

**Appendix D5: Updated Socio-economic Assessment/Addendum
(2017 revision)**

Socio- Economic Impact Assessment of Amended 2017 Solar Energy Facility Proposal, Disselsfontein
For
Keren Energy Disselsfontein (Pty) Ltd
In support of the Environmental Basic Assessment Report by Enviro Africa, Helderberg.



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Reports

Preliminary SEI	March 2012
SEI	May 1012
SEI of Amended Proposal	March 2017

Executive Summary

In 2012 EnviroAfrica cc, was appointed by Keren Energy Disselsfontein (Pty) Ltd to undertake a Basic Environmental Assessment (BA Report) for a proposed Photovoltaic Energy Generation Facility on Portion 8 of Farm 77, Hopetown, Thembelihle Local Municipality, in accordance with the Environmental Management Act, 1998 (Act no 107 of 1998), as amended and the Environmental Assessment Regulations, 2010. Leap Sustainable Development was appointed to undertake the specialist socio-economic impact assessment as part of the BAR. The reports generated in this round were a Preliminary Socio-economic Impact Assessment and a Socio-economic Impact Assessment.

The Environmental Authorizations granted lapsed and applications have to be made afresh. This report represents a Socio- Economic Impact Assessment of the amended 2017 Solar Energy Facility Proposal, Disselsfontein.

Purpose

This report assesses

- a) the amended application to accommodate any changes that may come about since the original assessment and
- b) the cumulative impacts as required by DEAT.

Approach

The assessment is done by

- a) Comparing development proposals in 2011 – 2012 with development proposals in 2017. The impact of the differences, if any, is then evaluated and mitigation measures are proposed.
- b) Evaluating cumulative impacts as per DEAT's requirements.

Comparison between 2012 and 2017 proposal

Changes in the 2017 proposal are tabulated below and can be summarized as follows:

- a) Site location changed slightly.
- b) Different technology is used (Crystalline photovoltaic instead of concentrated photovoltaic)
- c) Less energy will be generate (5MW instead of 10 MW)
- d) Downscaling in size of infrastructure

No downscaling in extent of the facility.

Impacts and Cumulative impacts during the Construction, Operational and Decommissioning Phases:

The significance and intensity of impacts during the **construction phase** stays the same as in 2012 should the proposed mitigation measures be applied.

The significance and intensity during the **operational phase** stays the same as in 2012 should the proposed mitigation measures be applied.

The significance and intensity during the **operational phase** stays the same as in 2012 should the proposed mitigation measures be applied.

The cumulative impacts of the proposed development and four other renewable projects (three solar and one hydro electricity) planned have the following results:

- a) The community will experience positive changes in their economic and material well-being as
 - More job and job opportunities will be generated.
 - Skills levels will increase.
 - The local economy will improve (increased sales and contribution to GGP)
- b) The community will experience the following environments to be under stress, but through mitigation the stress can be managed:
 - Authority and municipal services as the likelihood of fires and theft of livestock and increase in noise levels during decommissioning (although temporary) may be more likely.
 - Community resources: archaeological, palaeontological and sense of place.
The sense of place will bring about changes in quality of living environment, but the within acceptable levels. Although the nature of the development requires very little mitigation, a vegetation strip between the road and the solar facility provides a soft boundary mitigation the experience of the solar facility. This vegetation strip should be retained.
- c) The community will experience the following environments to be under stress and mitigation is indirect:
 - The employment sector as more people will migrate into Disselsfontein looking for work. However, the in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

Conclusion

The impacts of the 2017 Proposal is similar and overall positive after mitigation as proposed in 2011.

The cumulative impacts are positive, or can be mitigated to support the positive impacts. The in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

The Northern Cape Economic Potential and Investment Profile, 2012 highlights the energy sector as one of the sectors to enhance the socio-economic circumstances of the Northern Cape. Moreover, the carbon footprint to generate electricity will get reduced.

The proposed development is therefore supported from a socio-economic perspective.

Background

In 2012 EnviroAfrica cc, was appointed by Keren Energy Disselsfontein (Pty) Ltd to undertake a Basic Environmental Assessment (BA Report) for a proposed Photovoltaic Energy Generation Facility on Portion 8 of Farm 77, Hopetown, Thembelihle Municipality, in accordance with the Environmental Management Act, 1998 (Act no 107 of 1998), as amended and the Environmental Assessment Regulations, 2010. Leap Sustainable Development was appointed to undertake the specialist socio-economic impact assessment as part of the BAR. The reports generated in this round were a Preliminary Socio-economic Impact Assessment and a Socio-economic Impact Assessment.

The Environmental Authorizations granted lapsed and applications have to be made afresh. This report represents a Socio-Economic Impact Assessment of the amended 2017 Solar Energy Facility Proposal, Disselsfontein.

Purpose

This report assesses

- c) the amended application to accommodate any changes that may come about since the original assessment and
- d) the cumulative impacts as required by DEAT.

Approach

The assessment is done by

- c) Comparing development proposals in 2011 – 2012 with development proposals in 2017. The impact of the differences, if any, is then evaluated and mitigation measures are proposed.
- d) Evaluating cumulative impacts as per DEAT's requirements.

Amended Proposal (2017)

Keren Energy Disselsfontein (Pty) Ltd intends to construct a 5 MW solar photovoltaic (PV) energy generation facility on Portion 8 of Farm 77, Hopetown, Thembelihle Municipality Local Municipality, Northern Cape. The facility is located 23.5 km northwest of Hopetown and 1.2 km away from the western banks of the Orange River. Portion 8 of Farm 77 is owned by JD Ferreira Familie Trust. The land is zoned Agriculture 1

The proposed development entails the construction of about 18540 PV solar panels with a footprint of less than 20 ha. The PV panels will be mounted on pedestals drilled and set into the ground. Associated infrastructure includes a perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The substation is situated adjacent to the site.

Comparison between 2012 and 2017 proposal

Changes in the 2017 proposal are tabulated below and can be summarized as follows:

- e) Site location changed slightly.
 - f) Different technology is used (Crystalline photovoltaic instead of concentrated photovoltaic)
 - g) Less energy will be generate (5MW instead of 10 MW)
 - h) Downscaling in size of infrastructure
- No downscaling in extent of the facility.

Elements	2012 Proposal	2017 Proposal	Result
- Technology Type	- concentrated photovoltaic (CPV) - uses Fresnel lenses to concentrate light from sun onto individual PV cells	Solar Photovoltaic, Crystalline PV	Different Technology
- Capacity	- 10MW, - A single solar generator produces $\pm 66kV$. A number of generators arranged in multiple/ arrays produce 10MW	5MW, 18540 solar modules, 927 Modules strings (a string constitutes a number of modules connected to a common inverter)	Less (half) energy generated
- Inversion and inverters	- An inverter is then used to convert direct current electricity produced into alternating current in order to connect to ESKOM grid	3 inverter stations (inverters to keep generation of energy at 5MW or below). A total of 7 central inverters will be used.	None
- Specifications/ Scale & Mass	- CPV panels will be elevated 2m above ground supported by a structure, and track path of the sun during the day for maximum efficiency	Single axis unit. Elevated $\pm 1.5m$ above ground	Shorter axis, down scaling of size of infrastructure
	- Approximately 1.8ha is required to install 1MW (10MW requires 20ha)	Extent of the development stays the same	Smaller take up but extent of the development stays the same
	- Each panel will be approximately 17-22m wide by 12.5m high. When panels are tracking vertically the structure will have a maximum height of approximately 15.64m.	Module: 1.956m x 0.992m Module String: 20 x 1.956m x 0.992m = $\pm 40m \times \pm 20m$ Height tracking vertically: $\pm 10.5m$	Maximum height lower
- Mounting	- CPV panels will be mounted on pedestals drilled and set into the ground.	Same	None
- Preparation of land to assemble stands	- Extensive bedrock excavations are not envisaged, some vegetation need to be cleared.	Excavations for footings are 1.5m in diameter	None
- Associated Infrastructure	- 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 perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp	None
- Transmission & Substation	- General: Electricity generated will be fed into the national grid at an Eskom substation:	Substation is on/ next to site	None
- Access	- Site accessed from R369, using existing secondary roads. Additional temporary access roads will be established.	Site will be accessed from R369.	None
- Location, Ownership, extent	- To be established on 20ha of land on Portion 8 of Farm 77, Hopetown	10h to be established on 20ha of land on Portion 8 of Farm 77, Hopetown owned by JD Ferreira Familie Trust, zoned Agriculture 1	Slight changes in property boundary.
- Changes in receiving environment	Although the site boundary has moved slightly, the receiving community has not changed.	No changes occurred in receiving environment which impact on the original assessment.	None

Impacts and Cumulative impacts during the Construction, Operational and Decommissioning Phases:

Summary of impacts during the Construction Phase

The impacts identified in the 2012 assessment, have low levels of significance. Where negative, mitigation could keep the levels of significance low or could reverse the impact to become neutral.

The 2017 proposal (different technology, less energy generate, downscaled infrastructure but development footprint stay the same) is compared and evaluated.

The same is done for the cumulative impacts.

The table below lists all the impacts identified during the construction phase, their significance (low or high) and intensity (positive or negative) before and after mitigation:

Impacts	Related Impact	Preferred Alternative 2011	Preferred Alternative 2011 mitigated	Proposal 2017 (2011 mitigation measures)	Cumulative (within 30km)
More jobs / increase in job opportunities will be generated	- Low skills level may cause an influx of job seekers, some loss of community safety	Low, positive	Low, positive	Low positive	Medium positive (job creation)
	- Influx of people			Insignificant	Medium negative
Increase skills levels (changes in economic and material well-being)	- Skills development, training and capacity building locals may not benefit as "others" may be employed.	None	Low, positive	Low, positive	Medium. positive
Reduced road safety	- Less than 50 trips per day (stock & workers). - Slow moving vehicles may cause intersection to be less safe - Heavy vehicles may cause deteriorating road surfaces	Low, negative	Neutral	Neutral	Medium Negative
Local resources (i.e. clinic) & services under stress.	- Increased demand for municipal and authority services	Insignificant	Insignificant	Insignificant	Low, negative
Decrease Health and Social Well being	Dust and noise levels raise	Medium, negative	Low, negative	Low, negative	Low negative
Increased sales and contribution to GGP		Low, positive	Low, positive	Low, positive	Medium, positive
Community Resources (and tourist attractions) under stress	Archaeological Resources: More than 90% of the archaeological remains are Middle Stone Age (MSA) tools, while small numbers of Later Stone Age (LSA), and Early Stone Age (ESA) lithics, including a handaxe and bifaces, were recorded. Chunky, weathered retouched blade tools of the Fauresmith MSA were also encountered. The presence of different types of tools from all three periods of the South African Stone Age reflects the wide range and diversity of tools	Low	Low	Low	Low

	that are known to occur in the Northern Cape Province. As the remains are scattered, it has been rated as having low (Grade 3C) significance.				
	<p>Palaeontology Resources: Potentially fossiliferous rock units within the broader Hopetown - Douglas study region include Permian marine sediments of lowermost Ecca Group (Prince Albert Formation) as well as Tertiary fluvial gravels of the Orange River. However no fossiliferous rock at proposed development which is largely mantled by various superficial deposits (surface gravels, calcretes, aeolian sands) (very low palaeontological sensitivity). The only Karoo Supergroup rocks present are unfossiliferous glacial tillites that are additionally deeply weathered and calcretised.</p>	Low	Low	Low	Low Significance of cumulative impacts on very sparse local fossil assemblages posed by Disselsfontein Keren solar plant and other developments in the Hopetown region is low.
	<p>Biodiversity: One species NFA protected [Sheppard's trees (<i>Boscia albitrunca</i>)] & five (5) NCNCA species protected encountered.</p>			Low, medium	<p>Low, medium: Impact on protected trees within the site and to a lesser degree potential accidental veld fires.</p> <p>Proposed development footprint needs $\pm 50\%$ of 20ha, Micro-adjustment of final layout plans to avoid trees & minimizing actual development footprint. Biodiversity features e.g. corridor function or special habitats to function without interruption.</p>
	<p>Sense of Place The facility is located 23.5 km northwest of Hopetown and 1.2 km away from the western banks of the Orange River.</p>	Temporary, Low		Temporary, Low.	Temporary, Medium The landscape has a medium absorption rate which reduces the impact site preparation has. The site is visible from the R369, but for a short period. The level of change is within acceptable levels.

The significance and intensity of impacts during the construction phase stays the same as in 2012 should the proposed mitigation measures be applied.

The cumulative impacts of the propose development and four other renewable projects planned have the following results:

- d) The community will experience positive changes in their economic and material well-being as
 - More job and job opportunities will be generated.
 - Skills levels will increase
 - the local economy will improve (increased sales and contribution to GGP)
- e) The community will experience the following environments to be under stress, but through mitigation the stress can be managed:
 - The roads as there are more slow moving vehicles using the road (R369).
 - Authority and municipal services as the likelihood of incidences and need for engineering services may be more likely.
 - Living environment as increased dust and noise levels will decrease air quality.
 - Community resources: archaeological, palaeontological and sense of place.
Sense of Place: This impact is of a temporary nature.
- f) The community will experience the following environments to be under stress and mitigation is indirect:
 - The employment sector as more people will migrate into Disselsfontein looking for work. However, the in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

Operations and Demolition

The impacts identified in the 2012 assessment, have low levels of significance. Where negative, mitigation could keep the levels of significance low or could reverse the impact to become neutral.

The 2017 proposal (different technology, less energy generate, downscaled infrastructure but development footprint stay the same) is compared and evaluated.

The same is done for the cumulative impacts.

The table below lists all the impacts identified during the construction phase, their significance (low or high) and intensity (positive or negative) before and after mitigation:

Impacts		Preferred Alternative 2011	Preferred Alternative 2011 mitigated	Proposal 2017 (2011 mitigation measures)	Cumulative
More jobs / increase in job opportunities will be generated	- Low skills level may cause an influx of job seekers, some loss of community safety	Low, positive	Low, positive	Low positive	Medium positive (job creation)
	- Influx of people			Insignificant	Medium negative
Increased skills levels (changes in economic and material well-being)	- Skills development training and capacity building in cleaning & maintenance	Low, positive	Medium, positive	Medium, positive	Medium, positive
Reduced road safety	- Increased traffic below threshold of 50 trips per day (security & maintenance).	Low, negative	Neutral, insignificant	Neutral, Insignificant	Neutral, insignificant
Decrease health & social well-being	- Fire hazard - Livestock get stolen (perception security staff steal live stock)	Low, negative	Low, negative	Low, negative	Low, negative

	- Noise during decommissioning: short term, safety as per international standards.				
Increased sales and contribution to GGP		Low, positive	Low, positive	Low, positive	Medium positive
Sense of place change (changes in quality of living environment)	<p>Sense of Place The facility is located 23.5 km northwest of Hopetown and 1.2 km away from the western banks of the Orange River.</p> <p>The site is home to a substation and HV Power lines, the surrounding area has a rural character. The area is characterized by a topography of low rises just outside the valley corridor and more hills and ridges occur closer to the river.</p> <p>The nature of the development requires very little mitigation. A vegetation strip between the road and the solar facility provides soft boundary and this vegetation strip should be retained.</p>	Low, negative	Low, negative	Low, negative The landscape has a medium absorption rate which reduces the significance of land use change. The R369 will be exposed to the site, but the impact is of short. The change in technology reduces the intrusion level of the proposal and thus results in a lower overall impact than the original proposal. The level of change is within acceptable levels.	Low, negative The plain area displays a level of gradient that present a fairly high level of absorption and views are restricted to the immediate environment (seldom more than 5km, catchment area does not extent to the 30km radius). The other three energy facilities within this radius are visible and within a timeframe of 30min as one pass by on the R369 (two to southeast and one to northwest). The topography and adjacent infrastructure helps to absorb the impact (±15km apart). The development of the proposed hydro-electric facility is still uncertain, but is significantly larger. The development enlarges the current substation enclave and has the potential to attract further development.
Loss of agricultural land	Food security reduced.			Insignificant, Municipal land, no food production.	
Enhanced tourism	Palaeontology Resources:	Low	Low	Low	

The significance and intensity during the operational phase stays the same as in 2012 should the proposed mitigation measures be applied.

The cumulative impacts of the proposed development and four other renewable projects (three solar and one hydro) planned have the following results:

- g) The community will experience positive changes in their economic and material well-being as
 - More job and job opportunities will be generated.
 - Skills levels will increase.
 - The local economy will improve (increased sales and contribution to GGP)
- h) The community will experience the following environments to be under stress, but through mitigation the stress can be managed:
 - Authority and municipal services as the likelihood of fires and theft of livestock and increase in noise levels during decommissioning (although temporary) may be more likely.
 - Community resources: archaeological, palaeontological and sense of place.
The sense of place will bring about changes in quality of living environment, but the within acceptable levels. Although the nature of the development requires very little mitigation, a vegetation strip between the road and the solar facility provides a soft boundary mitigation the experience of the solar facility. This vegetation strip should be retained.
- i) The community will experience the following environments to be under stress and mitigation is indirect:
 - The employment sector as more people will migrate into Disselsfontein looking for work. However, the in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

Conclusion

The impacts of the 2017 Proposal is similar and overall positive after mitigation as proposed in 2011.

The cumulative impacts (use of municipal service and change in sense of place) are positive, or can be mitigated to support the positive impacts. The in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does..

The Northern Cape Economic Potential and Investment Profile, 2012 highlights the energy sector as one of the sectors to enhance the socio-economic circumstances of the Northern Cape. Moreover, the carbon footprint to generate electricity will get reduced.

The proposed development is therefore supported from a socio-economic perspective.

References

ACRM, 2017: Archaeological Impact Assessment: The proposed Keren Energy Disselsfontein Solar Energy Farm on Erf 753 (Portion of Erf 1), Disselsfontein, Northern Cape.

Goestratics, 2017: MT Roper, Farm 321, Solar Energy Facility, Visual Assessment

Leap Sustainable Development, 2012: Socio Economic Impact Assessment: Disselsfontein Photovoltaic Electricity Generation Facility

Natura Viva cc. 2017: Recommended exemption from further palaeontological studies & mitigation: Proposed Disselsfontein Keren Energy Solar Plan, Kgatelopele Local Municipality, Northern Cape

PB Consult: Ecological & Botanical management services, 2017: Addendum to the biodiversity assessment & biodiversity assessment & botanical scan, for the Mount Roper Solar project:

**Appendix D5: Socio-economic Assessment
(Original report)**

Socio-Economic Impact Assessment
For
Keren Energy Disselsfontein (Pty) Ltd
Photovoltaic Electricity Generation Facility,
Disselsfontein, Hope Town
Basic Environmental Assessment Report



March 2012

by



Executive Summary

Thembelihle Municipality is home to the proposed 10MW photovoltaic electricity generation facility on Remainder Farm Disselsfontein, No78, near Hope Town, Northern Cape. In Thembelihle Municipal area and Hope Town, the majority of people work in un- and semi-skilled jobs as fifty two percent (52%) of the population of Thembelihle is unskilled, 30% semi-skilled and 18% highly skilled.

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, Operational phase	R8.7 million
Percentage of expected current value accrued to PDI, Operational phase	56% (R4.9million)

The unemployment rate for the Northern Cape is 26% and 13% in Thembelihle municipal area.

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 Disselsfontein (Pty) Ltd and Thembelihle 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 Disselsfontein (Pty) Ltd and Thembelihle 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 visitors will be interested in the facilities and cause more people to visit Hope Town 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 Thembelihle population has a corresponding low level of education: Twenty five percent (25%) of the population of Thembelihle has no schooling, 47% some secondary schooling and 18% has a Grade 12 or higher 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 neutralises the impact on municipal amenities.

Additional pressure on the supply of domestic services is unlikely. However should it occur it will be sporadic and the significance of the impact will be 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 and the absorption capacity of the site environment, the intensity and thus significance 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 Disselsfontein (Pty) Ltd Photovoltaic Electricity Generation Facility on Remainder Farm Disselsfontein, No78, near Hope Town, Northern Cape Hope 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 absorption capacity of the environment;
- no need to build long distances of high voltage lines as Eskom substation is on the terrain;
- Most impacts are 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 Thembelihle Local Authority will benefit from proposed photovoltaic electricity generation facility.

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 are industrial (mining). 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 Thembelihle 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	8(-)	Low, negative – neutral	4(-)	No impact
Safety	Low, negative	8(-)	Low, negative – neutral	4(-)	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-neutral	4(-)	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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility should be approved on condition that the proposed mitigation measures are implemented.

**Keren Energy Disselsfontein (Pty) Ltd Photovoltaic Electricity Generation Facility,
Disselsfontein**

Socio-economic Impact Assessment

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Chapter 1:

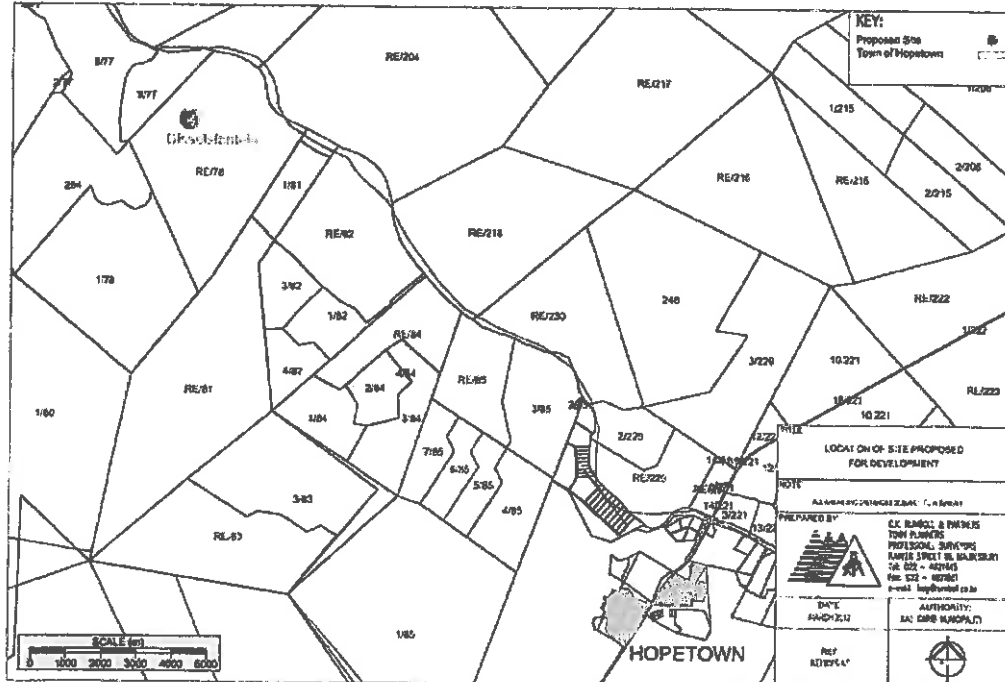
Overview of Proposed Development and Social and Economic Impact

1.1 Introduction

EnviroAfrica cc, was appointed by Keren Energy Disselsfontein (Pty) Ltd to undertake an Environmental Impact Assessment (EIA) for a proposed Photovoltaic Energy Electricity Generation Facility on a portion of Remainder Farm Disselsfontein, No78. Leap Sustainable Developments were appointed to undertake a specialist Social Impact Assessment (SIA) as part of the EIA. This report constitutes a Socio-economic Impact Assessment.

1.2 Description of the Proposed Development

Keren Energy Disselsfontein (Pty) Ltd is proposing the establishment of a 10MW concentrated photovoltaic solar energy facility near the town of Hope Town, Thembelihle Local Municipality, Northern Cape Province. The facility will be established on approximately 20 ha, of the remainder of the Farm Disselsfontein, No78. The proposed solar facility is located approximately 24 km northwest of Hopetown in the Northern Cape Province (See Figure 1). The Gariep River is less than 2 km away.



The proposed Keren Energy Disselsfontein (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.

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. Construction workers will be housed in temporary in Hope Town. Some of the materials will be stored and the workshop will be housed in temporary containers on the construction site.

The electricity generated from the project will be fed directly into the national grid at the Eskom Oasis substation which is situated alongside the subject property (Kaplan, p4).

The site will be accessed from the N14, using existing secondary roads. However, additional temporary access roads will have to be established on site.

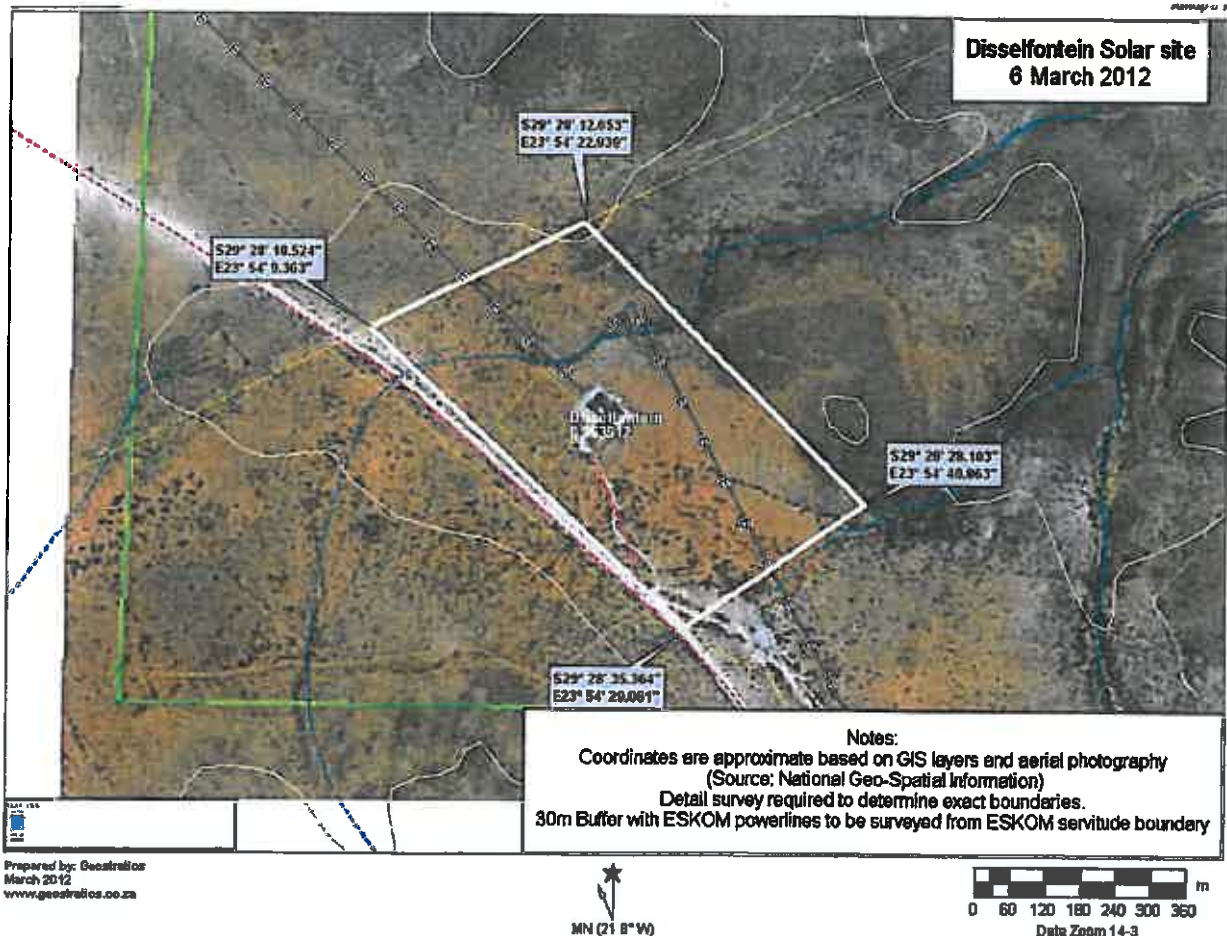


Figure 2: Topography & Footprint of Keren Energy Holdings Photovoltaic Energy Generation Facility, Hope Town

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 existing electrical infrastructure and

substation is on the proposed site contribute to Farm Disselsfontein, No78. Hope Town being selected as the preferred alternative.

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

- will generate jobs of which Hope Town and Thembelihle Municipal area 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 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 should be executed:

- Review of project information and specialist reports;
- Collection and synthesis of only the most critical 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 (SEIA);
- 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 affected 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 the Social & 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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility. The baseline data was obtained through secondary data sources such as Statistics South Africa, 2001 National Census, the Thembelihle 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 most critical social and economic context;

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;

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 Disselsfontein (Pty) Ltd Photovoltaic Electricity Generation Facility, Hope Town 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 Disselsfontein (Pty) Ltd Photovoltaic Electricity Generation Facility, Hope Town, 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 Disselsfontein (Pty) Ltd Photovoltaic Electricity Generation Facility, Hope Town, 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)

To 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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility, Hope Town, complies with the normative principles of the National Spatial Development Framework as follows:

NSDF Principles	Proposed Keren Energy Disselsfontein (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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation project creates 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;	The proposed facility will provide economic development opportunities aligned with growth the 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 resources of the Thembelihle Municipality.

The proposed Keren Energy Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility, Hope Town, 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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility:

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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility, Hope Town are aligned i.e.:

NCPSDS Development priorities	Keren Energy Disselsfontein (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 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 confirms the need for sustainable municipal services in Hope Town.

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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility, Hope Town, are aligned:

NCPDS Development priorities	Keren Energy Disselsfontein (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;	Hope Town will be the projects economic base for day to day supplies and services. Kimberly will be the centre for services not supplied in Hope Town.
Provide appropriate levels of services.	The project will support the provision of services in the area as the tax basis of the Thembellhe Municipality will increase.

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. These corridors are vital lifelines from a transport perspective and the proximity to 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 Disselsfontein (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 Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility will contribute to the local economy to make the provision of services worthwhile.

Keren Energy Disselsfontein (Pty) Ltd Photovoltaic Energy Generation Facility is supportive of the majority of the focus area strategies of the Northern Cape Provincial Spatial Development Strategy.

Chapter 3:

Impacts identified during the Construction Phase

The chapter first provides a description of the assessment of the impact according to several 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	3

	activity, either because of natural process or by human intervention.	
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:

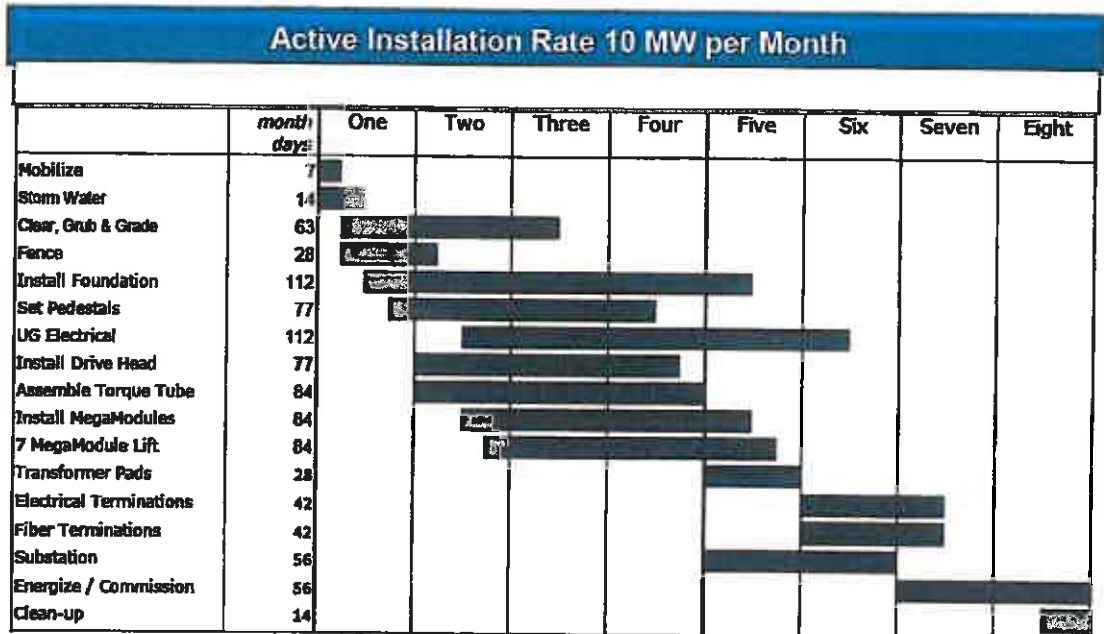
Activity	Skills required
1. Prepare site	Fencing, surveying, grading and construction
2. Excavate and Install a pedestal	Excavation, trenching, cable laying, concrete work, mechanical and electrical assembly of connections with substation, steelwork assembly, casting and erection of tower.
3. Install 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.

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 Eskom substation is on the site and no transmission lines will be required.

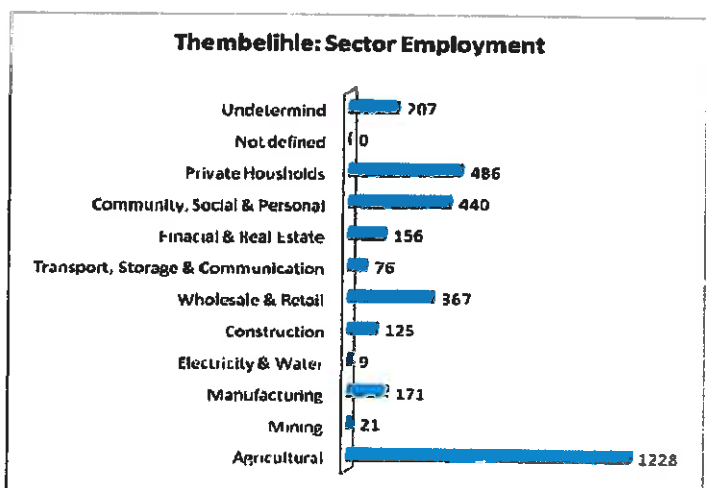
The construction schedule runs over eight months.



The impacts were identified and some have been assessed and mitigation measures suggested whilst the balance of the impacts require further assessment to determine their significance.

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 42% and 52% of the population is unskilled and semi-skilled respectively. Therefore others



may be employed to do the work. However, 13% of the employable population of Thembelihle Municipal Area is unemployed whilst 47% of the same cohort (employable population) is not economically active.

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 Thembelihle (13%).

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 (%)	0-34 (<1%)	34-170 (<5%)	>171 (>5%)
Provincially		0-6195 (<1%)	6196-12394 (<2%)	>12395 (>2%)

A summary of the impact follows in Table 1 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.

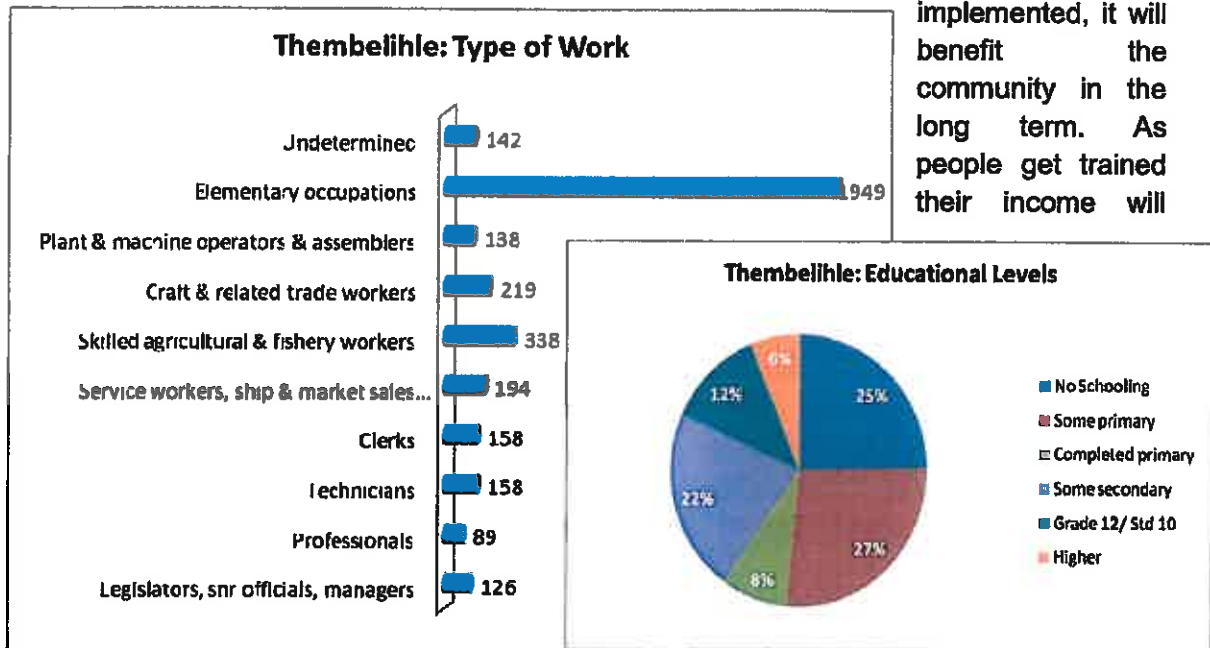
ALTERNATIVES	Preferred		No Go	
Extent of impact (A)	Local	1	No impact	-
Duration of Impact (B)	Short term	1	No impact	-
Probability of occurrence (C)	Probable	2	No impact	-
Intensity of Impact(D)	Low	1	No impact	-
Degree of confidence (E)	High	3	No impact	-
Level of significance (AxBxD+E)xC	Low, positive	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 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; 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	Influx of contract workers due to lack of skills Influx of job seekers due to jobs created			

Table 1: 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. Given the population of the Thembelihle Municipality the intensity could be rated even higher as medium. However, creating jobs is viewed positive given the challenge of overall unemployment in the municipality and in the province.

3.2.2 Skills development, training and capacity building

As educational levels of the Thembelihle Municipality are low (18% has grade 12 and higher qualifications) and the skills levels are low (52% un-skilled and 30% semi-skilled), 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. The majority of the households earn less than R3 500 per month. As most people are employed in elementary occupations, 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 in Ward 7, the Upington Solar Park proposed by Eskom, 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 creation of the opportunity to work and to receive training and skills development will cause more jobseekers to settle in the Thembelihle community. This may cause societal tension and instability particularly if locals do not find work.

A summary of the impact follows in Table 2 below.

Cumulative Impact	Changes In economic and material well-being			
Impact and Nature of Impact	<p>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.</p> <p>Job seekers may join the community and impact on safety and security and the stability of the society.</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)	Low, positive	1	No Impact	-
Degree of confidence (E)	Medium	2	No Impact	-
Level of significance (AxBxD+E)xC	Low	6	No impact	-
<p>Mitigation measures:</p> <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 the area (Hope Town) and the education and skills training providers. In the long term (generationally) the improved skills level will ultimately lead to improved levels of education or ○ 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 Thembelihle Municipality. Others are afforded the opportunity to develop their skills.			

Table 2: 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, irrespective of its low significance, 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 Kuruman will be minimal. Vehicles transporting goods, materials and equipment would make use of the road. 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 Kuruman 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 minor road / turn off of the main road (R31) may deteriorate and will have to be maintained.

The slow moving delivery vehicles (trucks with loads) may impact on the safety of minor road-main road intersection (turning off to Disselsfontein). 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 3 below.

Cumulative Impact	Changes in the living environment
Impact and nature of Impact	<p>Traffic will increase minimally (8 trips per day).</p> <p>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> <p>The internal road surface 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 minor (internal) and main road 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</p>

	day.		
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	8(-)	No impact
Mitigation Measures			
<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	8	
Related impacts	Increase in pedestrian traffic. Increased economic opportunity.		

Table 3: 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 low significance, yet positive. The No Go alternative will have no impact. There is no need for the impact to be assessed further.

3.2.4 Increased use of Municipal and Authority Services

Health amenities will be utilized should a construction related accident happens. It is anticipated that there is sufficient capacity in Kuruman to handle emergencies until routed to Upington or Kimberley. 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 adhere to.

A summary of the impact follows in Table 4 below.

Cumulative Impact	Changes in the living environment			
Impact and Nature of Impact	Demand for services may increase sporadically: Health and emergency facility capacity may be required 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. 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 4: Impact of services demand: Construction Phase

The impact of the temporary construction team on amenities and municipal services is low, yet the intensity is negative. After mitigation the probability of the impact happening becomes less and the intensity decreases. 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

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 (removed from neighbourhoods and farm yards) and for a limited period of time.

Irrespective of local or "others" be employed, increased movement may lead to crime and trespassing i.e. livestock theft (from neighbouring farms) and littering.

A summary of the impact follows in Table 5 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. The location of the proposed facility is removed from the town environment or farm yard. 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)	Low, negative	1(-)	No impact	-
Degree of confidence (E)	High	3	No impact	-
Level of significance (AxBxD+E)xC	Low	8(-)	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; • Access must be on recognised routes. 				

<ul style="list-style-type: none"> Litter and littering must be strictly controlled. 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. 			
Level of significance after mitigation	Low (Unlikely: 1)	4(-)	
Related Impacts	Deterioration of the bio-physical environment. Tress passing and stock theft.		

Table 5: 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 bought in Kuruman 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 there of 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 or Thembelihle. As Kuruman is a small town, people may tend to go shopping or purchase services and stock in bigger centres such as Upington or Kimberley. This would lead to the dilution of sales in Thembelihle 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 6 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.			
Extent	Local – Regional			
Duration	Short term			
Related impacts	None.			
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	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 demand 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 previously disadvantaged persons should be promoted. • The promotion of joint ventures between small business (owned by previously 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 6: 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. This impact does not require further investigation.

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 (40 MW plant)	No Go
Direct GGP ('000 000)	32	0
Indirect GGP ('000 000) ¹	182.5	0
Total GGP Contribution ('000 000)	214.5	0
% change in GGP	<1%	0

Table 24: GGP contribution: Construction 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 7 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	1	Low	1
Degree of confidence (E)	High	3	High	3
Level of significance (AxBxD+E)xC	Low	15	Low	12

¹ R3 mil road, R37mil building, R0.8mil, concrete foundation

Mitigation Measures			
None			
Level of significance after mitigation	No mitigation		No mitigation
Related impacts	None		

Table 7: Impact of GGP: 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		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	8(-)	Low, negative – neutral	4(-)	No impact
Safety	Low, negative	8(-)	Low, negative – neutral	4(-)	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 Operations 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 8 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 8: 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 (52% 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

An overview of the skills challenge in the Thembelihle Municipality was provided under 3.2.2. The majority of people work in semi-skilled occupations (crafts, services, clerks and technicians) followed by those working in elementary occupations in. The energy sector is new to the region and related skills are limited. Education levels are low: 25%, 47% and 18% of the Thembelihle population has no schooling, some secondary schooling and a Grade 12 or higher qualification respectively.

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 receive training and skills 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 9 below.

Cumulative Impact	Changes in economic and material well-being			
Impact and Nature of Impact	Skills levels and skills capacity will increase provincially, but not necessarily those of the locals. The newly acquired skills may leave the province as new projects in neighbouring provinces 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)x C	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 Thembelihle municipality.
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Table 9: 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, 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 Thembelihle. 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.

This impact needs further assessment as there are some uncertainties regarding the training and skills development strategy to be employed.

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

Health amenities may be utilized by the maintenance and cleaning team when they are visiting the area on average four times a year. It is anticipated that there is capacity in Kuruman to handle routine visits and that emergencies will be routed to Upington or Kimberley. 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 District 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 District Fire Fighting Service.
- Irrespective of locals or "others" be employed, there may be the fear that increased crime (stock theft) will be experienced on the neighbouring farm area where the site is located. Trespassing on the neighbouring farms and increase in stock theft may take place. The perception that crime may increase provide criminals, not the locals, the opportunity to increase their activities such as stealing livestock. However the plant and related infrastructure will be safe guarded 24 hours. 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 10 below.

Cumulative Impact	Changes in the health and social well-being
Impact and Nature of Impact	<p>The anticipated impacts on health and safety is limited:</p> <p>Operational: The likelihood of health impacts occurring, is low as maintenance of the site according to international standards will have to be adhered to.</p> <p>No noise impact will occur.</p> <p>Fire may be a hazard.</p> <p>The facility may create the opportunity for thieves to steal livestock as locals may have the perception that security staff may steal livestock.</p>

	<p>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.</p> <p>Noise will be generated during the decommissioning phase.</p>			
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	2(-)
Degree of confidence (E)	Low	1	Moderate	2
Level of significance (AxBxD+E)xC	Low	7(-)	Low	16(-)
<p>Mitigation Measures</p> <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 (Intensity:1)	4(-)	Low (intensity low)	8
Related impacts	<p>Deterioration of the bio-physical environment should the EMP not being adhere to. Ceasing of farming activities.</p>			

Table 10: 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 decommissioning 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 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 Kuruman and the provincial 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.

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/ 90
Indirect Sales ('000 000) ²	130	0/ 167
Total Sales ('000 000)	200	0/ 257
% change in Sales	<1%	0

Table 32: Impact of Sales: Operational Phase

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 in a change of less than 1%. A summary of the impact follows in Table 11 below.

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

² R3 mil road, R37mil building, R0.8mil, concrete foundation

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"> • 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 11: 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. 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 34: 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 12 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 12: Impact of GGP: Operational Phase

The intensity of the impact on the GGP is low and yet the impact is of medium significance before and after mitigation. The No Go alternative has no impact. The impact does not require any further assessment.

4.8 Sense of place

The proposed site is situated in the rural area adjacent to the Orange River corridor. The Orange River corridor represents a production landscape, with lower level of irrigations in the immediate vicinity and extensive farming. The area is characterized by a steadily raising topography just outside the valley corridor as more hills and ridges occur closer to the river. The plain area displays a level of gradient that present a fairly high level of absorption. Views are generally restricted to the immediate environment and extend seldom more than 5km. Disselfontein displays sufficient gradient variations to restrict views significantly.

The proposed solar facility is on the site of an existing Eskom substation with High Voltage power lines already established.

The proposed solar facility will change the character of the immediate surrounds. The landscape has a medium absorption rate which reduces the significance of land use change.

The R369 will be exposed to the site, but the visibility is of short duration and linked to existing similar infrastructure i.e. the substation and High Voltage power lines. The briefness of view duration reduces the significance of impact.

As the CPV units are planned next to the substation, the transmission lines will be on-site and not add any additional off-site visual impact to the development

The proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended. The impact does not necessitate any mitigations measures (Lategan, 2012)

All mitigation measures proposed by the visual impact assessor should be implemented.

A summary of the impact follows in Table 13 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 				

<p>used.</p> <ul style="list-style-type: none"> 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. New transmission lines to be aligned with existing power lines connection to the substation. <p>Operational</p> <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. Monitor the glare of the units to prevent unsafe roads, and if necessary change their position on site for the required time slot. <p>Decommissioning</p> <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	9(-)	No mitigation	
Related Impacts	Light pollution at night. Lack of awareness amongst locals and tourists about sustainable energy.			

Table 13: 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

The proposed facility can serve as a tourism attraction. Should tourists visit the facility, other tourism activities in the region such as site seeing, game driving and agri-tourism may benefit.

A summary of the impact follows in Table 14 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	Medium	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 Thembelihle and Hope Town through a website and the local tourism office. 				
Level of significance after mitigation	Low, positive	16		
Related impacts	Expansion of tourism properties of the facility.			

Table 14: Impact of and on tourism: Operational Phase

The significance of the impact caused by the proposed photovoltaic electricity generation facility on tourism is of medium 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	4(-)	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 and facilitate 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 Hope Town 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 Hope Town 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 subsection).

- 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 Hope Town 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 Hope Town, 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 Hope Town 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 Roma Energy Hope Town (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 Hope Town and the community within the Thembelihle Municipal area.

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