PROPOSED KAROO RENEWABLE ENERGY FACILITY ON A SITE NEAR VICTORIA WEST, NORTHERN AND WESTERN CAPE PROVINCE

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29 March 2010

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ACRONYMS

DEA:	Department of Environmental Affairs
EIA:	Environmental Impact Assessment
EMP:	Environmental Management Programme
HDSA:	Historically Disadvantaged South African
IDP:	Integrated Development Plan
I&AP:	Interested and Affected Party
LM:	Local Municipality
PV:	Photovoltaic
SIA:	Social Impact Assessment
StatsSA:	Statistics South Africa
SMME:	Small to Medium Size Enterprise
ULM:	Ubuntu Local Municipality

1. INTRODUCTION

1.1 Background

Savannah Environmental (Pty) Ltd, as Environmental Assessment Practitioners (EAP), has been appointed by South African Renewable Green Energy (Pty) Ltd. (SARGE) to conduct an Environmental Impact Assessment (EIA) for the proposed establishment of the Karoo Renewable Energy Facility which would consist of both a wind energy facility component and a photovoltaic solar facility component, as well as associated infrastructure on a site located approximately 34 km south of Victoria West in the Northern and Western Cape Province.

Before a project of this nature can proceed an EIA needs to be undertaken. The EIA process consists of two phases, namely the Scoping Phase and a detailed EIA Phase. As part of the EIA process, a Social Impact Assessment (SIA) is required to be undertaken.

1.2 The Karoo Renewable Energy Facility

The Karoo Renewable Energy Facility comprises the proposed construction and operation of a commercial renewable energy facility consisting of both a wind energy facility component and a photovoltaic solar facility component, as well as associated infrastructure. A broader area of approximately 200 km^2 is being considered within which the facility is to be constructed. The proposed facility will thus have a smaller development footprint than the identified site which is assessed as part of the EIA. It is planned that the facility would have a generating capacity of approximately 350MW and would include:

- Up to 150 wind turbines and concrete foundations to support them (~450MW);
- An array of photovoltaic (PV) panels (~50MW);
- Each turbine will be a steel tower (between 80 and 125m in height), a nacelle (gear box) and three rotor blades with a rotor diameter of between 90 and 100 m (i.e. each blade ranging from 45 to 50m in length);
- Two (2) 132 kV substations with high-voltage (HV) yard footprints of approximately 50m x 50m;
- Foundations to support both the turbine towers as well as the PV panels;
- Cabling between the project components, to be lain underground where practical;
- Two (2) new overhead 132 kV power lines;
- Internal access roads (minimum width of 6.5 m depending on the proposed crane) linking the wind turbines and PV component with the other infrastructure on the site. Existing farm roads will be used as far as possible. However, the dispersed distribution pattern of wind turbines will necessitate the construction of a number of new roads; and

- Small office and/or workshop building for maintenance and storage purposes

The project is proposed on portions of the following farms which are located approximately 34 km south of Victoria West. The main study area falls within the Northern Cape Province although a smaller section falls within the Western Cape Province:

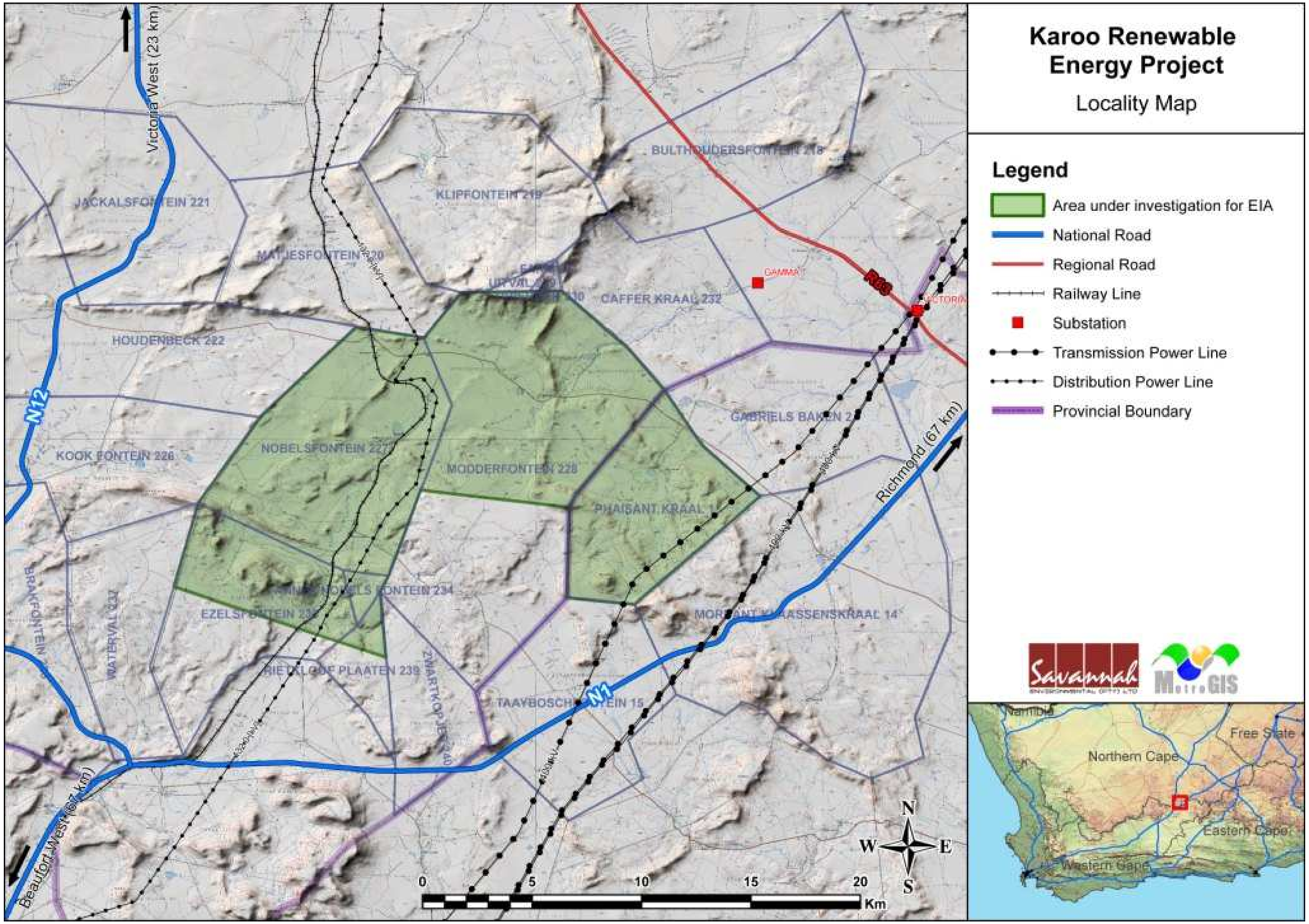
- Nobelsfontein 227;
- Annex Nobelsfontein 234;
- Ezelsfontein 235;
- Rietkloofplaaten 239;
- Modderfontein 228; and
- PhaisantKraal 1 (Western Cape).

Surrounding farms include the following:

- Matjesfontein 220;
- Klipfontein 219;
- Farm 231;
- Uitval 229;
- Caffer Kraal 232;
- Gabriels Baken 2;
- Mordant Klaassenskraal 176 (Western Cape);
- Mordant Klaassenskraal 14/11 (Western Cape);
- Taayboschfontein 15 (Western Cape);
- Rooikrans Retreat;
- Zwartkopjes 240/1 and 240/2;
- Grootklip 238;
- Waterval 237;
- Kookfontein 226; and
- Houdenbeck 222.

1.3 Map of study area

Herewith a map of the study area:


Karoo Renewable Energy Project
Locality Map
Legend
Area under investigation for EIA
National Road
Regional Road
Railway Line
Substation
Transmission Power Line
Distribution Power Line
Provincial Boundary
Victoria West (23 km)
Richmond (67 km)
Beaufort West (67 km)
N12
N1
R63
JACKALSFONTEIN 221
KLIPFONTEIN 219
HOUDENBECK 222
KOOK FONTEIN 226
NOBELSFONTEIN 227
MODDERFONTEIN 228
CAFFER KRAAL 232
PHAISANT KRAAL 1
TAAYBOSCHFONTEIN 15
RIETKLOOF PLAATEN 239
Northern Cape
Free State
Eastern Cape
Western Cape
0 5 10 15 20 Km
N E S W

2. DEFINITION OF A SOCIAL IMPACT ASSESSMENT

Burdge (1995) describes a Social Impact Assessment as the "…systematic analysis in advance of the likely impacts a development event (or project) will have on the day-to-day life (environmental) of persons and communities." A SIA therefore attempts to predict the probable impact of a development (before the development actually takes place) on people's way of life (how they live, work, play and interact with one another on a daily basis), their culture (their shared beliefs, customs and values) and their community (its cohesion, stability, character, services and facilities), by:

- Appraising the social impacts resulting from the proposed project;
- Relating the assessed social impacts of the project to future changes in the socio-economic environments that are not associated with it. This would serve to place the impacts of the project into context;
- Using the measurements (rating) to determine whether the impacts would be negative, neutral or positive;
- Determining the significance of the impacts; and
- Proposing mitigation measurements.

An SIA is thus concerned with the human dimensions of the environment, as it aims to balance social, economic and environmental objectives and seeks to predict, anticipate and understand the potential impacts of development.

The usefulness of an SIA as a planning tool is immediately clear, in that it can assist the project proponent to conceptualise and implement a project in a manner which would see the identified negative social impacts addressed through avoidance or mitigation and the positive impacts realised and optimised. It would also allow the community to anticipate, plan for and deal with the social changes once they come into effect. In this sense then, the SIA is an indispensable part of the EIA, the Environmental Management Plan (EMP) and any participative activity (e.g. community involvement in mitigation and monitoring during planning and implementation).

3. PURPOSE OF THE SOCIAL IMPACT ASSESSMENT REPORT

The aim of the Social Impact Assessment Report is to:

- Determine the current socio-economic status of the area and the social characteristics of the receiving environment;
- Indicate the anticipated core impact categories and impact areas (possible hot spots);

- Identify anticipated positive socio-economic impacts of the proposed project, including positive impacts and provide management measures for these impacts;
- Identify and highlight negative socio-economic impacts (social hot spots) of the proposed project and indicate mitigation measures to deal with these impacts;
- Present the findings, recommendations and conclusions of the social study.

4. METHODOLOGY

The broad steps followed as part of the Social Impact Assessment are discussed below.

4.1 Scope of the Assessment

Based on information received from SARGE and Savannah Environmental, the scope of the assessment was determined. A site visit was undertaken during October 2010 to enable the consultants to familiarise themselves with the area and the social characteristics of the receiving environment.

4.2 Literature Review, Analysis and Desktop Studies

The literature review and desktop studies assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities.

4.3 Data Gathering

4.3.1 *Primary Data*

Primary data assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities. Interviewing of 'key" persons during the Scoping Phase also formed part of the research process. This included telephonic and personal interviews with e.g. the surrounding property owners, and representatives of the Ubuntu Local Municipality, and so forth.

4.3.2 *Secondary Data*

Secondary data, which was not originally generated for the specific purpose of the study, were gathered and analysed for the purposes of the study. Such data included the census data, project maps, local histories, planning documentation such as the draft Integrated Development Plan (IDP) of the Ubuntu Local Municipality.

4.3.3 *Consultation*

Information gathered and social issues identified and verified during the public participation process (focused on the host community) undertaken as part of the Scoping Phase and

detailed Environmental Impact Assessment, also served as key input to the social assessment.

In addition to the above, lists with specific questions were sent to representatives of the Ubuntu Local Municipality, the Department of Finance, Economic Affairs and Tourism Northern Cape, and the Department of Social Development Northern Cape. The aim was to further explore and verify specific issues applicable to these departments, thus enabling a more detailed social analysis.

4.3.4 *Questionnaires*

Questionnaires aimed at obtaining site specific information were distributed to the surrounding property owners. The questionnaires included questions regarding background information, basic socio-economic variables, as well as questions for the assessment of information and concerns about wind energy facilities and PV facilities. Questionnaires were distributed to the surrounding landowners. Refer to Section 13.3 for a list of the individuals on the mailing list.

4.4 Profiling

Profiling serves to build on information generated during the Scoping phase. It involves a description of the social characteristics and history of the area being assessed, an analysis of demographic data, changes in the local population, and the land-use pattern in the study area, as well as any other significant developments in the area and thus social character over time. The profiling process is a combination of secondary and primary research, site visits and consultation. This could include information on:

- Historical background;
- Social characteristics;
- Culture, attitudes and socio-psychological conditions;
- Population characteristics;
- Community and institutional structures;
- Community resources; and
- Broad economic impacts.

The broad profiling will typically include descriptions regarding the following:

- The social trends and current conditions;
- The land-use in the area;

- The demographical profile and social characteristics of the host community;
- Other potential developments in the area;
- The local and regional economy; and
- Potential economic links between the proposed project and its environs.

4.5 Projection and Estimation of effects

A baseline assessment indicates the current reality in the social and related aspects of the affected environment. A baseline assessment is necessary to enable a logical and theoretically sound analysis of social impacts. It forms part of the process of identifying important cause-and-effect relationships and a comparative framework for anticipated changes and impacts.

The output of this phase is the impact matrix and mitigation measures.

4.6 Variables

The following variables are typically assessed (Burdge, 1995) as part of the Social Impact Assessment:

- Population impacts;
- Community/institutional arrangements;
- Conflicts between local residents and newcomers;
- Individual and Family level impacts;
- Community infrastructure needs; and
- Intrusion impacts.

For the purpose of assessing the impacts associated with the proposed project, the above variables were adapted to allow the assessment of the full range of social impacts relevant to the specific project. These variables would relate to the construction and operational phases of the proposed project.

4.7 Significance Criteria

During the Environmental Impact Assessment Phase, the anticipated social impacts were rated according to a rating approach used and specified by Savannah Environmental. This rating approach is described below:

CATEGORY	DESCRIPTION

CATEGORY	DESCRIPTION
Nature	A description of what causes the effect, what will be affected and how it will be affected.
Extent	Whether the impact will be local (limited to the immediate area or site of development) or regional. A value between 1 and 5 will be assigned as appropriate (1 = low and 5 = high).
Duration	Where it will be indicated whether: • The lifetime of the impact will be of a very short duration of 0 – 1 years: Assigned a score of 1 • The lifetime of the impact will be of a short duration of 2 – 5 years: Assigned a score of 2 • Medium term of 5 – 15 years: Assigned a score of 3 • Long term (> 15 years): Assigned a score of 4 • Permanent: Assigned a score of 5
Magnitude	This is quantified on a scale of 0-10, where • 0 is *small* and will have no effect on the environment; • 2 is *minor* and will not result in an impact on processes; • 4 is *low* and will cause a slight impact on processes; • 6 is *moderate* and will result in processes continuing but in a modified way; • 8 is *high* where processes are altered to the extent that they temporarily cease; and • 10 is *very high* and results in complete destruction of patterns and permanent cessation of processes.
Probability	The probability of occurrence describes the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5, where: • 1 is *very improbable* (probably will not happen)

CATEGORY	DESCRIPTION
	• 2 is *improbable* (some possibility, but low likelihood) • 3 is *probable* (distinct possibility) • 4 is *highly probable* (most likely) • 5 is *definite* (impact will occur regardless of any prevention measures)
Significance	The significance shall be determined through a synthesis of the characteristics described above and can be assessed as *low, medium or high*. The significance weightings for each potential impact are as follows: • < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area) • 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated) • > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area) The significance is calculated by combining the criteria in the following formula: S = (E+D+M)P S= Significance weighting E= Extent D= Duration M= Magnitude P= Probability
Status	The Status will be described as *positive, negative or neutral*.
Reversibility	The degree to which the impact can be reversed.
Irreplaceable loss of resources?	The degree to which the impact may cause irreplaceable loss of resources.

CATEGORY	DESCRIPTION
Can impacts be mitigated?	The degree to which the impact can be mitigated.
Mitigation	Description of mitigation measures.
Cumulative impacts	Identification of cumulative impacts.
Residual impacts	Identification of residual (remaining) impacts after mitigation.

4.8 Data Gaps and Limitations

As indicated above, data for the Social Impact Assessment was obtained through various means. Specific lists of questions were distributed to representatives of the Ubuntu Local Municipality, the Department of Finance, Economic Affairs and Tourism Northern Cape, and the Department of Social Development Northern Cape. Questionnaires were distributed to the surrounding landowners.

These questionnaires were formulated to evaluate a wide range of perceptions with regards to the proposed facility, but also to gain more detailed information from the landowners with regards to the activities undertaken on their properties to properly inform the SIA study.

The questions submitted to the relevant government representatives focused on issues pertaining to capacity building and skills development, social responsibility and possible impact of the facility on the functions of the various departments.

On the time of completion of the draft SIA, however, only two completed questionnaire were received from two property owners. No questions posed to the government officials were answered.

5. BASELINE DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 General Description of the Study Area

The proposed study area falls within the Ubuntu Local Municipal area, which forms part of the Pixley Ka Seme District Municipality. Even though a small section of the study area (farm Phaisantkraal and bordering properties) falls within Beaufort West Municipal area in the Western Cape Province, the report would mainly focus on the socio-economic character of the Ubuntu Local Municipal area, as well as the Pixley Ka Seme District Municipality due to the fact that the largest part of the study area is situated within these municipal boundaries.

The main town within the Ubuntu Local Municipal area is Victoria West, with smaller towns such as Loxton and Richmond. Two smaller settlements, namely Merriman and Hutchinson were established as part of the railway system's settlements. Hutchinson is approximately 12 km south-east of Victoria West situated on the Cape Town-Kimberley railway line, just off the R63, and thus in close proximity to the proposed site.

The Beaufort West Local Municipality includes the towns of Beaufort West, and the smaller settlements of Merweville and Nelspoort situated in the depths of the Central Karoo. Beaufort West is the heart of the Central Karoo and was originally established as a service centre for the rail and road transport and for the rural agricultural activities. The town has managed to maintain some economic growth even though the rail transport and the agricultural sectors are declining in terms of economic opportunities. This could mainly be attributed to the high volume of traffic passing through the town on the N1 (BWM IDP, 2010).

Nelspoort is approximately 42 km north east of Beaufort West and was established around the construction of a Tuberculosis (TB) Sanatorium. This facility is not functioning anymore which left the community with almost no services except for the school in the town (BKS, 2004 & BWM IDP, 2010). Merweville is situated within the Karoo Plains and is often compared to the desert region of Nevada and Arizona in the USA. The town is situated next to a river and several fountains which led to the development of an efficient irrigation system. Various vegetable gardens, pomegranate hedges and orchards are thus found in town (BKS, 2004).

Victoria West is surrounded by private farms but also has land that is used for communal farming and a game camp. Sheep, mutton and wool Merino sheep, Dorper Sheep and Angora goats) are the main farming activities in the Victoria West and Beaufort West areas, while hunting and eco-tourism activities are fast becoming a significant industry. Wool is mainly used for export purposes, while meat is generally produced for the local market (Ubuntu LM IDP, 2009 & BKS, 2004). Olive production, apricots and prickly pears are some of the other agricultural activities found in the Beaufort West area (BKS, 2004).

The vegetation in the study area is typical Karoo veld characterised by plains, broken ridges, small bushes and grasslands as the main features. The Karoo area also has a number of archaeological, historical and rock art sites, especially of the San.

The farms Nobelsfontein 227, Annex Nobelsfontein 234, Ezelsfontein 235 and Rietkloofplaaten 239 are the property of the developer, SARGE. These farms have been the property of the Roux family for quite some time. The Nobelsfontein Water project (a water bottling project) is also being undertaken on the farms Nobelsfontein 227 and the Annex Nobelsfontein 234. The two farms Modderfontein 228 and Phaisantkraal 1 belong to Mr. Marais who have

inherited the properties. On all the properties sheep farming is undertaken. Mr. Marais also operates a guest house on the farm Modderfontein 228.

5.2 Population Dynamics

5.2.1 *Population Figures*

According to the 2001 Census figures, the total population within the Ubuntu Local Municipality totals 16 376 which indicates a decrease in the population from the 1996 figures (19 712). The Community Survey undertaken in 2007 indicates the total population as 16 153 which again points to a decrease in the population (Ubuntu LM IDP, 2009).

This decrease would have far reaching consequences for the municipality's service delivery, as well as with regards to grants and subsidies made available to them. The decrease could be the result of a stagnating economy that is unable to provide school leavers with sufficient job opportunities.

The total population for the Beaufort West area (including Nelspoort and Merweville) was estimated at 40 000 for 2010 (BKS, 2004).

Typical to the Northern Cape the area is scarcely populated with most of the residents living in scattered towns and settlements. The farms in the study area mainly house the property owners and the farm workers. Some property owners do not even permanently reside on their properties. The study area is thus also very scarcely populated.

5.2.2 *Age Groups*

The largest sections of the Ubuntu Local Municipality residents fall within the 15 to 34 years age category (5 450 individuals), followed by the 35 to 64 age category (4 550). Approximately 3 601 individuals make up the 5 to 14 years category (Census 2001 Statistics as included in the Ubuntu LM IDP, 2009).

The age structure in the Beaufort West Municipal area is also very young and the majority of the economic inactive section of the population is younger than 18 years (BKS, 2004).

It is thus clear that the majority of the residents within the Ubuntu and Beaufort West Local Municipalities can be classified as youths which increase the pressure on the development of job opportunities and other social services such as schooling, community facilities, orphanages and other child care facilities. A large section of the population would also become economically active within the next 5 to 10 years and proper education would thus be a key to ensuring a good quality life.

5.2.3 *Education Levels*

The educational levels among the population of Ubuntu are relatively low which impact on the employment potential of the population and therefore also on the local economic development and job creation initiatives (Ubuntu LM IDP, 2010).

Literacy and educational levels within the Beaufort West Municipal area are low (BKS, 2004). The percentage of people with a higher education in Beaufort West is 5%, compared to the Central Karoo District with 6%. However, in terms of occupational skills, Beaufort West has a proportion of 17%, compared to Central Karoo District with 14%. The low level of education, particularly amongst historically previously disadvantaged females is indeed of concern. As the demands of the economy diversify, the potential exists for functional and technical education in schools. The municipality however, indicated their willingness to invest in technical education that will support local economic development (BWM IDP, 2010).

5.2.4 *Employment Status and Income*

According to the Statistics South Africa's 2001 survey, the labour force in the Ubuntu Local Municipality include 6 189 individuals. This includes the employed (66%) and unemployed (34%), but not those that are not economically active but who would normally form part of the labour market (Ubuntu LM IDP, 2009).

The labour market actually constitutes 62% of the total population. Should those be taken into consideration, the unemployment rate of 34% could therefore be somewhat misleading due to the fact that people not seeking work, who can be classified as unemployed people, are not included.

Of the employed labour force, 69% earn less than R800 per month. This gives an indication of the poverty that exists among the majority of residents within the Ubuntu Local Municipality.

The unemployment rate in the Beaufort West area is calculated at 58% which can be classified as a high unemployment rate with subsequent high poverty rates (BKS, 2004). According to the BWM IDP (2010), only 36% of the economically active people (18 years and older) are unemployed. Irrespective of the actual unemployment rate it was stated that the low income levels remain a concern (BWM IDP, 2010).

Declining economic activities and limited business opportunities in both the areas worsen the situation with regards to unemployment. This again leads to various social challenges especially with regards to the involvement of the unemployed in various types of criminal activities (BKS, 2004 & BWM IDP, 2010).

5.2.5 *Employment Sectors*

The main employment sector in the Ubuntu Municipal area is the agricultural sector (livestock farming), followed by the wholesale and trade sector. Few people are employed within the manufacturing and construction sector (Ubuntu LM IDP, 2009).

Within the Beaufort West Municipal area, the majority of those employed are employed within the commerce, community services and agricultural sectors (BKS, 2004).

5.3 Basic Services

5.3.1 *Housing Provision*

A large section of the population of the Ubuntu Local Municipality lives in formal housing. There is still a housing backlog estimated at 1 554 houses, which needs to be attended to (Ubuntu LM IDP, 2009).

The housing backlog within the Beaufort West Municipality amounts to more than 3 000 houses which are increasing on a daily basis. Various steps have been put in process by the municipality to address this backlog (BWM IDP, 2010).

5.3.2 *Sanitation Services*

In the formal towns of the Ubuntu Municipality, sanitation services are provided, although informal settlements at various towns still make use of the bucket system. This give a clear indication of the need for the upgrading of the sanitation infrastructure and services provided (Ubuntu LM IDP, 2009).

Within the towns of Beaufort West and Nelspoort, all sites, except a very small number of shacks in Beaufort West itself (approximately 20) have access to water borne sanitation, while Merweville is still using "suction tanks" (BKS, 2004).

5.3.3 *Water Provision*

The Ubuntu Municipality falls within the Karoo which can be classified as a semi-desert area. No natural surface water is found in the area and rainfall is low which hampers the provision of water (quantity and quality) to the water users. Water meters and water networks in all the towns need replacement (Ubuntu LM IDP, 2009).

The majority of the residents in the Beaufort West area have access to potable water. Water services are also of a high standard and all sites have been provided with a water meter. Residents in Nelspoort and Merweville have access to at least one water point per site. The protection and management of the water sources remains important due to the scarcity of the water sources in the area (BKS, 2004).Waste Services

The majority of households in the towns of Victoria West, Richmond and Loxton have waste removal once a week. The landfill site in Victoria West, however, should be moved as it is creating health risks to the communities.

Littering and illegal dumping still occur and should be urgently addressed as this rubble increases the health risks experienced by the communities (Ubuntu LM IDP, 2009).

Refuse removal in the town of Beaufort West is up to standard and working efficiently (BKS, 2004).

5.3.4 *Electricity Provision*

All formal houses in the Ubuntu Local Municipality are provided with electricity. The electricity distribution system is, however in a poor condition and needs to be upgraded (Ubuntu LM IDP, 2009).

All towns within the Beaufort West Municipality have access to Eskom supplied electricity (BKS, 2004).

5.3.5 *Health Services*

The health services in the area seem to be insufficient and therefore one of the socio-economic goals of the Ubuntu Local Municipality is the establishment of health programmes and the provision of health services (hospitals, clinics and mortuaries) to the benefit of all the residents (Ubuntu LM IDP, 2009).

The prevalence of HIV/Aids, alcohol abuse and other communicable diseases are high. Awareness creation among the local residents is critical to combat the spread of these diseases and to limit family violence and crime associated with alcohol abuse (Ubuntu LM IDP, 2009).

In the Beaufort West area, the spread of HIV/Aids is especially perturbing and it is anticipated that the disease could even lead to a decline in the population in future, which would again impact on the increased need for orphan and health care facilities. The high prevalence could be attributed to the trucking industry and the location of the town around the N1 (BKS, 2004).

The Beaufort West area has one provincial hospital, three municipal clinics, one district municipal clinic and nine mobile clinics which service the rural and remote areas (BKS, 2004).

5.3.6 *Safety and Security*

At this stage, the emergency infrastructure and personnel of the Ubuntu Local Municipality are not up to standard. All towns within the area need ambulance and fire fighting services (Ubuntu LM IDP, 2009).

Crime levels are relatively low and mostly involve minor crimes, although the incidences of family violence and crime associated with alcohol abuse remains a grave source of concern (Ubuntu LM IDP, 2009)

5.4 Infrastructure

The main roads in the study area are the N1 and N12 (linking Beaufort West and Victoria West), as well as a secondary road, referred herein as the Biesiespoort Road leading to the actual site itself. The N1 is in close proximity to the study area (Pöyry, 2010) where it is linking Richmond and Beaufort West. The R63 is to the north west of the proposed site. Some additional smaller "farm roads", which are normally only used by residents of the surrounding area to access their properties, link from these roads. A service road, not frequently used, also runs parallel to the railway line.

The Skietkuil/Biesiespoort substation is located on the farm Nobelsfontein 227 which is situated within the eastern section of the larger site investigated for the proposed Karoo Renewable Energy Facility. The Biesiespoort/Kromrivier 132 kV power line traverses the western section of the site in a north-south direction through the Skietkuil/Biesiespoort substation, while the 400 kV Droërivier-Hydra 2 transmission power line runs across the farm Phaisantkraal 1 which is in the south eastern section of the larger site under investigation. The Gamma Substation is being constructed at this time and is to the north east of the site under investigation.

A railway line runs from north to south through the Skietkuil/Biesiespoort station and then change direction and runs from west to east and then turns away in a southerly direction. The Skietkuil/Biesiespoort station is no longer in use, but this railway station has a siding and offloading platform.

5.5 Land Use

The farms investigated as part of the Karoo Renewable Energy Facility are mainly used for sheep farming. On the farm Nobelsfontein 227, a water bottling operation is also undertaken, whereas a guest house is operated from the main dwelling and buildings on the farm Modderfontein 228. This facility is located directly to the north of the Biesiespoort Road.

The land uses of the surrounding farms are also mainly sheep farming, with some guest houses found on the adjoining farms.

5.6 Tourism and Leisure

From a tourist point of view, Victoria West is wedged between mountains and a river and is well placed along the main routes between Cape Town and Johannesburg via Kimberley. Various attractions in and around town include:

- The Victoria West Town Hall;
- The Victoria West Museum;
- The Anglican Church in Victoria West;
- The Apollo Theatre;
- The Gunpowder Magazine building;
- Victoria West Caravan Park;
- The Victoria West Dam; and
- The Mannetjies Roux Museum.

Game farms with some hunting establishments are also found in the rural areas surrounding the town.

Tourism is becoming a more important contributor to the economic activity in the Ubuntu Local Municipal area. It does not only generate income, but also provides various job opportunities and prospects for SMME development. Due to the proximity of Richmond, Victoria West and Loxton on the main tourism routes (N1, N12 and R63) the development of tourism needs serious prioritisation in the formulating of strategies for local economic development (Ubuntu LM IDP 2010).

According to the Ubuntu Tourism Strategy (Creative Harvest, 2009) the area could be developed as a prime tourist destination but significant effort would be required which could include the following:

- Focused Tourism Development;
- Restoration and listing of Heritage sites for tourism development purposes;
- Active promotion of the municipality as a destination to create tourism demand;
- Competent human resources to champion tourism in the municipality; and
- Tourism infrastructure development.

Tourism within the Beaufort West area is centred around the accommodation sector (including restaurants) within town, as well as the Karoo National Park situated just outside of Beaufort West. The area is internationally known for its plant species and archaeological sites. Various other tourism attractions also exist within Beaufort West town (BKS, 2004). Tourism therefore remains an important sector to stimulate general economic growth.

Another key tourist attraction is the Three Sisters hills situated to the east of the N1 to the south of the site.

5.7 Economy

The local economy of Victoria West and surrounds are based on the agricultural activities taking place on privately owned farms. This is mainly focused on livestock farming. Although it is not always that lucrative, it supports a number of people in the area. The undiversified local economy is thus quite vulnerable to economic fluctuations.

An industry with potential for growth is the tourism sector due to the area's location with regards to the N12 and the N1. The municipality therefore developed a tourism strategy to be implemented over the next ten years to promote this economic sector. This would focus on

- Leisure tourism;
- Retail tourism;
- Meetings, incentives, conferences, and exhibitions (MICE); and
- General business.

6. POTENTIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE

Construction of a PV facility and wind energy facility would typically entail site surveying, construction of access roads, site preparation (e.g. clearing of vegetation at the footprint of the components for the turbines and PV panels), construction and establishment of internal access roads, fencing of the site and construction of the entrance gate, transportation of components and equipment to the site, construction of the on-site generator transformers and small substations, installation of turbines, mechanical and electrical completion of the turbines followed by the commissioning of the turbines, setting up of connections points by Eskom, cable laying, mount installation, installation of inverters and associated electronics, and the construction of the required buildings, establishment of ancillary infrastructure such as the power lines, and site rehabilitation.

The construction period for the PV facility is expected to be between 12 to 18 months. The duration could, however, be shortened should more than one team (e.g. four teams) be used

simultaneously (Pöyry, 2010). The construction period for the wind energy facility would typically require between 18 to 24 months (SARGE, 2011).

It is anticipated that at some stage of the construction period that construction activities of the wind energy facility and the PV facility would be undertaken at the same time. This would, however, all depend on the allocation of the licenses and the finalisation of the REFIT execution (SARGE, 2011)

Impacts associated with this phase of the project is thus of a short duration, temporary in nature, but could have long term effects on the surrounding environment.

The following socio-economic impacts have the potential to materialise during the construction phase of the project:

6.1 Job Creation and Skills inequities

The proposed wind energy facility project could provide limited construction jobs for the local population. A large part of the construction activities associated with the PV facility would however entail manual labour such as the erection of the fence, creation of fire breaks, cable laying, mount installation and the construction of the workshop area and so forth. More specialised skills, however would be required for the installation of the modules and electronics. The jobs associated with the Karoo Renewable Energy Facility would thus fall within the unskilled, semi-skilled, skilled and highly skilled positions.

From information received it is expected that a total number of twenty (20) construction workers would be employed for the wind energy facility and the PV facility. It is anticipated that 60% of the workforce would fall within the skilled category and 40% in the unskilled category (SARGE, 2011).

The benefits to the local population would be determined by the degree to which the employment opportunities created by the proposed project match the actual job skills present in the local communities or the unemployed sector. Various issues present among the local population could therefore influence the impact of job creation, such as:

- the young population profile of the Ubuntu and Beaufort West Local Municipalities;
- the low education levels among the population of the Ubuntu and Beaufort West Local Municipalities;
- the main employment sector within the Ubuntu Local Municipality which is the agricultural sector (livestock farming);
- the high unemployed levels found in the Ubuntu and Beaufort West Local Municipalities area;

- the scarcely populated study area; and
- the stagnating localised economy.

The population profile of the Ubuntu Local Municipality indicates a large young population profile of 5 450 individuals within the 15 to 34 years age category (2 708 of these individuals are males/49%). In addition 3 601 individuals fall within the 5 to 14 years category (1 789 of these individuals are males/49%) (Ubuntu LM IDP, 2009). It is therefore anticipated that there is currently a large number of school learners and older individuals (particularly males) that could be in the employable age range once the project construction start (e.g. in two to four years' time). Experience has shown that the construction related positions would typically be filled by male individuals. It is therefore expected that there would be sufficient numbers of males in the study area that could be employed.

A concerning factor, however is the low education levels among the population of the Ubuntu and Beaufort West Local Municipalities and the fact that the majority of the people within the Ubuntu Local Municipality are employed within the agricultural sector and those in the Beaufort West Local Municipality are employed within the commerce, community services and agricultural sectors (BKS, 2009). It should, however be noted that a small number of the people of the Ubuntu Local Municipality are employed within the construction sector. At this stage it cannot be determined how many of these individuals would thus have the relevant skills that would make them suitable for construction related activities. However, as the construction phase would involve unskilled, semi-skilled and skilled workers it is likely that applicable locals for the unskilled and semi-skilled positions could be sourced and that there would be sufficient numbers of individuals to choose from. Due to the high unemployed figures, it is also clear that there would be various unemployed persons in search of employment, even if they can only secure temporary positions. For the lower level skilled positions, outsiders would thus definitely not have to be sourced. Even though all individuals that would be employed might not have the necessary applicable skills, this issue could be addressed through proper focused skills training and capacity building initiatives after locals have been sourced, but prior to construction activities starting.

Based on the above, it is concluded that the unskilled, semi-skilled and some skilled positions could easily be sourced locally. To ensure that the positive impact associated with job creation during the construction phase, even if limited, accrue to the locals, it must be ensured that the main contractor make use of local labourers and not of staff imported from elsewhere. The quality of work, however, should not be compromised during the process.

Select specialists required for the e.g. electrical installations and supervision of the turbine installations would probably be sourced from all over South Africa or even abroad.

It should furthermore be noted that usually, infrastructural development type projects create expectations that numerous job opportunities for the local community members will be generated. This perception is even more so in cases where the implementation and construction is actually taking place in close proximity to rural settlements and/or towns. Unrealistic expectations with regards to job creation should thus be guarded against.

NATURE: EMPLOYMENT CREATION				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With enhancement**	**Without mitigation**	**With enhancement**
Extent	Regional (4)	Regional (4)	Regional (4)	Regional (4)
Duration	Short duration (2)	Short duration (2)	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Highly probable (4)	Highly probable (4)	Definite (5)
Significance	Medium (36)	Medium (48)	Medium (44)	Medium (55)
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	

Mitigation:

- Although the majority of construction related work are usually undertaken by males, local females should also be considered for some of the construction activities before outsourcing these positions to males from outside the study area
- A broad-based approach should be followed to identify and involve relevant organisations such as the Ubuntu Local Municipality which could assist the main contractor and project proponent in identifying people whose skills may correspond with the job specifications. The existing database of local entrepreneurs of the Ubuntu Local Municipality could thus be used.
- Semi-skilled and even unskilled labourers could be trained to assist with the construction of the

NATURE: EMPLOYMENT CREATION	
WIND ENERGY FACILITY	**PV FACILITY**
solar panels and mounts • Employment of local community members should be undertaken where possible. Preference should be given to community members from Victoria West, Hutchinson and Beaufort West • The applicant should ensure an equitable process whereby locals and previously disadvantaged individuals (including women) are taken into account. • The project proponent and contractors should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMME's during the construction process. • Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses and SMME's from the local sector. • A local Labour desk should be set-up (if not already established) in the beneficiary communities by the main contractor or project proponent to co-ordinate the process of involving local labour. • Communication efforts with regards to job creation opportunities should refrain from creating unrealistic expectations	
Cumulative impacts: • The proposed project could further result in capacity building through on-site training and skills development opportunities • Improvement in quality of life even if only for a short duration • Possible economic downfall of individuals after the period of employment has lapsed as they have become used to a certain income level	
Residual impacts: • Capacity building and skills development of those involved in the construction phase of the project	

6.2 Inflow of workers

This variable refers to the impact of the inflow and outflow of temporary workers during the construction period. A total of twenty (20) construction workers would be involved with the project construction phase.

The construction period for the PV facility is expected to be between 12 to 18 months. The duration could, however, be shortened should more than one team (e.g. four teams) be used simultaneously (Pöyry, 2010). Some of the main activities with regards to the construction of the PV facility could overlap as indicated below:

Table 1: General timeframe of activities (PV facility) during construction period

Activity	Construction Period in Months					
	0-3	3-4	4-6	6-8	8-10	10-12
Site preparation						
Cable ways and civil works (foundations)						
Erection of the supporting structure and assembly of the PV modules						
Field Connections and electrical equipment installation						

The assembly of the PV modules can thus commence after parts of the support structures (a group or bank of support structures) have been erected. From the above it is thus anticipated that months three to eight could possibly be seen as the peak construction period for the PV facility with the largest numbers of workers involved during these stages. (Pöyry, 2010: adapted and concluded from information received).

The construction period for the wind energy facility would typically require 18 to 24 months. The timeframe would thus depend on the number of cranes and installation teams, as well as commissioning teams and tools available (SARGE, 2011). Construction activities would mainly consist of the transportation of the turbines (sea and land), installation of the turbines, mechanical and electrical completion of the turbines, followed by commissioning and energising of the turbines (grid connection), and finally test runs.

Should both facilities' construction periods overlap, the total number of workers during the peak construction period is therefore anticipated to be twenty (20) individuals.

Whilst the expected inflow of workers from outside the study area cannot be quantified at this stage, although it is not anticipated to be many individuals, experience has shown that an increase of people movement in an area usually creates the perception that criminal activities increase. This would probably be the perception among property owners in the study area irrespective of whether local people or outsiders are employed. Concerns relate to small livestock theft and damage to or theft of fences. Should locals be employed, it could, however, minimise the perceived and actual risk in this regard.

Any new workforce could furthermore impact on the existing social networks through the increased risk in the spread of sexually transmitted diseases (especially in the area with its high HIV/Aids prevalence), possible littering throughout the study area, temporary intrusions

on private properties due to vehicle and worker movement, misbehaviour of workers, and increased pressure on the service levels and infrastructure development in the area.

Even though a very small construction workforce would be present in the area, social conflict between "outsiders" and the local population could materialise in the form of anger and discontentment aimed at outsiders. In worst cases it could even lead to violence between the two groupings. The possibility of conflict materialising should thus be noted. A critical mitigation measure in this regard is thus the employment of locals. The site location is a further mitigation factor in itself as no large communities and/or towns are situated close by.

NATURE: INFLOW OF WORKERS				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Site of development and surrounding area (2)	Site of development and surrounding area (2)	Site of development and surrounding area (2)	Site of development and surrounding area (2)
Duration	Short duration (2)	Short duration (2)	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	Medium (40)	Medium (30)	Medium (36)	Low (27)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes No in terms of the spread of HIV/Aids		Yes No in terms of the spread of HIV/Aids	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation:				

NATURE: INFLOW OF WORKERS	
WIND ENERGY FACILITY	**PV FACILITY**
• Construction workers falling within the semi-skilled to unskilled category should be sourced from the local population where possible • Construction workers should be supervised at all times • No construction workers should remain on-site overnight • Construction activities should be kept to normal working hours • Workers should receive induction training on site to undertake the various repetitive tasks, especially those associated with the construction of the PV facility • Property owners surrounding the construction areas should be informed of the construction schedules and activities • Security on-site should be active prior to the construction period • The construction site should be properly managed to avoid any littering and possible environmental pollution. Water and sanitation facilities should be up to standard • Information distributed as part of the existing HIV/Aids awareness campaigns should again be focused on and communicated to the local workforce • Unrealistic employment expectations should not be created • The development of informal vending "stations" where food and small goods are sold should, if allowed, be properly managed, to avoid littering and possible environmental pollution. Workers should preferably receive daily meals on site or should be responsible for their own food and drink requirements	
Cumulative impacts: • Increased safety and security risks for animals and people with possible increase in crime • Health related impacts • Short-term additional pressure on the provision of temporary services	
Residual impacts: • Long term consequences with regards to the provision of services and implementation of infrastructure should construction workers from outside the study area remain in the area on completion of the construction period	

6.3 Influx of jobseekers

With the majority of construction projects, an influx of jobseekers is to some extent experienced. The size and profile of these jobseekers cannot be determined or controlled. The extent of the inflow is usually determined by some of the following factors:

- The proximity of the construction site to existing low-income or informal settlements;
- The unemployment levels of those residents in close proximity to the construction site or in the study area;
- The type of construction activity and the need for unskilled or semi-skilled workers;
- The length of the construction period;
- The scale of the construction activities;
- The existing presence of jobseekers who already came to the area in search of employment at other sources of possible employment;
- Whether recruiting of labourers is taking place at the construction site itself; and
- The confidence of the jobseekers with regards to actually securing employment.

An extensive influx of jobseekers to an area could result in negative social impacts such as illegal settlements with associated environmental pollution, social conflict between the jobseekers and locals to secure employment, conflict between informal vendors (also seen as jobseekers) for "new" business, misbehaviour of jobseekers (e.g. possible increase in alcohol use) possible increase in crime due to these jobseekers being unemployed, lack of sufficient accommodation and other infrastructure to cater for their needs, pressure on water and sanitation related facilities, and so forth.

Although the unemployment levels in the study area are high and of concern, it is not anticipated that large numbers of jobseekers would continuously be drawn to the construction site and would loiter at the site due to the location of the Karoo Renewable Energy Facility and its distance to the nearest towns of Victoria West, Hutchinson and Beaufort West. It should, however be noted that informal vendors remaining at the site for the entire construction period are also viewed as jobseekers. Unemployed jobseekers would probably peak at the start of the construction process, and later dissipate. Mitigation measures, however, should be implemented to deal with the possibility of these types of jobseekers coming to site.

NATURE: INFLUX OF JOBSEEKERS				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Site of development and	Site of development and	Site of development and surrounding area	Site of development and

NATURE: INFLUX OF JOBSEEKERS				
WIND ENERGY FACILITY			**PV FACILITY**	
	surrounding area (2)	surrounding area (2)	(2)	surrounding area (2)
Duration	Short term (2)	Very short term (1)	Short term (2)	Very short term (1)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	Medium (40)	Low (27)	Medium (40)	Low (27)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	To some extent		To some extent	

Mitigation:

- The applicant, local leaders and the Ubuntu Local Municipality should jointly develop a strategy to minimise the influx of jobseekers to the area.
- Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process.
- The recruitment process and the use of contractors should be clearly communicated to the local communities.
- The communication strategy of the applicant regarding the proposed project should ensure that unrealistic employment expectations are not created.
- The applicant could attend community meetings arranged within the various wards to discuss the employment and recruitment process to be followed
- Construction workers should be easily identifiable by wearing uniforms and even identity tags
- The development of informal vending "stations" where food and small goods are sold should, if allowed, be properly managed, to avoid littering and possible environmental pollution

Cumulative impacts:

NATURE: INFLUX OF JOBSEEKERS	
WIND ENERGY FACILITY	**PV FACILITY**
• Conflict between so-called "outsiders" and locals • Additional pressure on infrastructure and services during the construction period • A possible in-migration of unemployed outsiders who remain in the study area after the project has been completed resulting in a permanent additional pressure on infrastructure and services	
Residual impacts: • Possible permanent settlement of job seekers in the area with associated cumulative impacts as indicated above	

6.4 Accommodation of workforce

It is unlikely that the construction workforce would be accommodated in a construction camp on or near the construction site. From a social perspective the development of a construction camp is also not preferred due to the negative social impacts associated with such a camp (e.g. possible environmental pollution, social disturbances and negative impact on local social fabric, increased noise, need for additional services and infrastructure, littering and so forth). It is further anticipated that any increase in crime could be attributed by the locals to "outside" workers residing in a study area.

If the majority of the workforce could consist of local labourers, there would also not be a need for such accommodation facilities as the workers would remain at their existing residences and travel to site on a daily basis. Alternatively, the workers should be accommodated in nearby towns such as Victoria West, Hutchinson, and Beaufort West.

Should some of the specialist teams (limited numbers) and the larger workforce be accommodated at nearby accommodation facilities (Bed and Breakfast facilities) and/or in towns within close proximity to the study area, it could be beneficial to the local hospitality industry, even though the overall number of workers is anticipated to be low.

NATURE: ACCOMMODATION OF WORKFORCE				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Site of development and surrounding	Site of development and	Site of development and	Site of development and

NATURE: ACCOMMODATION OF WORKFORCE				
WIND ENERGY FACILITY			**PV FACILITY**	
	area (2)	surrounding area (2)	surrounding area (2)	surrounding area (2)
Duration	Short duration (2)	Short duration (2)	Very short term (1)	Very short term (1)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)
Significance	Medium (30)	Medium (30)	Low (27)	Low (27)
Status (positive or negative)	Negative (construction camp) Positive (hospitality industry)	Negative (construction camp) Positive (hospitality industry)	Negative (construction camp) Positive (hospitality industry)	Negative (construction camp) Positive (hospitality industry)
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- Local labour should be used as far as possible to eliminate the need for a construction camp
- Workers should not be accommodated on site and existing accommodation facilities should be utilised as far as possible
- Team members that would make use of Bed and Breakfast facilities should preferably make use of the local facilities available in close proximity to the site such as those located on nearby farms. Alternatively, accommodation in Hutchinson, Victoria West and Beaufort West should be sought

Cumulative impacts:

- Possible increase in crime or perception of increase in crime due to criminals taking advantage of the construction workers being in the area
- Possible economic spin-offs due to economic benefits for the local hospitality industry

Residual impacts:

NATURE: ACCOMMODATION OF WORKFORCE	
WIND ENERGY FACILITY	**PV FACILITY**
• Economic benefits to local accommodation facilities and hospitality industry	

6.5 Impacts on daily living and movement patterns

Apart from the behaviour and presence of construction workers in the area (as discussed under various sections in the report), construction related activities could impact on the daily living and movement patterns of the local property owners and farm workers due to e.g. increased construction vehicle activity on the local gravel roads, upgrading of local roads, the movement of abnormal vehicles on local roads transporting wind turbines, increased noise and possible blasting noise, and construction of new access roads on site or upgrading of existing roads on site.

The access roads on site that would be required between the construction area and the lay down storage area, as well as from the Biesiespoort road to these areas could increase the dust pollution during the construction phase. As these roads would be relatively short, the travel time on these roads and subsequent creation of dust by the construction vehicles could be limited.

The excessive noises and dust creation would thus occur intermittently and would be of a short duration. Due to the limited number of residential dwellings and thus sensitive receptors located in close proximity to the proposed construction site and local roads, the impact is anticipated to be low and would respond to mitigation. However, possible degradation of the local roads with a wider local impact on all the road users remains a concern.

NATURE: IMPACTS ON DAILY LIVING AND MOVEMENT PATTERNS				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Short term (2)	Short term (2)	Very short term (1)	Very short term (1)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)

NATURE: IMPACTS ON DAILY LIVING AND MOVEMENT PATTERNS				
WIND ENERGY FACILITY			**PV FACILITY**	
Significance	Medium (33)	Low (27)	Medium (30)	Low (24)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	Possible, if local roads are degraded and not maintained		Possible, if local roads are degraded and not maintained	
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- Additional access roads at the construction sites should be kept to a minimum
- Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users
- Noise and dust pollution should be limited as far as possible
- Surrounding property owners should be notified if and when blasting would occur
- Gravel roads should be sprayed with water to limit dust creation if economically feasible and reasonable from an environmental perspective (water scarce area)
- Construction vehicles should adhere to the speed limits
- Construction vehicles and those transporting materials and goods should be inspected to ensure that these are in good working order and not overloaded
- The movement of abnormal loads should be communicated to the property owners in the study area and the necessary permits and authorisations should be obtained from the relevant government departments
- Limit unnecessary movement of abnormal loads as far as possible
- Source general construction material and goods locally where available to limit transportation of these over long distances

Cumulative impacts:

- Possible degradation of local roads with no funds available from Provincial or Local Government for maintenance of these roads
- Possible increase in risk of accidents due to movement of vehicles on local roads

NATURE: IMPACTS ON DAILY LIVING AND MOVEMENT PATTERNS	
WIND ENERGY FACILITY	**PV FACILITY**
Residual impacts: • Permanent access roads on site	

6.6 Impact on farming activities

The farms Nobelsfontein 227, Annex Nobelsfontein 234, Ezelsfontein 235, Rietkloofplaaten 239, Modderfontein 228 and Phaisantkraal 1 are currently used for farming (mainly sheep) and other smaller compatible production activities. The Nobelsfontein Water project is also being undertaken on the property.

During the construction phase some negative impacts on the resource use on the farms are anticipated due to the extent of the construction activities. Alternative grazing areas would have to be found for the sheep currently grazing on the areas to be used for the wind turbines and solar panels. Farming activities could furthermore be negatively impacted on by general intrusions and noise associated with the construction activities such as the increase in vehicular movement and possible blasting noise.

As the two property owners of the abovementioned farms are intensely involved in the process it is anticipated that the negative impacts on the farming practices have been considered and that the issue can either be successfully mitigated or that sheep farming would be phased out over time.

Due to the type of construction activities and size of the land, some intrusion impacts (noise and dust) on the surrounding property owners could be experienced, but it is not anticipated that their farming activities would be negatively affected during the construction phase, except if construction workers and/or jobseekers would enter these properties and in the event that stock thefts occur.

It is not expected that the water sourcing project would be affected and that any jobs would be lost as a result of the proposed Karoo Renewable Energy Facility project.

NATURE: IMPACT ON FARMING ACTIVITIES				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Site of	Site of	Site of development	Site of

NATURE: IMPACT ON FARMING ACTIVITIES				
WIND ENERGY FACILITY			**PV FACILITY**	
	development (1)	development (1)	(1)	development (1)
Duration	Medium term (3)	Short term (2)	Medium term (3)	Short term (2)
Magnitude	High (8)	Moderate (6)	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	Medium (48)	Low (27)	Medium (48)	Low (27)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	No		No	
Irreplaceable loss of resources?	Yes (footprint areas of wind turbines and solar panels)		Yes (footprint areas of wind turbines and solar panels)	
Can impacts be mitigated?	Possibly		Possibly	
Mitigation: • Construction activities should not interfere with the water bottling project • Local labourers should be used during the construction phase to limit the inflow of outsiders to the area • The influx of jobseekers should be limited				
Cumulative impacts: • Possible loss of income should the farming with sheep discontinue				
Residual impacts: • Permanent loss of income • Permanent loss of grazing areas and sterilisation of the land for farming practices				

6.7 Local procurement

At this stage it is not anticipated that local procurement would be achievable for the technology requirements associated with a project of this nature. It is highly likely that the wind turbines and solar panels would be imported from overseas. Local procurement would

be more focused on the procurement of general construction materials and goods (e.g. steel and concrete) which would result in positive local economic spin-offs and benefits such as increased income, and expansion of other local economic sectors. Payments to construction companies and suppliers during the construction phase however would ensure additional "once-off" income to those involved. The details of this aspect, however, would be dependent on the outcome of the tender process.

The impact of the project on the procurement of local businesses and previously Historically Disadvantaged South Africans (HDSA's) can therefore not be determined at this stage. It is, however recommended that the project proponent commits itself to involving locals (HDSA's and SMME's) in the procurement of capital goods, consumables and services, if these are locally available.

NATURE: LOCAL PROCUREMENT				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Regional (4)	Regional (4)	Regional (4)	Regional (4)
Duration	Very short term (1)	Short term (2)	Very short term (1)	Short term (2)
Magnitude	Low (4)	Moderate (6)	Low (4)	Moderate (6)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)
Significance	Low (27)	Medium (36)	Low (27)	Medium (36)
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	
Mitigation: • Local businesses, entrepreneurs and SMME's should be informed of and be provided the opportunity to be involved in the tender process				

NATURE: LOCAL PROCUREMENT	
WIND ENERGY FACILITY	**PV FACILITY**
• Investigation with regards to goods and materials to determine whether goods and materials can be sourced locally • Local sourcing should be undertaken if economically feasible to assist in providing more economic prospects and employment opportunities for the local people, even if only for a short duration	
Cumulative impacts: • Stimulation of and support to local businesses and local economy which could ensure that benefits accrue to the local communities	
Residual impacts: • Positive local economic stimulus	

6.8 Impact on Ubuntu Local Municipality

Should the project proponent *not* be responsible for the upgrading of the local roads, and the implementation of temporary service infrastructure to the site (such as electricity, water and sanitation which could possibly be required during the construction phase), the development of these would fall on the Ubuntu Local Municipality. If the funding for these temporary services has not been budgeted for, it is highly unlikely that funds for such development would be readily available. Such a situation could delay the construction phase. It is however anticipated that the project proponent would be responsible for the implementation of the required temporary services and the upgrading of the local roads. The impact is thus rated based on the worst case scenario for the Ubuntu Local Municipality.

NATURE: IMPACT ON UBUNTU LOCAL MUNICIPALITY				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Short term (2)	Short term (2)	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)

NATURE: IMPACT ON UBUNTU LOCAL MUNICIPALITY				
WIND ENERGY FACILITY			**PV FACILITY**	
Significance	Medium (44)	Low (27)	Medium (44)	Low (27)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation: • The project applicant should be responsible for the provision of temporary services and infrastructure to the site. If this would not be the case, then the Ubuntu Local Municipality should undertake a detailed audit of the temporary services and infrastructure requirements that would be required • Detailed planning and discussions with the Ubuntu Local Municipality in this regard should be undertaken to ensure integrated planning • A dedicated planning forum should attend to this issue to avoid any delays in the project commissioning				
Cumulative impacts: • Financial impact on the Ubuntu Local Municipality • Possible delays of project implementation				
Residual impacts: • Possible financial impacts on the Ubuntu Local Municipality				

6.9 Traffic Related Impact

Access to the farms under investigation can be obtained from the N1 and N12, as well as a secondary road, referred herein as the Biesiespoort Road leading to the actual site itself. The R63 is to the north west of the proposed site. Some additional smaller "farm roads", which are normally only used by residents of the surrounding area to access their properties, link from these roads. Such a farm road exists on the eastern boundary of the farm Nobelsfontein 227. The road stretches from the Biesiespoort road across the farm

Nobelsfontein linking with the railway line in the south and continues to the farm dwelling and outbuildings located on the farm Nobelsfontein. A railway service road, not frequently used, also runs parallel to the railway line.

The imported wind turbines would be transported via sea to possibly Cape Town harbour. The wind turbines would then be transported along the national, secondary and local access roads to the actual site. Due to the size of the wind turbines and the abnormal size of the vehicles that would be required, some of the secondary and local roads may have to be upgraded prior to the delivery of the turbines, which would include widening of corners and/or bridges. The developer would thus have to ensure that the necessary agreements with the relevant road departments are in place to allow them to undertake any upgrades and/or maintenance activities on the roads.

Additional construction vehicles that would make use of the national, secondary and local roads to access the construction site(s) would include cranes, trucks, excavators, graders and those heavy vehicles transporting the materials and equipment required for the PV plant and general construction activities. Even though the N12 is being upgraded, all of these types of vehicles would thus increase the risk of accidents on these roads and would put additional pressure on the capacity and road surface of the local gravel roads.

It was indicated that three turbines could be transported in land per week. As the proposed development is anticipated to consist of 150 wind turbines, this totals 50 weeks of transportation. Should less turbines be required (e.g. 113 turbines as indicated as part of the latest layout plans), the transportation time would also be reduced. Abnormal vehicles would have the most detrimental impact on the local roads' surface and capacity. Continuous pressure over a period of time could result in more rapid degradation of the local roads than would have occurred under normal circumstances and customary traffic loads. It is however, anticipated that the general construction vehicles would be stored on site and movement of these vehicles between the construction site and source areas would be kept to the minimum.

Irrespective of the number of trucks, it is fair to state that the increase in heavy vehicles on the local roads would have a detrimental impact on the road conditions. The intensity of the impact would thus depend on the actual figures (numbers of trucks and frequency) which cannot be finalised at this stage. It should, however, be noted that it could be possible to transport the PV components via rail which would already mitigate the possible negative impacts in this regard.

NATURE: TRAFFIC RELATED IMPACTS	
WIND ENERGY FACILITY	**PV FACILITY**

NATURE: TRAFFIC RELATED IMPACTS				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Short term (2)	Very short duration (1)	Short term (2)	Very short duration (1)
Magnitude	Moderate (6)	Moderate (6)	Low (4)	Low (4)
Probability	Highly probable (4)	Probable (3)	Probable (3)	Probable (3)
Significance	Medium (44)	Medium (30)	Low (27)	Low (24)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes to some extent		Yes to some extent	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- All regulations and legislation pertaining to the use of provincial and local roads by abnormal vehicles to transport the wind turbines should be noted and adhered to
- The developer would thus have to ensure that the necessary agreements with the relevant road departments are in place to allow them to undertake any upgrades and/or maintenance activities on the roads
- Speeding of construction vehicles should be avoided at all costs
- The safety of the road users (vehicles and pedestrians) should be a priority
- Property owners of the surrounding farms should at all times have proper access to their properties
- Strict vehicle safety standards should be implemented and monitored
- The local gravel access roads frequently used by construction vehicles should regularly be graded by the project proponent to limit the degradation of the road surface

NATURE: TRAFFIC RELATED IMPACTS	
WIND ENERGY FACILITY	**PV FACILITY**
• The feasibility of transporting materials and equipment via rail to the Biesiespoort Station should be investigated, especially for the PV components.	
Cumulative impacts: • Possible erosion of the soil due to heavy vehicles and machinery • Poor local road and surface conditions which are unlikely to be attended to by the provincial and/or local authorities	
Residual impacts: • Poor local road and surface conditions which are unlikely to be attended to by the provincial and/or local authorities	

6.10 Impact on tourism

During the construction phase, the project could be to the benefit of the local guest houses as some members of the construction team could be accommodated at these establishments located in close proximity to the construction site. This aspect could create or maintain jobs for locals in the area thereby resulting in positive impacts even if only of a limited extent.

As no major tourist routes pass the construction site, the negative visual impact experienced during the construction phase is not expected to have any negative impacts on the local tourism sector.

NATURE: IMPACT ON TOURISM				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Short term (2)	Short term (2)	Very short duration (1)	Very short duration (1)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Highly probable (4)	Probable (3)	Highly probable (4)
Significance	Medium (33)	Medium (44)	Medium (30)	Medium (40)
Status	Positive	Positive	Positive	Positive

NATURE: IMPACT ON TOURISM				
WIND ENERGY FACILITY			**PV FACILITY**	
(positive or negative)				
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation: • Members of the applicant's team, contractors, specialists and other construction team members should be encouraged to make use of the local accommodation facilities situated in close proximity to the construction site				
Cumulative impacts: • Possible further positive economic spin-offs and returns of members of the specialist teams to the area as tourists • Exposure of the larger area to various individuals with possible future positive impacts on the tourism sector				
Residual impacts: • Positive economic benefits to local accommodation establishments				

6.11 Impact of construction of substations and power line

The existing Skietkuil/Biesiespoort substation is situated on the farm Nobelsfontein 227 on the eastern section of the site investigated for the proposed Karoo Renewable Energy Facility. Two additional substations are also proposed, which would be situated as follows:

- Substation 1 situated on the farm Nobelsfontein 227 just north of the Biesiespoort Road, east of the proposed laydown area and east of the existing Biesiespoort-Kromrivier 132 kV power line; and
- Substation 2 situated to the south of the Biesiespoort Road on the eastern corner of the farm Phaisantkraal 1.

Four options are currently available to link the facility with the existing electricity grid, namely:

- Substation 1 Option 1: where there would be an immediate turn in line to the Hutchinson-Biesiespoort 132 kV line;
- Substation 1 Option 2: where there would be a link to the existing Biesiespoort substation;
- Substation 2 Option 1: where there would be a turn in line to the Droërivier-Hydra 2 x 400 kV power line; and
- Substation 2 Option 2: where there would be a link between the substation 2 to the existing Victoria Substation located to the north-east of the study area.

The main impacts usually associated with the construction of a power line and substation refer to the intrusions and possible negative impacts on the social fabric due to the inflow of workers to the area, impacts on the land value and resource use, impacts on the property owners' daily living and movement patterns and so forth. Three of the four options, however, result in a short power line which would limit the social impacts in this regard. The construction of the proposed substations and power line on the farm Nobelsfontein 227 or on the farm Phaisantkraal 1 is therefore not regarded as sensitive in relation to the larger scale construction activities of the Karoo Renewable Energy Facility. However, option four (Substation 2 Option 2) would have more marked social impacts in this regard, as the farm Gabrielsbaken 2 could be negatively affected by this additional power line traversing the property with possible negative impacts on that land value.

The discussions and issues noted under sections 6.1, 6.2, 6.3, 6.4 and 6.5 also remain relevant in this regard.

From a social perspective the shortest route on the affected farms would be preferred. Two substations are required and the following options are the preferred options: Substation 1 Option 1, Substation 1 Option 2 and Substation 2 Option 1 would therefore be recommended above Substation 2 Option 2.

NATURE: IMPACT OF CONSTRUCTION OF SUBSTATIONS AND POWER LINES				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Site of development and surrounding area (2)	Local (3)	Site of development and surrounding area (2)
Duration	Short term (2)	Short term (2)	Very short duration (1)	Very short duration (1)

NATURE: IMPACT OF CONSTRUCTION OF SUBSTATIONS AND POWER LINES				
WIND ENERGY FACILITY			**PV FACILITY**	
Magnitude	Moderate (6)	Low (4)	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Medium (33)	Low (16)	Medium (30)	Low (14)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation: • Mitigation measures noted under sections 6.1, 6.2, 6.3, 6.4 and 6.5 also remain relevant in this regard • The construction of the power lines should be carefully considered. From a social perspective the shortest route would have the least negative social impacts. Substation 2 Option 2 should preferably not be implemented				
Cumulative impacts: • Possible negative impact on land value due to presence of substations and power lines, especially if Substation 2 Option 2 be implemented • Additional infrastructure with additional negative visual impact and subsequent impact on the sense of place				
Residual impacts: • Negative visual impact associated with a substation and power line • Sterilisation of land where substation is located and at tower footprints				

6.12 Health and Safety

An inflow of workers could, as a worst case scenario and irrespective of the size of the workforce, pose some security risks. Criminals could also use the opportunity due to "outsiders" being in the area to undertake their criminal activities. As the crime levels in the

area are low, any criminal incidences in this regard would definitely be noted by the property owners, which in the worst case could result in attitude formation against the proposed project.

During the construction phase the actual safety of construction workers is of concern as is the case with any other construction activities, but especially due to the large equipment used and the size of the turbines to be erected. Injuries or fatalities as a result of falling from heights during the tower erection and stringing of the power line could occur. Further health and safety issues associated with the actual construction site include unauthorized entry to the site and construction areas, the usage of large cranes on site, the risks associated with the storage of equipment and material on site, as well as the increased risk of accidents due to the increased movement of construction vehicles on the local roads.

Other concerns relate to littering, unwanted behavior of construction workers, transmission of Sexually Transmitted Diseases (STDs), environmental pollution, an increase risk in fires and so forth. Although such perceptions cannot be substantiated or be changed it should be sensitively dealt with. It is thus clear that even though the construction phase when these impacts could occur is only of a very short to short duration, the effects of the impacts could remain in the medium term.

If locals are employed it would definitely serve as key mitigation measure in this regard, as the development of a construction camp would then be unnecessary and outsiders would not come to the area intruding on the local social networks.

NATURE: HEALTH AND SAFETY				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Medium term (3)	Short term (2)	Medium term (3)	Very short duration (1)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)
Significance	Medium (36)	Medium (33)	Medium (36)	Medium (30)
Status (positive or negative)	Negative	Negative	Negative	Negative

NATURE: HEALTH AND SAFETY		
WIND ENERGY FACILITY		**PV FACILITY**
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes to some extent	Yes to some extent

Mitigation:

- Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce.
- Screening of workers that apply for work could be useful to lessen perceived negative perceptions about the outside workforce.
- Construction workers should be easily identifiable by wearing uniforms and even identity tags.
- Local community organisations and policing forums must be informed of the presence of the outside workforce.
- Care should be taken to avoid conflict between the local communities and the "outside" workforce
- The property owners surrounding the construction area should be involved during the construction process by communicating the construction schedule and movement of workers with these representatives.
- Property owners and their workers, together with the relevant community structures should be motivated to be involved in crime prevention and by reporting crimes.
- The construction site should be fenced

Cumulative impacts:

- Possible increase in crime levels with subsequent possible economic losses or in worst-case scenarios loss of lives of animals and individuals

Residual impacts:

- Possible increase in crime levels with subsequent possible economic losses or in worst-case scenarios loss of lives of animals and individuals

6.13 Visual Impact

The main visual impact associated with the construction phase would be the actual construction site, possible storage of equipment and construction vehicles (laydown area), as well as the disruption of the soil and vegetation. The laydown area is proposed to be located to the north and south of the Biesiespoort Road just to the east of the existing 132 kV power line which crosses the Biesiespoort Road. It would therefore be clearly visible to the road users. These impacts, however, are temporary and should respond to mitigation.

NATURE: VISUAL IMPACT				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Short term (2)	Short term (2)	Very short duration (1)	Very short duration (1)
Magnitude	Low (4)	Low (4)	Low (4)	Low (4)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	Medium (36)	Low (27)	Medium (32)	Low (24)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation: • Soils should be replaced and rehabilitated as soon as possible after construction • The construction site should be kept litter free • Overall site rehabilitation should occur as soon as the construction process allows • The recommendations made by the Visual Impact Assessment should be adhered to				
Cumulative impacts:				

NATURE: VISUAL IMPACT	
WIND ENERGY FACILITY	**PV FACILITY**
• Cumulative visual impact as a result of infrastructure already present in the area	
Residual impacts: • None anticipated	

7. POTENTIAL IMPACTS ASSOCIATED WITH THE OPERATIONAL PHASE

Wind energy facilities are usually designed to operate on a continuous basis with very low maintenance during its typical 120 000 hours of operation. It is estimated that the lifespan of the Karoo Renewable Energy Facility would be between 20 to 30 years (Savannah Environmental: Draft Scoping Report 2010 and SARGE, 2011).

Once operational, these types of facilities can thus be controlled and managed remotely. Permanent security personnel however would be required. Maintenance teams (maintenance and control room staff) would be mobile and would only be used when required (for the wind energy facility). Maintenance would typically be done twice a year, but due to the size of the Karoo Renewable Energy Facility maintenance throughout the year could be expected (Pöyry, 2010). Maintenance of the PV panels, however, would be done on a daily basis.

During the operational phase the following social impacts could be anticipated:

7.1 Job Creation

The wind energy facility would employ approximately twenty (20) individuals during the operational life (SARGE, 2011). For the PV facility there would only be between five (5) to eight (8) positions required for the administration, maintenance (three to four individuals) and management activities (Pöyry, 2010). Additional employment could be created by the provision of ancillary services on-site such as the security personnel required. Maintenance would mainly involve the cleaning of the panels, general cleaning of the site, replacement of panels and/or other mechanical and infrastructural repairs. It is anticipated that maintenance of the turbines would be done twice a year, but for the PV facility this would be done on a daily basis.

Maintenance of the substation would be the responsibility of Eskom. General maintenance of the local roads could furthermore result in some temporary jobs during the operational life of the facility.

The large young population in the study area emphasises the critical need for employment creation in the area. Furthermore, it should be noted that, considering that the agricultural

sector (Ubuntu Local Municipality) and commerce, community services, as well as agricultural sectors (Beaufort West Local Municipality) form the economic backbone of the area, skills training, which could strengthen the relevant skills base of the local workforce, would be critical.

Even if the permanent employment opportunities are very limited, it still receives a positive rating due to the high unemployment figures prevalent among the local community members (Beaufort West and Ubuntu Local Municipalities) and the lack of sectors that could create large scale future employment opportunities. An approximate thirty (30) jobs created could therefore sustain 30 families (roughly 120 to 150 individuals) in the long term.

The influx of jobseekers during the operational phase of the project is also highly unlikely as individuals in search of employment would possibly realise that the facility would not provide large scale jobs during its operation. Should this, however, occur it is believed that it would be of a very restricted extent with no or very limited impact on the social environment. No mitigation measures in this regard are thus proposed.

The maintenance and operation of the wind energy facility, as well as the PV facility are not deemed to result in any major social impacts due to the limited number of workers on site on a daily basis. No mitigation measures in this regard are thus deemed necessary.

NATURE: JOB CREATION				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)	Probable (3)	Highly Probable (4)
Significance	Medium (36)	Medium (48)	Medium (36)	Medium (48)
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	

<table>
<tr><td colspan="3">NATURE: JOB CREATION</td></tr>
<tr><td colspan="2">WIND ENERGY FACILITY</td><td>PV FACILITY</td></tr>
<tr><td>Can impacts be mitigated?</td><td>Positive impacts can be enhanced</td><td>Positive impacts can be enhanced</td></tr>
<tr><td colspan="3">Mitigation:
• Contractors should capacitate locals where practical
• The project proponent should consider training and capacity building programmes to lessen the skills disparity
• The skill requirements should be communicated to the local community leaders and community based organisations
• The Contractors and/or the applicant should make use of local recruitment agencies or other relevant community based organisations to obtain a list of jobseekers
• An equitable process whereby minorities and previously disadvantaged individuals (women) are taken into account, should be implemented</td></tr>
<tr><td colspan="3">Cumulative impacts:
• Through the employment of locals other anticipated negative social impacts could be mitigated
• Improved quality of life of those employed
• Increased purchasing power of those employed through the project.
• Indirect benefits to businesses
• Stimulation of local economy</td></tr>
<tr><td colspan="3">Residual impacts:
• Skilled and capacitated individuals</td></tr>
</table>

7.2 Impact on daily living and movement patterns

During the operational phase, general maintenance of the Karoo Renewable Energy Facility would include maintenance on the equipment (turbines, gearboxes etc.) and solar panels, clearing of alien vegetation between the turbines, road maintenance, firebreaks, general maintenance at the security gatehouse and so forth.

These maintenance activities are not expected to have negative impacts on the neighbouring farmers, apart from a limited increase in the movement of people to and from the site, as well as the presence of these employees on-site. It should furthermore be noted that all the employees would not be on site on a daily basis due to the remote monitoring and operational systems to be used for specifically the wind energy facility.

The main impact on daily living and movement patterns during the life of the facility refers to the permanent visual impact of the solar energy and wind energy facilities, as well as the associated power line, which again impacts on the character of the area and thus on the sense of place as experienced by the residents and visitors. This aspect is further discussed under section 7.11.

NATURE: IMPACT ON DAILY LIVING AND MOVEMENT PATTERNS				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Medium (30)	Low (20)	Medium (30)	Low (20)
Status (positive or negative)	Neutral	Neutral / Positive	Neutral	Neutral / Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation: • Speeding on the local roads should be avoided for safety reasons and to limit dust creation • The local access road to the site should be regularly maintained to keep the local road conditions in a good quality state				
Cumulative impacts: • Possible intrusions due to additional traffic in the area				
Residual impacts: • None anticipated				

7.3 Safety and security

When operational, the facility's site will be fenced with a multipurpose security gatehouse at the entrance to the site. Maintenance personnel would thus have to access the site through the security entrance.

It is thus not anticipated that the proposed facility would increase any safety and security risks in the area, although unauthorised entry to the site should be avoided for general safety purposes. As the site would be fenced as indicated above, this would be highly unlikely to happen. The presence of permanent security personnel in the area could even limit other possible criminal activities.

As the proposed solar energy section of the facility could increase the risk of fires, it would be useful if attention could be given to the provision of some kind of fire fighting and emergency services on site to attend to any possible emergencies in the study area.

NATURE: SAFETY AND SECURITY				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)	Low (4)	Low (4)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Medium (33)	Low (22)	Medium (33)	Low (22)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	
Mitigation: • The site should be properly fenced				

NATURE: SAFETY AND SECURITY	
WIND ENERGY FACILITY	**PV FACILITY**
• Fire fighting and general emergency services should be available on site • Normal operational safety guidelines should be adhered to • Security personnel should be aware of the possibility of animal theft and poaching and should be able to identify possible criminal elements and/or criminal activities in this regard. • Procedures and measures to prevent, and in worst cases, attend to fires should be developed in consultation with the surrounding property owners	
Cumulative impacts: • Possible increase in criminal activities due to people movement in the area, although unlikely • Possible loss of livestock with subsequent economic losses to property owners	
Residual impacts: • Increased fire risks	

7.4 Possible impact on tourism

The major routes used by tourists are the N1 and N12. The only tourist related facilities in the local area refer to the accommodation facilities on privately owned farms in close proximity to the site under investigation. Some of the farms in the area also receive visitors for hunting purposes. As no well-known tourist attractions and facilities are thus situated in close proximity to the proposed site and tourists passing the site would be very limited, no negative impacts on the local tourism industry are foreseen.

It should also be noted that wind energy facilities and PV facilities are generally viewed in a positive light, mainly due to the clean technology used and overall positive impact on the environment. The presence of wind energy facilities and PV facilities are thus not believed to negatively impact on tourists' enjoyment of their holiday. It is furthermore highly likely that tourists would return to an area where these facilities are present if they had a pleasant overall holiday experience. Tourists could even be interested in visiting these facilities, especially if these facilities have associated educational centres. As South Africa has not seen many of such facilities of this scale, it is highly likely that local tourists interested in renewable energy would want to view these facilities.

The proposed Karoo Renewable Energy Facility could thus become a major tourist attraction in its own right and could also complement the existing tourism attractions in the area, thereby resulting in promoting a positive image of the area with resultant positive impacts on the local tourism industry, economy and environment.

Negative impacts, in this regard should not be discarded although this would depend on select individuals perceiving the facility in a very negative light. These anticipated negative perceptions, however, are not expected to have long term negative impacts on any tourism activities undertaken in the area.

NATURE: POSSIBLE IMPACT ON TOURISM				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)	Low (4)	Moderate (6)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)
Significance	Medium (33)	Medium (39)	Medium (33)	Medium (39)
Status (positive or negative)	Potentially negative / Positive	Positive	Potentially negative / Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	
Mitigation: • The proposed facility should be included as an attraction in the Ubuntu Local Municipality's Tourism Strategy • The project proponent, representatives of the Ubuntu Local Municipality, tourism operators and property owners involved in the tourism sector should jointly investigate and promote the role which the Karoo Renewable Energy facility could play with regards to the local tourism industry				
Cumulative impacts: • Possible increased visitors to the area with positive financial impacts on the local tourism sector				
Residual impacts:				

NATURE: POSSIBLE IMPACT ON TOURISM	
WIND ENERGY FACILITY	**PV FACILITY**
• Positive impact on the local tourism industry	

7.5 Local procurement

The design and manufacturing of the equipment used at a wind energy facility requires highly skilled resources and inputs and the services of professionals experienced with the operation and maintenance of wind turbines would thus be critical for the success of the project. It is not likely that there would be local manufacturers that would be able to fulfil this demand and it is consequently anticipated that the infrastructure and equipment would be imported internationally. The same would be applicable to the infrastructure and equipment required for the PV facility.

Apart from the highly specialised technical components it is expected that some local procurement of goods, materials and services could occur which would result in positive economic spin-offs. These opportunities for local service providers to render services to the Karoo Renewable Energy Facility could include maintenance of the guardhouse, gardening at the guardhouse, cleaning services, security services and maintenance or replacement of general equipment.

This aspect, however, would be dependent on the outcome of the tender process, and cannot be determined at this stage. Should local procurement occur, it could result in indirect economic spin-offs and benefits such as increased income, and expansion of other local economic sectors.

NATURE: LOCAL PROCUREMENT				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)	Low (4)	Moderate (6)
Probability	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)
Significance	Low (22)	Medium (39)	Low (22)	Medium (39)

NATURE: LOCAL PROCUREMENT				
WIND ENERGY FACILITY			**PV FACILITY**	
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	
Mitigation: • Local sourcing of materials and general services to assist in providing more economic and employment opportunities for the local people				
Cumulative impacts: • Stimulation of and support to local businesses and local economy which could ensure that benefits accrue to the local communities				
Residual impacts: • Same as above				

7.6 Local Economic Contribution

The Karoo Renewable Energy Facility's total capital expenditure totals approximately R4 billion where the wind energy facility would total approximately R2.6 billion and the PV solar facility R1.4 billion (SARGE, 2011). The proposed Karoo Renewable Energy facility is thus expected to result in increased local economic activity and local employment through the creation of additional employment opportunities.

Although the average wind speed at the site would influence the productivity and electricity costs, a national impact on the electricity supply is foreseen as the power generated by the wind and solar facility would be fed into the national electricity grid and thus enables the strengthening of the system. This should be seen as a significant positive impact, especially in light of the country facing electricity price hikes fuelled by various factors.

The economic spin-offs in this regard are difficult to quantify although it is almost a definite that it would result in positive economic returns. It should, however, be taken into account

that the project proponent should secure commitments in terms of the buying of the power generated, to ensure the success of the project and the positive indirect economic returns.

NATURE: LOCAL ECONOMIC CONTRIBUTION				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	High (8)	Moderate (6)	High (8)
Probability	Probable (3)	Highly probable (4)	Probable (3)	Highly probable (4)
Significance	Medium (39)	Medium (60)	Medium (39)	Medium (60)
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	
Mitigation: • The economic contribution of the project should aim to economically assist the local community through secondary spin-offs as far as possible and by economically assisting with community based projects and initiatives • The applicant could strengthen community partnership through strategic funding of community projects and initiatives				
Cumulative impacts: • Positive trickle down economic spin-offs • Increased economic activity in the region				
Residual impacts: • Same as above				

7.7 Social Development and Social Services Support

Social development and social services support is not a direct impact of the proposed project as such, but would only materialise if the applicant commits to social upliftment and development due to their presence in the area. An important positive role that SARGE thus could fulfil as part of their social responsibility towards the local communities is to assist in addressing community development needs. This would ensure the upliftment of the local communities. The project proponent could investigate the possibility of supporting some community projects already being undertaken in the area. The social responsibility assistance and involvement of the project proponent in local development issues, should, however, be balanced in terms of the extent of the Karoo Renewable Energy facility project. It would be unfair to expect the same input from the project proponent compared to e.g. mining operators.

Although education and training is mainly the responsibility of government, there is increased pressure on the business sector in South Africa to increase the development and skills of their workforce. The project applicant is therefore accountable to optimise the productive potential of those employed at the proposed facility's operation through capacity building and skills training, whether these individuals are temporary or permanent employees.

One of the aims of the project would be to revitalise the area in terms of job creation and infrastructure development, in other words it would focus on broad based empowerment. SARGE furthermore aims to create bursaries for promising individuals from the community to further themselves in the field of energy generation. The applicant has further committed to the establishment of a Skills Development Levy (SDL) which would amount to 1% of the total operational salaries (SARGE, 2010).

NATURE: SOCIAL DEVELOPMENT AND SOCIAL SERVICES SUPPORT				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	High (8)	Moderate (6)	High (8)
Probability	Probable (3)	Highly probable (4)	Probable (3)	Highly probable (4)
Significance	Medium (39)	Medium (60)	Medium (39)	Medium (60)

NATURE: SOCIAL DEVELOPMENT AND SOCIAL SERVICES SUPPORT				
WIND ENERGY FACILITY			**PV FACILITY**	
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	

Mitigation:

- Involvement in upliftment programmes could be done according to the needs identified as part of the IDP of the Ubuntu Local Municipality
- Capacity building and skills training should form part of the social development support provided to local communities
- Individual tailor made training programmes for full time employees should be embarked upon in association with accredited training facilities to ensure long term benefits to those involved
- In cases for the middle to lower skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions
- The Skills Development Levy should be established once the project is commissioned to ensure that the benefits of the implementation thereof reach the local communities from the start of the project
- Bursary candidates should be identified and selected based on a stringent screening process
- The project applicant should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMME's during the operational phase for rendering ancillary services to the proposed facility

Cumulative impacts:

- Social development and upliftment as a result of the proposed project

Residual impacts:

- Social development and upliftment as a result of the proposed project
- Improved livelihood of those benefiting from the capacity building and skills training

7.8 Impact on farming activities

The proposed PV plant would be divided into 25 sub-fields of approximately 2.02 MW. Each sub-field would then consist of 8 400 modules, divided into 420 strings. The distance between the rows of PV modules is expected to be 8 m. The distance between the turbines would depend on the sizes of the turbines and blade lengths (SARGE, 2011).

The wind energy facility and PV facility would thus allow sheep to continue grazing on site between the panels (possibly underneath as well due to its height), between the turbines and within the power line servitude area which would result in some agricultural practices continuing on site. No watering points would also be negatively affected by the proposed facility. The only land that would thus be sterilised would be the areas actually used for the turbine structures, the footprint of the solar mounts, access roads, fire breaks and associated buildings and sub-station buildings. Care, should still be taken to not create uneconomical sub-units due the areas being divided by the infrastructure thereby impacting on the actual portions that could be used for grazing purposes.

Game could leave the area due to the intrusion of the infrastructure and possible noise pollution of the turbines, although the area is not known for various hunting operations and activities.

Some landowners, however, might feel that their future, the future of sheep farming and the "sense of place" have been compromised by the proposed project. As the farming activities on the neighbouring farms are not anticipated to be negatively affected by the operations of the Karoo Renewable Energy Facility, and due to the limited number of landowners that expressed any concerns in this regard, this issue received a moderate rating prior to the implementation of mitigating measures.

NATURE: IMPACT ON FARMING ACTIVITIES				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Medium (39)	Low (26)	Medium (39)	Low (26)
Status (positive or	Negative	Negative	Negative	Negative

NATURE: IMPACT ON FARMING ACTIVITIES				
WIND ENERGY FACILITY			**PV FACILITY**	
negative)				
Reversibility	No		No	
Irreplaceable loss of resources?	To a limited extent		To a limited extent	
Can impacts be mitigated?	To some extent		To some extent	
Mitigation: • Reduce any negative impacts on farming activities by keeping fencing within the site to a minimum and designing fencing to maximise efficiency of stock movements • Limit the development on new access roads on site as far as possible				
Cumulative impacts: • Possible economic losses due to downscaling of sheep farming				
Residual impacts: • Same as above				

7.9 Land Value

This impact investigates the social impact associated with the change in property prices as a result of the proposed Karoo Renewable Energy facility.

The exact impact on the different properties, however, could only be undertaken as part of a detailed property evaluation and/or economic study. From a social perspective it is thus difficult to quantify the impact as the actual impact would be determined by social aspects such as:

- the location of the property in relation to the proposed facility (distance, in the view shed or outside the viewshed);
- the activities undertaken on the property and the location of dwellings and other infrastructure;
- the perception of specific property owners with regards to the impact of the facility on the social and bio-physical environment;

- the role which the facility would play with regards to the promotion of the local tourism industry;
- the perception of property owners and the larger community with regards to the operation of the facility and maintenance of the equipment; and
- the local economic climate and need for properties in the area.

The proposed Karoo Renewable Energy facility could negatively impact on the property values in the surrounding area during the short term, as the facility could be seen as not an established part of the existing landscape, thereby influencing the sense of place, and due to the uncertainty associated with the development of such a facility. Possibly after the construction phase and commissioning of the facility, when experience has shown that the proposed facility has no or little impact on the surrounding landowners and the activities undertaken on their properties, the impact on the property prices could return to normal.

From a social perspective, a limited long-term impact on the property values are thus foreseen mainly due to the overall positive association made with regards to these types of facilities in general as "cleaner and greener resources" with its limited negative impact on the environment.

NATURE: LAND VALUE				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (3)	Local (3)	Local (3)	Local (3)
Duration	Short term (2)	Long term (4)	Short term (2)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Medium (39)	Low (26)	Medium (33)	Low (26)
Status (positive or negative)	Negative	Possibly negative to Neutral	Negative	Possibly negative to Neutral
Reversibility	No		No	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	

NATURE: LAND VALUE	
WIND ENERGY FACILITY	**PV FACILITY**
Mitigation: • The Visual, Noise and Heritage Impact Assessment recommendations should be implemented to limit any potential negative impacts on the sense of place • Equipment should be maintained and serviced on a regular basis • The facility should be managed according to international best practice	
Cumulative impacts: • Impacts on sense of place • Possible indirect economic impact of select property owners	
Residual impacts: • Very limited possible long-term impact on the property values	

7.10 Health related impacts

As the operations at the proposed Karoo Renewable Energy facility would not result in any air pollution, the subsequent health impacts on communities in close proximity or sensitive receptors are deemed insignificant. Additional waste would however be generated by the employees on site. This limited impact is expected to be mitigated through the proper design of the facilities on site.

On a larger scale the project is anticipated to have positive social and health related impacts through the "greener" technology that will be used (no emissions and so forth).

NATURE: HEALTH RELATED IMPACTS				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Regional (3)	Local (2)	Regional (3)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)	Minor (2)	Minor (2)
Probability	Improbable (1)	Probable (3)	Improbable (1)	Probable (3)
Significance	Low (8)	Low (27)	Low (8)	Low (27)

NATURE: HEALTH RELATED IMPACTS				
WIND ENERGY FACILITY			**PV FACILITY**	
Status (positive or negative)	Positive	Positive	Positive	Positive
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Positive impacts can be enhanced		Positive impacts can be enhanced	
Mitigation: • Marketing of the "green" technology to be used can assist in awareness creation about the benefits of renewable energy. • Engineering aspects and the design of the facility should ensure no environmental pollution. Proper waste, water and sanitation infrastructure and facilities must thus be installed				
Cumulative impacts: • Wider awareness of "green" technology				
Residual impacts: • Same as above				

7.11 Visual impact and sense of place

The social impact associated with the impact on the sense of place relates to the change in the landscape character and visual impact of the proposed wind energy facility and PV plant. The permanent visual impact on property owners in the area was assessed as part of the Visual Impact Assessment. The following discussion should thus be read from a social perspective as the impact on the sense of place, but also in conjunction with the Visual Impact Assessment.

According to the Draft Scoping Report of Savannah Environmental (Savannah Environmental: Draft Scoping Report, 2010), the towers could be between 80 m to 125 m tall, depending on the specific turbine types chosen for this wind energy facility. The turbines would have a concrete foundation, and would consist of a steel tower, a hub and blades. The PV panels would be mounted on a support structure which would allow the panels to be set at such an angle as to allow the maximum use of solar radiation (Savannah Environmental, 2010). The

latest layout plans indicate that substations 1 and 2 would be situated along the Biesiespoort Road and would therefore be highly visible for the road users.

Even though the area is rural in character, there is some limited existing disturbance by infrastructure such as roads, transmission lines, telephone poles, the railway line, the existing substation, scattered homesteads and so forth. The proposed facility is thus expected to add to the existing negative visual impact of these types of infrastructure on the open relatively undisturbed rural landscape and therefore on the sense of place.

The number of receptors could also play a significant role in the intensity and significance of the visual impact. The area surrounding the affected farms is not densely populated, homesteads are scattered throughout the area and the site under discussion is not situated directly along major tourist routes. The permanent visual impact would thus be limited to a small minority of residents and road users (e.g. those making use of the Biesiespoort Road). Even though one would then deal with "less" concerns and an impact of limited extent based on the population figures, the impact could have a more marked effect on these residents' quiet, undisturbed rural lifestyle, their quality of life and their sense of place. Based on the limited inputs received during the public participation process it can be concluded that the change in the landscape character has been accepted by the majority of residents in the area.

In this regard it should also be noted that the impact of the turbines, substations and PV panels on the visual environment would differ based on the receptors' perception of such facilities. Some people could view the turbines and panels as having a significant negative impact on the beauty of the landscape, while others could view them in a positive light and even use the presence of the facility as part of the area's marketing efforts.

Another impact that should be noted is the reflection of the sun on the blades. This is referred to as "shadow flicker" which could impact on nearby residents or motorists making use of local roads. Due to the low density and location of nearby homestead, as well as the temporary nature of the impact, this issue is, from a social perspective, not anticipated to be highly problematic.

Screening of some areas of the facility is possible due to the natural landscape (hills / "koppies") which could reduce the visual exposure to the PV panels and to a less extent the turbines from some of these residents. To balance the negative visual impact on the number of residents, with the intense impact on the sense of place, as well as the role that each person's individual perception plays in this regard, a moderate rating was given.

NATURE: VISUAL IMPACT AND SENSE OF PLACE

WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Definite (5)	Highly probable (4)	Highly probable (4)	Probable (3)
Significance	Medium (60)	Medium (48)	Medium (48)	Medium (36)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	No		No	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	To a very limited extent		To a very limited extent	

Mitigation:

- The design and specific positioning of the panels and turbines should aim to minimise the possible negative visual impact of the facility on the surrounding property owners
- The panel mounts should have the lowest height practically possible
- The natural landscape could possibly be used to conceal some of the panels and turbines. The visual impact is absorbed somewhat, by the topography (hills and mountains) in the medium distance
- It should be ensured that there is no reflection from the panels.
- The design of the security buildings should blend in with surrounding environment
- Lighting issues should receive the attention it deserves to avoid any light pollution at night
- The design of the blades should limit any possible "shadow flicker"
- The mitigation measures of the Visual Impact Assessment should be strictly implemented

Cumulative impacts:

- Possible negative impacts on the land value as a result of the negative impact on the sense of place

Residual impacts:

NATURE: VISUAL IMPACT AND SENSE OF PLACE	
WIND ENERGY FACILITY	**PV FACILITY**
• Change in rural character and quality of the natural environment	

7.12 Noise impact

The following discussion focuses on the social impacts associated with an increase in noise generating sources. This section should thus be read from a social perspective, but also in conjunction with the Noise Impact Assessment.

Due to the rural characteristics of the area and the low population profile, existing noise levels are anticipated to be low.

Noise generated during the operational phase would be due to the wind turbines, as the PV plant is noise free and would not increase any noise levels in the area. Noise could thus be generated by the sound made by the air passing over the wind turbine blades. The gearbox and rotor is expected to only be heard when the observer is physically inside the turbine tower (Savannah Environmental: Draft Scoping Report, 2010).

Noise generating sources, apart from the wind turbines could relate to the number of workers that would be on site on a daily basis, vehicle movement on the local roads and on-site movement, as well as maintenance activities. This, however, would be of a very limited extent. The substation site (already present on the farm Nobelsfontein) and power line (corona noise) could be perceived as additional sources of noise pollution. Homesteads in the area however are limited and the closest sensitive receptors are some distance away from the project site. These noise disturbances would only be temporary and would only occur at certain times during specific weather conditions.

From a social perspective it is thus concluded that the increased noise would occur from time to time, it could be of an intrusive nature for those in close proximity to the facilities (thus those on site near the wind turbines, near the substation and underneath the power line), but not socially disruptive. It would thus not interfere with the quality of the daily activities of nearby residents and would not negatively influence their health. In addition it should be noted that improved engineering principles with regards to the wind turbines could also limit the noise increase.

Also refer to the detailed Noise Impact Assessment undertaken as part of the EIA study.

NATURE: NOISE IMPACT				
WIND ENERGY FACILITY			**PV FACILITY**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Long term (4)	Short duration (2)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)	Probable (3)	Improbable (1)
Significance	Medium (36)	Low (24)	Low (24)	Low (8)
Status (positive or negative)	Negative	Negative	Possibly negative	Neutral
Reversibility	Yes		Yes	
Irreplaceable loss of resources?	No		No	
Can impacts be mitigated?	Yes		Yes	

Mitigation:

- Mechanical noise should be kept to a minimum by means of insulation at the gearbox and the generator of the various wind turbines
- The engineering design of the turbines should thus ensure the least noise as possible
- The mitigation measures of the Noise Impact Assessment should be strictly implemented

Cumulative impacts:

- None anticipated

Residual impacts:

- Possible increase in noise pollution

8. NO-GO OPTION

Should the proposed project not proceed, no construction related impacts would realise which could, in some instances, be viewed as a positive aspect where severe negative impacts on the social environment is expected.

The project, however is aimed to provide increased energy security and an opportunity would be lost should it not be implemented. Benefits in terms of job creation and possible local procurement would thus not occur should the proposed project not continue.

As the project aims to strengthen the supply and improve the supply consistency to electricity consumers in South Africa, from a social point of view, the no-go option should not be supported even though negative social impacts would occur as part of the implementation.

9. DECOMMISSIONING

After the expected 30 year lifespan of the Karoo Renewable Energy Facility it is anticipated that the equipment will either be upgraded or the entire facility will be completely decommissioned. This would depend on the economic feasibility of the various options.

Decommissioning could thus include the dismantling of the infrastructure and/or replacement of the infrastructure with newer technology. Typical social impacts associated with decommissioning of the proposed facility or issues that should be investigated include the following:

- A repeat of construction related intrusion impacts due to the replacement of the infrastructure;
- Job-losses in the case of dismantling of infrastructure (even limited);
- The impact and implementation of a retrenchment or downscaling programme;
- The existence of other sectors that could replace the jobs lost;
- Temporary job creation in the case of the replacement of the infrastructure with newer technology;
- The change in community infrastructure;
- Disruptions and nuisance factors associated with the actual decommissioning or replacement of the infrastructure such as noise and visual impacts; and
- Safety factors associated with the decommissioning of the infrastructure.

As decommissioning or the replacement of the infrastructure is likely to only take place within approximately 30 years), it is recommended that a detailed Social Impact Assessment be undertaken then to determine the actual impacts on the changing social environment at that stage.

10. CONCLUSIONS

Based on the social assessment, the following general conclusions and findings should be noted:

- The potential negative impacts associated with the construction phase are typical of general construction related projects and are anticipated to respond to mitigation. These relate to the inflow of workers to the area, inflow of jobseekers, intrusion impacts (e.g. noise pollution, increased vehicle movement and so forth), as well as safety and security issues.
- The main potential social benefits associated with the construction and operation of the proposed Karoo Renewable Energy Facility refers to the job opportunities, the creation of "green energy" and possible socio-economic spin-offs created through the process.
- Even though the construction phase would create some job opportunities and the operational phase a very limited number of job opportunities, this aspect still receives a positive rating given the high unemployment levels and large young population profile found in the area. Employment of locals is thus imperative. Failure to do so could result in a negative attitude towards the proposed development and in worst cases could turn into social mobilisation against the project and the applicant.
- Employing of locals could furthermore lessen possible negative impacts associated with the inflow of outsiders to the area.
- The proposed project could have a positive impact on awareness creation among the neighbouring residents with regards to wind and solar energy facilities, making them even more favourable towards this type of renewable energy.
- From comments received during the entire EIA process it is unlikely that the neighbouring residents would oppose the proposed development, and it is anticipated that their opinion towards the wind and solar energy facility could become more favourable once operational. At this stage though, there are no objections from the landowners of the affected properties as a large section of the land belongs to the developer. Consent from the other property owner (farms Modderfontein 228 and Phaisantkraal 1) has also been noted.

- Should the construction phase, however, have large scale negative impacts on the daily living and movement patterns of the neighbouring residents, this positive attitude could change and could in worst cases lead to active mobilisation against the applicant and project.
- The increase in construction vehicles, especially the abnormal vehicles, would result in detrimental impacts on the local road conditions which could have lasting implications if the quality of the gravel roads would not be sufficiently attended to.
- The proposed project's impact on the local tourism industry is anticipated to be minimal to slightly positive.
- Anticipated safety and security impacts, especially during the construction phase, could remain a grave concern and should be sensitively and thoroughly dealt with.
- Very limited local procurement of goods, materials and services could occur, but which would still result in positive economic injections to the area, and possible economic spin-offs.
- Enjoyment of the landscape and "sense of place" would be negatively affected for those residents, landowners, tourists and/or bystanders who are either opposed to such facilities and/or those that strongly perceive wind and solar facilities as visually intrusive.
- Some landowners might feel that their future, the future of sheep farming and the "sense of place" have been compromised by the proposed project. As the farming activities on the neighbouring farms are not anticipated to be negatively affected by the operations of the Karoo Renewable Energy Facility, and due to the limited number of landowners that expressed any concerns in this regard, this issue received a moderate rating.
- The intensity of the negative visual impact of the proposed facility would depend on the perception of the viewer. It is, however, not anticipated that the proposed project would alter the host community's standard of living or quality of life or directly negatively impact on the activities undertaken on these properties, even though it would have a negative impact on the sense of place. Mitigation measures proposed by the Visual Impact Assessment should thus be strictly implemented.
- Social services support and social development in the form of capacity building and skills training would enhance the positive economic impacts associated with the proposed project. The overall improvement in the quality of living of those benefiting from these initiatives is also important.

Based on the initial assessment of the receiving environment and the anticipated impacts associated with the wind energy and solar energy facility, it is concluded that there are no fatal flaws associated with the project.

11. RECOMMENDATIONS

All mitigation measures proposed should be strictly implemented. The following recommendations however are expected to limit the proposed project's negative social impacts, but also to enhance the anticipated positive impacts:

- The project applicant should put in place a policy of preferentially sourcing local labour for construction and maintenance activities. This aspect should be included and stipulated in the tender documentation to ensure that locals receive real economic benefits.
- It would be in the interest of social harmony and economic equity for the project applicant to provide financial support to local community projects and/or initiatives that could be linked to the proposed Karoo Renewable Energy Facility. Open communication with regards to how funds could be applied should be undertaken with the relevant role players (e.g. community leaders, affected communities and Ubuntu Local Municipality) in this regard.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other similar environments.
- Local residents, with the focus on the surrounding landowners, should receive accurate information with regards to the project status, timeframes for construction and other relevant information about issues that could influence their daily living and movement patterns such as details with regards to the increase of traffic volumes and possible traffic / road disruptions.
- During the construction phase, all contractors and their employees should be regulated by a code of conduct specifically designed for the project.
- The number of turbines within visually sensitive areas or areas where it would be mostly visible should either be moved or reduced (also adhere to the mitigation measures proposed by the Visual Impact Assessment).
- Local access roads to the site and access roads on site should be upgraded in cases where these roads have not been designed to accommodate the abnormal vehicles. This should also be agreed with the relevant roads authorities.

- During the construction phase dust should be kept to the minimum.
- The construction site should be fenced to eliminate any unauthorised entry to the site. Fencing should remain once the facility is operational.
- Contractors and their employees should make use of the existing accommodation facilities within the area or in the nearest towns such as Victoria West and Beaufort West. No contractors should thus be residing on site in contractors' camps or any informal type of accommodation facilities.

12. ENVIRONMENTAL MANAGEMENT PLAN

From a social perspective the following objectives and measures should be included as part of the Environmental Management Plan (EMP) for the proposed Karoo Renewable Energy Facility:

12.1 Construction Phase

12.1.1 *Maximise local employment and business opportunities*

OBJECTIVE: **Maximise local employment and business opportunities associated with the construction phase**

Employment opportunities could be created during the construction phase although limited. The unemployment rate in the study area is quite high and there are therefore various individuals in the area in search of employment. As indicated it is foreseen that it would be possible to make use of local labour for sections of the construction activities. Opportunities for SMMEs to be considered for some of the construction activities also exist. Employment of locals and the involvement of local SMMEs would enhance the social benefits associated with the project, even if the opportunities are only temporary.

The procurement of local goods could furthermore result in positive economic spin-offs.

Project component/s	Construction and establishment activities associated with the establishment of the facility and associated infrastructure such as the power line and substations.
Potential Impact	The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/risk sources	Contractors who make use of their own labour thereby reducing the employment and business opportunities for locals. The inflow of various specialists from outside the study area and

	even abroad Sourcing of individuals outside the municipal area
Mitigation: Target/Objective	The project proponent should aim to employ a maximum number of the low-skilled to semi-skilled workers from the local area where possible. This should also be stipulated in the tender documentation and contractors should adhere to this guideline. Inputs from the Ubuntu Local Municipality in this regard would be critical.

Mitigation: Action/control	Responsibility	Timeframe
Employment of local community members (e.g. source labour from within the municipal area) should be undertaken where possible.	Project proponent, Ubuntu Local Municipality (ULM) & Contractor	Pre-Construction
A broad-based approach should be followed to identify and involve relevant organisations which could assist the main contractor and project proponent in identifying people whose skills may correspond with the job specifications	Project proponent, Ubuntu Local Municipality (ULM) & Contractor	Pre-Construction
An equitable process should be promoted whereby locals and previously disadvantaged individuals (women) are taken into account.	ULM & Project proponent	Pre-Construction
Create conditions that are conducive for the involvement of entrepreneurs, small businesses, and SMME's during the construction process.	ULM, Project proponent & Contractor	Pre-Construction
Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses and SMME's from the local sector.	Project proponent & Contractor	Pre-Construction
A local labour desk should be set-up (if not already established) in the beneficiary communities to co-ordinate the process of involving local labour.	ULM & Contractor	Pre-Construction

Mitigation: Action/control	Responsibility	Timeframe
Communication efforts concerning job creation opportunities should refrain from creating unrealistic expectations.	Project proponent	Pre-Construction

Performance Indicator	» Job opportunities, especially of low to semi-skilled positions, are primarily awarded to members of local communities. » Locals and previously disadvantaged individuals (women) are taken into account during the hiring process. » SMME's are awarded with contracts during the construction phase. » Labour, entrepreneurs, businesses and SMME's from the local sector are awarded with jobs, based on requirements in the Tender Documentation. » The involvement of local labour is promoted. » Reports are not made from members of the local communities regarding unrealistic employment opportunities.
Monitoring	» Project proponent and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

12.1.2 *Address economic inequities*

OBJECTIVE: Address economic inequities within the study area and enhance capacity building and skills training

A concerning factor is the low education levels among the population of the Ubuntu and Beaufort West Local Municipalities and the fact that the majority of the people within the Ubuntu Local Municipality are employed within the agricultural sector and those in the Beaufort West Local Municipality are employed within the commerce, community services and agricultural sectors. It should, however be noted that a small number of the people of the Ubuntu Local Municipality are employed within the construction sector.

As the construction phase would involve unskilled, semi-skilled and skilled workers it is likely that applicable locals for the unskilled and semi-skilled positions could be sourced and that there would be sufficient numbers of individuals to choose from. Due to the high unemployed figures, it is also clear that there would be various unemployed persons in search of employment, even if they can only secure temporary positions. For the lower level skilled positions, outsiders would thus definitely not have to be sourced. Even though all that would

be employed might not have the necessary applicable skills, this issue could be addressed through proper focused skills training and capacity building initiatives after locals have been sourced, but prior to construction activities starting.

Project component/s	Availability of required skills in the local communities
Potential Impact	The opportunities and benefits associated with the creation of local employment and business could be maximised as it is anticipated that sufficient locals would have the necessary skills to be employed.
Activity/risk source	Unavailability of locals with the required skills resulting in locals not being employed and labour be sourced from outside the ULM area Higher skilled positions might even be sourced internationally
Mitigation: Target/Objective	Project proponent, in discussions with the ULM, should aim to employ a maximum number of the low-skilled workers from the local area where possible. Should the necessary skills not be readily available, skills training and capacity building should be undertaken

Mitigation: Action/control	Responsibility	Timeframe
A broad-based approach should be followed to identify and involve relevant organisations in identifying people whose skills may correspond with the job specifications.	Project proponent and ULM	Pre-Construction
In cases for the semi-skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions.	Project proponent and Contractor	Construction Phase
Capacity building and skills development should include on-site training and tailor made individual packages to further each individual	Project proponent and Contractor	Construction Phase
Capacity building initiatives could link in with existing capacity building and skills	Project proponent and ULM	Pre-construction and

Mitigation: Action/control	Responsibility	Timeframe
training initiatives of the ULM and/or other initiatives of contractors		Construction Phase

Performance Indicator	» A skills development plan is developed » Job opportunities, especially of lower skilled positions, are primarily awarded to members of local communities. » Skills training and capacity building initiatives are developed and implemented » Local SMME's and/or entrepreneurs should be awarded the opportunity to become involved in the tender process.
Monitoring	» Project proponent and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

12.1.3 *Minimise the impact of the inflow of an outside workforce and jobseekers*

OBJECTIVE: Minimise the impact of the inflow of an outside workforce and job seekers into the study area

A total of twenty (20) construction workers would be involved with the project. The timeframe for the proposed PV facility would be between 12 to 18 months and for the wind energy facility it could be between 18 to 24 months. All construction workers are not expected to be on site for the entire duration of the construction period and the numbers would increase only during the peak construction times.

No construction workers would be housed on site and no construction camp for accommodation purposes would be built. Workers would thus have to be transported to and from site on a daily basis. The inflow of workers to and from the construction site could thus result in intrusion impacts (an increase in traffic, noise, dust, etc.) irrespective of whether locals or outsiders would be employed. This, however is anticipated to result in a limited negative impact.

Other possible negative impacts due to the workforce's presence in the area and especially when jobseekers come to the area would include misconduct of workers, trespassing of workers on privately owned farms, the possible increase in crime, littering, increase in traffic, increase in noise, the development of informal vending stations and so forth. Poaching of livestock is also a source of concern.

Project	Inflow of an outside workforce and jobseekers

component/s	
Potential Impact	The inflow of outsiders and jobseekers could result in negative impacts on the surrounding property owners and local communities, and could even lead to conflict between the locals and these outsiders.
Activity/risk source	Outside workforce and jobseekers come into conflict with locals, their presence leads to environmental pollution and possibility of them remaining in the area after construction has ceased. This would put additional pressure on the existing infrastructure and services. Locals are not employed, which would increase the probability of the impacts occurring.
Mitigation: Target/Objective	Limit the number of outsiders to be employed and put pro-active measures in place to deal with possible jobseekers. A transparent approach and open consultation with adjacent property owners, prior and throughout the construction period will further provide a platform where grievances or requests can be addressed before issues become contentious.

Mitigation: Action/control	Responsibility	Timeframe
Construction workers falling within the semi-skilled to unskilled category should be sourced from the local population where possible	Contractor	Pre-Construction
Local labourers should remain at their existing residences and no workers can be allowed on site during night time. No workers should thus be accommodated on site at night.	Contractor	Construction
Maintain normal working hours. Where possible, on-site construction activities will be limited to 6:00am to 6:00pm Monday – Saturday (excluding public holidays) (in terms of the Environment Conservation Act).	Contractor	Construction
Before construction commences,	Project proponent	Pre-Construction

Mitigation: Action/control	Responsibility	Timeframe
representatives from the ULM, community leaders, community-based organisations and the surrounding property owners, should be informed of the details of the contractors, size of the workforce and construction schedules.		
Security on-site should be active prior to the construction period	Project proponent	Pre-Construction
Construction workers should be easily identifiable by wearing uniforms and even identity tags.	Environmental Control Officer	Construction
Care should be taken to avoid conflict between the local communities and the "outside" workforce.	Project proponent	Construction
Sufficient water and sanitation facilities should be provided for the workers on site during the construction period.	Contractor	Construction
The construction site should be properly managed to avoid any environmental pollution (due to inadequate water and waste infrastructure and services) and littering.	Environmental Control Officer & Contractor	Construction
The construction site should be properly managed	Environmental Control Officer & Contractor	Construction
The construction site should be properly fenced	Contractors	Pre-Construction
The applicant, local leaders and the Ubuntu Local Municipality should jointly develop a strategy to minimise the influx of jobseekers to the area	Project proponent, local leaders and ULM	Pre-Construction Construction
Informal vending stations should not be allowed on or near the construction site. Construction workers should preferably receive daily meals and beverages to avoid the need for a vending station.	Contractors	Construction

Mitigation: Action/control	Responsibility	Timeframe
Information distributed as part of the existing HIV/Aids awareness campaigns should again be focused on and communicated to the local workforce.	Project proponent & Contractors	Construction
Develop a transparent communication and recruitment process to minimise the influx of jobseekers to the area.	Project proponent, local leaders and the ULM	Pre-construction
The recruitment process and the use of contractors should be clearly communicated to the local communities.	Project proponent	Pre-construction
The communication strategy should ensure that unrealistic employment expectations are not created.	Project proponent	Pre-construction & Construction

Performance Indicator	» Locals are employed. » Reports are not made from members of the local communities regarding unrealistic employment opportunities and/or negative intrusions or even possible increase in crime. » Sound environmental management of construction site. » Limited numbers of jobseekers coming to the area. » No conflict between outsiders, jobseekers and local community members
Monitoring	» Project proponent and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

12.1.4 *Minimise traffic related impacts*

OBJECTIVE: To minimise traffic related impacts

Access to the farms under investigation can be obtained from the N1 and N12, as well as a secondary road, referred herein as the Biesiespoort Road leading to the actual site itself. The R63 is to the north west of the proposed site. Some additional smaller "farm roads" which are normally only used by residents of the surrounding area to access their properties link from these roads. The imported wind turbines would be transported via sea to possibly Cape Town harbour where after it would be transported along the national, secondary and local access roads to the actual site. Due to the size of the wind turbines and the abnormal size of

the vehicles that would be required, some of the secondary and local roads would have to be upgraded prior to the delivery of the turbines, which would include widening of corners and/or bridges. Abnormal vehicles would have the most detrimental impact on the local roads' surface and capacity. Additional construction vehicles that would make use of the national, secondary and local roads to access the construction site(s) would include cranes, trucks, excavators, graders and those heavy vehicles transporting the materials and equipment required for the PV plant and general construction activities. Even though the N12 is being upgraded, all of these types of vehicles would thus increase the risk of accidents on these roads and would put additional pressure on the capacity and road surface of the local gravel roads.

Project component/s	Traffic related impacts on existing road infrastructure and property owners situated along the routes to be travelled and those surrounding the construction site, as well as possible impact on local road users.
Potential Impact	Impact of abnormal sized vehicles and general heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals
Activities/risk sources	Construction vehicle movement Speeding on local roads Degradation of local road conditions
Mitigation: Target/Objective	Minimise the impact of the increase in abnormal and heavy vehicles on existing infrastructure, property owners, animals and road users.

Mitigation: Action/control	Responsibility	Timeframe
The contractor's plans, procedures and schedules, as well as the anticipated intrusion impacts should be clarified with affected parties prior to the construction phase.	Project proponent and Environmental Control Officer	Pre-Construction
All regulations and legislation pertaining to the use of provincial and local roads by abnormal vehicles to transport the wind turbines should be noted and adhered to	Project Proponent, Contractor and relevant government departments (national	Pre-construction Construction

Mitigation: Action/control	Responsibility	Timeframe
	and provincial)	
Speeding of construction vehicles should be avoided at all costs	Contractor & Environmental Control Officer	Construction
Strict vehicle safety standards should be implemented and monitored	Contractor & Environmental Control Officer	Construction
Property owners of the surrounding farms should at all times have proper access to their properties	Contractor & Environmental Control Officer	Construction
The local gravel access roads frequently used by construction vehicles should regularly be graded by the project proponent to limit the degradation of the road surface	Project proponenent	Construction

Performance Indicator	» Vehicles keeping to the speed limits » Vehicles are in good working order and safety standards are implemented » Local residents and road users are aware of vehicle movements and schedules » Property owners have access to their properties at all times. » No traffic related accidents are experienced. » Local road conditions and road surfaces are up to standard » Complaints of residents are not received (e.g. with regards to the speeding of heavy vehicles).
Monitoring	» Project proponent and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

12.1.5 *Minimise the potential impact on safety and security*

OBJECTIVE: To minimise the potential impact on safety and security

An inflow of workers could, as a worst case scenario and irrespective of the size of the workforce, pose some security risks. Criminals could also use the opportunity due to "outsiders" being in the area to undertake their criminal activities. The actual safety of

construction workers is also of concern due to the large equipment used and the size of the turbines to be erected. Further health and safety issues associated with the actual construction site include unauthorized entry to the site and construction areas, the usage of large cranes on site, the risks associated with the storage of equipment and material on site, as well as the increased risk of accidents due to the increased movement of construction vehicles on the local roads.

Other concerns relate to littering, unwanted behavior of construction workers, transmission of Sexually Transmitted Diseases (STDs), environmental pollution, an increase risk in fires and so forth. Although such perceptions cannot be substantiated or be changed it should be sensitively dealt with. It is thus clear that even though the construction phase when these impacts could occur is only of a very short to short duration, the effects of the impacts could remain in the medium term.

Project component/s	Inflow of workers could result in increased safety and security risks.
Potential Impact	Outside workers are involved in criminal activities and/or fires occur.
Activities/risk sources	Safety of individuals and animals are at risk Theft of livestock Theft of construction material On-site accidents Spread of sexually transmitted diseases Littering and environmental pollution
Mitigation: Target/Objective	Employment of local labour should be maximised and strict security measures should be implemented at the construction site.

Mitigation: Action/control	Responsibility	Timeframe
Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce.	Contractor	Pre-Construction
Screening of workers that apply for work could be useful to lessen perceived negative perceptions about the outside	Contractor	Pre-Construction

Mitigation: Action/control	Responsibility	Timeframe
workforce.		
Construction workers should be easily identifiable by wearing uniforms and even identity tags.	Contractor	Construction
Local community members and property owners should be informed of the presence of the outside workforce, the construction schedule and movement of workers.	Project proponent	Construction
Care should be taken to avoid conflict between the local communities and the "outside" workforce	Project proponent and Contractor	Pre-Construction and Construction
Property owners, their workers, as well as local communities should be motivated to be involved in crime prevention and by reporting crimes.	Project proponent Local communities	All phases of project
The construction site should be fenced and access to the area controlled.	Project proponent and Contractor	All phases of project
Security personnel should be aware of the possibility of animal theft and poaching and should be able to identify possible criminal elements and/or criminal activities in this regard.	Project proponent and Contractor	Construction
Procedures and measures to prevent, and in worst cases, attend to fires should be developed in consultation with the surrounding property owners and ULM.	Project proponent ULM Local communities	Pre-Construction and when required

Performance Indicator	» No criminal activities and theft of livestock are reported. » No fires occur. » No on-site accidents occur » No long term increase in the prevalence of STD's
Monitoring	» Project proponent, and appointed ECO must monitor indicators listed above to ensure that they have been implemented.

12.1.6 *Minimise the potential impact on the daily living and movement patterns and farming activities*

OBJECTIVE: To minimise the potential impact on the daily living and movement patterns and farming activities

The farms under investigation are currently used for farming (mainly sheep) and other smaller compatible production activities. During the construction phase some negative impacts on the resource use on the farms are anticipated due to the extent of the construction activities. Alternative grazing areas would have to be found for the sheep currently grazing on the areas to be used for the wind turbines and solar panels. Farming activities could furthermore be negatively impacted on by general intrusions and noise associated with the construction activities such as the increase in vehicular movement and possible blasting noise.

Some intrusion impacts due to the construction activities and vehicular movements (noise and dust) on the surrounding property owners could be experienced, but it is not anticipated that their farming activities would be negatively affected during the construction phase, except if construction workers and/or jobseekers would enter these properties and in the event that stock thefts occur.

Project component/s	Construction activities could impact on the farming activities undertaken on the farms under investigation, as well as impact on the activities and daily living and movement patterns of the surrounding farms
Potential Impact	Loss of resource use Dust and noise pollution General intrusion
Activities/risk sources	Possible loss of income should sheep farming not continuing Increased risk of accidents due to increase in vehicle movement Possible degradation of local roads Dust and noise pollution negatively affecting farming activities
Mitigation: Target/Objective	Limit any negative impacts on the farming activities and on the surrounding property owners' daily living and movement patterns

Mitigation: Action/control	Responsibility	Timeframe
Additional access roads at the	Contractor	Pre-Construction

Mitigation: Action/control	Responsibility	Timeframe
construction sites should be kept to a minimum. Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users		Construction
Noise and dust pollution should be limited. Gravel roads could be sprayed with water to limit dust creation if economically feasible and reasonable from an environmental perspective (water scarce area)	Contractor	Construction
Surrounding property owners should be notified if and when blasting would occur	Project proponent and Contractor	Construction
Construction vehicles should adhere to the speed limits and should be inspected to ensure that these are in good working order and not overloaded	Project proponent and Contractor	Construction
The movement of abnormal loads should be communicated to the property owners in the study area and the necessary permits and authorisations should be obtained from the relevant government departments	Project proponent Local communities	Pre-construction Construction
Source general construction material and goods locally where available to limit transportation of these over long distances	Project proponent and Contractor	Pre-construction Construction
The property owners affected should put pro-active measures in place to find alternative grazing areas for the sheep currently grazing on the affected areas	Project proponent	Pre-construction
Local labourers should be used during the construction phase to limit the inflow of outsiders to the area	Project proponent ULM	Pre-construction Construction

Performance Indicator	» No loss of resource use and no loss of income » No noise and dust pollution » Limited intrusions on surrounding property owners » Limited or no reports from property owners regarding problems with construction activities and workforce » No degradation of local roads
Monitoring	» Project proponent, and appointed ECO must monitor indicators listed above to ensure that they have been implemented.

12.2 Operational Phase

12.2.1 *Maximise local employment and local procurement*

OBJECTIVE: Maximise local employment and business opportunities associated with the operation phase

The proposed Karoo Renewable Energy Facility is not labour intensive and approximately twenty (20) permanent employment opportunities will manifest during the operational phase of the project. Security personnel would be on site on a permanent basis, although the other personnel would not necessarily be on site on a daily basis due to the remote operational system.

Therefore, long-term direct job opportunities for locals exist, although limited. However, in an area with such high unemployment figures, these limited opportunities should still be seen as a positive impact on the quality of life of those benefiting from the employment.

Some local procurement of goods, materials and services could occur which would result in positive economic spin-offs. These opportunities for local service providers to render services to the Karoo Renewable Energy Facility could include maintenance of the guardhouse, gardening at the guardhouse, cleaning services, security services and maintenance or replacement of general equipment

Project component/s	Operation and maintenance of the facility
Potential Impact	The opportunities and benefits associated with the creation of local employment and business should be maximised
Activities/risk sources	Locals are not employed where the local skills exist Local procurement is not undertaken if possible Local businesses are not supported
Mitigation: Target/Objective	Maximise the appointment of local employees

Mitigation: Action/control	Responsibility	Timeframe
Contractors should capacitate locals where practical	Project proponent Contractor	Pre-operation and Operation
The project proponent should consider training and capacity building	Project proponent	Operation

Mitigation: Action/control	Responsibility	Timeframe
programmes to lessen the skills disparity		
The skill requirements should be communicated to the local community leaders and community based organisations	Project proponent	Operation
Make use of local recruitment agencies or other relevant community based organisations to obtain a list of jobseekers	Project proponent	Operation
An equitable process whereby minorities and previously disadvantaged individuals (women) are taken into account should be implemented.	Project proponent	Operation
Local sourcing of materials and general services to assist in providing more economic and employment opportunities for the local people	Project proponent	Operation

Performance Indicator	» An employee list should be drawn up indicating the percentage of locals employed. » A Skills Development Plan should be developed. This plan should concentrate on the transfer of skills to employees to increase their capacity and to equip them with alternative skills should they wish to be employed elsewhere. » For each employee a career path should be developed to put mechanisms in place which allows employees to progress from lower skilled working levels to higher skilled and possibly management levels. » Local procurement is undertaken
Monitoring	» Project proponent should be able to demonstrate that the above indicators are implemented.

12.2.2 *Enhance social development, social services support and capacity building initiatives*

OBJECTIVE: Assist with social development and enhance capacity building and skills development within the local communities

An important positive role that the project proponent could fulfil as part of their social responsibility towards the local communities is to assist in addressing community development needs.

The project applicant is therefore accountable to optimise the productive potential of those employed at the proposed facility's operation through capacity building and skills training, whether these individuals are temporary or permanent employees.

One of the aims of the project could be to revitalise the area in terms of job creation and infrastructure development, in other words it would focus on broad based empowerment.

Project component/s	Capacity building and skills training undertaken during the operational phase.
Potential Impact	Positive contribution to the capacity of individuals involved with the project, and equipping them with transferable skills Contribution towards local development initiatives
Activity/risk source	No social responsibility from project proponent No contribution towards local development initiatives Inefficient training or lack of capacity building and skills training
Mitigation: Target/Objective	Capacity building and skills training should be continuously undertaken during the operational phase of the project Positive social responsibility initiatives

Mitigation: Action/control	Responsibility	Timeframe
Involvement in upliftment programmes could be done according to the needs identified as part of the IDP of the Ubuntu Local Municipality	Project proponent and ULM	Operation
Capacity building and skills training should form part of the social development support provided to local	Project proponent and ULM	Operation

Mitigation: Action/control	Responsibility	Timeframe
communities		
Individual tailor made training programmes for full time employees should be embarked upon in association with accredited training facilities to ensure long term benefits to those involved	Project proponent	Operation
In cases for the middle to lower skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions	Project proponent ULM	Operation
The Skills Development Levy should be established once the project is commissioned to ensure that the benefits of the implementation thereof reach the local communities from the start of the project	Project proponent ULM	Operation
Bursary candidates should be identified and selected based on a stringent screening process	Project proponent	Operation
The project applicant should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMME's during the operational phase for rendering ancillary services to the proposed facility	Project proponent	Operation

Performance Indicator	» A Skills Development Plan should be developed. This plan should concentrate on the transfer of skills to employees to increase their capacity and to equip them with alternative skills should they wish to be employed elsewhere. » For each employee a career path should be developed to put mechanisms in place which allows employees to progress from lower skilled working levels to higher skilled and possibly management levels.

	» Local development initiatives should be supported
Monitoring	» Project proponent should be able to demonstrate that the above indicators are implemented.

12.2.3 *Minimise the potential impact on farming activities and on the surrounding landowners*

OBJECTIVE: Minimise the potential impact on farming activities and on the surrounding landowners

Once operational, the impact on the daily living and movement patterns of neighbouring residents is expected to be minimal and intermittent (e.g. the increase in traffic to and from site, possible dust creation of vehicle movement on gravel roads on site and possible increase in criminal activities). Limited number of workers would be on site on a daily basis with subsequent minimal social impacts in this regard.

The only land that would be sterilised would be the areas actually used for the turbine structures, the footprint of the solar mounts, access roads, fire breaks and associated buildings and sub-station buildings. Grazing of sheep could thus continue on the sections of land between the turbines and panels.

It is not anticipated that any activities undertaken as part of the operation and maintenance of the Karoo Renewable Energy facility would negatively impact on the surrounding property owners' daily living patterns. They would thus be able to continue their farming practices without interference from the wind energy and solar energy facilities. An increase in noise is however seen as a concern.

Project component/s	» Possible negative impacts of activities undertaken on site on the activities of surrounding property owners » Impact on farming activities on site
Potential Impact	» Possible limited intrusion impact on surrounding land owners » Possible phasing out of sheep farming
Activity/risk source	» Increase in traffic to and from site could impact on daily living and movement patterns of surrounding residents.
Mitigation: Target/Objective	» Effective management of the facility » Mitigation of intrusion impacts on property owners » Mitigation of impact on farming activities » Limit noise impacts

Mitigation: Action/control	Responsibility	Timeframe
Effective management of the facility to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services, and limiting any increase in noise levels	Project proponent	Operation
Vehicle movement to and from the site should be minimised	Project proponent Employees	Operation
Local roads should be maintained to keep the road surface up to standard	Project proponent	Operation
Reduce any negative impacts on farming activities by keeping fencing within the site to a minimum and designing fencing to maximise efficiency of stock movements	Project proponent	Operation
Limit the development on new access roads on site as far as possible	Project proponent and Contractors	Operation
The engineering design of the turbines should thus ensure the least noise as possible	Project proponent and Contractors	Operation

Performance Indicator	» No environmental pollution occur (waste, water and sanitation related) » Limited noise pollution » No intrusion on private properties and on the activities undertaken on the surrounding properties » Continuation of farming activities » No noise increase
Monitoring	» Project proponent should be able to demonstrate that facility is well managed without environmental pollution and that the above requirements have been met

12.2.4 *Minimise the potential visual impact and subsequent impact on the sense of place and land value*

OBJECTIVE: Minimise the potential visual impact and subsequent impact on the sense of place and land value

The social impact associated with the impact on the sense of place relates to the change in the landscape character and visual impact of the proposed wind energy facility and PV plant.

Even though the area is rural in character, there is some limited existing disturbance by infrastructure such as roads, transmission lines, telephone poles, the railway line, the existing substation, scattered homesteads and so forth. The proposed facility is thus expected to add to the existing negative visual impact of these types of infrastructure on the open relatively undisturbed rural landscape and therefore on the sense of place. The permanent visual impact would thus be limited to a small minority of residents and road users, but due to the scarcely populated area it would have a more marked effect on these residents' quiet, undisturbed rural lifestyle, their quality of life and their sense of place.

In this regard it should also be noted that the impact of the turbines, substations and PV panels on the visual environment would differ based on the receptors' perception of such facilities. Some people could view the turbines and panels as having a significant negative impact on the beauty of the landscape, while others could view them in a positive light and even use the presence of the facility as part of the area's marketing efforts.

Another impact is a source of concern is referred to as "shadow flicker" which could impact on nearby residents or motorists making use of local roads.

The above mentioned visual impact and the viewers and/or landowners' perception of the facility could result in devaluation of the land in the short term. Once operational it is however expected that the value of the land would return to normal should the facility be properly managed with no negative impacts on the surrounding landowners' activities.

Project component/s	» Visual impact due to turbines and PV panels and subsequent impact on sense of place »
Potential Impact	» Visual impact and subsequent impact on sense of place » Possible negative impact on land value
Activity/risk source	» Devaluation of land value » Change of landscape character
Mitigation: Target/Objective	» Limit the negative visual impact and thereby limiting the negative impact on the sense of place

Mitigation: Action/control	Responsibility	Timeframe
The design and specific positioning of the panels and turbines should aim to minimise	Project proponent	Pre-operation Operation

Mitigation: Action/control	Responsibility	Timeframe
the possible negative visual impact of the facility on the surrounding property owners		
The Visual, Noise and Heritage Impact Assessment recommendations should be implemented to limit any potential negative impacts on the sense of place	Project proponent	Pre-operation Operation
The panel mounts should have the lowest height practically possible	Project proponent	Pre-operation Operation
The natural landscape could possibly be used to conceal some of the panels and turbines	Project proponent	Pre-operation Operation
It should be ensured that there is no reflection from the panels	Project proponent and Contractor / Engineer	Pre-operation Operation
The design of the blades should limit any possible "shadow flicker"	Project proponent and Contractor / Engineer	Pre-operation Operation

Performance Indicator	» The visual impact is limited as far as possible » The change in the landscape character is contained as far as possible » The facility is managed according to international best practice to avoid any negative impacts on the land value
Monitoring	» Project proponent and surrounding property owners must monitor indicators listed above and should be able to demonstrate that the mitigation measures are implemented.

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www.demarcation.org.za
www.northerncape.gov.za
www.northerncape.org.za
www.pixleykasemedm.co.za
www.ubuntu.gov.za

13.3 Questionnaires distributed

Questionnaires were distributed to the following individuals:

Mr. H. Marais: Property owner of the farms Modderfontein 228 and Phaisantkraal 1

Mr. J. de Klerk: Property owner of the farm Mordant Klaassenskraal

Mr. D. Marais: Property owner of the farm Taayboschfontein 15

Mrs. M. van Heerden: Property owner of the farm Rooikrans Retreat (indicated as Sweetfontein 228/3 on the project maps)

Mr. J. van der Merwe: Property owner of the farm Zwartkopjes 240/1 and 240/2

Mr. N. Loubser: Manager of the farms Mordant Klaassenskraal 176 and Gabrielsbaken 2

Mrs. S. Trichardt: Property owner of the farm Matjesfontein 220 (Highlands)

Mr. H. Schoeman: Property owner of the farm Kookfontein 226

Mr. P. van der Merwe: Property owner of the farm Houdenbeck 222

Mrs. J. Seabe: Eskom as property owner of the farms Cafferkraal 232 and Uitval 229

13.4 Completed questionnaires received

Mr. J. van der Merwe: Property owner of the farm Zwartkopjes 240/1 and 240/2

Mrs. S. Trichardt: Property owner of the farm Matjesfontein 220 (Highlands)

14. APPENDIX A: QUALIFICATIONS AND EXPERIENCE OF SPECIALIST

Ms. Ingrid Snyman holds a BA Honours degree in Anthropology. She has fourteen years' experience in the social field. Ms. Snyman has been involved in various Social Impact Assessments during her career as social scientist. These project themes consist of infrastructure development, waste management, road development, water and sanitation programmes, township and other residential type developments. She has also been involved in the designing and managing of numerous public participation programmes and communication strategies, particularly on complex development projects that require various levels and approaches.

Ms. Snyman has no vested interest in the outcome of the project and hereby declares her independence with regard to the study undertaken for the above mentioned project