

Socio-Economic Impact Assessment

For

Keren Energy Kakamas (Pty) Ltd

Photovoltaic Electricity Generation Facility, Erf 1654, Kakamas

Basic Environmental Assessment Report



May 2012

by



Executive Summary

Kai! Garib Municipality is home to the proposed 10MW photovoltaic electricity generation facility on Erf 1654, Kakamas. In Kai !Garib Municipal area and Kakamas, the majority of people work in un- and semi-skilled jobs in Agriculture, Fishing and Forestry, followed by Community Services, Whilst the unemployed rate in Kai !Garib is 15%, 88% households earn R3500 and less per month. In Kakamas there are 93% households earning R3 500 and less. The Kakamas population with their low skills level represents 17% of the Northern Cape population. Hence the Northern Cape contributes approximately 2% to the National GDP. Another challenge is the housing backlog (2 640) in the Municipality representing 15% of the households in the Kai !Garib municipality and more households than the number of households (2 349) in Kakamas. Well more than 80% of households in Kakamas receive basic services from the local Authority.

This socio-economic assessment, based on a basic model which could be changed to have overall better outcomes, identified the following impacts during the Construction, Operational and Decommissioning Phases:

Positive Impacts:

Impacts causing positive changes of low and medium significance to the economic and material well being of the community after being amplified by mitigation are:

a) Job creation:

The construction and decommissioning of the proposed photovoltaic electricity facility has an impact of low positive significance whilst its operation has a medium positive significant impact as summarised in the table below:

| | |
|--|---------------------------------------|
| New employment opportunities, Construction phase | 30 jobs over 6-8 months |
| Expected value of employment opportunities, Construction phase | ±R3 million (R2 million for 8 months) |
| % of value of employment accrued to Previously Disadvantaged Individuals, Construction phase | 40-45% |
| Number of permanent employment opportunities, Operational Phase | 10 (7 direct & 3 indirect) |
| Expected current value of employment: first 10 years, | R8.7 million |

| | |
|--|-------------------|
| Operational phase | |
| Percentage of expected current value accrued to PDI, Operational phase | 56% (R4.9million) |

The unemployment rate for the Northern Cape, Kai !Garib and Kakamas is 26%, 15% and 22% respectively.

b) Increase in Sales volume and sustainable municipal income:

The construction and decommissioning of the proposed photovoltaic electricity facility has an impact of low significance whilst its operation has a impact of high positive significance given the long term rental agreement between Keren Energy Kakamas (Pty) Ltd and Kai !Garieb municipality.

c) Increase in GGP:

The GGP will increase slightly during the construction, operation and decommissioning phases. The impact of the proposed photovoltaic electricity facility is low positive in significance during construction, operations and decommissioning but is medium high positive in significance during operations given the long term lease agreement between Keren Energy Kakamas (Pty) Ltd and Kai !Garieb municipality. The table below provides the contributions during construction and operation.

| | |
|---|--------------------------|
| Expected capital expenditure (Construction) | R308.8 million per 10 MW |
| Expected yearly income (Operation) | R65 million per annum |

d) Growth in Tourism:

It is anticipated that the operation of a photovoltaic facility will attract tourists. Business and Leisure visitors will both be interested in the facilities and cause more people to visit Kakamas than previously. The impact of the proposed photovoltaic facility is low positive in significance during construction and operations.

e) Skills development:

The employment model applied (an external construction team and a roaming cleaning and maintenance team) cause the impact of skills development to be low but positive in significance before and after mitigation. Most of the skills will be developed through on-the-job-training, hence the rating stays low.

The Kai !Garib population has a corresponding low level of education: Fifteen percent (15%) of the population has no schooling, seventy percent (70%) of the population has less than 12 years of schooling of which twenty eight (28%) had at least nine (9) years of education and are functionally literate and numerate in comparison with nine percent (9%), sixty seven percent (67%) and twenty two percent (22%) in the case of Kakamas. Fifteen percent (15%) of the population has a qualification equal to matric or higher whilst twelve percent (12%) in Kakamas has a matric qualification.

Negative Impacts that can be neutralized or reversed:

Impacts that initially cause negative changes of low significance to a) the living environment of and b) the health and social well being of the community during all three phases but are either neutralized or reversed to be positive, are:

- f) An **increase in traffic** which has been assessed to be low negative during construction and decommissioning given the slow moving vehicles but through mitigation can be neutralized. The impact is unlikely to occur during operations.
- g) An increase in **dust and noise (health & safety)** which has been assessed as of low negative significance during the construction and decommissioning phases but through mitigation can be neutralized. The impact of dust and noise will be unlikely in the operational phase.

Fires could threaten safety during construction and decommissioning, but mitigation and the location of the proposed site neutralise such an impact.

Impacts on health and safety are unlikely during operations.

- h) Increased **demand for municipal services** i.e. health service. The demand for the said services may occur sporadically during the construction and decommissioning phase, but given the employment model applied (an external construction team and a roaming cleaning and maintenance team) the impact is likely but of very low significance. Mitigation measures neutralise the impact on municipal amenities.

As less than half (48%) of the households in Kai !Garib have piped water whilst two thirds (2/3rds) of households (64%) have flush toilets (Census 2001) any impact during any of the phases will increase the pressure on the supply of domestic services. However, having considered the possible impacts, it is unlikely that there will be any

demand for additional services whilst the impact on domestic services will also be sporadic and hence low.

Negative Impacts that cannot be reversed:

Impacts that cause negative changes of low significance to the living environment of the community and cannot be mitigated, are:

- i) a **change to the sense of place**. Despite the location, surrounding land uses and hence the absorption capacity of the site environment, the intensity and thus significance is during construction, operations and decommission is low but negative. Only after decommissioning the impact will be neutralized.

Overall the impacts are positive or are neutralized or reversed to positive and their significance is low to medium. Mitigation measures amplify these impacts.

Need and Desirability

The need for and desirability of the proposed 10 MV Keren Energy Kakamas (Pty) Ltd Photovoltaic Electricity Generation Facility on Erf 1654, Kakamas is confirmed by

a) the Northern Cape Provincial Spatial Development Strategy (NCSDS) as

- *Economies of emerging growth centres, i.e. Upington & Springbok, are diversified (balancing downscaling of export grapes and copper mines industries with growth prospects in non-traditional sectors i.e. energy generation);*
- *Proximity of land reform sites to economic activities should be ideal as economic potential of land reform sites are inadequate. Alternative energy generation enhances economic activity and potential of land reform sites;*
- *Development Corridors and Special Resource Areas i.e. Orange River corridor (from Springbok through Upington to Kimberley) link the major economic centers in the province through established transport infrastructure. Alternative energy projects are examples of flagship economic development projects along transport/ development corridors and within special resource areas enhancing economic potential of development corridors;*
- *Stagnating Small Towns will lead to reconsideration of future service provision levels; Alternative energy generation can contribute to sustainable municipal income, enabling the municipality to maintaining and develop services.*

Desirability of the proposed photovoltaic electricity generation facility is supported by:

- the acceptable level of change in the sense of place given the surrounding land uses and hence absorption capacity of the environment;
- no need to build long distances of high voltage lines as Eskom high voltage lines are crossing the terrain;
- sustainable income generation for the Kai !Garib Municipality as the property on which the proposed project is located will be leased in the long term to Keren Energy Kakamas (Pty) Ltd.
- Most impacts, except two, rated as either of low positive significance or can be reversed to be neutral or positive.
- Overall, the carbon footprint to generate electricity will get reduced, whilst the Northern Cape Economy and the community of Kai !Garib Local Authority will benefit from proposed photovoltaic electricity generation facility.

b) the Kai !Garib Local Economic Development Plan (LED), 2008 aims to alleviate poverty and reduce unemployment. A potential internal economic driver is the exploitation of the climate of the area for energy generation (sunshine), i.e. solar farming to enhance the economy and reduce unemployment.

Desirability of the proposed photovoltaic electricity generation facility is also supported by the ability of the environment to absorb the changes in the sense of place as the surrounding land uses is industrial and institutional. The precedent set is positive as the lease agreement with the local authority will bring about sustainable municipal income whilst all remaining impacts are either of low positive significance or can be reversed to become neutral. Overall, the carbon footprint to generate electricity will get reduced, whilst the Northern Cape Economy and the community of Kai !Garib Local Authority will benefit from proposed photovoltaic electricity generation facility.

Conclusion

The socio-economic assessment, based on a basic model which could be changed to have overall better outcomes, reveals that the positive impacts can be amplified whilst negative

impacts can be reversed through appropriate mitigation measures. A summary of impacts are listed below reflecting that most impacts are of low significance:

| Impacts during Construction | Alternative: Preferred | | Alternative: Preferred | | Alternative: No Go |
|---------------------------------------|------------------------|-------|-------------------------|-------|--------------------|
| | Sig/ intensity | | Mitigated | | |
| Job creation | Low, positive | 8 | Low, positive | 12 | No impact |
| Skills development | Low, positive | 6 | Low, positive | 9 | No impact |
| Traffic | Low, negative | 8(-) | Low, positive - neutral | 8 | No impact |
| Municipal services | Low, negative | 3(-) | Low, positive - neutral | 4 | No impact |
| Health | Low, negative | 10(-) | Low, negative – neutral | 2(-) | No impact |
| Safety | Low, negative | 10(-) | Low, negative – neutral | 2(-) | No impact |
| Sales volume | Low, positive | 8 | Low, positive | 12 | No impact |
| GGP contribution | Low, positive | 15 | No mitigation measures | - | No impact |
| Impacts: Operations & Decommissioning | Alternative: Preferred | | Alternative: Preferred | | Alternative: No Go |
| | | | Mitigated | | |
| Job creation | Low, positive | 30 | Medium, positive | 45 | No impact |
| Skills development | Low, positive | 6 | Low, positive | 9 | No impact |
| Traffic | Unlikely | | - | | No impact |
| Municipal services | Unlikely | | - | | No impact |
| Health & Safety (operations) | Low, negative | 7(-) | Low, negative | 7(-) | No impact |
| Health & Safety (decommissioning) | Low, negative | 16(-) | Low, negative - neutral | 10(-) | No impact |
| Sales volume | Low, positive | 30 | Medium-high, positive | 45 | No impact |
| GGP contribution | Low, positive | 45 | No mitigation | 45 | No impact |
| Sense of place | Low, negative | 9(-) | Low, negative | 9(-) | No impact |
| Tourism | Low, positive | 16 | Low, positive | 16 | No impact |

With the benefits of job creation, strengthening tourism, a reduced carbon footprint and clean energy, the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility should be approved on condition that the proposed mitigation measures are implemented.

Keren Energy Kakamas (Pty) Ltd Photovoltaic Electricity Generation Facility

Socio-economic Impact Assessment

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Chapter 1: Overview of Proposed Development and Social and Economic Impact

1.1 Introduction

EnviroAfrica cc, was appointed by Keren Energy Kakamas (Pty) Ltd to undertake an Environmental Basic Assessment (EBA) for a proposed Photovoltaic Energy Electricity Generation Facility on a portion of Erf 1654, Kamamas. Leap Sustainable Developments were appointed to undertake a specialist Social Impact Assessment (SIA) as part of the EBA.

1.2 Description of the Proposed Development

Keren Energy Holdings is proposing the establishment of a 10 MW concentrated photovoltaic solar energy facility next to the town of Kakamas (Northern Cape Province, Kai !Garib Local Municipality). The facility will be established on an area of approximately 20 ha, on a portion of Erf 1654 (Kakamas), located adjacent and south-west of Kakamas (Botes, 2012, p1).

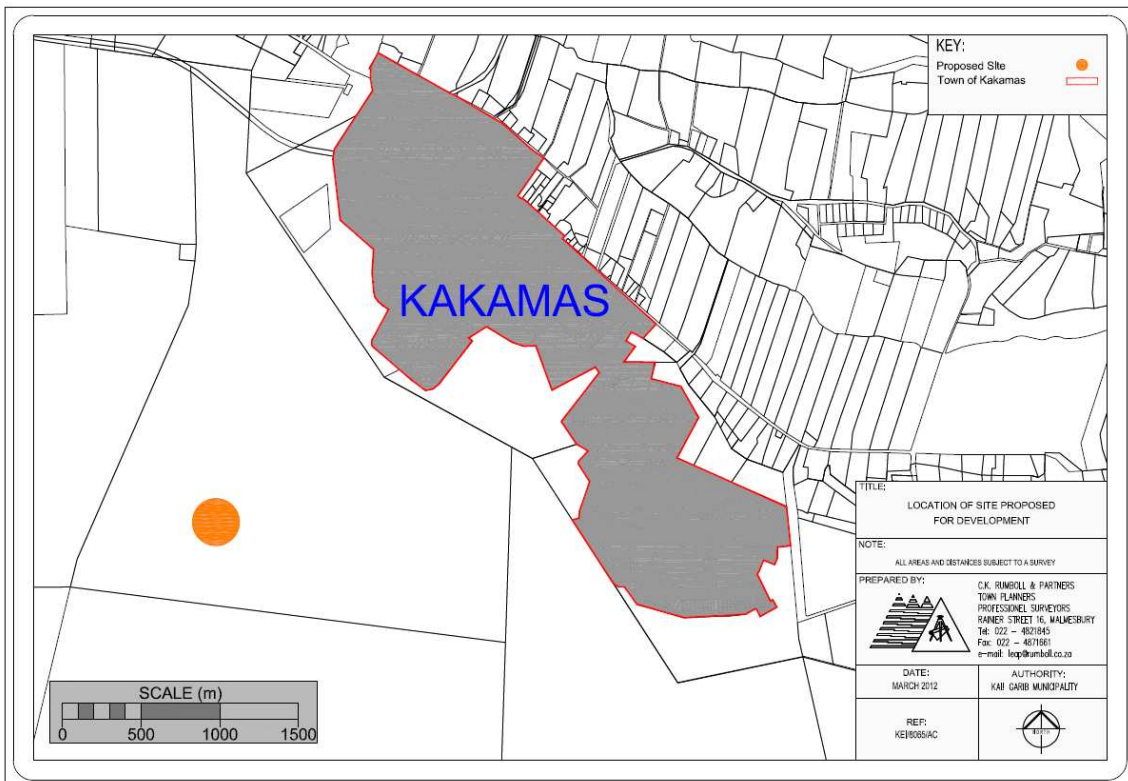


Figure 1: Location of the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy

The current zoning of Erf 1654, Kakemas is Agriculture I a change in land use application is made to rezone 20ha to Special Zone. The land concerned is a ±495ha in extent and the special zone will allow for the utilization of the land primarily for agricultural purposes and secondarily for the generation of alternative electricity. The land is used as a grazing commonage covered with natural vegetation. The proposed portion of property to be utilized for the generation of alternative energy is located just west and north west of the Kakamas sewerage works and waste disposal site. To the north of Erf 1654 the municipal traffic test centre is located as well as a subsidized housing project being currently removed. Erf 1654 is surrounded by the N14, erven 1084, 1768, 2261, 1651 and 2105.

The land belongs to Kai !Garieb Local Authority and Keren Energy Kakamas (Pty) Ltd entered into a lease agreement with the local authority.

The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility will utilise Concentrated Photovoltaic (CPV) technology. CPV uses Fresnel lenses to concentrate the light from the sun onto individual PV cells. An inverter is then used to convert the direct current electricity produced into alternating current in order to connect into the Eskom grid.

A single solar generator produces approximately 66kV. To produce 10 MW, the proposed facility will require a number of generators arranged in multiples/arrays. The CPV panels will be elevated 2m above ground by a support structure, and will be able to track the path of the sun during the day for maximum efficiency. Approximately 1.8ha is required per installed MW. A 10MW capacity facility and its associated infrastructure will thus require a development footprint of approximately 20 ha. Each panel will be approximately 22m wide by 12.5 m high. When the panels are tracking vertically the structure will have a maximum height of approximately 15m (Botes, p4). The CPV panels will be mounted on pedestals drilled and set into the ground. Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared from the site.

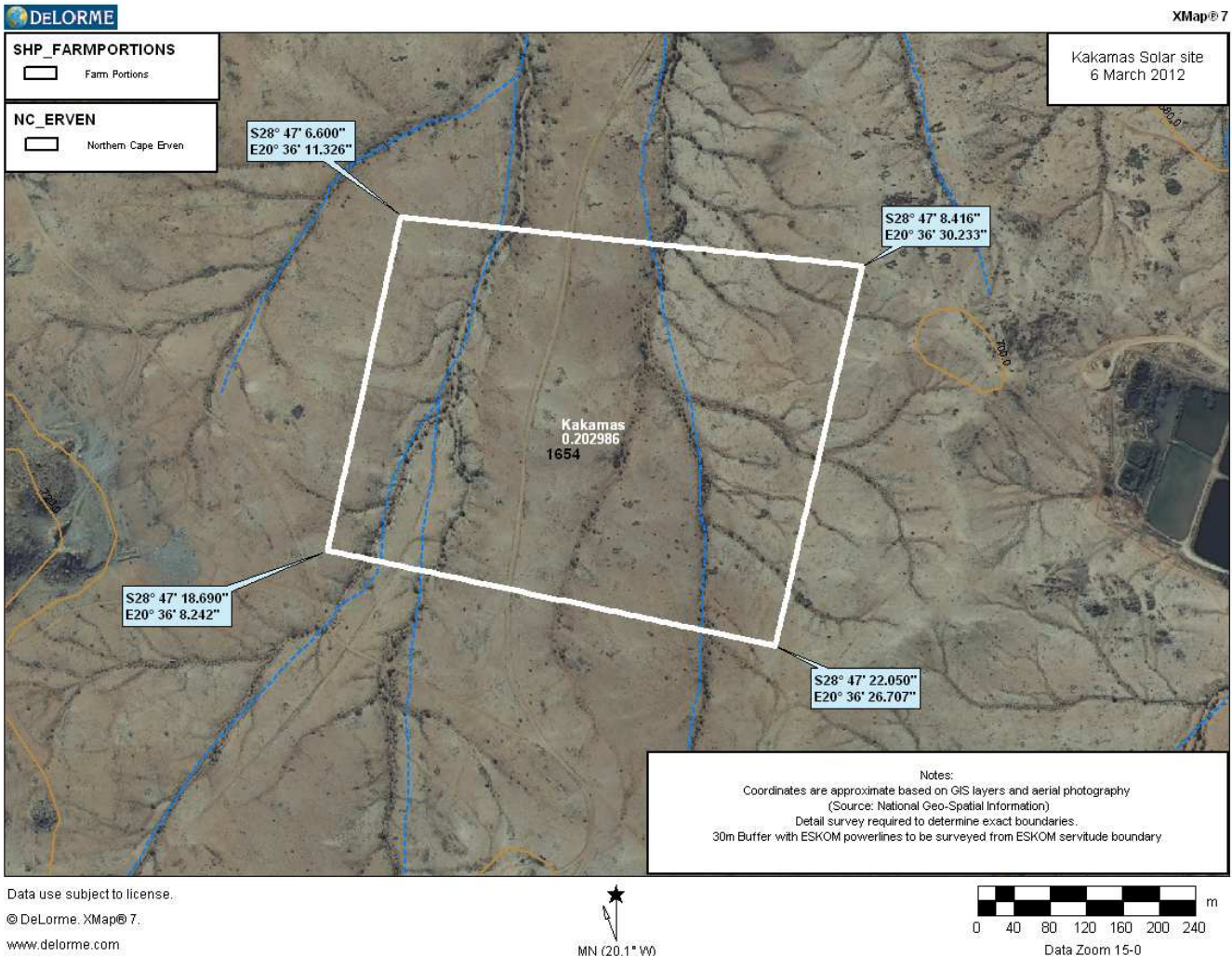


Figure 2: Topography of Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation site

Associated infrastructure includes single track internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp on site. A workshop will be operated and material will be stored in temporary containers. Construction workers will be temporary housed in Kakamas.

The electricity generated from the project will be fed directly into the national grid at the Eskom substation which is situated 1.5km away, located north of Kakamas/ alongside the subject property (Kaplan, p4).

The site can be accessed from the N14 or from Hofmeyer road (within Kakamas), using existing secondary roads. However, additional temporary access roads will have to be established on site.

1.3 Development Alternatives

The Northern Cape has the highest levels of Solar Irradiance (~6kW/m²/day) in South Africa which is above the Solar Photovoltaic norm of >4.5kW/m²/day. The Northern Cape is therefore an ideal location of the proposed Photovoltaic Energy Generation Facility. The selection of a development site was further refined by the need to tap into an ESKOM line close to an ESKOM substation. The site fitted this criteria as there is Eskom infrastructure and a substation within a 1.5km radius.

Another alternative is the No-Go Alternative should not be considered as an option as the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation facility:

- will generate jobs of which the Northern Cape is in much need of;
- will provide opportunities to obtain skills to the local community.
- will generate electricity of which South Africa is in need of;

1.4 Approach

The approach to this socio-economic study is directed by the requirements for Environmental Impact Assessments and the Guidelines for Social Impact Assessments (SIA) and Economic Impact Assessments commissioned by DEA&DP. Hence the followings activities were executed:

- Review of project information and preliminary specialist reports;
- Collection and synthesis of baseline socio-economic data on the area;
- Identification project results and key social and economic variables, and the impact of the project results on the receiving society and economy as per Guidelines for Social Impacts;
- Verification of some results, social variables and impacts through communication with the developer, specialists and key project team members as per bibliography;
- Preliminary rating the identified impacts as per rating criteria in Chapter 3;

- Preparation of Preliminary Socio-Economic Impact Assessment (SIA);
- Ascertain significance of impacts through a round of interviews and correspondence with registered interested and affected parties, other community members, specialists and key project team members as per bibliography.
- Rating the confirmed impacts as per recommended scale informed by the results of the interviews with various parties as outlined above.
- Recommending management measures to mitigate the impacts of the proposed development.

1.5 Assumptions and limitations

1.5.1 Assumptions

a) Complying with planning and policy requirements does not exempt the application from procedural requirements although the development is in line with national and provincial planning and strategy documents.

1.5.2 Limitations

a) Assessment of alternatives is limited.

The alternatives assessed by the Socio- Economic Impact Assessment are limited to the proposed project site and the no-go alternative as the only alternatives.

b) Basic model subject to change.

A basic model which could be changed to have overall better outcomes, is the subject of this assessment. The model assessed, creates employment mainly regionally and represents larger structures that are highly visible vs. an altered model creating local employment and being less visible.

c) Demographic data is dated.

The demographic data used in the study is dated as it is based on the 2001 Census. However, the data does provide useful information on the demographic profile of the study area. Other data used are more recent and comparisons reflect discrepancies.

d) The number of jobs created.

The number of jobs created was based on information from the developers and comparing those with other similar projects. The Social Accounts Matrix was not used.

e) Interviews with a limited group representing the mainly professionals involved in the project. Impacts recommended to be further assessed will include a number of people, not a representative sample, but those (interested and affected parties, key officials, some community members and business men) who can amplify the issues at hand.

1.6 Specialist Details

The author of this report is an independent specialist with, 10 years experience in the field of rural development, 7 years in community education, 5 years in project management and coordination, 6 years in town and regional planning (A. Coetzee, Reg. no: A/1369/2010) and 6 years in socio-economic research.

1.7 Declaration of Independence

This is to confirm that Anelia Coetzee, the consultant responsible for conducting the study and preparing the Preliminary and Final Socio Economic Impact Assessment Report, is independent and has no vested or financial interests in the proposed development being either approved or rejected.

1.8 Draft Report Outline

The report is divided into six sections, namely:

- Section 1: Overview of Proposed Development and Approach to Socio-economic Impact Assessment;
- Section 2: Description of Related Policies and Area of Study;
- Section 3: Socio-Economic Impacts identified during the Construction Phase and assessment thereof;
- Section 4: Socio-Economic Impacts identified during the operational phase and assessment thereof;
- Section 5: Management guidelines to address socio-economic impacts.

Chapter 2:

Description of the Area of Study

2.1 Introduction

This section of the report provides an overview of the baseline socio-economic conditions in the area that are relevant to the social and economic assessment of the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility. The baseline data was obtained through secondary data sources such as Statistics South Africa, 2001 National Census, the Kai !Garib Municipality and specialist studies. The baseline data provides the foundation to determine the impact of the development proposals.

The section is divided into five sections, namely:

- Overview of the local planning context;
- Description of the local demographic and social context;
- Description of the economic context;
- Overview of the capacity of the municipal services in the area;

2.2 Policy and Planning Context

The compatibility of the proposed development with the relevant land use planning policies and development plans for the area plays an important role when identifying and assessing potential social impacts. The following planning documents are relevant to the proposed development:

- White Paper on Energy Policy for the RSA (1998);
- White Paper on Renewable Energy (2003);
- National Energy Act (2008);
- National Alternative Energy Strategy (2009);
- National Spatial Development Perspective, 2006 (NSDP);
- Northern Cape Spatial Development Strategy;
- Kai !Garib Municipality Integrated Development Plan, 2008/2009 (IDP) and
- Kai !Garib Municipality Local Economic Development Plan, 2008 (LED).

2.2.1 White Paper on Energy Policy for the RSA (1998)

The White Paper on Energy Policy for South Africa (December 1998) give recognition to “renewable *[that]* energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential”. “Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future”. As South Africa has a very attractive range of renewable resources, particularly solar and wind, the fact that renewable applications are the least costly particularly when social and environmental costs are considered, is strongly emphasized.

The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Electricity Generation Project is in line with the principles of the White Paper on Energy Policy for South Africa as it promotes the use of renewable resources to generate energy.

2.2.2 White Paper on Renewable Energy (2003)

As signatory to the Kyoto Protocol, Government is determined to, by means of the White Paper on Renewable Energy (November, 2003):

- a) make good the country’s commitment to reduce greenhouse gas emissions and
- b) ensure energy security through diversification of supply (National Energy Act).

Government’s long-term goal is to establish a renewable energy industry that will offer in future sustainable, fully non-subsidised alternatives to fossil fuels. The medium-term (10-year) target set in the White Paper is *10 000 GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro electrical plants*. This target constitutes 4% of the total projected demand. The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Electricity Generation Project supports the medium and long term renewable energy government goals as it will assist to make good the country’s greenhouse gas emissions and ensure energy security.

2.2.3 National Energy Act (2008)

Again, the National Energy Act (Act 34 of 2008) promotes diversification of energy sources and supply including renewable resources, i.e. solar and wind. The diversified energy resources have to be available in sustainable quantities at affordable prices and should support economic growth, poverty alleviation and consider the preservation of the environment.

The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Electricity Generation Project enhances energy source diversification is thus in line with the National Energy Act.

2.2.4 National Alternative Energy Strategy

South Africa's government has identified around 20GW of pure renewable energy capacity and 4GW of co-generation technologies that may form part of its renewable energy procurement plan under the region's feed-in tariff programme. Concentrated solar power accounted ten percent (10%) of proposed capacity (NewsNet, 2010).

2.2.5 National Spatial Development Perspective, 2006 (NSDP)

The National Spatial Development Framework serves as instrument to coordinate all government action and to align social, economic and environmental goals. The National Spatial Development Framework provides the basis to maximize the overall social and economic impact of government development investment through interpreting the strategic direction, policy coordination and combining government action into a continuous spatial framework of reference.

The ultimate goal is to provide basic services, to ameliorate poverty and undo uneven and ineffective spatial patterns and address the additional burden on poor people.

The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility complies with the normative principles of the National Spatial Development Framework as follows:

| NSDF Principles | Proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility |
|---|--|
| a) Economic growth is a prerequisite to achieve policy objectives; | The proposed project will contribute to the GGP of the province. |
| b) Government spending on fixed investment should therefore be focused on localities of economic growth or economic potential; | The Northern Cape has been earmarked by the National Government for the generation of alternative energy and in particular solar energy. The proposed project is located in the Northern Cape and enhances government spending on localities of economic growth. |
| c) Efforts to address past and current social inequalities should focus on people not places. | The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation project create employment and on the job skills development opportunities. |
| d) To overcome the spatial distortions of apartheid, future settlement and economic development opportunities should be channeled into corridors and nodes that are adjacent to or link the main economic growth centers; | Upington is earmarked as a growth centre and Kakamas is linked to Upington by means of the planned Orange River Corridor along the N14. Economic development opportunities are thus aligned with the growth corridor and centres in the Northern Cape. . |
| e) Future urban and rural development in the province should change the current pattern of resource application and investment significantly to ensure a sustainable environment for the future. Infrastructure investment and development spending should primarily support localities that will become major growth nodes in South Africa | The resource application and investment are not only aligned with national energy strategies but with enhancing the potential of vacant municipal land. Upington, earmarked as growth node, will be supported. |

The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Project is in line with the principles of the National Spatial Development Framework as it promotes alternative energy generation and is in close proximity of the Orange River and Karoo corridors and the Orange River Basin Resource Area promoting economic growth.

2.2.6 Northern Cape Provincial Spatial Development Strategy (NCSDS)

The principles of the National Spatial Development Strategy inform the Northern Cape Provincial Spatial Development Strategy. The following strategic issue pertains to the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility:

Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility Socio- Economic Impact Assessment May 2011

Emerging Growth Centers:

The two areas identified are Upington and Springbok and its surroundings. Balancing the downscale of export grapes and copper mines industries with the growth prospects in non-traditional sectors will be the focus. Hence both the Siyanda and Namaqua Districts will experience a significant rural-urban shift with some stepwise (onward and outward) migration to other major centers both inside and outside the province. This migration will place greater demand for services on local authorities who are not identified as growth nodes. Development priorities in these areas and Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility are aligned i.e.:

| NCPSDS Development priorities | Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility Development priorities |
|--|---|
| Promoting of emerging growth opportunities to absorb the employment needs of a growing population; | Promote alternative energy, an emerging industry in South Africa |
| Developing small and medium enterprises in emerging economic sectors; | The photovoltaic energy generation facility will provide opportunities for small and medium enterprises to offer their services to plan, construct and maintain the facility. |
| Re-distribution of service provision to take into account the internal movement of people into these towns from other centers. | The project has a 30 year life span and it is likely to be repeated. Its permanency and rental income it generates will enable Kai !Garib Local Authority to comply with service demands. |

Land Reform Areas:

Land re-distribution and security of tenure have led to the need to provide services in previously under or non-serviced areas. From a spatial development perspective the locality of these areas, that is under or non-serviced, will be a critical determinant for their future viability. Most of them are in areas in relatively close proximity to the Kimberley, Postmasburg and Upington areas. Although the proximity of land reform sites to economic activities is ideal, the economic potential of the land reform sites are inadequate as a source of economic livelihoods. Development priorities in these areas and the objectives of the Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility, are aligned:

| NCPSDS Development priorities | Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility Development priorities |
|--|--|
| Maximize local economic development opportunities; | The photovoltaic energy facility provides opportunity for local small business to be involved in the maintenance of the facility, maximizing the economic development opportunities. |
| Promote integration and linkages with the surrounding economy; | Kakamas will be the projects economic base for day to day supplies and services. Upington will be the centre for services not supplied in Kakamas. Hence the project will enhance the linkages between towns in the Northern Cape. |
| Provide appropriate levels of services. | The project will support maintenance and development of services as it will generate rental income. |

Development Corridors and Special Resource Areas:

There are four discernible development/ transport corridors of which the Orange River corridor (from Springbok through Upington to Kimberley (and the Free State and Gauteng)) and the Karoo corridor (linking Namibia to Upington, passing through De Aar to the Eastern Cape) link the major economic centers in the province. The Orange River Corridor, with its base the Orange River Basin is located in the Siyanda District Municipality. The focus is on the construction of access roads along the N14 from Kakamas to Upington and N10 from Upington to Glibershoop. These roads will cross Kai! Garib, Kheis and //Khara Hais Municipalities. Kakamas is located in the Kai! Garib Municipality. These corridors are vital lifelines from a transport perspective and the proximity of established transport infrastructure to areas of relatively high economic potential, is beneficial. Hence development priorities in these areas are, and of which the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Project is in support of, designating spatial development initiatives; providing direct support to catalyze flagship economic development projects along transport/ development corridors and within special resource areas; and provision of necessary infrastructure and services to support economic development.

Stagnating Small Towns:

A source of out-migration to other centers in the Northern Cape and other parts of South Africa as well as the basis of a significant number of people who continue to reside in these towns, will lead to reconsideration of future service provision levels. The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility can contribute to the local economy to make the provision of services more worthwhile.

Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility is aligned with the majority of the focus areas of the Northern Cape Provincial Spatial Development Strategy.

2.2.7 Kai !Garib Integrated Development Plan (IDP), 2008/2009

According to the IDP the following priorities will be attended to over the next five years:

- 264 houses per annum will be built whilst 300 erven per annum will be developed.
- Permanent employment for 100 persons per annum, 100 persons per annum will be trained and land and infrastructure will be provided to 25 emerging farmer per annum.
- All households have access to water, sanitation & sewerage, electricity, roads and storm water.
- Improved and proper internal and external communication including an annually reviewed municipal corporate plan and access to IDP translated into different languages.
- Municipal capacity developed to implement the IDP and provide proper services based on a long-term human resource development plan and on reviewed financial strategies.
- Establish a community forum and develop appropriate policy to combat increases in HIV/AIDS prevalence and teenage pregnancies.
- Establish one sport and recreational facility accessible to all communities per annum.

- Upgrade health services and facilitate awareness campaigns and interdepartmental planning sessions.

Additional priorities identified by the community are:

- Promote tourism, i.e. eco-tourism, agri-tourism & community tourism along the river;
- Improve infrastructure in particular roads;
- Enhance youth development economically and socially;
- Establish emerging farmers and support cultivation of crops;
- Offer apprenticeship and enhance development of existing skills;
- Facilitate the involvement of churches and social organizations;
- Promote informal business;

2.2.8 Kai !Garib Local Economic Development Plan (LED), 2008

The Local Economic Development Plan had as its aim the alleviation of poverty and the reduction of unemployment. The proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility supports following LED priorities as per Kai !Garib's IDP:

- To provide permanent employment for 100 people per annum over the next 5 years in all of the identified economic sectors, i.e. agriculture, tourism and business (60 youth, 20 women, 10 disabled, 10 community) - 100 jobs p/a
- To provide skills development or training to 100 people per annum over the next 5 years in all of the identified economic sectors, i.e. agriculture, tourism and business -100 people trained;
- To provide land and improve infrastructure on farms for 100 emerging farmers over the next 5 years - 25 farmers affected.

The plan also identifies potential internal economic drivers which are in support of the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility:

- The expansion, diversification and refinement of irrigated agricultural crops as well as associated agro-industrial processing, with an emphasis on high valued crops and especially those that serve the export market.
- The marketing and use of the transportation infrastructure to create a regional and even international hub for imports, exports and cargo handling / distribution, i.e. spin offs from the envisaged telecommunication development in Carnarvon (Pixley Ka Seme District Municipality)
- The development of niche tourism markets that capture full value out of the special attributes of the area.
- The exploitation of the climate of the area for energy generation (sunshine), i.e. solar farming in the adjacent Mier and //Khara Hais Municipalities

2.3 Demographic and Social Context

Kai !Garib Municipality is a category B municipality within the Siyanda District Municipal Area in the Northern Cape. Kakamas Dorp is part of Ward 3 of the Kai !Garib Municipality, which includes Alheit, Bloukam and Truter. Erf 1654 is located adjacent and south west of Kakamas and therefore the assessment is based on the Kai !Garib municipal area. The Municipal Area is divided into 8 wards of which the remaining 7 are:

Ward 1 Augrabies, Noudonsies, Zeekoeisteek, Blouputs

Ward 2 Lutzburg, Cillie, Marchand, Perde-eiland, Omdraai

(Ward 3 Kakamas Dorp, Alheit, Bloukamp, Truter)

Ward 4 Kromhout Boerdery, Kakamas Oos (Langverwag), Neus

Ward 5 Lennertsville, Koms, Kenhardt

Ward 6 Gardenia, Whalsig, Noodkamp, Vaaldriehoek

Ward 7 Friersdale, Warmsand, Eenduin, Keimoes Dorp, Akasia Park, Swartbooisberg

Ward 8 Eksteenskuil Eilande, Soverby, Bloemsmoed, McTaggerscamp, Curriescamp, Blaauwsekop, Kanoneiland

Priorities identified by the community for Kai !Garib Municipality include: (ward public participation processes: 2006)

- Tourism, i.e. eco-tourism, agri-tourism & community tourism along the river

- Existing infrastructure, i.e. basic services and roads
- Youth i.e. economically, socially
- Agriculture, i.e. emerging farmers, cultivation of crops
- Apprenticeship & existing skills
- Churches and social organizations
- Informal business

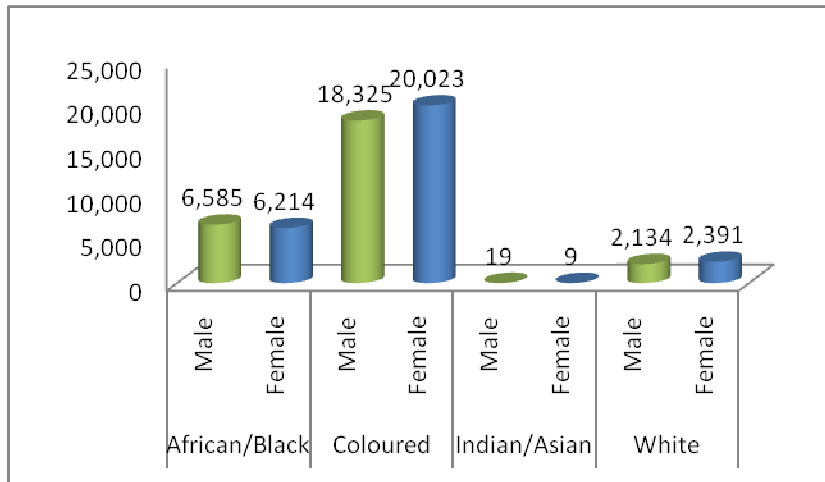
The Municipal Area of Kai !Garib is situated along the Orange River. The Orange River, contrasted with semi-desert sandy plains and hills, is the biggest economic driving force providing impetus to agriculture in the Orange River Basin. Kai !Garib Municipality is situated between the 20°00' EL (eastern longitude) and 21° 30' EL as well as between the 28°20'SL (southern latitude) and 29°30' SL and is bordered by the Municipal Boundaries of //Khara Hais Municipality (in which Upington is located) in the Northeast and Namibia in the Northwest.

The Municipal Area falls within the Siyanda District Municipality's Area and covers an area of 7449km². The Municipal Area consists of 3 large towns, i.e. Keimoes, Kenhardt and Kakamas. In between these towns, 6 former settlements are found, previously administrated by the "Benede-Oranje" District Council. Kakamas and Keimoes are situated in the midst of an intensive Irrigation Farming Community stretching from Groblershoop in the east up to Blouputs in the west.

2.3.1 Population

The total population of Kai !Garib Municipality was 55 700 and currently there is an estimated ± 17389 households in the area serviced by the Municipality (Statistics South Africa, Community Survey, 2007). In 2001 there were 2 284 households in Kakamas with an average household size of four persons. Thus the population of Kakamas numbered 7 309 people in 2001, constituting thirteen percent (13%) of the population of the Kai !Garib. (Statistics South Africa, 2001).

Fifty percent ($\pm 50\%$) of the population in the municipal area is male and fifty percent ($\pm 50\%$) is female whilst there are more women (53%) than men (47%) in Kakamas. Sixty nine percent (69%) of the population in the municipal area is Coloured, twenty three percent (23%) African and eight percent (8%) White.



Graph 1: Population per race category, Kai !Garib Municipality (Census: 2001)

2.3.2 Age Distribution

Table 2 provides a breakdown of the age categories of the Kai !Garib municipal area. Sixty seven percent (67%) of the community is of employable age whilst approximately twenty eight percent (28%) can be defined as children and youth at school and five percent (5%) are 65 years and older in the Municipal area. This means that persons of employable age are double in number than person of non-employable. Thus the dependency ratio is 1:2 (for each dependent person there are two employable persons). Sixty percent (60%) of the Kakamas community is employable which means that for every 2 person working there is one dependant.

Fifty seven percent (56.8% or 21 599 persons) of the persons in the employable category in the municipal area falls also within the youth category (15 – 35), which implies potential economic growth. In the case of Kakamas fifty seven percent (57% or 2 463 persons) of the persons in the employable category falls within the youth category. According to the Statistics South Africa’s Community Survey, the youth

category (15 – 49) constituted fifty seven percent (56.5% or 31 404¹ persons) of the total population of the municipal area, not only the employable population.

| Age Cohort | Kai !Garib | | Kakamas | |
|------------|------------|--------|---------|--------|
| | Male | Female | Male | Female |
| 0 – 4 | 2 694 | 2 595 | 425 | 390 |
| 5-9 | 2 527 | 2 600 | 386 | 403 |
| 10-14 | 2 567 | 2 543 | 439 | 443 |
| 15 – 19 | 2 835 | 3 047 | 470 | 482 |
| 20 – 24 | 2 842 | 2 923 | 259 | 291 |
| 25 – 29 | 2 738 | 2 778 | 240 | 273 |
| 30 – 34 | 2 232 | 2 204 | 222 | 226 |
| 35 – 39 | 1 856 | 2 027 | 194 | 237 |
| 40 – 44 | 1 679 | 1 847 | 208 | 232 |
| 45 – 49 | 1 300 | 1 467 | 170 | 212 |
| 50 – 54 | 1 008 | 1 272 | 108 | 168 |
| 55 – 59 | 772 | 879 | 94 | 100 |
| 60 – 64 | 714 | 725 | 83 | 111 |
| 65 – 69 | 535 | 621 | 60 | 95 |
| 70 – 74 | 323 | 452 | 45 | 82 |
| 75 – 79 | 218 | 306 | 23 | 36 |
| 80 – 84 | 131 | 210 | 13 | 43 |
| 85+ | 92 | 141 | 17 | 26 |

Table 1: Age distribution: Kai !Garib and Kakamas population; Census 2001

2.3.3 Education levels

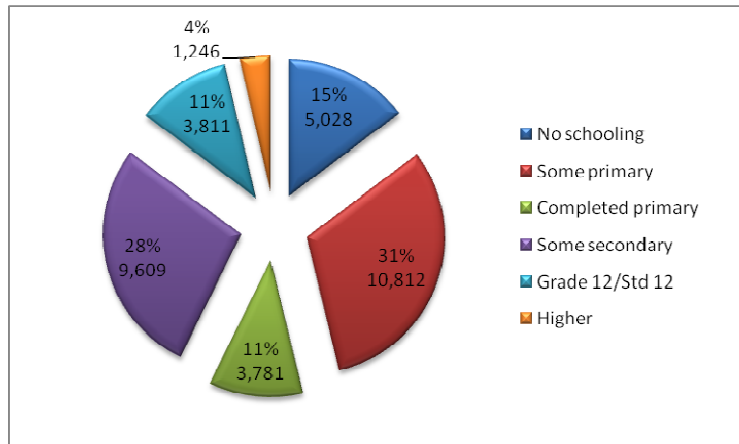
Challenges relating to schooling in the Kai !Garib municipal area is as follows:

- Travelling distances between communities and schools, particularly to high school.
- Availability of good quality sport and recreational facilities at the smaller schools.
- Lack of teachers and classrooms for the number of pupils.

The impact these challenges have, are found in the educational levels of the Kai !Garib community as per Graph 2. According to the 2001 Census data, fifteen percent (15%) of the community has had no education whilst fifteen percent (15%) has Grade 12 and higher education. The remaining seventy percent (70%) has had less than 12 years of

¹ As per Kai !Garib IDP, 2008/2009.

schooling and are numerate and literate, whilst twenty eight (28%) of the 70% has achieved at least nine (9) years of education. A Grade 9 qualification equals functional literacy and numeracy. An estimated 28% of the population of Kai !Garib Municipality is thus functionally literate and numerate.



Graph 2: Education Level of Kai !Garib: Census 2001

The Census 2001 data reflects that four percent (4%) of the employable Kai !Garib population is highly skilled, whilst fifty seven percent (57%) is unskilled and thirty nine percent (39 %) are semi-skilled i.e. tradesmen and crafts.

2.4. Economic Context

The economic context and growth profile of the Kai !Garib Municipality is discussed according to its economic structure, employment trends and levels of income. Where possible the information was delineated for Kakamas in particular.

2.4.1 Economic Structure

Economic structure is a function of the sum total of all economic activities within the geo-political boundaries of the area. In South Africa, the Standardised Industrial Classification (SIC) (Annexure C) is applied to compare industries and industrial activities associated with each main sector. The main categories of the South African Standard Classification of all Economic Activities of 1993 have nine (9) sectors and are as follows (CSS, 1993:3): Agriculture, Utilities (Electricity and Water), Transport, storage

& communication, Mining and Quarrying, Construction, Financial, Real Estate & Business Services, Manufacturing, Trade and Social & Community Services.

The above classification of all of the economic activities enables a comparative analysis of different economic sectors.

2.4.2 Sector Growth Profile

The Northern Cape contributed 2% and 2.2% in 2002 and 2007 respectively to the Gross Domestic Product (GDP), the lowest contribution of the nine provinces. The economy of Northern Cape is heavily dependent on the primary sectors of the economy, which in 2002 made up 31.0% of GDP. The largest sector is mining which contributed 23.7% in 2002 to the GDP, followed by Agriculture which contributed 7.3%. A limited amount of processing of the primary commodity output in mining and agriculture takes place in the Northern Cape as manufacturing contributes only 4.2% towards GDP. All the industries in the secondary sector have decreased including the electricity and water sector.

The industries in the tertiary sector have all increased in their contribution to the regional GDP except for the wholesale and retail industry that has shown a decrease of 1.1% during the 1996 to 2002 period.

| Constant 1995 prices: R'000 000 | 1996 | Percentage(%) | 2002 | Percentage(%) |
|--|-------------|---------------|-------------|---------------|
| Primary Industries | 3748 | 32.0 | 3900 | 31.0 |
| Agriculture, forestry and fishing | 725 | 6.2 | 921 | 7.3 |
| Mining and quarrying | 3023 | 25.8 | 2979 | 23.7 |
| Secondary Industries | 1308 | 11.2 | 1269 | 10.1 |
| Manufacturing | 514 | 4.4 | 532 | 4.2 |
| Electricity and Water | 545 | 4.7 | 502 | 4.0 |
| Construction | 249 | 2.1 | 235 | 1.9 |
| Tertiary Industries | 6655 | 56.8 | 7406 | 58.9 |
| Wholesale and retail trade, hotel and restaurant | 1359 | 11.6 | 1320 | 10.5 |
| Transport, storage and communication | 1382 | 11.8 | 1611 | 12.8 |
| Finance, real estate and business services | 1438 | 12.3 | 1717 | 13.7 |
| Community, social and other personal services | 908 | 7.8 | 1031 | 8.2 |

Table 2: Percentage contribution of various economic sectors to GDP, Northern Cape

The proportional contribution of the various sectors to the Kai !Garib economy was calculated using constant prices². Mining and quarrying is the main economic sector contributor (23.7%) and appears to be declining. Finance, Real estate and Business services follows with a fourteen percent contribution (13.7%), followed by Transport, storage and communications with a thirteen percent (12.8%) contribution whilst Wholesale, Retail and Trade contribute, eleven percent (11%) and Community and social service contribute eight percent (8.2%). Agriculture is ranked as the sixth biggest contributor (7.3%) with extensive potential for economic growth, i.e. agri-tourism. Commercial farmers farm with export grapes, raisins and wine, whilst the commercial and emerging farm with small livestock. Several abattoirs are located in Keimoes, Kehart and Kakamas.

The Manufacturing and Wholesale and Retail sectors have the potential to grow and contribute to the local economy of Kai !Garib Municipal Area. Requests to buy land for agricultural industrial development have increased. The planned transport infrastructure in the area makes several towns well positioned to deal with industrial development and should be regarded as one of the area's comparative advantage.

The tourism sector is a growing sector and previously disadvantaged individuals (PDI) should be involved in offering opportunities, not only as labourers.

The tress³ index for the Northern Cape is 53.8, which indicates dependence on a few economic activities and in particular mining, agriculture, government and service. There is a need to explore increased contributions by other economic sectors.

The following section provides trends in employment levels in the Kai !Garib Municipality.

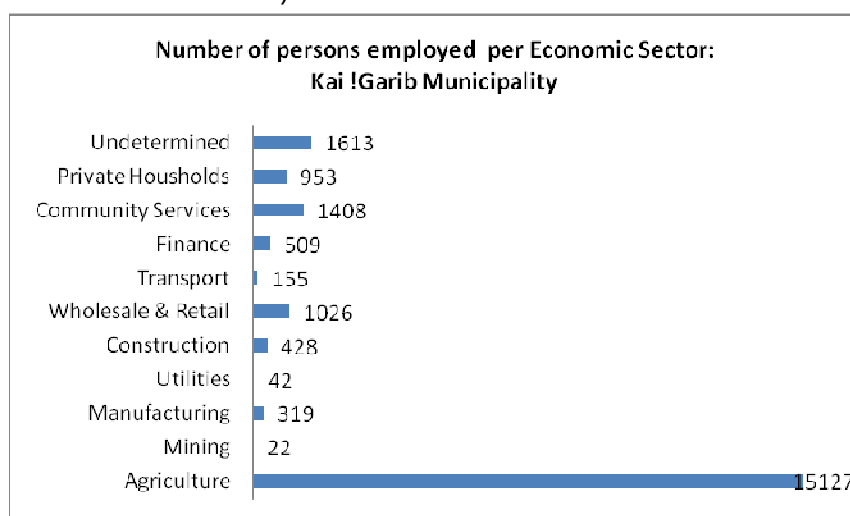
² The value of goods and services this year valued at 1995 prices.

³ The tress index measures the levels of diversification or concentration of the region's economy. A tress index of 0 indicates a totally diversified economy while an index closer to 100 indicates a concentrated economy. The latter is vulnerable to exogenous shocks, such as the international business cycle (e.g. price fluctuations) and adverse climatic conditions (e.g. droughts).
Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility Socio- Economic Impact Assessment May 2011

2.4.3 Sector Employment

The table reveals the sectors of relative importance in providing employment in 2007 (Community Survey, Statistics SA).

The highest number of persons (28.4%, 2001) are employed in Agriculture, Forestry and Fishing (ranked as the sixth biggest economic contributor in the Kai !Garib) followed by 19.8% (2001) in Community Services (ranked as the fifth biggest economic contributor in Kai !Garib), 12.7% in Whole Sale and Retail (ranked as the fourth biggest economic contributor in Kai !Garib) and 11.4% Private Households.



Graph 3: Number of persons employed per Economic Sector, Kai !Garib Municipality

Data from Census 2001 indicates that of those that are formally employed, the primary sector employs 36.4% and the secondary sector employs 10.8%. The largest employer is the agricultural sector, showing a 3.6% increase in the number of people being employed and the lowest being the energy sector employing 0.7% of those formally employed.

| Sectors | 1996 | Percentage of person employed(%) | 2001 | Percentage of persons employed(%) |
|-----------------------------------|-------|----------------------------------|-------|-----------------------------------|
| Primary Industries | | | | |
| Agriculture, forestry and fishing | 48646 | 24.8 | 55016 | 28.4 |
| Mining and quarrying | 18556 | 9.5 | 15493 | 8.0 |
| Secondary Industries | | | | |
| Manufacturing | 8812 | 4.5 | 10596 | 5.5 |

| | | | | |
|--|---------------|------|---------------|------|
| Electricity and Water | 2397 | 1.2 | 1385 | 0.7 |
| Construction | 10402 | 5.3 | 8971 | 4.6 |
| Tertiary Industries | | | | |
| Wholesale and retail trade, hotel and restaurant | 23099 | 11.8 | 24671 | 12.7 |
| Transport, storage and communication | 9963 | 5.1 | 6366 | 3.3 |
| Finance, real estate and business services | 7733 | 3.9 | 10989 | 5.7 |
| Community, social and other personal services | 39724 | 20.2 | 38463 | 19.8 |
| Private Households | 26887 | 13.7 | 22028 | 11.4 |
| Total | 196219 | | 193980 | |

Table 3: Percentage of persons employed in various economic sectors, 1996 to 2001, Northern Cape

Of the economically active population in the Northern Cape, 55.5% were employed while 26.1% could not find employment. This unemployment figure is lower than the national figure of 29.5%. A third of the total population is younger than 15 years old and approximately 45% of the potential labour force is younger than 30 years. Unemployment is the highest among the youth with unemployment rates of 54% and 47% in the 15-19 and 20–24 year-old age groups.

In general there has been an improvement in the educational qualifications of the labour force in the Northern Cape. The percentage of people with no formal education has been reduced from 16.7% in 1996 to 14.3% in 2001. There has been an increase in the proportion of the labour force that has a secondary and tertiary education. This would appear to be the result of an increase in access to education since 1994, in particular, amongst new entrants to the labour force.

According to the Integrated Development Plan (2008), the unemployment rate in the Kai !Garib Municipality is 15% which is lower than the unemployment rate for the Northern Cape. The employment participation rate in Kai !Garib is 58%. The labour force (economically active population), drawn from all those aged between 15 and 65 years has grown with 1.3% between 2001 and 2007, whilst the employment opportunities have increased with 1811 opportunities and the unemployed increased with 1584 from 3559 persons in 2001 to 5143 persons in 2007. Hence the unemployment rate increased with 3.5% from 11.5% in 2001 to 15% in 2007.

The employment trends of the total population between 15 and 65 are reflected in the table below.

| | Total population aged 15 -65 | Labour Force Percentage of Total Population | Employed | Unemployed | Unemployment rate (Percentage) |
|-------------|------------------------------|---|----------|------------|--------------------------------|
| 2001 | 55 700 | 64.6 | 27 371 | 3559 | 11.5 |
| 2007 | 55 201 | 65.9 | 29 182 | 5143 | 15.0 |

Table 4: Employment trends: 2001 - 2007

This section dealt with economic sector contributors and the number of people employed in the various economic sectors, the employment participation rate and the unemployment rate. The following section provides an overview of the levels of income and thus spending power of the population in the Kai !Garib Municipal area.

2.4.4 Income levels

The majority of the population of the Kai !Garib Municipal Area earn less than R3500. The income of eighty eight percent (88%) households is below R 3500 per annum whilst 96% and 93% of all persons in Kai !Garib and Kakamas earn less than R3 500 per month.

| Individual Income | Persons | Household Income | Households |
|---------------------|---------|-------------------------|------------|
| No income | 27 206 | No Income | 1241 |
| R 1 - R 400 | 7 444 | R 1 – R 4 800 | 2518 |
| R 401 - R 800 | 15 723 | R 4 801 – R 9 600 | 6519 |
| R 801 - R 1600 | 1 834 | R9 601 - R 19 200 | 3200 |
| R 1601 - R 3200 | 1 542 | R19 201 - R 38 400 | 2388 |
| R 3201 - R 6400 | 1 139 | R38 401 - R 76 800 | 1208 |
| R 6401 - R 12800 | 541 | R76 801 - R153 600 | 562 |
| R 12801 - R 25600 | 161 | R153 601 - R307 200 | 279 |
| R 25601 - R 51200 | 52 | R307 201 - R614 40 | 69 |
| R 51201 - R 102400 | 31 | R614 401 - R1 228 800 | 36 |
| R 102401 - R 204800 | 17 | R1 228 801 - R2 457 600 | 22 |
| R 204801 or more | 11 | R2 457 601 and more | 8 |

Table 5: Individual and Household income, Kai !Garib Municipality, 2001

According to Census 2001, forty nine (49%) of the Kai !Garib populations has no income, forty two percent (42%) receive an income of less than R1600 per month, forty-eight percent(48%) (including the 42% earning less than R1600 per month) receive and income of less than R3 200 per month, three percent (3%) receive and income of

R3201 to R6400, whilst two one percent (2%) receive an income of more than R6400 per month.

According to the Community Survey, 2007, forty seven percent (46.5%) or 25 822 persons are dependent on government grants or pensions, implying that these persons earn less than R 1800 per month. Fifty two percent (52%) of the grants is child support grants. This tendency in itself has a negative influence on the payment of services. In total 2706 households are subsidized by the services subsidy scheme

| | No income | Less than R1 600/ R 1800 | Less than R3 200/ R3 500 | Between R3201 – R6400/ R 3500 – R7000 | R6 400/ R7 000 and more |
|-----------------|-----------|--------------------------|--------------------------|---------------------------------------|-------------------------|
| 2001 | 49% | 45% | 48% | 2% | 1% |
| 2007 | 34% | 46.5% | | | |
| % change | -15% | 1.5% | | | |

Table 6: Income variation trends: 2001 – 2007 (Census 2001 and Statistics South Africa's Community Survey 2007)

For those earning less than R 3000 per month the average monthly travelling expenses is R209 and account for at least 7% of the income earned (Department of Transport. 2005).

Four percent (4%) of the head of households are self-employed or are an employer. Thus the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility presents the opportunity to enhance Small Medium and Macro Enterprises in the Kakamas area.

| Kai! Garib Local Municipality: Work status of head of household | |
|--|--------|
| Paid employee | 10 759 |
| Paid family worker | 1 392 |
| Self-employed | 485 |
| Employer | 165 |
| Unpaid family worker | 17 |
| Not applicable | 5 230 |

Table 7: Work status of head of household; Kai !Garib Municipality, 2001

2.4.5 Health

Although there are facilities, there is not sufficient and qualified staff, equipment or medicine. Limited skills amongst current nurses and nursing sisters prohibit correct diagnosis and prescriptions. Mobile clinics fail to render regular and sufficient service.

The health challenges are the increase of HIV/AIDS (8.5 % HIV prevalence) and Tuberculoses as well as a high rate of teenage pregnancies. Several youngsters are not completing school and together with high levels of unemployment, drug and alcohol abuse and crimes related to drug and alcohol increase.

2.4.6 Crime

Ward 3 has a police station in Kakamas. Since 2006, crime has increased with 4%.

2.5 Municipal Service levels

According to the Integrated Development Plan, there is a lack of proper housing. The housing backlog will be addressed jointly by Siyanda District Municipality and Kai !Garib Municipality. The target is to reduce the backlog with fifty percent (50%) by 2012 or with 264 houses per annum. Furthermore 300 erven per annum will be developed in Kai !Garib over the next 5 years.

The Integrated Development Plan further aims that by 2012 all Kai !Garib households have access to basic water services, basic sanitation, electricity and refuse removal service.

The provision of municipal services, taking into consideration housing, water, sewerage, electricity, telephone, refuse, roads and mode of transport will be discussed.

Thirty four percent (34% or 453 households) of the 1340 households pay their rates and taxes regularly whilst thirty three percent (33% or 443 households) registered for a monthly subsidy of R116.74 per month.

2.5.1 Housing

A backlog of 2 640 low cost houses exists in the Kai !Garib Municipality (2009).

Eighty seven percent (87%) of the inhabitants of Kai !Garib live in formal structures that can accommodate at least another two generations of their families. Three percent (3%) persons live in back yards. However, given the backlog, Public-Private Partnerships are regarded as the most viable option to address the future need.

| Kai! Garib Local Municipality: Housing Type | |
|--|-------|
| House or brick structure on a separate stand or yard | 9 959 |
| Traditional dwelling/hut/structure made of traditional materials | 446 |
| Flat in block of flats | 392 |
| Town/cluster/semi-detached house (simplex; duplex; triplex) | 956 |
| House/flat/room in back yard | 209 |
| Informal dwelling/shack in back yard | 143 |
| Informal dwelling/shack NOT in back yard | 710 |
| Room/flatlet not in back yard but on shared property | 97 |
| Caravan or tent | 51 |
| Private ship/boat | 0 |
| Not applicable (institution) | 5 087 |

Table 8: Housing type, Kai !Garib Municipality

2.5.2 Water

Thirty five percent (35%) households have easy and convenient access to clean potable water inside their dwellings. Forty Eight percent (48%) of households has access to piped water on the erf whilst another eight percent (8%) has access to water at a community stand that is 200m or closer to their dwelling.

| Kai! Garib Local Municipality: Access to piped water | |
|--|-------|
| No access to piped (tap) water | 1 264 |
| Piped (tap) water to community stand: distance greater than 200m from dwelling | 472 |
| Piped (tap) water to community stand: distance less than 200m from dwelling | 1 372 |
| Piped (tap) water inside yard | 8 598 |
| Piped (tap) water inside dwelling | 6 345 |
| Not applicable | 0 |

Table 9: Access to piped water, Kai !Garib Municipality, 2001

2.5.3 Sewerage

Sixty four percent (64%) of the households in the Kai !Garib Municipality has flush toilets either connected to a sewerage system or a septic tank. Five percent (5%) of households still have the bucket latrine system which needs to be eradicated.

| Kai! Garib Local Municipality: Toilet facilities | |
|---|-------|
| Flush toilet (connected to sewerage system) | 9 040 |
| Flush toilet (with septic tank) | 2 459 |
| Chemical toilet | 71 |
| Pit latrine with ventilation (VIP) | 941 |
| Pit latrine without ventilation | 2 081 |
| Bucket latrine | 821 |
| None | 2 637 |

Table 10: Toilet facilities, Kai !Garib Municipality, 2001

Kai !Garib Municipality is in the process to replace the bucket system.

2.5.4 Electricity

Sixty nine percent (69%) of households in the Kai !Garib municipality has access to electricity or gas, whilst thirty one percent (31%) use paraffin or wood for cooking.

| Kai! Garib Local Municipality: Energy sources for cooking | |
|--|--------|
| Electricity | 11 678 |
| Gas | 793 |
| Paraffin | 1 034 |
| Wood | 4 450 |
| Coal | 42 |
| Animal dung | 18 |
| Solar | 16 |
| Other | 18 |

Table 11: Energy sources, Kai !Garib Municipality, 2001

2.5.5 Refuse

Forty one percent (41%) of households in Kai !Garib's refuse is removed weekly, whilst seven percent (7%) of households' refuse is remove less frequently. Six percent (6%) has access to a communal refuse dump, whilst forty four percent (44%) has their own refuse dump.

| Kai! Garib Local Municipality: Refuse removal | |
|--|-------|
| Removed by local authority at least once a week | 7 327 |
| Removed by local authority less often | 1 239 |
| Communal refuse dump | 1 021 |
| Own refuse dump | 7 991 |
| No rubbish disposal | 473 |

Table 12: Refuse Removal, Kai !Garib Municipality, 2001

2.5.6 Telephone

Twenty four percent (24%) of the households in Kai !Garib Municipal area has access to a cell phone or telephone whilst sixty nine percent (69%) has access to a phone of a neighbour, public telephone or phone at a location nearby. The majority of the population does not have access to communication networks.

| Kai! Garib Local Municipality: Access to telephone | |
|---|--------|
| Telephone in dwelling and cell-phone | 1 277 |
| Telephone in dwelling only | 1 803 |
| Cell-phone only | 1 212 |
| At a neighbour nearby | 1 677 |
| At a public telephone nearby | 10 316 |
| At another location nearby | 534 |
| At another location; not nearby | 461 |
| No access to a telephone | 743 |
| Not applicable (institutions) | 27 |

Table 13: Access to telephones, Kai !Garib Municipality, 2001

2.5.7 Amenities

The community lacks sport and recreational facility with easy access for all communities in the Kai !Garib Municipality.

2.5.8 Roads

The upgrading of roads has been identified as an Integrated Development Plan priority. The road concerned in this proposed Keren Kakamas (Pty) Ltd Photovoltaic Energy Generation project is the N14. There is no need to upgrade the specific road.

Two of the four transport corridors should be noted:

- Orange River corridor (from Springbok through Upington to Kimberley (and the Free State and Gauteng));
- Karoo corridor (linking Namibia to Upington, passing through De Aar to the Eastern Cape) links the major economic centers in the province.

The focus is on the construction of access roads along the N14 from Keimoes to Upington and N10 from Upington to Glogershoop. These roads will cross Kai !Garib, Kheis and //Khara Hais Municipalities.

2.5.8. Mode of Transport

Thirty six percent (36%) of the population travel on foot, ten percent (10%) by car and one percent (1%) by public transport.

| Kai! Garib Local Municipality: Mode of travelling | |
|--|--------|
| On foot | 20 043 |
| By bicycle | 290 |
| By motorcycle | 56 |
| By car as a driver | 1 843 |
| By car as a passenger | 3 877 |
| By minibus / taxi | 555 |
| By bus | 2 332 |
| By train | 47 |
| Other | 2 857 |
| Not applicable | 23 801 |

Table 14: Modes of travel, Kai !Garib Municipality, 2001

2.6 Summary

The demographics and municipal services of the Kai !Garib Municipality can be summarized as follows.

Employability:

- Kai !Garib has a relatively young population with a 2:1 employable dependent ratio.
- The unemployment rate in the Kai !Garib is 15% in comparison with 22% in Kakamas;
- The majority (96%) of the workforce of Kai !Garib is employed in unskilled and semi-skilled positions.
- 15% of the Kai !Garib population has no schooling, 70% of the population has less than 12 years of schooling of which 28% had at least nine (9) years of education and are functionally literate and numerate in comparison with 10%, 76% and 19% in the case of Kakamas. 15% of the Kai !Garib population has a qualification equal to matric or higher whilst 14% of the population has in Kakamas.
- The majority of people work in agriculture, fishing and forestry, followed by community services.

- Proper construction/building/transport and tourism related skills are limited.

Demographics:

- There are 7 309 people living in Kakamas constituting thirteen percent (13%) of the population of the Kai !Garib.
- 47% of the Kakamas population is male whilst 53% of the population is female.
- 69% of the Kai !Garib population is coloured, 23% African and 8% White.
- More than 80% of the Kai !Garib population is Afrikaans speaking whilst 99% of the Kakamas population speaks Afrikaans.
- 70% of the Kai !Garib population had < 12 years of schooling, of which 15% has no schooling and 15% had 12 and more years of schooling in comparison with 76%, 10% and 14% of the Kakamas population respectively.
- 4% of the employable Kai !Garib population is highly skilled, whilst 57% is unskilled and thirty nine percent 39 % are semi-skilled i.e. tradesmen and crafts.
- 67% of the Kai !Garib population is of employable age whilst ± 28% can be defined as children and youth at school. 5% is retired. 60% of the Kakamas population is employable.

Economics:

- Northern Cape contributes 2 % of the national GDP.
- The economy of the Kai !Garib is dominated by Mining and quarrying (23.7%) followed by Finance, Real Estate and Business services (13.7%) and Transport, storage, communications (12.8%), Wholesale, retail, trade (11%), Community Service (8.2%) and Agriculture (7.3%).
- The highest number of persons (28.4%, 2001) are employed in Agriculture, Forestry and Fishing (ranked as the sixth biggest economic contributor in the Kai !Garib) followed by 19.8% (2001) in Community Services (ranked as the fifth biggest economic contributor in Kai !Garib), 12.7% in Whole Sale and Retail (ranked as the fourth biggest economic contributor in Kai !Garib) and 11.4% Private Households.

- 88% of the all Kai !Garib households earn R 3 500 or less whilst 96% and 93% of all persons in Kai !Garib and Kakamas earn less than R3 500 per month.
- The rate of job creation grows proportionally slower at 1.4% whilst the unemployment rate grows by 3.5% in the Kai !Garib.
- 36% of the Kai !Garib population travel on foot, 10% by car and 1% by public transport in comparison with 69%, 17% and 5% Kakamas households respectively.

Housing and Infrastructure:

- Kai !Garib has an estimated backlog of 2 640 houses according to the IDP.
- 87% of the inhabitants of the Kai !Garib live in formal structures in comparison with 92% households in Kakamas.
- 48% of the households in Kai !Garib have piped water.
- 64% of the households have flush toilets in comparison with 98% households in Kakamas (Census 2001).
- 69% of the Kai !Garib households have access to electricity or gas to cook in comparison with 89% households in Kakamas.
- 24% of the households have access to telephone or cell-phone.
- 41% of Kai !Garib households' refuse are removed weekly in comparison with 98% in Kakamas.

Whilst 60% of the population of Kakamas is of employable age, a third of the population falls into the youth category. The majority of the population has low skills levels and are employed in un- and semi-skilled jobs mainly Agriculture, Forestry and Fishing. The population of Kakamas representing 17% of the Northern Cape population of whom 88% households earns R3500 per month or less. In Kakamas there are 93% households earning R3 500 and less. The Northern Cape contributes approximately 2% of the National GDP. The Housing backlog (2 640) in the Municipality represents 15% of the households in the Kai !Garib municipality and is higher than the number of household (2 349) in Kakamas. Well over 80% of households in Kakamas receive services from the local Authority.

. Chapter 3:

Impacts identified during the Construction Phase

The chapter first provides a description of the assessment of the impact according to sever assessment measures. The impacts occurring during the Construction Phase is then assessed.

3.1 Assessment

The assessment starts with a description of the nature of the impact. This appraisal describes the type of effect the activity would have on the affected environment. This description should include what is being effected and how.

3.1.1 Extent (A)

This assessment measures of the geographical scale of the impact

| Extent of the Impact | | |
|----------------------|---|-------|
| Rating | Definition of rating | Score |
| Local | Extending only as far as the activity, Will be limited to the site and its immediate surroundings | 1 |
| Regional | Will have an impact on the region | 2 |
| National | Will have an impact on a national scale | 3 |
| International | Will have an impact across international borders | 4 |

The extent of some of the impact is considered mainly local whilst some impacts are regional, national or international

3.1.2 Duration (B)

This assessment measure indicates the lifetime of the impact.

| Duration of the Impact | | |
|------------------------|---|-------|
| Rating | Definition of rating | Score |
| Short term | 0-5 years | 1 |
| Medium term | e.g. 5-15 years | 2 |
| Long term | The impact will cease after the operational life of the activity, either because of natural process or by human intervention. | 3 |
| Permanent | Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient | 4 |

The duration of some of the impacts during construction is considered mainly short term, whilst the duration of the impacts during the operational phase is considered long term.

3.1.3 Intensity (C)

Here it should be established whether the impact is destructive or benign and should be indicated as:

| Intensity of the Impact | | |
|--------------------------------|---|----------------|
| Rating | Definition of rating | Score |
| Low | The impact affects the environment in such a way that natural, cultural and social functions and processes are not affected | 1 (+/-) |
| Medium | The affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and | 2 (+/-) |
| High | Natural, cultural or social functions or processes are altered to the extent that it will temporarily or permanently cease. | 3 (+/-) |

The intensity of some of the impacts of the proposed project varies. In the case of the proposed project the criteria was customize and refined to their particular study (e.g. a positive impact of “high” significance is when the project could reduce local employment by 5% or more).

3.1.4 Probability (D)

This should describe the likelihood of the impact actually occurring indicated as:

| Probability of the Impact | | |
|----------------------------------|---|--------------|
| Rating | Definition of rating | Score |
| Improbable | The possibility of the impact to materialize is very low either because of design or historic experience; | 1 |
| Probable | There is a distinct possibility that the impact will occur; | 2 |
| Highly probable | It is most likely that the impact will occur, | 3 |
| Definite | The impact will occur regardless of any prevention measures | 4 |

3.1.5 Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability and be described as:

| Significance of the Impact: (F)= (A*B*D+E)*C | | | |
|---|--|---------------|-----------|
| Rating | Definition of rating | Score | |
| Low | Where it will not have an influence on the decision; | 0 to - 40 | 0 to 40 |
| Medium | Where it should have an influence on the decision unless it is mitigated; | - 41 to - 80 | 41 to 80 |
| High | Where it would influence the decision regardless of any possible mitigation. | - 81 to - 120 | 81 to 120 |
| Very High | Where it would influence the decision regardless of any possible mitigation. | > - 120 | > 120 |

The above significance bands have been determined through calculating a maximum potential score of 156 (e.g. positive or negative) applying the above criteria. This was then subdivided into broad bands as indicated above to provide a comparative assessment of all impacts in relation to the maximum possible significance score.

The overall status of the impact (after mitigation) for the preferred alternative are also assessed applying the above criteria.

Impacts that change with a similar or nearly similar score from negative to positive or vice versa are viewed as neutralised. Impacts scoring negative and, after mitigation, become less intensity, but still negative, and more unlikely (or the negative score decreased) are also viewed as neutralised.

The above rating scales were applied to assess the impacts during the construction and operational phase.

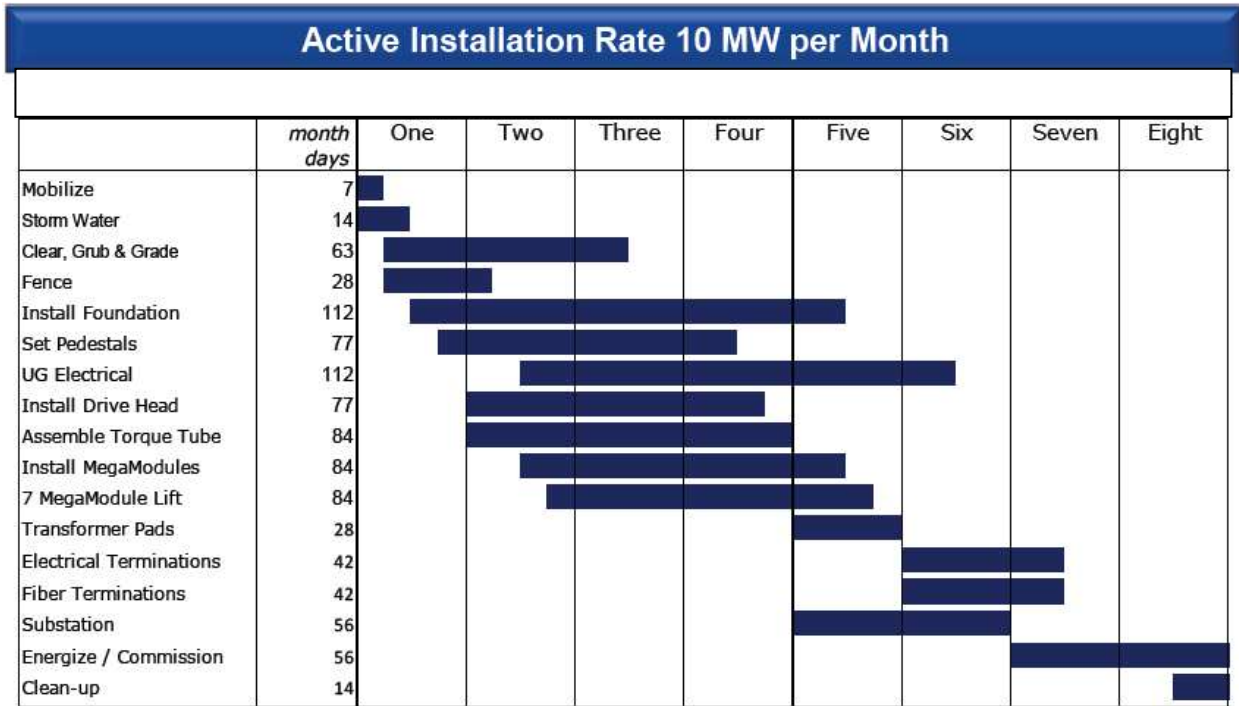
3.2 Impacts identified during the Construction Phase

The construction phase will include the following broad activities:

| Activity | Skills required |
|--|---|
| 1. Prepare site | Fencing, surveying, grading and construction |
| 2. Excavate and Install a pedestal | Excavation, trenching, cable laying, concrete work, mechanical and electrical assembly of connections with substation, steelwork assembly, casting and erection of tower. |
| 3. Install drive head onto pedestal | Operating a crane & fixing drive head on pedestal |
| 4. Add service cage to pedestal | Operating a crane & fixing service cage to pedestal |
| 5. Lift Mega module into place | Operating a crane by crane & fixing mega module. |
| 6. Complete balance of plant including actuators , invertors | Installing line hardware on towers, stringing lines and site rehabilitation |

The site preparation will include surveying foundations and roads, erecting a double fence, grading roads, building a guard house. Approximately 148 support structures will be erected and excavations of 1m² by 5m deep will precede the building of the pedestals. Trenches for underground cabling will be dug. Additional temporary access roads will have to be established on site. The balance of the surface area not carrying infrastructure or equipment will remain natural.

The construction schedule runs over eight months.



The impacts were identified, are assessed and mitigation measures are suggested in the section below.

3.2.1 Increased Jobs

The project will result in an increase of jobs as 30 persons will be employed over a period of 6 – 8 months. The majority of people in the Northern Cape work in agriculture, fishing and forestry, followed by Community Services. Construction, building and transport related skills are limited, whilst 57% and 39% of the population is unskilled and semi-skilled respectively. Therefore others may be employed to do the work. However, 22% of employable population of Kakamas, is unemployed.

Approximately twenty three (23) of these jobs will fall in the unskilled and semi-skilled categories. These jobs include, but are not limited to site clearing, fencing, general construction work (boxing, concrete mixing and casting), digging trenches, creation of fire breaks and operating the construction vehicles.

| No of jobs: Direct : Indirect | Duration of contract | Skills levels required | Value of employment opportunities | Involvement of locals |
|--|---------------------------------|---|--|-----------------------------------|
| 30 : 90 | 8 months | 16 unskilled 7 semi skilled 7 skilled | R2 million | Limited, own construction team |

It is likely that some locals will be recruited to do the unskilled and semi-skilled work during the construction phase. Skilled labour (i.e. a project manager (an electrical engineer) and electricians) may be sourced provincially, nationally and internationally.

Should some or all of the unskilled and semi-skilled employment opportunities be granted to locals the competition with “outsiders” to get the work done would be eliminated. The employment of locals would have a short term positive impact on the economic and material well being of the local community as the expected value of employment opportunities over 8 months is ±R2million. Between R800 000 to R900 000 should benefit previously disadvantaged individuals.

However, should only contract workers or outside job seekers be employed, it may have an impact on the community stability and safety. Conflict between locals and outsiders may be experienced given the high unemployment rate in Kai !Garib.

The intensity of the impact on the local population will be measured according to the following scale:

| | Rating | Low | Medium | High |
|------------------------|---------------------------|------------------------|---------------------------|---------------------------|
| Municipal level | Number of jobs (%) | 0-56 (<1%) | 57-281 (<5%) | > 282 (>5%) |
| Provincially | | 0-6195 (<1%) | 6196-12394(<2%) | >12395 (>2%) |

A summary of the impact follows in Table 15 below.

| Impact | Changes to the economic and material well being of the community | | | |
|--|--|---|--------------|---|
| Impact and Nature of Impact | Jobs will be created Due to low skills level (skills imbalances) job seekers may stream into the local area, which in turn may impact on the safety, security and stability of the community. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Short term | 1 | No impact | - |
| Probability of occurrence (C) | Probable | 2 | No impact | - |
| Intensity of Impact(D) | Low, positive | 1 | No impact | - |
| Degree of confidence (E) | High | 3 | No impact | - |
| Level of significance (AxBxD+E)xC | Low, positive | 8 | No impact | - |
| Mitigation measures: | | | | |
| <ul style="list-style-type: none"> Contractors, employing or seeking to employ local HDIs from the region who are suitably qualified, should get preference; The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer; A database of locally based firms, including SMME's owned and run by HDIs that qualify as service providers (construction companies, catering companies, waste collection companies, site cleaning | | | | |

| | | | | |
|--|--|----|---------------|--|
| <p>companies etc) should be compiled by the developer prior to the commencement of the tender process. These firms should be invited to bid for tenders;</p> <ul style="list-style-type: none"> • The developer should, where necessary, assist local HDI owned firms to complete and submit the required tender forms; • Establish a Monitoring Committee for the construction phase in collaboration with representatives of the local community. The Monitoring Committee has to ensure that the EMP is implemented and that any problems that arise and is associated with the construction phase, is addressed. | | | | |
| Level of significance after mitigation | Low (Highly probable (3)) | 12 | No mitigation | |
| Related impacts | <p>Influx of contract workers due to lack of skills Influx of job seekers due to jobs created</p> | | | |

Table 15: Impact of job creation: Construction Phase

The increase in the number of jobs is positive, but the significance of the impact is low as the number of jobs generated is of low intensity (>1% of the employable population between 16 and 65 years of age) for the local municipality and of low intensity for the Northern Cape. However, creating jobs is viewed positive given the challenge of unemployment in the municipality and in the province.

3.2.2 Skills development, training and capacity building

As educational levels of the Kai !Garib Municipality are low (15% has grade 12 and higher qualifications) and the skills levels are low (39% semi-skilled and 59% unskilled), should capacity building and skills development training programmes be implemented, it will benefit the community in the long term. As people get trained their income will increase and their economic and material well-being will improve. Approximately 88% of the households earn less than R3 500 per month. More than ninety percent (96% and 91%) of all persons in Kai !Garib and Kakamas earn less than R3 500 per month.

The majority of people work in agriculture, fishing and forestry, followed by community services. Construction, building and transport related skills are limited.

Obtaining skills will enable community members to find work at future construction projects in the area, municipality and the region. Future projects where employment can be obtained are the building of Breaking New Ground houses, Upington Solar Park

proposed by Eskom and other similar proposal by private individuals, and the establishment of Agri-villages, a government priority since 2011. More of these projects will be proposed and developed given the Northern Cape's Solar Irradiance and climate.

The proposed project model limits the opportunity for locals to receive on the job skill development and training. The perception that skills development opportunities exists, will cause more jobseekers to settle in the Kakamas community. This may cause societal tension and instability particularly if locals do not find work.

A summary of the impact follows in Table 16 below.

| Cumulative Impact | Changes in economic and material well-being | | | |
|---|--|---|--------------|---|
| Impact and Nature of Impact | Skills levels and skills capacity will increase, but not necessarily those of the locals. The newly acquired skills may leave the area as new projects in surrounding areas come into being. Job seekers may join the community and impact on safety and security and the stability of the society. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Short term | 1 | No Impact | - |
| Probability of occurrence (C) | Probable | 2 | No Impact | - |
| Intensity of Impact(D) | Low, positive | 1 | No Impact | - |
| Degree of confidence (E) | Medium | 2 | No Impact | - |
| Level of significance (AxBxD+E)xC | Low | 6 | No Impact | - |
| Mitigation measures: <ul style="list-style-type: none"> • Reserve a number of employment opportunities for local labour. • Facilitate mechanisms to enable locals to access to employment. • The proposed development should enhance formal and informal skill transfer: <ul style="list-style-type: none"> ○ Should skilled persons from outside the community be employed, the developer should consider implementing a training and skills development programme to enhance the opportunities for local historically disadvantaged individuals in the construction and maintenance industry. Measures should be put in place to ensure successful training and development i.e. structured job shadowing and learnerships. Such a programme should be offered in liaison with an accredited Further Education and Training College or University; ○ Some basic skills could be introduced at school level in a joint venture established by the developer between the primary schools in Kakamas and the education and skills training | | | | |

| | | | |
|---|--|---|--|
| <p>providers. In the long term (generationally) the improved skills level will ultimately lead to improved levels of education or</p> <ul style="list-style-type: none"> o An “access to education support service” assisting future students should be considered attending to application fees for bursaries and financial planning and strategies for the period of studying. | | | |
| Level of significance after mitigation | Low (Highly probable (3)) | 9 | |
| Related impacts | Skills drain in the Kai !Garib Municipality. Others are afforded the opportunity to develop their skills. | | |

Table 16: Impact of skills development, training and capacity building: Construction Phase

The skills increase is positive, but the significance of the impact is low as locals may not benefit from it. However, creating skills development opportunities for locals is viewed positive given the challenge of unemployment in the municipality and in the province.

3.2.3 Increase in traffic

During the construction phase, construction vehicles (graders, TLB's, cement trucks and a site crane) would be used. These vehicles would stay onsite and their impact on the road to Kakamas will be minimal. Vehicles transporting goods, materials and equipment would make use of the N14 road mainly. (Hofmeyer road, within Kakamas, will serve as an alternative entrance). Approximately 150 truckloads of materials will be delivered over the first 4-5 months resulting in 7 truckloads per week resulting in 2 trips per day. Construction workers would be accommodated in Kakamas and will be transported in two to three vehicles per day, twice a day resulting in 6 trips per day. An increase in 8 trips per day constitutes low significance. Although the trip frequency is low, the road surface of the gravel road off the N14 may deteriorate and will have to be maintained. Additional temporary access roads will have to be established on site.

The slow moving delivery vehicles (trucks with loads) may impact on the safety of gravel road-N14 intersection. Road signs, erected to address the additional impact of the slow moving vehicles on the intersection, will neutralize this conflict.

A summary of the impact follows in Table 17 below.

| Cumulative Impact | Changes in the living environment |
|------------------------------------|---|
| Impact and nature of Impact | Traffic will increase minimally (8 trips per day). The road infrastructure is capable of accommodating the additional traffic cause by construction vehicles as most of the traffic will be take place on the construction site itself. Vehicles transporting goods will generate 14 trips per week. |

| | | | | |
|--|---|------|--------------|---|
| | <p>The gravel road surface (Turn off from N14) may deteriorate due to the load of the delivery vehicles. This may cause the road to be more unsafe.</p> <p>The intersection with the N14 will be used more frequently and the slow moving delivery vehicles may cause the intersection to be more unsafe. Road signals will have to be upgraded to neutralize the conflict at the intersection.</p> <p>Construction workers will be transported daily generating 6 trips per day.</p> | | | |
| Related impacts | Increased economic opportunity. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | |
| Duration of Impact (B) | Short term | 1 | No impact | |
| Probability of occurrence (C) | Probable | 2 | No impact | |
| Intensity of Impact(D) | Low, negative | 1(-) | No impact | |
| Degree of confidence (E) | High | 3 | No impact | |
| Level of significance (AxBxD+E)xC | Low, negative | 8(-) | No impact | - |
| <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Rehabilitate the gravel road during and particularly after construction to at least the same standard as is currently. • Upgrade road signs to address the movement conflict at the intersection. • Provision should be made for pedestrians to cross any access road. • Road signs for pedestrians and protecting pedestrians should be displayed. • Provide transport to decrease pedestrian traffic. • Restrict heavy vehicles to specific hours. • Road signs signal times when heavy vehicles will make use of the road. | | | | |
| Level of significance after mitigation | Low , positive (Intensity: 1) | 8 | | |
| Related impacts | Minimal increase in pedestrian traffic. | | | |

Table 17: Impact of Traffic: Construction Phase

The intensity of the impact caused by the increase of traffic is low but negative. Mitigation measures will reverse the impact to be of equal positive low significance. Hence the impact has been neutralised. The No Go alternative will have no impact.

3.2.4 Increased use of Municipal and Authority Services

Amenities, such as local hospital and clinic and local doctors and ambulances will be utilized should a construction related accident happens. It is anticipated that there is

sufficient capacity in Kakamas to handle emergencies or to route such emergencies to Upington. Construction related accidents may in the short-term, place additional pressure on the existing emergency facilities. However the likelihood of emergencies occurring, is unlikely as national safety standard will have to be adhering to.

The temporary stay of the construction team may cause future pressure on the clinic due to undesirable sexual behaviour. There will also be a temporary increased in the demand for accommodation i.e. rental housing in Kakamas. The temporary stay of the construction team will not increase the demand for services but will utilise existing services.

A summary of the impact follows in Table 18 below.

| Cumulative Impact | Changes in the living environment | | | |
|--|---|------|---------------|---|
| Impact and Nature of Impact | Demand for services will increase: Hospital and emergency capacity may be required sporadically to cope with any construction accidents. Additional pressure may also be placed on community health services to deal with the consequences of undesirable sexual behaviour in the long term. Temporary accommodation will be required using existing services. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Short term | 1 | No impact | - |
| Probability of occurrence (C) | Highly Probable | 3 | No impact | - |
| Intensity of Impact(D) | Low, negative | 1(-) | No impact | - |
| Degree of confidence (E) | High | 2 | No impact | - |
| Level of significance (AxBxD+E)xC | Low, negative | 3(-) | No impact | - |
| Mitigation Measures <ul style="list-style-type: none"> To adhere to international construction health and safety standards and precaution measures. To provide health and social training amongst the project team and in the community. To make effort to ensure that the project team and their families meet at least monthly. | | | | |
| Level of significance after mitigation | Low (Probability:2, Intensity: 0) | 4 | No mitigation | |
| Related impacts | Long term consequences of undesirable sexual behaviour. | | | |

Table 18: Impact of services demand: Construction Phase

The impact of the temporary construction team on amenities and municipal serves is low, yet the intensity is negative. After mitigation the probability of the impact

happening become less and the intensity decrease. These positive changes slightly outweighed the negative intensity and the impact is being assessed as neutralised. The No Go alternative will have no impact.

3.2.5 Decreased Health and Safety

Dust and noise will be generated during the establishment of the construction site, but only for a limited time. Excavation activities such as for building and infrastructure foundations, trenches for cabling and piping may affect the noise and dust levels for a limited time. After preparation and during the building period noise will be generated by activities such as concrete mixing, building, concrete vibration and steel work, and the installation of services. On-site vehicle movement, delivery of materials and equipment and additional traffic will also create noise. These impacts will be of a local nature (the municipal land, neighbouring industrial sites and institutional uses i.e. waste disposal site and sewerage works) and for a limited period of time.

Irrespective of local or “others” be employed, it is unlikely that in the case of the proposed project crime and trespassing i.e. livestock theft (from neighbouring farms) and littering may increase. This is due to the location and extent of the Erf 16654.

A summary of the impact follows in Table 19 below.

| Cumulative Impact | Changes in the health and social well-being | | | |
|--------------------------------------|---|---|--------------|---|
| Impact and Nature of Impact | <p>Dust and noise may impact on the health of employees, locals and the neighbours but for a short term during the construction period. Dust and noise cause respiratory or psychological illnesses. In the long term it may lead to the depopulation of the area.</p> <p>Dust and noise will occur during the construction period of 8 months, which is short term. Although adjacent to Kakamas, the proposed facility is removed from the town environment. The extent of Erf 1654, Kakamas causes neighbouring farms to be removed from the site. Given the short term nature and location of the site it is unlikely that dust and noise will have a significant impact.</p> <p>Dust and noise suppression can be applied as mitigation measure to maintain the standard of health as from the start of the project.</p> | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Short term | 1 | No impact | - |
| Probability of occurrence (C) | Probable | 2 | No impact | - |

| | | | | |
|--|---|-------|-----------|---|
| Intensity of Impact(D) | Medium, negative | 2(-) | No impact | - |
| Degree of confidence (E) | High | 3 | No impact | - |
| Level of significance (AxBxD+E)xC | Low, negative | 10(-) | No impact | - |
| Mitigation Measures | | | | |
| <ul style="list-style-type: none"> • Dust creation must be controlled as per construction management and control code. • Noise creation should be controlled as per construction management and control code. • Appoint an Environmental Control Officer to supervise construction and building. • Adhere to the Environmental Management Plan (EMP) for the Construction Phase. • All workers and management must undergo an induction course. • All road construction must be limited to the road reserve. • Any natural habitat destroyed by constructing infrastructure should be rehabilitated. • Enforce strict operating hours for heavy vehicles and construction activities on site to reduce noise and dust impacts on adjacent landowners. • Implementation dust suppression measures; • All construction waste and building rubble must be removed off site. • Cut and fill should be kept to a minimum and should be rehabilitated immediately. • Access must be on recognised routes. • Litter and littering must be strictly controlled. | | | | |
| Level of significance after mitigation | Low, negative (Unlikely:1; Intensity: 1(-)) | 2(-) | | |
| Related impacts | - | | | |

Table 19: Impact of dust and noise: Construction Phase

The intensity of the impact of dust and noise is medium negative and the significance low as the impact occurs over a short period of time. Mitigation will neutralize the impact as the intensity decreases, but are still negative and likelihood of the impact to occur becomes less.

The occurrence of increase crime, trespassing and stock theft is unlikely given the location of the proposed project and the mitigation measures should be adhered to.

The No Go alternative has no impact.

3.2.6 Increased Sales

During the construction phase, the general building materials, such as stone, cement, bricks and fuel will be purchased locally. Domestic purchases, such as groceries, liquor

and restaurant services will also be bought in Kakamas and the surroundings. This will cause the sales volumes (direct and indirect) to increase. The panels and related equipment will be purchased internationally. The impact thereof is not assessed. The assessment focused on the regional GDP.

The capital expenditure on completion is R308.8 million. The capital expenditure locally (in Northern Cape and South Africa) is estimated as R161million.

The increase in sales volume is as follows:

| Sales Volume | Preferred Option | No Go |
|----------------------------|-------------------------|--------------|
| Direct Sales('000 000) | 212 | 0 |
| Indirect Sales ('000 000) | 392 | 0 |
| Total Sales ('000 000) | 604 | 0 |
| % increase in Sales Volume | <1 | 0 |

Sales will benefit the province but to a lesser extent the municipality of Kakamas. As Kakamas is a small rural town, people may tend to go shopping or purchase services and stock in bigger centres such as Upington. This would lead to the dilution of sales in Kakamas lost to the region. Sales will contribute to the GGP of the region. Effort should be made to keep the sales in the region (Northern Cape) and not to lose these sales to the country. Appropriate mitigation measures should be explored.

Intensity will be measured according to the following scale:

| Rating | Low | Medium | High |
|---------------------------------|----------------|------------------|----------------|
| % change to Sales output | <10% | 10% - 50% | >50% |

A summary of the impact follows in Table 20 below.

| Cumulative Impact | Changes in the economic and material well-being | | | |
|--------------------------------------|--|--------------|-----------|---|
| Nature of Impact | Sales volume will increase. Direct and indirect sales volume will increase and it is highly likely that sales will be diluted to the benefit of the region. | | | |
| ALTERNATIVES | Preferred | No Go | | |
| Extent of impact (A) | Local-Regional | 2 | No impact | - |
| Duration of Impact (B) | Short term | 1 | No impact | - |
| Probability of occurrence (C) | Probable | 2 | No impact | - |
| Intensity of Impact(D) | Low, positive | 1 | No impact | - |
| Degree of confidence (E) | Medium | 2 | No impact | - |

| | | | | |
|---|---------------------------|----|---------------|---|
| Level of significance (AxBxD+E)xC | Low | 8 | No impact | - |
| Mitigation Measures <ul style="list-style-type: none"> Contractors should be directed by tender criteria to purchase locally and to make use of local service providers. Spending money locally should benefit employees. The proposed development should leverage discount in the local economy of the municipal area. Small business should be supported (i.e. skills training, assistance and guidance to set up small businesses) and joint ventures with previous disadvantaged persons should be promoted. The promotion of joint ventures between small business (owned by previous disadvantaged persons) and more established business should be encouraged. | | | | |
| Level of significance after mitigation | Low (Highly probable (3)) | 12 | No mitigation | |
| Related impacts | None. | | | |

Table 20: Impact of Sales: Construction Phase

The impact of sales is low, as the increase in sales is less than 1% of the national sales but positive. Mitigation measures will prohibit sales to be diluted to the benefit of the country. Mitigation measures will be directed towards the provincial economy, yet the impact will stay low. The No Go alternative has no impact.

3.2.7 Increased GGP

The increase in sales volume will contribute to the GGP of the province. The impact during the construction phase will not be significant enough to change the leading economic contributor to the Northern Cape GGP. The contribution to the GGP is as follows:

| GGP | Preferred Option | No Go |
|-----------------------------------|------------------|-------|
| Direct GGP ('000 000) | 32 | 0 |
| Indirect GGP ('000 000) | 182.5 | 0 |
| Total GGP Contribution ('000 000) | 214.5 | 0 |
| % change in GGP | <1% | 0 |

Intensity will be measured according to the following scale:

| Rating | Low | Medium | High |
|------------------------|------|-----------|------|
| % change to GGP output | <10% | 10% - 50% | >50% |

A summary of the impact follows in Table 22 below.

| Cumulative Impact | Changes in the economic and material well-being | | | |
|--|---|----|---------------|----|
| Nature of Impact | GGP will increase. Direct and indirect sales volume will increase which will lead to an increase of the GGP of the province. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local & Provincial | 2 | Local | 1 |
| Duration of Impact (B) | Short Term | 1 | Short term | 1 |
| Probability of occurrence (C) | High | 3 | High | 3 |
| Intensity of Impact(D) | Low, positive | 1 | Low | 1 |
| Degree of confidence (E) | High | 3 | High | 3 |
| Level of significance (AxBxD+E)xC | Low | 15 | Low | 12 |
| Mitigation Measures | None | | | |
| Level of significance after mitigation | No mitigation | | No mitigation | |
| Related impacts | None | | | |

Table 21: GGP contribution: Construction Phase

The significance of the impact on the GGP is low but positive for the province and the municipal area. The No Go alternative has a low impact.

3.3 Summary of impacts during the Construction Phase

The impacts identified, based on a basic model which could be changed to have overall better outcomes, all have a low level of significance and significance stays low after mitigation. Impacts that are negative can all be reversed through mitigation to become positive although their significance stays low. The mitigation measures thus neutralise the impact. The table below lists all the impacts identified during the construction phase and their significance (low or high) and intensity (positive or negative) before and after mitigation.

| Impacts during Construction | Alternative: Preferred Sig/ intensity | | Alternative: Preferred Mitigated | | Alternative: No Go |
|-----------------------------|---------------------------------------|-------|----------------------------------|------|--------------------|
| Job creation | Low, positive | 8 | Low, positive | 12 | No impact |
| Skills development | Low, positive | 6 | Low, positive | 9 | No impact |
| Traffic | Low, negative | 8(-) | Low, positive - neutral | 8 | No impact |
| Municipal services | Low, negative | 3(-) | Low, positive - neutral | 4 | No impact |
| Health | Low, negative | 10(-) | Low, negative – neutral | 2(-) | No impact |
| Safety | Low, negative | 10(-) | Low, negative – neutral | 2(-) | No impact |
| Sales volume | Low, positive | 8 | Low, positive | 12 | No impact |
| GGP contribution | Low, positive | 15 | No mitigation measures | - | No impact |

Chapter 4:

Impacts identified during Operational and Decommissioning Phase

The impact occurring during the Operational and Decommissioning Phase is assessed in this chapter.

4.1 Increased Jobs

The proposed facility should result in an increase of jobs during the operation of the project. The generation of energy is not labour intensive and a total of seven (7) to ten (10) permanent jobs will be created. The facility will contract a service provider to do the site maintenance and cleaning. This service provider will not be locally based, but will be a roaming team that will also maintain and clean other Keren Photovoltaic Energy Generation Facilities. The roaming team will visit the site on average four times a year. The roaming team will include general workers (cleaners) and a project manager (electrician). Security service will be contracted locally.

The expected current value of the employment for the first ten (10) years is R8.7million of which approximately 56% or R4.9 million rand will benefit previously disadvantaged individuals.

The local and district community's opportunity to benefit from the increased jobs are restricted given the model employed (making use of service providers based in the province), but the Northern Cape Province will benefit as such.

Conflict between locals and outsiders will also be restricted as the roaming team will not have a permanent presence in the village.

A summary of the impact follows in Table 22 below.

| Impact | Changes to the economic and material well being of the community | | | |
|-----------------------------|--|-------|-----------|---|
| Impact and Nature of Impact | Jobs will be created but will mainly benefit the province given the model employed to source services. The services provided locally, and in particular security services, will benefit for locals. | | | |
| ALTERNATIVES | Preferred | No Go | | |
| Extent of impact (A) | Provincial | 4 | No Impact | - |

| | | | | |
|--|---|----|-----------|---|
| Duration of Impact (B) | Long term | 3 | No impact | - |
| Probability of occurrence (C) | Probable | 2 | No impact | - |
| Intensity of Impact(D) | Low | 1 | No impact | - |
| Degree of confidence (E) | High | 3 | No impact | - |
| Level of significance (AxBxD+E)xC | Low | 30 | No impact | - |
| Mitigation measures: | | | | |
| <ul style="list-style-type: none"> Local contractors, employing or seeking to employ local HDIs from the region who are suitably qualified, should get preference; The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the project administrator; The developer should, where necessary, assist local HDI owned firms to complete and submit the required tender forms; Skills transfer and development, formally and informally, should be implemented together with local education and skills training providers (e.g. job shadowing). | | | | |
| Level of significance after mitigation | Medium (Highly probable (3)) | 45 | | |
| Related impacts | Unemployment levels stay high at local municipal level. | | | |

Table 22: Impact of job creation: Operational Phase

As job creation will affect less than <1% of the employable population, its significance is low but with mitigation it changes to medium. However as skills levels are very low (57% of the population is unskilled), affording 7-10 people the opportunity to get employed is significant in comparison with the No Go alternative generating no opportunities.

4.2 Skills development, training and capacity building

As educational levels of the Kai !Garib Municipality are low (15% has grade 12 and higher qualifications) and the skills levels are low (39% semi-skilled and 59% unskilled), should capacity building and skills development training programmes be implemented, it will benefit the community in the long term. As people get trained their income will increase and their economic and material well-being will improve. Approximately 88% of the households earn less than R3 500 per month. 96% and 91% of all persons in Kai !Garib and Kakamas earn less than R3 500 per month. The majority of people work in agriculture, fishing and forestry, followed by community services. The energy sector is new to the region and related skills are limited.

Obtaining skills will enable community members to find work at other alternative energy facilities in the area, municipality and the region. Several of these projects will be proposed and developed given the Northern Cape's Solar Irradiance and climate.

The creation of the opportunity to work and to access on the job skills training and development will cause more jobseekers to settle at the base town of the roaming cleaning and maintenance team. The base town of the roaming team is not as yet finalized but will be within the Northern Cape Province. This may cause societal tension and instability particularly if locals do not find work.

A summary of the impact follows in Table 23 below.

| Cumulative Impact | Changes in economic and material well-being | | | |
|--|--|---|--------------|---|
| Impact and Nature of Impact | Skills levels and skills capacity will increase, but not necessarily those of the locals. The newly acquired skills may leave the area as new projects in surrounding areas come into being. Job seekers may join the community and impact on safety and security and the stability of the society. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Short term | 1 | No Impact | - |
| Probability of occurrence (C) | Probable | 2 | No Impact | - |
| Intensity of Impact(D) | Low, positive | 1 | No Impact | - |
| Degree of confidence (E) | Medium | 2 | No Impact | - |
| Level of significance (AxBxD+E)xC | Low | 6 | No Impact | - |
| Mitigation measures: <ul style="list-style-type: none"> • Reserve a number of employment opportunities for local labour. • Facilitate mechanisms to enable locals to access to employment. • The proposed development should enhance formal and informal skill transfer: <ul style="list-style-type: none"> ○ Should skilled persons from outside the community be employed, the developer should consider implementing a training and skills development programme to enhance the opportunities for local historically disadvantaged individuals in the construction and maintenance industry. Measures should be put in place to ensure successful training and development i.e. structured job shadowing and learnerships. Such a programme should be offered in liaison with an accredited Further Education and Training College or University; ○ An "access to education support service" assisting future students should be considered | | | | |

| | | | |
|---|---|---|--|
| attending to application fees for bursaries and financial planning and strategies for the period of studying. | | | |
| Level of significance after mitigation | Low (Highly probable (3)) | 9 | |
| Related impacts | Others in the Northern Cape Province are afforded the opportunity to develop their skills and not the locals of the Kai !Garib municipality | | |

Table 23: Impact of skills development, training and capacity building: Operational Phase

As skills development will affect less than <1% of the employable unskilled population before and after mitigation the significance thereof is low. However as skills levels are very low (39% semi-skilled and 59% of the population is unskilled), affording approximately 7 people the opportunity to gain skills, is viewed as significant in comparison with the No Go alternative. The significance of gaining skills has been reiterated during interviews with community workers in Kai !Garib. The skills gained will not only benefit the persons obtaining them, but will benefit their families. It will give people confidence and help to obtain employment or to be self-employed. In the long term it will reduce drug and alcohol abuse.

4.3 Increase in traffic

During the operational phase security staff will commute to the site twice a day resulting in four trips per day. Trips generated by the roaming cleaning and maintenance team are infrequent and may average approximately 24 trips per annum. The increase in the number of trips has a very low intensity and is not significant (it is equal to the number of trips a residential dwelling will generate). Therefore the impact will not be further assessed.

4.4 Increased use of Municipal and Authority Services including housing

Amenities, such as the local hospital and local clinic will be utilized by the maintenance and cleaning team when they are visiting the area on average four times a year. Although, according to the Integrated Development Programme medical services is lacking, it is anticipated that there is capacity in Kakamas to handle routine visits and

that emergencies will be routed to Upington. The intensity of the impact is low, it is infrequent and the significance low. Therefore the impact will not be further assessed.

4.5 Decreased Health and Safety

The facility as such, will have no impact on health.

Operational phase:

- No noise impact is anticipated.
- Fire may be a hazard and put pressure on the Municipal Fire Fighting Service should a fire occur. However during the preparation of the site, fire breaks would be prepared along the fence to reduce the possibility of runaway fires. The site will be equipped with fire fighting equipment and gear as per international standard. These measures should neutralize the pressure that the facility may cause on the Municipal Fire Fighting Service.
- Irrespective of locals or “others” be employed, there may be the fear that increased crime and trespassing will be experienced. The perception that crime may increase provide criminals, not the locals, the opportunity to increase their activities such as stealing livestock. However due to the location of the proposed site and the 24 hour safe guarding of plant and related infrastructure, it is highly unlikely that crime, stock theft or trespassing will occur. Liaison with the local South African Police will also decrease the possibility of the impact happening.

Decommissioning phase:

- Special safety procedures according to international standards are required and any safety impacts should be prohibited and their probability to occur will be very low.
- The noise impact will be short term and only the immediate neighbour in the industrial area may be affected.

A summary of the impact follows in Table 24 below.

| Cumulative Impact | Changes in the health and social well-being |
|------------------------------------|--|
| Impact and Nature of Impact | The anticipated impacts on health and safety is limited: Operational: The likelihood of health impacts occurring, is low as maintenance of the site according to international standards will have to be adhered to. |

| | | | | |
|---|--|------|------------------------|-------|
| | No noise impact will occur. | | | |
| | Fire may be a hazard. | | | |
| | The facility may create the opportunity for thieves to steal livestock as locals may have the perception that security staff may steal livestock. | | | |
| | Decommissioning Health and safety risks will increase during the decommissioning of the plant. However, the risks appear to be minimal as international standards will have to be adhered to. | | | |
| | Noise will be generated during the decommissioning phase. | | | |
| ALTERNATIVES | Operational | | Decommissioning | |
| Extent of impact (A) | Local | 1 | Local | 1 |
| Duration of Impact (B) | Long term | 3 | Short term | 3 |
| Probability of occurrence (C) | Unlikely | 1 | Probable | 2 |
| Intensity of Impact(D) | Medium, negative | 2(-) | Medium, negative | 2(-) |
| Degree of confidence (E) | Low | 1 | Moderate | 2 |
| Level of significance (AxBxD+E)xC | Low, negative | 7(-) | Low, negative | 16(-) |
| Mitigation Measures | | | | |
| <ul style="list-style-type: none"> • Keep fire breaks intact. • Adhere to fire fighting equipment and gear as per international standard. • Liaison with the local South African Police from the operational phase to prohibit stock theft. • <i>Enforce strict operating hours to reduce movement and noise impacts on adjacent landowners during decommissioning.</i> • <i>Access must be on recognised routes.</i> • <i>Adhere to the Environmental Management Plan (EMP) for the Operational Phase and decommissioning phase.</i> | | | | |
| Level of significance after mitigation | Low, negative (no changes in scores) | 7(-) | Low (Intensity:1(-)) | 10(-) |
| Related impacts | - | | | |

Table 24: Impact of health and safety hazards: Operational Phase

The probability of dust and noise occurring is unlikely during operations. Should fires occur during operations, the precaution measures cause the impact to be of medium intensity and low significance. The probability of crime and trespassing is negligible during operations.

The probability of dust and noise occurring is like during operations and mitigation measure will lessen the intensity and significance. Should fires occur during decommissioning, the precaution measures cause the impact to be of medium intensity

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and low significance. The probability of crime and trespassing is negligible during decommissioning.

The No Go alternative has no impact.

4.6 Increased Sales

During the operational phase, specialized materials and equipment will be required for maintenance that will be purchased in the province. Domestic purchases will be bought in Kakamas and the surroundings. This will cause the sales volumes (direct and indirect) to increase slightly. Sales of the proposed project will contribute to the economy locally at municipal level and provincially. Effort should be made to keep the sales in the Northern Cape and appropriate mitigations measure should be explored.

Monthly rental income will be collected by the Kai !Garib Local Authority, enhancing their economic sustainability.

The sale of electricity will increase and will benefit the province and country. It is estimated that electricity to the value of R65 Million will be sold annually.

| Sales | Preferred Option | No Go |
|--|------------------|-------|
| Direct Sales('000 000) | 70 | 0 |
| Indirect Sales ('000 000) ⁴ | 130 | 0 |
| Total Sales ('000 000) | 200 | 0 |
| % change in Sales | <1% | 0 |

Intensity will be measured according to the following scale:

| Rating | Low | Medium | High |
|--------------------------|------|-----------|------|
| % change to Sales output | <10% | 10% - 50% | >50% |

All sales resulting from selling electricity and spending R3.5 million to operate the plant, will cause a change of less than 1%. A summary of the impact follows in Table 25 below.

| Cumulative Impact | Changes in the economic and material well-being |
|-------------------|---|
| Nature of Impact | Sales volume will increase. |

⁴ R3 mil road, R37mil building, R0.8mil, concrete foundation

| ALTERNATIVES | Preferred | | No Go | |
|--|----------------------------------|----|---------------|---|
| Extent of impact (A) | Local & Provincial | 4 | No impact | - |
| Duration of Impact (B) | Long term | 3 | No impact | - |
| Probability of occurrence (C) | Probable | 2 | No impact | - |
| Intensity of Impact(D) | Low, positive | 1 | No impact | - |
| Degree of confidence (E) | High | 3 | No impact | - |
| Level of significance (AxBxD+E)xC | Low | 30 | No impact | - |
| Mitigation Measures | | | | |
| <ul style="list-style-type: none"> Contractors should be directed by tender criteria to purchase locally and to make use of local service providers. Spending money locally should benefit employees. The proposed development should leverage discount in the local economy of the municipal area. Small business should be supported (i.e. skills training, assistance and guidance to set up small businesses) and joint ventures with previous disadvantaged persons should be promoted. The promotion of joint ventures between small business (owned by previous disadvantaged persons) and more established business. | | | | |
| Level of significance after mitigation | Medium; (Highly probable (3)) | 45 | No mitigation | |
| Related impacts | None. | | | |

Table 25: Impact of Sales: Operational Phase

The impact on sales is less than <1% of the regional sales and hence low. With mitigation the significance of the impact can be enhanced and change to be of medium significance. Given the monthly rental income collected by the Kai !Garib local authority, the impact on sales is rated as high. The No Go alternative has no impact on Sales.

4.7 Increased GGP

The increase in sales volume related to the selling of electricity will contribute to the GGP of the province. Although of low or medium significance, the overall impact of alternative energy in the Northern Cape will increase the GGP and may cause Mining or Financial services as the leading or second leading economic sector in the province to change to Electricity.

The contribution of the facility to the provincial GGP is as follows:

| GGP | Preferred Option | No Go |
|-------------------------|-------------------------|--------------|
| Direct GGP ('000 000) | 12 | 0 |
| Indirect GGP ('000 000) | 68 | 0 |
| Total GGP ('000 000) | 80 | |
| % change in GGP | <1% | 0 |

Table 26: GGP contribution: Operational Phase

Intensity will be measured according to the following scale:

| Rating | Low | Medium | High |
|-------------------------------|----------------|------------------|----------------|
| % change to GGP output | <10% | 10% - 50% | >50% |

A summary of the impact follows in Table 26 below.

| Cumulative Impact | Changes in the economic and material well-being | | | |
|---|---|--------------|---------------|---|
| Nature of Impact | GGP will increase. Direct and indirect sales volume in electricity increase which will lead to an increase of the GGP of the province. | | | |
| ALTERNATIVES | Preferred | No Go | | |
| Extent of impact (A) | Regional | 2 | No impact | - |
| Duration of Impact (B) | Long Term | 3 | No impact | - |
| Probability of occurrence (C) | Highly probable | 3 | No impact | - |
| Intensity of Impact(D) | Low | 2 | No impact | - |
| Degree of confidence (E) | High | 3 | No impact | - |
| Level of significance (AxBxD+E)xC | Medium | 45 | No impact | - |
| Mitigation Measures None | | | | |
| Level of significance after mitigation | Medium | 45 | No mitigation | |
| Related impacts | The leading economic may sector change. | | | |

Table 26: Impact of GGP: Construction Phase

The intensity of the impact on the GGP is low and yet the impact is of medium significance before and after mitigation and in particular the sustainability of the income given the rental to be collected by the Kai !Garib Local Authority. The No Go alternative has no impact.

4.8 Sense of place

The landscape consists of a valley with a hinterland to the north and south. The immediate hinterland to the south consists of hills and has an almost mountainous appearance. The hinterland to the north is more flat, but with interspersed hills,

„spitskoppe“ and dunes. Overall the area displays a surprisingly variety in slopes, hills, gradients and landform. This variation in landform reduces the view catchment area (Lategan, p9).

The area to the north contains intensive farming, urban development and infrastructure. The southern extension of town includes a large portion of council land being home to industrial facilities, a quarry, a waste disposal site and sewerage works. Low intensity farming takes place in the outlying areas (Lategan, p9-10).

National road No 14 is the main transport route through the area. This route has also been identified as an important tourist route. The proposed facility is visible, but the distance, travelling speed or obstructions (hills) reduce the visibility of the site. The intrusion of the specific site on the N14 is low. The same can be said for the R359 and residential areas (Lategan, p10).

The site is surrounded by infrastructure which includes high voltage power lines, electrical substations, sewage works, waste disposal and a quarry. Other uses in the area include industrial buildings, small holding type of residential-industrial uses and large vacant land. Residential precincts are located north and east of this area. The area does not have a well defined character and reflects a lack a sense of place. The site has a high absorption capacity due to the presence of existing land use and topographical variation.

The alignment of transmission lines from the site to the substations is not yet known. The type of lines are however of low impact.

The proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended (Lategan, p12).

A summary of the impact follows in Table 27 below.

| Cumulative Impact | Changes in the quality of the living environment | | | |
|--|--|------|---------------|---|
| Impact and Nature of Impact | The visual environment of the area will change. The visual impact will be limited as the area which is already populated with infrastructure also has a high absorption capacity. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Long term | 3 | No impact | - |
| Probability of occurrence (C) | Highly probable | 3 | No impact | - |
| Intensity of Impact(D) | Low, negative | 1(-) | No impact | - |
| Degree of confidence (E) | High | 3 | No impact | - |
| Level of significance (AxBxD+E)xC | Low, negative | 9(-) | No impact | - |
| Mitigation Measures | | | | |
| Design phase | | | | |
| <ul style="list-style-type: none"> A photographic record of the site and its immediate surrounding area must be kept as part of the EMP to serve as a baseline for measurement of all future visual impacts and as an aid to the full rehabilitation of the site should the facility be decommissioned in future. Excavation on the site is to be kept to the absolute minimum required for the successful implementation of the project. The fencing design is to imitate the agricultural fencing in the area while at the same time providing the security that is necessary. It is to be visually permeable. No barbed wire is to be used. Any necessary lighting must be shielded in such a way that no direct light is allowed to escape into the surrounding terrain or up into the sky. Only the areas that are necessary to be lit must be lit with the surrounding terrain being protected from any light pollution. | | | | |
| Operational | | | | |
| <ul style="list-style-type: none"> Littering is to be strictly controlled over the entire life of the project. All waste is to be regularly removed from facility to a recognized dumping site. Waste, in any form, should not be allowed to collect on the site. The use of any cleaning materials or defoliants to aid in the control of vegetation is to be strictly monitored so that their long-term use does no cause future problems should the site be decommissioned. The use of lighting is to be monitored over the entire life of the project so as to minimize light pollution. A strict fire prevention policy must be implemented and monitored. | | | | |
| Decommissioning | | | | |
| <ul style="list-style-type: none"> The site is to be returned to as near as its existing visual state as is possible. All waste material is to be removed from site. | | | | |
| Level of significance after mitigation | Low, negative (all scores stay the same) | 9(-) | No mitigation | |
| Related impacts | Light pollution at night. Lack of awareness amongst locals and tourists about sustainable energy. | | | |

Table 27: Visual Impact: Operational Phase

The significance of the visual impact of the proposed photovoltaic electricity generation facility on the environment during the operations phase is rated low negative before and after mitigation. The recommendations of the visual impact assessment should be implemented per Environmental Management Plan as these recommendations will ensure that the impact is neutralized after decommissioning. The No Go alternative has no impact.

4.9 Tourism

National road No 14 is the main transport route through the area and has been identified as an important tourist route. The facility can serve as a tourism attraction. Tourists and scholars, locally, nationally and internationally, interested in alternative energy could visit the site.

These visitors will support other tourism activities in the region such as site seeing, game driving and agri-tourism. The facility's tourism properties could contribute to the local economy.

A summary of the impact follows in Table 28 below.

| Cumulative Impact | Changes in economic and material well-being | | | |
|--|--|----|--------------|---|
| Impact and Nature of Impact | Tourism can be enhanced. Visitors may visit other tourist activities close by which will benefit such activities and enhance the local economy. | | | |
| ALTERNATIVES | Preferred | | No Go | |
| Extent of impact (A) | Local | 1 | No impact | - |
| Duration of Impact (B) | Long term | 3 | No impact | - |
| Probability of occurrence (C) | Medium | 2 | No impact | - |
| Intensity of Impact(D) | Low, positive | 2 | No impact | - |
| Degree of confidence (E) | Medium | 2 | No impact | - |
| Level of significance (AxBxD+E)xC | Low | 16 | No impact | - |
| Mitigation Measures <ul style="list-style-type: none"> Market the photovoltaic electricity generation facility as a tourist destination. Create links with other tourism activities in Kakamas through a website and the local tourism office. | | | | |
| Level of significance after mitigation | Low | 16 | | |
| Related impacts | Expansion of tourism properties of the facility. | | | |

Table 28: Impact of and on tourism: Operational Phase

The significance of the impact caused by the proposed photovoltaic electricity generation facility on tourism is of low significance before and after mitigation. The No Go alternative has no impact on tourism.

4.10 Summary of impacts during the Operational Phase

Most of the impacts identified have a low level of significance and significance stays low after mitigation as listed in the table below. However the impact of the proposed photovoltaic electricity generation facility on the GGP sales will change to medium significance after mitigation. The impact of the proposed facility on both Health and Safety and Sense of Place will be low negative and stay low negative during the Operational Phase. The impact of Health and Safety during decommissioning is low and negative but mitigation decreases its negative impact to become neutral.

| Impacts: Operations & Decommissioning | Alternative: Preferred | | Alternative: Preferred Mitigated | | Alternative: No Go |
|---------------------------------------|------------------------|-------|----------------------------------|-------|--------------------|
| | | | | | |
| Job creation | Low, positive | 30 | Medium, positive | 45 | No impact |
| Skills development | Low, positive | 6 | Low, positive | 9 | No impact |
| Traffic | Unlikely | | - | | No impact |
| Municipal services | Unlikely | | - | | No impact |
| Health & Safety (operations) | Low, negative | 7(-) | Low, negative | 7(-) | No impact |
| Health & Safety (decommissioning) | Low, negative | 16(-) | Low, negative - neutral | 10(-) | No impact |
| Sales volume | Low, positive | 30 | Medium-high, positive | 45 | No impact |
| GGP contribution | Low, positive | 45 | No mitigation | 45 | No impact |
| Sense of place | Low, negative | 9(-) | Low, negative | 9(-) | No impact |
| Tourism | Low, positive | 16 | Low, positive | 16 | No impact |

This report identified the social variables and impacts and assessed these impacts based on a basic model which could be changed to have overall better outcomes. Management guidelines to be incorporated in the Environmental Management Plan are proposed in the chapter to follow.

Chapter 5:

Management guidelines to address socio-economic impacts

In order to ensure that the disadvantages are managed to maximize positive impacts, specific management strategies and mechanisms need to become part of the proposed development. These strategies and mechanisms need to be implemented through development conditions and are as follows:

- a) Skills development despite,
- b) Preferential procurement policies,
- c) Enhancing the sense of place.

To implement the strategies and mechanisms, the development should enable the administration and liaison of the various strategies and mechanisms. The administration and liaison of the strategies and mechanisms should be in partnership with the local authority.

The recommendations follow below.

5.1 Skills development

Skills development should be done according to national norms and standards, enabling people to not only access the job market but to stay in the job market. The following is proposed:

- Training and skills development programmes to enhance the opportunities for local historically disadvantaged individuals in the construction, minerals and energy, maintenance, light industrial and wholesale and retail sectors should be the focus.
- Skills transfer and development, formally and informally, should be co-ordinated together with local education and skills training providers (e.g. job shadowing) that are accredited and acknowledged by the Department of Education and the Committee for Higher Education and Training;

- Some basic skills can be introduced at school level in a joint venture between the primary schools and the developer. In the long term (generationally) the improved skills level will ultimately lead to improved levels of education.
- Communication and information facilities should be established or improved to enhance access to information and educational opportunities.
- There are several educational institutions that can support the development of skills and qualifications. The following institutions can be approached, although the list is not limited to these institutions:
 - Higher and Further Education Institutions
 - Sector Education and Training Authority (SETA) (established in accordance with the Skills Development Act of 1998) i.e. the Construction Education and Training Authority (CETA) and Energy Sector Education and Training Authority (ESETA) that monitor's and facilitates training in the construction sector and in particular in civil construction and building construction and in the energy sector respectively.
- Other key measures introduced by government to combat skills shortages that should become part of the development proposal, either as the responsibility of the contractors or as part of the grant contributed to the community by the developer are:
 - The Kha Ri Gude programme aimed at acquiring basic literacy and numeracy skills (ABET 1 – 4) for adults.
 - The aftercare programme for school children offered by the Department of Social Development.
 - SMME support programmes offered by the Department of Trade and Industry.
- Skills training will assist the Kakamas community to be better prepared to compete for the opportunities created by the proposed photovoltaic electricity generation facility development. There are a number of options that can be considered in this regard, namely:
 - a) Enter into a Partnership with a local College and ensure alignment of courses offered with skills required by the proposed development or support the college to

offer the relevant courses should they not do so. The training should be a combination of theory and “on the job” training.

b) Facilitate the attendance of training courses offered by the various institutions for those employed in Kakamas and the surrounding communities.

c) Access the levy refunds through the SETAs in the required sectors (e.g. CETA & ESETA).

d) Apply the procurement policy proposed (discussed in the following sub-section).

- The skills drive should, from the start, engage with the community to obtain their contributions to what is required, how it should be offered and how to access information and communication regarding training and skills development.

5.2 Preferential procurement policies

Preferential procurement policies could include the following:

- Local contractors, employing or seeking to employ local historically disadvantaged South Africans from Kakamas and the region who are suitably qualified, should get preference;
- The municipality, local community and local community organizations should be informed of the project, and the potential job opportunities, by the developer;
- A database of locally based firms, including SMME’s owned and run by historically disadvantaged individuals that qualify as service providers (construction companies, catering companies, waste collection companies etc), should be compiled by the administrator prior to the commencement of the tender process. These firms should be invited to bid for tenders;
- The developer should, where necessary, assist local HDI owned firms to complete and submit the required tender forms.
- Establish and maintain communication and information facilities to enhance SMME’s access to information and trading opportunities.
- Procurement procedures and contracts with builders should ensure that previously disadvantaged persons benefit as per Black Economic Empowerment guidelines.

- Labour instead of technology should be preferred without compromising timelines, cost and quality during the Construction and Building Phase according to the Expanded Public Works Programmes Principals.
- Procurement policies should support purchases from local suppliers of materials, goods and services and local SMME should get preference.
- Historically disadvantaged persons, who are suitably qualified, should get preference and should benefit during the Operational Phase of the proposed photovoltaic electricity generation facility.
- Spending money locally should benefit employees. The proposed development should leverage discount in the local economy of the municipal area.
- The municipality, local community and local community organizations should be informed of the project and the potential job opportunities by the developer;

5.3 Enhancing the sense of place

Enhance sense of place, whilst supporting the growing construction sector in Kakamas, should include the following:

- Appoint an Environmental Control Officer to supervise construction and building.
- All construction and building work fall under a comprehensive set of guidelines that determine acceptable standards for visual issues.
- All workers and management must undergo an induction course.
- A building zone must be defined consisting of a panel footprint and a 1.5m buffer strip.
- All road construction must be limited to the road reserve.
- Any natural habitat destroyed by constructing infrastructure should be rehabilitated.
- Stock piles must be screened off from general view and liquids must not leach into the open space systems.
- Dust creation must be controlled.
- Access must be on recognised routes.
- Litter and littering must be strictly controlled.
- All construction waste and building rubble must be removed off site.

- Construction workers are not allowed to hunt or gather wood.
- Cut and fill should be kept to a minimum and should be rehabilitated immediately.
- The overall development must adhere to the ethos of Kakamas and all mitigation measures related to construction should be adhered to.
- The comprehensive lighting guidelines should be developed and implemented.
- Visual standards should be maintained by means of the baseline photograph as recommended in the Visual impact assessment.

5.4 Conclusion

The above management guidelines have been presented in terms of the specific social constraints that might result due to the proposed Keren Energy Kakamas (Pty) Ltd Photovoltaic Energy Generation Facility and related infrastructure. These guidelines direct a basic model which could be changed to have overall better outcomes and requiring only some of these guidelines. These guidelines aim to change the social constraints of the proposed development into benefits in favour of the local community of Kakamas and the community within the Kai !Garib Municipal area.

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