not possible to determine whether the Banna Ba Pifhu Wind Energy Project will be one of the projects chosen to qualify for a long term contract - the adjudication process will determine this. There are, however, a number of factors in the project's favour that include:

- Strong international and local partnerships;
- Extensive experience and reputation of WKN Windcurrent SA;
- Advanced stage of viability assessment and environmental application process; and
- Potential to stabilise the local grid

It needs to be recognised that profitable wind farms are only currently possible with a government subsidy and that a number of wind farm projects are competing for this subsidy. The use of public funds in the form of the subsidy calls for high levels of care in the allocation of funds. Fortunately, the existence of a number of alternative wind farm developers and sites looking to access the subsidy means that the state can be selective in allocating the subsidy to those projects (and project alternatives) that show the most promise and lowest levels of risks of negative impacts. Indications are that a particularly large number of alternative wind energy projects will be available for the state to choose from. Private developers recently submitted expressions of interest to The Department of Energy for the development of various renewable energy projects with a combined capacity of 20,000 MW, the bulk of which would be wind power generation (Salgado, 2010). This exceeds the 1,850 MW earmarked for allocation to wind energy until 2016 through the IPP Procurement Programme by a highly significant margin. Alternatives are therefore not likely to be in short supply even if one assumes that a large proportion of the 2010 expressions of interest were based on trying to access the more generous REFIT subsidies previously favoured by government and were for projects that had not yet reached the EIA stage.

While risks cannot be ignored, financial viability risks are considered minor assuming a long term contract can be agreed on with the relevant authorities that secure payment for the electricity generated. The project will, however, have to compete with other wind energy projects in order to secure a contract.

The balance between financial benefits and costs are thus likely to be positive for the applicant and land owners partners. These financial returns that motivate developments such as the Banna Ba Pifhu Wind Energy Project are necessary as the promise of profit is what fuels much of our economy. It does, however, need to be recognized that achieving profits for some can come at an unacceptable cost to wider society. The remainder of this report focuses on the economic impacts (including costs and benefits) that would accrue to wider society in order to provide information on the overall economic desirability of the project.

10.4.3 Impacts on land owners within the site boundaries

The installation of wind turbines and associated infrastructure has the potential to impact both positively and negatively on the land owners whose land parcels would be included in the project. Positive impacts would flow primarily from sharing in the profits of the projects while negative impacts could be associated with the loss of land, disruption of activities and the introduction of nuisance factors (primarily noise and visual impacts).

10.4.3.1 Positive impacts

As in the case of wind farms in other parts of the world, the project would entail payments to the private land owner on whose land turbines and related infrastructure would be placed. These would take the form of either fixed rental payment per turbine or variable payments based on a share of profits. The land owner would be required to decide between these options and whether the final payment offer is acceptable. As no-one would be forced to accept an offer, the relevant land owner would be able to weigh up the financial gains from the project against any

negatives. This should result in net financial gains to the land owner and minimise the chances of the land owner ending up financially worse off because of the project.

10.4.3.2 Negative impacts

At present the proposed site is zoned for Agriculture, and is mainly used for extensive dairy and beef cattle farming. Table 10.5 below summarises the key farming activities on farm making up the study site.

Table 10.5: Activities on the farm making up the site

Landowner	Farm name and size of land included in wind farm proposal	Activities
David Masterson	Remainder of Farm 688, Portion 2 and 15 of Farm 689, Portion 1 of Farm 868 totalling 1,200 ha (Broadlands and Saragossa Farms)	• Farming with roughly 850 dairy and beef cattle on 75 ha of irrigated pastures, 687 ha of dryland pastures and roughly 438 ha of natural veld. • Production from roughly 300 cows being milked daily and roughly 150 beef cattle sold per year. • Carrying capacity is roughly 1 LSU / 1 ha for irrigated areas and roughly 1 LSU / 3 - 4 ha for dryland areas. • Staff of 18 workers

Potential impacts on these activities could stem from loss of land, changed access, noise and other nuisance factors.

With regard to loss of agricultural land, the soil/agricultural specialist has estimated that 8.38 ha (or 0.7% of the area of the farm) would be put out of production for the duration of the project. Based on the natural carrying capacity of the area, the loss of this land would result in reduced capacity of 3 to 5 cattle or LSU in total bearing in mind that turbines would not be placed on irrigated pastures thereby further protecting production levels. This would represent a minimal loss in production. It should also be considered an unlikely worst case scenario as the land owner has indicated that his stocking rates are relative low and he has spare capacity to move cattle and should in a position to expand production elsewhere on their land using income from the wind project (D. Masterson, pers com.).

With respect to potential negative impacts from noise, the noise specialist study has found that if adequate mitigation measures are implemented negative impacts associated with noise would be acceptably low for inhabited buildings (Williams, 2012).

With respect to visual impacts, there can be no doubt that the visual landscape on the farm will change significantly. It is not, however, anticipated that these changes will lead to unmanageable conflicts with agricultural activities on the farm making up the site. Setbacks from inhabited buildings have also been chosen to ensure acceptable visual impacts and shadow flicker risks. Bear in mind that the land owner will be compensated for the presence of the turbines on his land and has indicated his willingness to accommodate the turbines on this basis (D. Masterson, pers com.).

Note that the construction phase of roughly one year would be associated with disruptions. However, these are expected to be minimal and manageable in consultation with land owners. Once established, all farming activities would essentially be able to continue as before resulting in minimal, if any, impacts on these activities.

10.4.3.3 The balance between positive and negative impacts

Given the above, it is highly likely that the net impacts on the land owner would be net positive and probably significantly so. Given the added income stream that would be associated with the wind farm, it is also likely that the value of properties on the site would increase. This would conform with experience in other countries.

Impacts have consequently been given a medium significance positive rating for the land owner concerned with mitigation (see summary impact rating table at the end of Section 5).

Mitigation measures

- Recommendations of noise, visual, ecological, bird and bat specialist studies to be implemented.
- Adequate setbacks from buildings, structures and residences in particular to be strictly enforced.

10.4.4 Impacts on surrounding land owners

Aside from onsite impacts, the installation of wind turbines and associated infrastructure has the potential to impact on surrounding land owners. Negative impacts could be associated primarily with noise and visual impacts.

The site is surrounded mostly by other farms. No negative impacts are anticipated on the agricultural activities on these farms for the same reasons that no significant impacts are anticipated on agricultural activities on the site. All agricultural production and activities will be able to continue as at present.

Setbacks from nearby inhabited buildings have been chosen by the visual specialist to ensure acceptable visual impacts and shadow flicker risks. With respect to noise, the noise specialist study found no instances where turbines would result in unacceptable impacts on neighbouring farms (Williams, 2012). In addition, Windcurrent SA intends applying international standards with respect to turbine placement distances from farm boundaries.

As a consequence of the prediction of minimal if any significant negative impacts, it is deemed unlikely that there would be negative impacts on the agricultural value of properties surrounding the site.

Impacts have consequently been given a low negative to neutral rating with mitigation during operations although impacts may be slightly negative during construction given the potential for disruptions (see summary impact rating table at the end of Section 10.5).

Mitigation measures

- Recommendations of noise, visual, ecological, bird and bat specialist studies to be implemented.
- Adequate setbacks from site borders and residences in particular to be strictly enforced.

10.4.5 Impacts on tourism potential and development

As was outlined in the economic context section, tourism plays an important role in the economy of the local area and region and has the potential to play an increasingly prominent role as a driver of economic development. It is thus important to consider the potential impacts of the proposed development on this sector. Tourism impacts are often driven by changes in the sense of place in an area. The proposed development thus has the potential to impact on tourism as its nature dictates that it is likely to change the character of the area. Potential positive impacts could also arise should the development provide an added attraction in the area that could draw tourists.

In order to assess tourism impacts, information on current tourism use and potential future use focusing on the area surrounding the site was gathered. In order to verify and augment tourism issues raised during scoping, discussions were also held with tourism authorities and tourism stakeholders in order to get their views on potential impacts and inform assessment. Pertinent information from other specialist studies was examined, discussions were held with the specialists where necessary and an assessment of impacts made. In this regard the visual specialist study was most relevant.

Current tourism 'use' of the site is not direct in nature as there are no tourism facilities on the site. However, the site is indirectly part of the tourism package of the area as it can be seen from a number of vantage points, from routes used by tourists (i.e. the N2, R330 and R102) and from tourism establishments such as those offering accommodation.

10.4.5.1 Negative impacts

The potential for wind farms to have negative impacts on tourism is something that has received more research attention in Europe and the United States given the far greater number of wind farms in these countries. A recent review of research on the economic impact of wind farms on tourism covering 40 studies in the UK and Ireland and other reports from Denmark, Norway, the US, Australia, Sweden and Germany provides a comprehensive source of information on this issue (GCU, 2008). In summary it found that:

- "There is often strong hostility to developments at the planning stage on the grounds of the scenic impact and the perceived knock-on effect on tourism. However developments in the most sensitive locations do not appear to have been given approval so that where negative impacts on tourism might have been a real outcome there is, in practice, little evidence of a negative effect.

- There is a loss of value to a significant number of individuals but there are also some who believe that wind turbines enhance the scene.
- An established wind farm can be a tourist attraction in the same way as a hydro-electric power station. This of course is only true whilst a visit remains a novel occurrence.
- In Denmark, a majority of tourists regard wind turbines as a positive feature of the landscape
- Over time hostility to wind farms lessens and they become an accepted even valued part of the scenery. Those closest seem to like them most.
- Overall there is no evidence to suggest a serious negative economic impact of wind farms on tourists"

These findings indicate that clear instances of negative impacts on tourism are relatively rare. This does not imply that negative impacts cannot occur, but does point to the need to have high levels of certainty before concluding that a wind farm will have a significant negative impact on tourism. The available evidence in the GCU review suggests that instances where wind farms are most likely to result in negative impacts are those where they are situated in areas with a clear wilderness quality with little or no signs of 'civilisation' in the form of infrastructure such as power lines, major roads, etc. In addition concerns regarding tourism have been a key motivator of guidelines on wind farm location such as those produced for the Western Cape Department of Environmental Affairs and Tourism (CNdV, 2006) and, more recently, for the national Department of Environmental Affairs (Environomics, 2010). Concerns around tourism should not therefore be downplayed and risks should be kept to a minimum.

With regard to sensitivity, the visual specialist study has found that the landscape into which the wind farm will be introduced is predominantly that of agriculture, and specifically dairy farming. The region also contains sensitive visual receptors in holiday resorts, holiday homes and coastal towns, and there are a number of nature reserves and protected areas where scenic views are valued. The surrounding area is predominantly a flat coastal plain and most views will contain a variety of man-made structures and elements associated with agriculture and its service centres (e.g. Humansdorp). However, there are views of distant mountains to the north and north-west as well as the ocean to the east and south which are valued for their scenic beauty even if they do contain less aesthetically pleasing elements such as power lines. This is particularly the case for views to the north from St Francis Bay and holiday homes and resorts along the Kromme River (Holland, 2012).

With respect to routes that tourists use in the area, the visual specialist study has found that the facility would be highly visible when viewed from routes used by tourists. It would have a relatively significant set-back distance from the N2 (roughly 5.5 km) and less so for R102 (roughly 3.5 km) which should mitigate impacts. It would, however, border on the R330 which is a key tourist route providing access to the tourist focused towns of St Francis Bay and Cape St Francis.

Key tourism areas and establishments nearby the site that require particular consideration and their distances from the nearest turbines are as follows:

- St Francis Bay where the nearest houses would be approximately 7.1 km from the turbines closest to them.
- Paradise Beach where the nearest houses would be approximately 7.9 km from the turbines closest to them.
- Jeffrey's Bay where the nearest houses would be approximately 9.5 km from the turbines closest to them.
- The Humansdorp town centre would be approximately 3 km from the turbines closest to it. Note that this area has less tourism significance as Humansdorp is not focused on tourism
- The western boundary of Lombardini Game Farm (situated roughly between the site and Paradise Beach) would be roughly 2.5 km from the nearest turbine while the Lombardini main lodge and events venue would be 6 km from the nearest turbine.
- The homes on the Kromme River in the vicinity of Eastcot Private Nature Reserve and the Kromme Island Private Nature Reserve would be approximately 3.2 km from the nearest turbine.
- The homes on the Kromme River in the vicinity of the Kromme River Estate would be approximately 4 km from the nearest turbine.

For tourism establishments in St Francis Bay, Paradise Beach and Jeffrey's Bay, the wind farm would be relatively distant at 7 km or further. Impacts on existing tourism establishments or the tourism potential of these areas would thus most likely be largely manageable. The visual specialist study does, however, note that the northern area of St Francis Bay would experience high levels of visual intrusion (Holland, 2012).

Lombardini Game Farm derives the majority of its income from its animal breeding programme and the hiring out of its events venue and accommodation options for weddings, conference and the like. It also offers game drives for those using its venue and for other tourists although this is provides a relatively small part (roughly 5%) of its total income. Discussions with the owner of Lombardini revealed relatively low levels of concern regarding the proposed wind farm. This related to a general opinion that the wind farm would not really impact on the relatively distant event venue and lodge area (6 km from the wind farm) or animal breeding activities. It was recognised that the presence of turbines in the wider area may change the character of game drives somewhat but that these were a small source of income and did not generally attract clients expecting to experience a particularly isolated or pristine natural environment free of the signs of human activity and development (S. Lottering, Lombardini, pers com). The visual specialist study also found a low to moderate visual intrusion on views from Lombardini (Holland, 2012).

The banks of the Kromme River, which runs in a north-west to south-east direction roughly 3 km south of the site, offers sought after sites for homes many of which are used as holiday homes. Most of these homes are situated between the main cluster of houses at the Kromme River Estate (approximately 4 km from the nearest turbine) and the St Francis Marina area of St Francis Bay. Pockets of homes are, however, also to be found further upstream at Kromme Island Private Nature Reserve, Eastcot Private Nature Reserve and surrounds (approximately 3 km from the nearest turbine). With regard to impacts on areas along the Kromme River, the

visual specialist study found that there are a number of areas along the Kromme River which may potentially be affected by the wind farm despite the relatively deep river valley that is incised into the landscape which screens many areas from high visual exposure. It was also found that residents on the northern edge of St Francis marina and those living along the Kromme River within areas with high visual exposure (particularly those nearer the site with north facing orientations) will have their existing views highly intruded upon by the turbines of the wind farm, since they are likely to see the wind farm as detracting from their existing views of the mountains (Holland, 2012). Tourisms risks would thus be applicable in these instances.

Discussions with the tourism associations and municipal officials focused on tourism, revealed that they have relatively high levels of concern with regard to the project and other wind farms in the area.[5] Their key concern is essentially that the project and others are of such a scale that they would change the overall character of the area thereby risking a detraction from its tourism appeal. Potential cumulative impacts are therefore their key concern (see Section 10.4.7 for a further discussion of cumulative impacts). Although it is recognised by the tourism authorities that the Kouga area is built up in many places, it largely has managed to maintain a relatively natural sense of place which is a key tourism draw-card. There is a general recognition for the need for renewable energy among tourism stakeholders. However, achieving this with no or minimal risks to tourism is viewed as clearly preferable.

Drawing on the visual assessment and international experience, it is seems most reasonable to conclude that the development would make a significant change to the current sense of place of the site and would not be without tourism risks. However, these should be mitigated by the lack of a significant number of particularly sensitive tourism receptors in very close proximity (i.e. less than 3 km) nearby. They are thus expected to be of a medium level noting the low to medium level of confidence that one can attach to this kind of assessment (i.e. tourism impacts of a largely unknown type of development in South Africa)

10.4.5.2 Positive impacts

Potential positive impacts on tourism would stem from the potential attraction that a wind farm would introduce. Wind farms are certainly a rarity in South Africa and can create a visual spectacle that may appeal to tourists. This is not to say that tourists would visit the area specifically to see the wind farm (although this is a possibility). Rather, it seems likely that the wind farm could add somewhat to the overall tourist experience in the area particularly while it remains novel. Note that the facility is only likely to appeal to certain tourists and positive impacts are likely to be of a short term nature and of a low significance.

Aside from potential benefits through visiting and/or viewing the facility, it also has the potential to contribute to the tourism package on offer in the area through its potential to enhance the ‘sustainable tourism’ or ‘eco-friendly’ brand of the area. Numerous examples can be found of individual tourism establishments and wider tourism areas that have used initiatives such as renewable energy installations, recycling programmes, rehabilitation programmes, etc. to their advantage. These initiatives are commonly used to enhance general reputation and credibility.

[5] Discussions were held with Mrs J Prinsloo (Kouga and Humansdorp Tourism chairperson), Ms K Nelani (Kouga Municipality LED and Tourism Department) and Mr Andy Thuysman (Jeffrey’s Bay Tourism chairperson and Supertubes Surfing Foundation representative on environmental matters)

In some cases they are part of a focused strategy that actively markets high levels of eco-friendliness or sustainability.

10.4.5.3 The balance between positive and negative impacts

Arriving at an assessment of the overall risk to tourism needs to be recognised as an exercise with high levels of uncertainty given the total lack of experience with wind farms in South Africa and widely diverging views regarding their aesthetic appeal in different contexts. Nevertheless, considered as a whole, the key potential drivers of negative tourism impacts (primarily visual impacts) seem significant enough to imply a medium level of risk for tourism with mitigation particularly when cumulative impacts are considered (see summary impact rating table at the end of Section 5). In the short term, whilst novel, it is possible that this risk would be somewhat off-set by the positive attraction provided by the project. Note that a discussion of cumulative impacts on tourism is contained in Section 10.4.7.

Some disturbance and nuisance would be experienced during construction. This would include the potential for increased dust and noise as well as increased social risks associated with a large workforce. Impacts should, however, be minimal provided the construction phase is well managed and the mitigation measures suggested by the other specialist studies forming part of the EIA are implemented. Impacts during construction are thus expected to be low with mitigation.

The no-go would have no impact relative to the status quo with regard to tourism.

Bear in mind that the balance between positives and negatives as well as the significance of tourism impacts are difficult to predict as they are primarily reliant on the perceptions of tourists some of whom may find that the project detracts from their experience and others who may not. Confidence in assessment is thus low to medium.

Mitigation measures

Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, noise and ecological impacts) would thus also minimise tourism impacts.

10.4.6 Impacts linked to expenditure on the construction and operation of the development

The construction and operational phase of the project would both result in a positive spending injection into the area that would lead to increased economic activity best measured in terms of impacts on employment and associated incomes in the local area and region.

All new expenditures will lead to linked direct, indirect and induced impacts on employment, incomes and production. Taking employment as an example, impacts would be direct where people are employed directly on the project in question (e.g. jobs such as construction workers),

indirect - where the direct expenditure associated with a project leads to jobs and incomes in other sectors (e.g. purchasing building materials maintains jobs in that sector) and induced where jobs are created due to the expenditure of employees and other consumers that gained from the project. Direct impacts are the most important of these three categories as they are the largest and more likely to impact on the local area. Their estimation also involves the lowest level of uncertainty. The quantification of indirect and induced impacts is a far less certain exercise due to uncertainty surrounding accurate multipliers particularly at a local and regional level. This uncertainty makes it inadvisable to quantify indirect employment unless an in-depth analysis is required. Potential direct employment and income impacts are consequently quantified here and likely indirect impacts are considered in a qualitative sense when providing overall impact ratings.

10.4.6.1 Construction phase impacts

Construction expenditure would not displace other investment and would constitute a positive injection of new investment. During the construction phase the civil and other construction, specialised industrial machinery and building construction sectors would benefit substantially. The development would provide a major injection for contractors and workers in the area that would in all likelihood purchase goods and services in Humansdorp, Jeffrey's Bay and the wider region.

Preliminary estimates indicate that a total of approximately R440 million would be spent on the entire construction phase including infrastructure and building construction as well as turbine and other specialised machinery installation (see Table 10.6). The majority of the machinery and equipment such as the turbines would need to be imported as these items are not currently available in South Arica. Notwithstanding the need for relatively high proportions of imports, the construction of the project represents a significant investment spread over roughly one year. Bear in mind that the estimates are not to be regarded as highly accurate and are subject to revision. They are relatively course estimates only meant to give an approximate indication of potential expenditure.

Table 10.6: Construction phase expenditure (in 2012 Rands)

	Cost in 2012 rands over roughly one year	% of total costs that would go to suppliers in the local municipal area	% of total costs that would go to suppliers in the rest of the Eastern Cape	% of total costs that would go to suppliers in the rest of South Africa	% of total costs for imports
Civils and all buildings	R 110 000 000	29%	65%	16%	0%
Machinery and equipment	R 330 000 000	0.2%	0.3%	11%	88%
Total	R 440 000 000				

Note: Machinery & equipment such as turbines are presently only available through import. Should this change, the need to import will decrease.

10.4.6.1.1 Employment during construction

In order to estimate direct temporary employment during construction standard construction industry estimates for labour required were used. Table 10.7 outlines employment that would be associated with the two main components of the construction phase over roughly one year. Roughly 167 jobs of between 6 and 12 month duration would be associated with the entire construction phase with the majority of jobs in the low and medium skill sectors as expected. Again, bear in mind that the estimates are not to be regarded as highly accurate and are meant to give an indication of potential employment impacts.

Table 10.7: Estimated direct temporary employment during construction

	Number of workers				Duration of employment
	Highly skilled	Medium skilled	Low skilled	Total	
Construction component					
-Civils and Building	7	25	70	102	6 -12 Months
-Installation of machinery and equip	10	20	35	65	6 - 12 Months
Total	17	45	105	167	

Table 10.8 below presents estimates of how much employment is likely to go to workers from different areas. It is anticipated that approximately 72 jobs of 6 to 12 month duration would be allocated to workers from the Kouga municipal area, a further 64 to workers from the Eastern Cape, 9 to workers from the rest of the country and 22 to overseas workers given the need for specialist skills not available in South Africa.

Table 10.8: Estimated direct temporary employment per area during construction

	Construction workers			
	High skill	**Medium skill**	**Low skill**	**Total**
Anticipated % of workers from the Kouga municipal area	0%	20%	60%	
Number from the Kouga municipal area	-	9	63	**72**
Anticipated % of workers from the rest of the Eastern Cape	25%	40%	40%	
Number from the rest of the Eastern Cape	4	18	42	**64**
Anticipated % of workers from the rest of South Africa	25%	10%	0%	
Number from rest of SA	4	5	-	**9**
Anticipated % of workers from overseas	50%	30%	0%	
Number from overseas	9	14	-	**22**
Total	17	45	105	**167**

10.4.6.1.2 Household incomes linked to wages during construction

Direct household income impacts would flow from all wages paid during construction. These were estimated by multiplying the projected number of direct jobs associated with the project above by assumed average monthly salaries for each skill category (i.e. R4,800 for low skilled, R12,000 for medium skilled and R22,000 for highly skilled employees). Again, these estimates are to be treated as indicators. The results of this exercise in Table 10.9 below indicate that incomes flowing to worker from the Kouga Municipality area would probably sum to R3.3 million over the course of the project. R4.1 million would accrue to workers from the rest of the Eastern Cape and R1.2 million to workers from the rest of the country.

Table 10.9: Direct household income per area during construction (2012 Rands)

	Direct income during construction			
	High skill	**Medium skill**	**Low skill**	**Total**
Workers from the Kouga Municipality area	R 0	R 864 000	R 2 419 200	R 3 283 200
Worker from the rest of the Eastern Cape	R 748 000	R 1 728 000	R 1 612 800	R 4 088 800
Workers from the rest of SA	R 748 000	R 432 000	R 0	R 1 180 000
Workers from overseas	R 1 496 000	R 1 296 000	R 0	R 2 792 000
Total	**R 1 496 000**	**R 3 024 000**	**R 4 032 000**	**R 8 552 000**

10.4.6.2 Operational phase impacts

Once established, the operation of the facility would result in direct and indirect economic opportunities. These would stem from expenditure on operations including expenditure on employees that would not otherwise have occurred particularly in the local area. Estimates of operational costs and where operational goods and services would be sourced from are highly preliminary at this stage. It is anticipated that roughly R11.9 million would be spent annually on operations (Table 10.10). As with construction, a high percentage (roughly 70%) of this would initially be imported given the limited availability particularly of highly skilled engineers. It is hoped that after 5 years or so, local skills will have been built up to the required level and maintenance engineering companies will have been established due to projects like the Banna Ba Pifhu Wind Energy Project so that the importation of these services will no longer be necessary. Aside from engineering services, all other operational costs would entail purchases of goods and services mostly from the local area and/or region resulting in an ongoing investment injection.

Table 10.10: Preliminary estimate of operational expenditure (2011 Rands)

Operational cost categories	Annual costs in 2012 rands once project is fully operational	% of total costs that would go to suppliers in the local municipal area	% of total costs that would go to suppliers in the rest of the Eastern Cape	% of total costs that would go to suppliers in the rest of South Africa	% of total costs for imports
Salaries and wages	R 600 000	20%	30%	50%	0%
Municipal services	R 30 000	100%	0%	0%	0%
Outsourced engineering services	R 10 000 000	0%	20%	0%	80%
Sundry supplies	R 300 000	80%	20%	0%	0%
Insurance, community benefits etc	R 1 000 000	70%	10%	20%	0%
Total costs once fully operational	**R 11 930 000**				

10.4.6.2.1 Employment during operations

With regard to direct employment during operations, Table 10.11 outlines what should be expected. In keeping with the relatively low maintenance and high technology nature of the facility, it is expected that approximately 10 direct employment opportunities would be created by the project equally spread across skill levels. Although high skill positions will probably have to initially be filled by imported technicians, medium and low skill positions will offer opportunities for locals and those from the region.

Table 10.11: Employment associated with activities on the site during operations

	Number of employees			
	Highly skilled	Medium skilled	Low skilled	Total
Operational jobs once fully operational	2	4	4	10

Aside from these direct employment opportunities, the operational expenditure on the project (detailed above) and the spending of those employed directly would result in positive indirect impacts on the local and regional economy.

10.4.6.2.2 Opportunities associated with growing the national wind energy sector

The potential for the Banna Ba Pifhu Wind Energy Project and other future wind energy projects to result in greater impacts on local economies and the South African economy as a whole is primarily dependent on economies of scale. Currently, import content is necessarily high. However, if the wind programme grows in size (aided by projects such as the Banna Ba Pifhu Wind Energy Project) it should provide opportunities for manufacturing and servicing at scale and the additional benefit that would flow from it. Marquad *et al*. (2008) point out that opportunities for competing with overseas firms on a cost basis in manufacturing are minimal at present, and an extensive wind programme would initially be implemented with imported equipment and using international expertise. However, according to Marquad *et al*. (2008), the introduction of a large-scale programme could provide local economic opportunities for component manufacture, and with an appropriate industrial policy it would be possible to leverage South Africa's relatively cheap steel resources. The distance from other international manufacturers will also confer a competitive advantage, especially for less-specialised large-scale components such as steel towers.

10.4.6.3 Significance of impacts

An assessment of the significance of the combined impacts of project-related expenditure on increased employment and incomes based on the findings above (both without and with mitigation measures) is presented at the end of Section 10.5. Impacts with mitigation would be of a medium significance during construction given the size of the expenditure injection and the number of potential employment and income generation opportunities involved. Similarly, new impacts during operations would be of a medium significance with mitigation. With time local impacts should become more pronounced as the sourcing of labour, goods and services becomes easier.

The no-go would have no impact relative to these benefits as there would be no expenditure injection.

Mitigation measures

Mitigation in the form of benefit enhancement should focus on three areas:

1. Targets should preferably be set for how much local labour should be used based on the needs of the proponent and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized.
2. Local sub-contractors should be used where possible and contractors from outside the local area that tender for work should also be required to meet targets for how many locals are given employment.

3. The proponent should continue to explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as community shareholding schemes, trusts and preferential procurement in accordance with the relevant Department of Energy bidding guidelines for Independent Power Producers.

Operationalising the first two measures is challenging and it is difficult to decide on appropriate targets and ensure they are reached. It is thus recommended that the proponent should draft proposals regarding targets with reasons for their choice for inclusion in the EMP. These should include targets for (1) the percentage of the total construction contract value that should go to local contractors and (2) the percentage of total labour requirement that should be met using local labour. Targets should then be negotiated further with the local economic development authorities in the local municipality before any tendering is done.

Note that the Department of Energy is placing significant emphasis on the local economic development initiatives which wind project developers propose when deciding which wind projects to support financially. This should ensure that only wind projects which have paid significant attention to this aspect will be given the financial support required to go ahead.

10.4.7 Cumulative impacts

Cumulative impacts are defined as the impact on the environment, which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (CEQ, 1997).

Impact assessment including significance ratings in previous sections has encompassed all impacts including those of a cumulative nature providing comment specifically on their cumulative nature where relevant. This section provides further consolidated discussion of these impacts in order to provide greater clarity. Bear in mind also that the distinction between cumulative and other impacts is often extremely difficult to make. The assessment of cumulative impacts is also generally more difficult primarily as they often require more onerous assumptions regarding the likely actions of others.

Table 10.12 below summarises the wind projects in the region currently either in the application stage or with approvals in place.

Table 10.12: Wind projects planned in the Kouga region

Environmental Practitioner	Last document released, approval status	Applicant	Location	Number of Turbines	Capacity MW
Savannah Environmental	Environmental approval granted	VentuSA Energy Corp	Dieprivier Mond, 17km west of Humansdorp north of the N2	50	100
Savannah Environmental	Environmental approval granted	Renewable Energy Investments South Africa (REISA)	Happy Valley, 3 km west of Humansdorp near the N2	15	30
CSIR	Environmental approval granted	Mainstream SA	Between Jeffrey's Bay and Humansdorp north of the N2	40 to 85	180
CSIR	Environmental approval granted	Windcurrent SA	Ubuntu project on Zuurbron and Vlakteplaas farms roughly 6 km north of Jeffrey's Bay	33 to 50	100
Arcus Gibb	Environmental approval granted	Red Cap Investments	Western Sector to the east of the Tsitsikamma River Central Sector nearby Oyster Bay Eastern Sector directly north of St Francis Bay	50 to 150	100 to 300

The key source of potential negative cumulative impacts identified in this assessment is the proposed development's risk to tourism when combined with other planned wind farm projects in the area listed above. Those with environmental approvals in place are particularly pertinent and include the Mainstream proposal between Jeffrey's Bay and Humansdorp and the Red Cap proposal in three locations near St Francis Bay, Oyster Bay and adjacent to the Tsitsikama River (see Appendix 10.3 and Appendix 10.4 for maps of these proposals). The concern would be that if these projects and others go ahead along with the Banna Ba Pifhu project, the area would become dominated by wind turbines with consequences for tourism. Should the approved projects all go ahead along with the Banna Ba Pifhu project, turbines would certainly become a prominent feature of the local environment and this would not be without risks. It is these kinds of cumulative risks among others that have prompted the drafting of guidelines with regard to wind farm location (CNdV, 2006 and Environomics, 2011). However, it is not particularly clear how significant these risks would be particularly in the absence of a regional study focusing on this question. The lack of such a study in the area should be viewed as a significant information gap. In the absence of such a study, it is probably reasonable to tentatively rate cumulative risks as having a medium significance particularly when one considers the international literature on the subject (see Section 10.4.5) and the findings of the visual specialist studies for the projects in question.

Positive cumulative impacts are also likely as the project should set a positive precedent for further investment in the area. By committing to investment in a large development, the proponent would be casting a strong 'vote of confidence' in the local economy. This has the potential to influence other investors (including locals) to also act with similar confidence thereby resulting in cumulative impacts on overall investment levels. In a sense the project and other wind projects have the potential to lead to the 'crowding in' of further investment. As have been noted, if the wind energy industry grows in size (aided by projects such as the Banna Ba Pifhu Wind Energy Project) it should provide opportunities for manufacturing and servicing at scale and the additional, cumulative benefit that would flow from it.

10.4.8 Reversibility and irreplaceability of impacts

Particularly from a longer term planning perspective, and as required by the Department of Environmental Affairs (DEA), it is important to consider the extent to which impacts are reversible and the extent to which resource losses are irreplaceable. This provides a better understanding of what is to be expected once the project has reached the end of its life.

Reversibility:

Positive and negative impacts from the project essentially flow from the presence of the project. For example, with regard to positive impacts in the form of energy provision, benefits to the land owner, jobs and incomes would all only materialise when the projects is either being constructed or operated. Note that even if benefit flows fall away, income can be invested and converted to other forms of capital to provide ongoing benefits into the future. The impact is therefore assessed as moderately reversible.

Risks for example to scenic beauty and tourism would also only be present when the project is being operated and the turbines are in place. Should the project come to an end and be decommissioned, at that point economic impacts would largely fall away or stop occurring as their source (i.e. the project) would be removed. They are therefore considered highly reversible at decommissioning with adequate mitigation.

Impacts on the loss of agricultural land and income associated with it could be largely reversed in that the land can be re-used after decommissioning. The impact is therefore assessed as moderate to highly reversible.

Irreplaceability:

The key economic resource that would be physically sacrificed for the project to continue would be agricultural land. As has been outlined in this report, the opportunity costs associated with the sacrifice of the agricultural areas would be relatively low. Rehabilitation would also be possible to restore agricultural production after decommissioning. This implies that the land would have a low irreplaceability.

10.4.9 Assessment of impacts of Preferred Alternative (30.6 M) and Alternative 1 (50 MW)

Both alternative layouts were assessed in the Economics study, with 30.6 MW being the preferred alternative with a minimum of 9 and a maximum of 17 turbines (Table 10.13) and 50 MW being alternative 1 with a maximum of 28 turbines (Table 10.14).

The overall impact ratings for the two alternatives would remain the same, but the following general observations can be made regarding nuances between the alternatives. The 50 MW alternative would entail a larger overall investment and expenditure in the area when compared with the 30.6MW alternative which would lead to higher positive impacts on associated economic activity, jobs and incomes. The 50 MW alternative would also go further in meeting renewable energy goals in the province and country while providing greater benefits to the land owner on whose land the project would be established. With regard to potential negative impacts, the smaller 30.6 MW alternative would entail lower risks from a visual perspective in particular which would decrease tourism risks and risks to surrounding land users somewhat relative to the 50 MW alternative."

Table 10.13: Summary table of impacts (Preferred Alternative of 30.6 MW)

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
CONSTRUCTION PHASE OVER ROUGHLY 1 YEAR									
1.1. Impacts on land owners and land uses on the site	**Negative**	**Local**, i.e. on site	**Short**, i.e. 1 year	**Low**, since construction activity would be relatively localised to smaller areas relative to each land parcel	**Highly probable**, since construction will entail significant activity on site	**Low**, since footprints would be minimal, farming can continue and owners would be paid for use of their land	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from buildings, structures and residences to be strictly enforced.	**Low**, since mitigation, e.g. limit footprints, locate turbine appropriately, will further limit negative impacts	**Medium**, since based on new and not well known type of land use
1.2. Impacts on surrounding land users	**Negative**	**Local,** i.e. on surrounding lands	**Short**, i.e. 1 year	**Low**, since construction activity would be relatively localised to smaller areas relative to each land parcel	**Highly probable**, since construction will entail significant activity on site	**Low**, since farming and other activities can continue	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from borders and residences in particular to be enforced.	**Low**, since farming and other activities can continue	**Medium**, since based on new and not well known type of land use
1.3. Impacts associated with project investment / expenditure	**Positive**	**Local, regional and national**	**Short**, i.e. 1 year	**Medium,** since construction expenditure would be a significant injection	**Highly probable**, since construction will entail significant activity on site and investment	**Medium,** given significance of injection relative to economy	Set targets for use of local labour and maximise opportunities for training. Use local sub-contractors where possible Explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as community shareholding schemes and trusts.	**Medium,** given significance of injection relative to economy	**High,** since based on known investment amounts

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
OPERATIONAL PHASE OVER ROUGHLY 25 YEARS									
1.1. Impacts on land owners and land uses on the site	**Positive**	**Local**, i.e. on site	**Long**, i.e. 25 years	**Low to Medium**, since farmers would be compensated and risks would be relatively minimal	**Highly probable**, since structures will be permanent and operations would continue for at least 25 years	**Low to Medium**, since footprints would be minimal, farming can continue and owners would be paid for use of their land	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from buildings, structures and residences to be strictly enforced.	**Medium**, since mitigation will further limit negative impacts	**Medium**, since based on new and not well known type of land use
1.2. Impacts on surrounding land users	**Negative to Neutral**	**Local,** i.e. on surrounding lands	**Long**, i.e. 25 years	**Low,** since risks are considered manageable	**Highly probable**, since structures will be permanent and operations would continue for at least 25 years	**Low Negative**, since farming and other activities can continue	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from borders and residences in particular to be enforced.	**Low Negative to Neutral**, since farming and other activities can continue	**Medium**, since based on new and not well known type of land use
1.3. Impacts on tourism	**Negative**	**Regional**	**Long**, i.e. 25 years	**Medium,** since risks are considered manageable	**Highly probable**, since structures will be permanent and operations would continue for at least 25 years	**Medium,** considering risks and opportunities	The measures recommended in other specialist reports to minimise biophysical impacts (primarily the minimisation of visual, noise and ecological impacts) would also minimise tourism impacts.	**Medium,** considering risks and opportunities	**Low to Medium,** since tourism behaviour difficult to predict

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
1.4. Impacts associated with project investment / expenditure	**Positive**	**Local, regional and national**	**Long**, i.e. 25 years	**Low to Medium,** since operational expenditure would be a significant injection	**Highly probable**, since expenditure on operations would continue for at least 25 years	**Low to Medium,** given significance of injection relative to economy	Set targets for use of local labour and maximise opportunities for the training of unskilled and skilled workers. Use local sub-contractors where possible Explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as community shareholding schemes and trusts.	**Medium,** given potential for mitigation to enhance benefits	**High,** since investment, employment are known

Table 10.14: Summary table of impacts (Alternative 1 of 50 MW)

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
CONSTRUCTION PHASE OVER ROUGHLY 1 YEAR									
1.1. Impacts on land owners and land uses on the site	**Negative**	**Local**, i.e. on site	**Short**, i.e. 1 year	**Low**, since construction activity would be relatively localised to smaller areas relative to each land parcel	**Highly probable**, since construction will entail significant activity on site	**Low**, since footprints would be minimal, farming can continue and owners would be paid for use of their land	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from buildings, structures and residences to be strictly enforced.	**Low**, since mitigation, e.g. limit footprints, locate turbine appropriately, will further limit negative impacts	**Medium**, since based on new and not well known type of land use
1.2. Impacts on surrounding land users	**Negative**	**Local,** i.e. on surrounding lands	**Short**, i.e. 1 year	**Low**, since construction activity would be relatively localised to smaller areas relative to each land parcel	**Highly probable**, since construction will entail significant activity on site	**Low**, since farming and other activities can continue	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from borders and residences in particular to be enforced.	**Low**, since farming and other activities can continue	**Medium**, since based on new and not well known type of land use
1.3. Impacts associated with project investment / expenditure	**Positive**	**Local, regional and national**	**Short**, i.e. 1 year	**Medium,** since construction expenditure would be a significant injection	**Highly probable**, since construction will entail significant activity on site and investment	**Medium,** given significance of injection relative to economy	Set targets for use of local labour and maximise opportunities for training. Use local sub-contractors where possible Explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as community shareholding schemes and trusts.	**Medium,** given significance of injection relative to economy	**High,** since based on known investment amounts

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
OPERATIONAL PHASE OVER ROUGHLY 25 YEARS									
1.1. Impacts on land owners and land uses on the site	**Positive**	**Local**, i.e. on site	**Long**, i.e. 25 years	**Low to Medium**, since farmers would be compensated and risks would be relatively minimal	**Highly probable**, since structures will be permanent and operations would continue for at least 25 years	**Low to Medium**, since footprints would be minimal, farming can continue and owners would be paid for use of their land	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from buildings, structures and residences to be strictly enforced.	**Medium**, since mitigation will further limit negative impacts	**Medium**, since based on new and not well known type of land use
1.2. Impacts on surrounding land users	**Negative to Neutral**	**Local,** i.e. on surrounding lands	**Long**, i.e. 25 years	**Low,** since risks are considered manageable	**Highly probable**, since structures will be permanent and operations would continue for at least 25 years	**Low Negative**, since farming and other activities can continue	Implement recommendations of noise, visual, ecological, bird and bat specialist studies. Adequate setbacks from borders and residences in particular to be enforced.	**Low Negative to Neutral**, since farming and other activities can continue	**Medium**, since based on new and not well known type of land use
1.3. Impacts on tourism	**Negative**	**Regional**	**Long**, i.e. 25 years	**Medium,** since risks are considered manageable	**Highly probable**, since structures will be permanent and operations would continue for at least 25 years	**Medium,** considering risks and opportunities	The measures recommended in other specialist reports to minimise biophysical impacts (primarily the minimisation of visual, noise and ecological impacts) would also minimise tourism impacts.	**Medium,** considering risks and opportunities	**Low to Medium,** since tourism behaviour difficult to predict

Nature of impact	Status (Negative or positive)	Extent	Duration	Intensity	Probability	Significance (no mitigation)	Mitigation/Management Actions	Significance (with mitigation)	Confidence level
1.4. Impacts associated with project investment / expenditure	**Positive**	**Local, regional and national**	**Long**, i.e. 25 years	**Low to Medium,** since operational expenditure would be a significant injection	**Highly probable**, since expenditure on operations would continue for at least 25 years	**Low to Medium,** given significance of injection relative to economy	Set targets for use of local labour and maximise opportunities for the training of unskilled and skilled workers. Use local sub-contractors where possible Explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as community shareholding schemes and trusts.	**Medium,** given potential for mitigation to enhance benefits	**High,** since investment, employment are known

10.5 CONCLUSION

When considering the overall costs and benefits of the project it was found that the latter should be more prominent allowing for the achievement of a net benefit. Benefits would be particularly prominent for the project proponents, land owners on the site and in the achievement of national and regional energy policy goals. The project would also result in significant positive economic spin-offs primarily because of the large expenditure injection associated with it.

Positive cumulative impacts are also likely as the project should set a positive precedent for further investment in the area. By committing to investment in a large development, the proponent would be casting a strong 'vote of confidence' in the local economy. This has the potential to influence other investors (including locals) to also act with similar confidence thereby resulting in cumulative impacts on overall investment levels.

The key source of potential **negative cumulative impacts** is the project's risk to tourism when combined with other planned wind farm projects in the area. It is not clear how significant these risks would be particularly in the absence of a regional study focusing on this question. The lack of such a study in the area should be viewed as a significant information gap. In the absence of such a study, it is probably reasonable to tentatively rate cumulative risks as medium significance particularly when one considers the international literature on the subject and the findings of the visual specialist studies for the wind projects in the area. With respect to risks and negative impacts, these are difficult to assess accurately but should prove to be acceptable provided adequate mitigation is put in place much of which will revolve around optimal turbine locations.

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10.7 APPENDICES

Appendix 10.1: Impact rating methodology supplied by the CSIR

The following methodology is to be applied in the specialist studies for the assessment of potential impacts.

The assessment of impact significance should be based on the following convention:

Nature of impact - this reviews the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?".

Extent - this should indicate whether the impact will be local and limited to the immediate area of development (the site); limited to within 5km of the development; or whether the impact may be realised regionally, nationally or even internationally.

Duration - this should review the lifetime of the impact, as being very short term (0 - 1 years), short term (1 - 5 years), medium (5 - 15 years), long term (>15 years but where the impacts will cease after the operation of the site), or permanent.

Intensity - here it should be established whether the impact is destructive or innocuous and should be described as either low (where no environmental functions and processes are affected), medium (where the environment continues to function but in a modified manner) or high (where environmental functions and processes are altered such that they temporarily or permanently cease).

Probability - this considers the likelihood of the impact occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of prevention measures).

The status of the impacts and degree of confidence with respect to the assessment of the significance, must be stated as follows:

Status of the impact: A description as to whether the impact will be positive (a benefit), negative (a cost), or neutral.

Degree of confidence in predictions: The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as high, medium or low.

Based on the above considerations, the specialist must provide an overall evaluation of the significance of the potential impact, which should be described as follows:

Low*:* Where the impact will not have an influence on the decision or require to be significantly accommodated in the project design

Medium: Where it could have an influence on the environment which will require modification of the project design or alternative mitigation;

High: Where it could have a 'no-go' implication for the project unless mitigation or re-design is practically achievable.

Significance Rating
Intensity: HIGH

		Duration				
		Permanent	Long term	Medium term	Short term	Very short term
Extent	National					
	Regional					
	Local					
	Site specific					

Intensity: MEDIUM

		Duration				
		Permanent	Long term	Medium term	Short term	Very short term
Extent	National					
	Regional					
	Local					
	Site specific					

Intensity: LOW

		Duration				
		Permanent	Long term	Medium term	Short term	Very short term
Extent	National					
	Regional					
	Local					
	Site specific					

	High significance
	Medium significance
	Low significance

The above assessment must be described in the text and summarized in a Table as shown in the example below.

Where relevant, this assessment must also include identification and description of scenarios (i.e. "environmental" scenarios such as winter vs. summer, or "operational" scenarios such as normal vs. upset conditions, if relevant). The impact assessment must be described in the text of section 6 and summarized in a Table as shown in the example below. You can tailor the table below according to north/south options (alternatives) and according to scenarios (summer/winter), however it MUST contain all columns as described below and impacts must be described separately for both the construction phase and the operational phase.

Furthermore, the following must be considered:

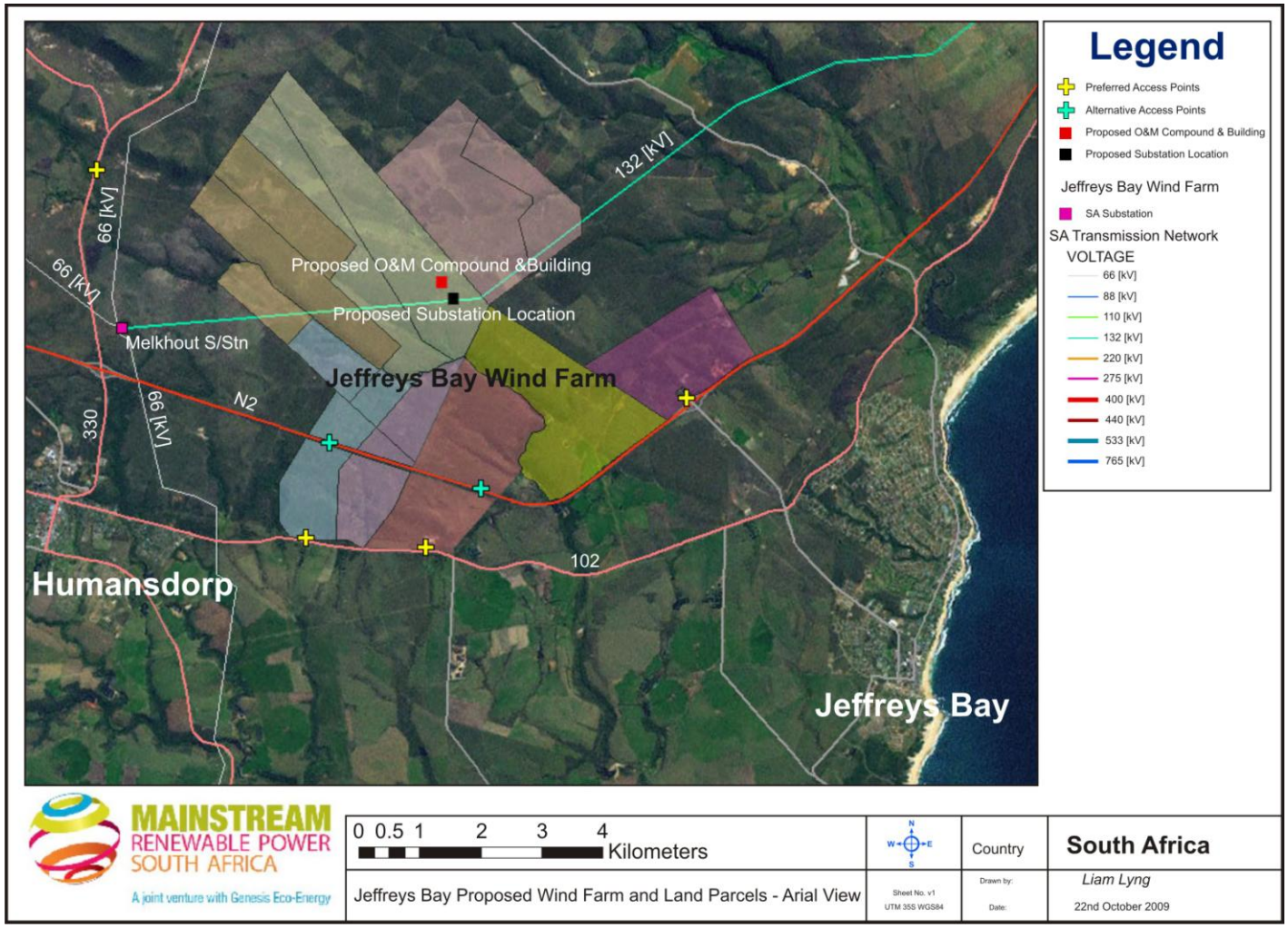
- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for both the construction, operations and decommissioning phases of the project, where relevant.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region, if relevant.
- Management actions: Where negative impacts are identified, specialists must specify practical mitigation objectives (i.e. ways of avoiding or reducing negative impacts). Where no mitigation is feasible, this should be stated and the reasons given. Where positive impacts are identified, management actions to enhance the benefit must also be recommended. The specialists should set quantifiable standards for measuring the effectiveness of mitigation and enhancement.

Monitoring: Specialists should recommend monitoring requirements to assess the effectiveness of mitigation actions, indicating what actions are required, by whom, and the timing and frequency thereof.

Appendix 10.2: Disclaimer

The primary role of this study is to inform the decision-making processes being undertaken by the relevant environmental authorities with regards to the proposed project. Due care and diligence has been applied in the production of the study. However, ultimate responsibility for approving, denying or requiring changes to the proposed project application rests with the relevant environmental authorities (and other government bodies where relevant) who also bear responsibility for interrogating and determining how assessment information from this economic specialist study along with other information is to be used to reach their decisions. Independent Economic Researcher and Dr Hugo van Zyl can therefore not be held responsibility or liable for any consequences of the decisions made by the relevant environmental authorities with regard to the proposed project. This includes any financial, reputational or other consequences that such decisions may have for the applicant, the Environmental Assessment Practitioner responsible for conducting the Environmental Impact Assessment process or for the environmental authorities themselves.

Appendix 10.3: Location of proposed Mainstream Wind Energy Project



Source:
Mainstream EIA done by CSIR, 2010

Appendix 10.4: Locations of proposed Red Cap Wind Energy Project

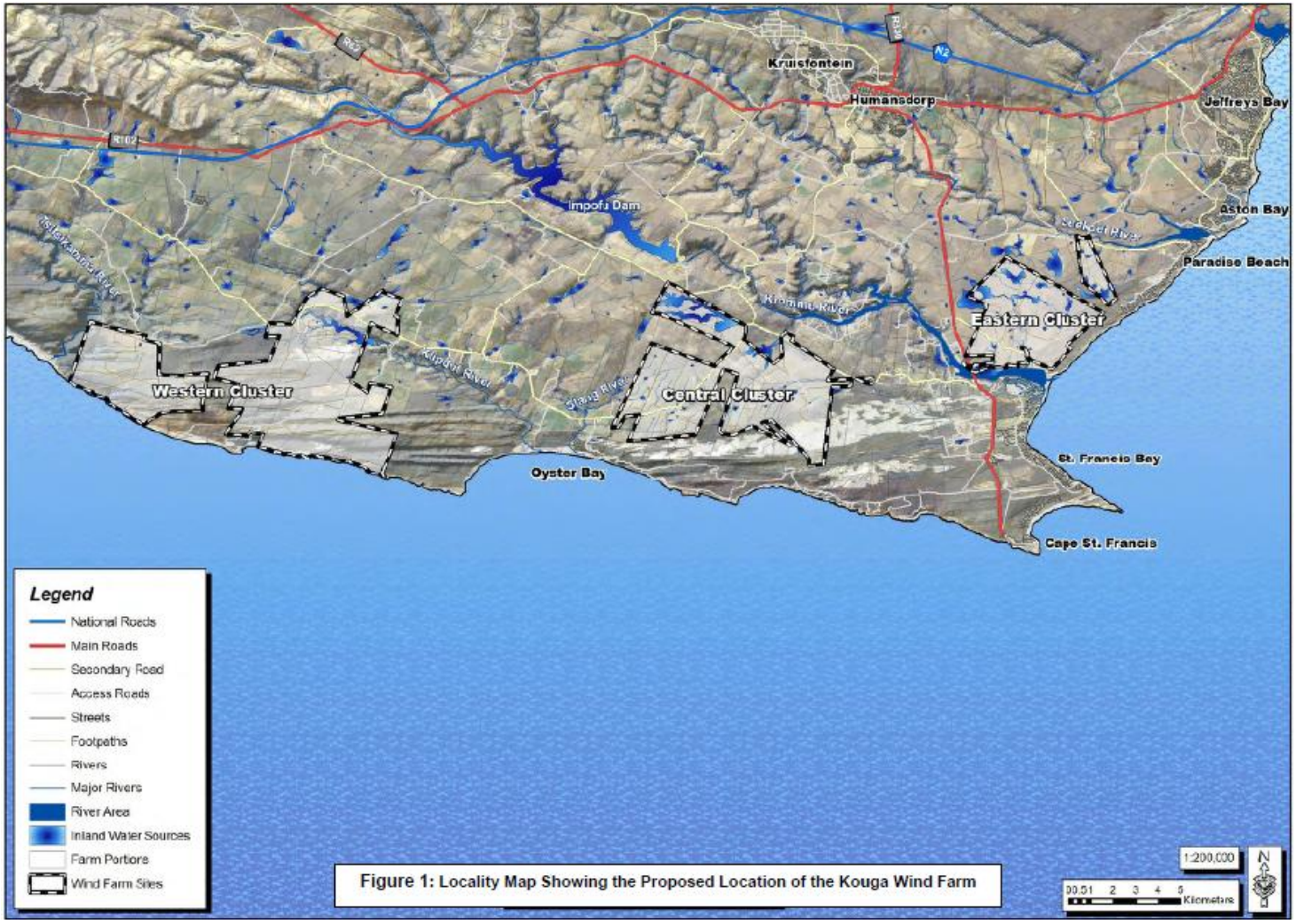


Figure 1: Locality Map Showing the Proposed Location of the Kouga Wind Farm

Source:
Red Cap EIA done by Arcus Gibb, 2010