

SOCIAL IMPACT ASSESSMENT
(FINAL REPORT)
PROPOSED ACED RENEWABLES DE AAR
PHOTOVOLTAIC SOLAR ENERGY FACILITY
NORTHERN CAPE PROVINCE

OCTOBER 2011

Prepared for

SAVANNAH ENVIRONMENTAL (Pty) Ltd

By

Tony Barbour and Daniel Rogatschnig

Tony Barbour

ENVIRONMENTAL CONSULTANT AND RESEARCHER

P O Box 1753, Sun Valley, 7975, South Africa

(Tel) 27-21-789 1112 - (Fax) 27-21-789 1112 - (Cell) 082 600 8266

(E-Mail) tbarbour@telkomsa.net

EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Savannah Environmental (Pty) Ltd was appointed by ACED Renewables De Aar as the lead consultants to manage the Environmental Impact Assessment (EIA) process for the establishment of a proposed photovoltaic Facility PV facility and associated infrastructure on a site located approximately 10 km east of the town of De Aar in the Northern Cape Province.

Tony Barbour Consulting was appointed by Savannah Environmental (Pty) Ltd to undertake a specialist Social Impact Assessment (SIA) as part of the EIA process. The terms of reference for the study include a scoping level assessment followed by a detailed assessment of the social issues as part of the EIA. This report contains the findings of the Draft SIA undertaken as part of the EIA process.

DESCRIPTION OF THE PROPOSED SOLAR ENERGY FACILITY

An area of approximately 60 km² is being considered for the construction of the PV facility. The proposed facility will accommodate an array of PV panels with a generating capacity of up to 400 MW. The initial proposal included a Concentrated Solar Power (CSP) component with a generating capacity of 100 MW. This component of the project has been excluded from the proposal due to water constraints identified in the scoping phase of the process.

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity. PV facilities consist of the following components.

The Photovoltaic Cell

A PV cell is made of silicone which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a PV panel.

The Inverter

The Photovoltaic Effect produces electricity in direct current. Therefore an inverter must be used to change it to alternating current.

The Support Structure

The PV panels will be fixed to a support structure set at an angle so as to receive the maximum amount of solar radiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics. The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

- PV panels with a generating capacity of ~ 400 MW;
- Five on-site substations to facilitate the connection between the PV facility and the Eskom electricity grid;
- Mounting Structures to support the PV panels;

- Cabling between the project components, to be laid underground where practical;
- Five overhead power lines (max 400 kV) to connect the facility with the existing Eskom electricity network via the Hydra Substation (Photograph 1.2) or existing Power Lines;
- Internal access roads; and
- Workshop area for maintenance and storage.

APPROACH TO THE STUDY

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA
- Collecting baseline data on the current social environment and historical social trends
- Identifying and collecting data on the Social Impact Assessment variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities
- Assessing and documenting the significance of social impacts associated with the proposed intervention
- Identifying alternatives and mitigation measures

In this regard the study involved:

- Review of demographic data from the 2001 Census Survey
- Review of relevant planning and policy frameworks for the area
- Site specific information collected during the site visit to the area and interviews with key stakeholders
- Review of information from similar projects
- Identification of social issues associated with the proposed project

Due to the requirements for the generation of solar energy, no alternative sites were identified within the area. As such, the EIA does not assess any additional site alternatives for the project.

SUMMARY OF KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning
- Construction phase impacts
- Operational phase impacts
- Cumulative Impacts
- Decommissioning phase impacts
- No-development option

The potential health impacts associated with PV facilities are also discussed.

Policy and planning issues

The key documents reviewed included:

- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Pixley ka Seme District Municipality Integrated Development Plan 2009-2012;
- Emthanjeni Local Municipality Integrated Development Plan 2010.

The findings of the review indicated that solar energy is strongly supported at a national, provincial, and local level. In this regard the Emthanjeni IDP identifies De Aar as a **Renewable Energy Hub**. Based on this the establishment of the proposed facility is supported by the relevant policy and planning documentation.

Construction phase

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The construction of the facility will take place in stages; if built in 75 MW blocks it would take between 7 - 18 months. However, the entire 400 MW would be constructed over a 6 - 7 year period. Approximately 300-500 employment opportunities are expected to be created during the construction phase. It is anticipated that approximately 70% (210-350) of the employment opportunities will be available to low skilled (construction labourers, security staff etc.) and semi-skilled workers (drivers, equipment operators etc.) and 30% (90-150) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of the employment opportunities, specifically the skilled and semi-skilled opportunities, are likely to be available to local residents in the area, specifically residents from the towns of De Aar, Britstown, and Hanover. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities.

In terms of training and skills development, ACED Renewables De Aar has indicated that training and skills development will be provided during the construction phase of the project. The majority of these opportunities are likely to be linked to the contractors appointed to manage the construction phase. The implementation of an effective training and skills development programme during the construction phase will be enhanced by the fact that the construction phase is spread out over 3-7 years. However, ACED Renewables De Aar will need to demonstrate a commitment to local employment targets and the implementation of a meaningful skills development and training programme in order to maximise the opportunities and benefits for members from the local community.

The capital expenditure associated with the construction phase will be in the region of R 10-12 billion. The total wage bill for the 3 year construction phase will be in the region of R 144-160 million. This equates to a monthly wage bill of ~ R 4-5 million.

The injection of income into the area in the form of rental for accommodation and wages will create opportunities for local businesses in De Aar, Britstown, and Hanover. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site. The benefits to the local economy will however be confined to the construction period.

Potential negative impacts

- Impacts associated with the presence of construction workers on site
- Influx of job seekers to the area;
- Loss of farm labour to the construction phase;
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site;
- Increased risk of veld fires associated with construction-related activities;
- Threat to safety and security of farmers associated with the presence of construction workers on site;
- Impact of heavy vehicles, including damage to roads, safety, noise and dust; and
- Potential loss of grazing land associated with construction-related activities.

The significance of the potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. In addition, given that the majority of the low and semi-skilled construction workers can be sourced from the local area the potential risk to local family structures and social networks is regarded as low. However, the impact on individuals who are directly impacted on by construction workers and or job seekers (i.e. contract HIV/AIDS) was assessed to be of Medium-High negative significance.

Table 1 summarises the significance of the impacts associated with the construction phase.

Table 1: Summary of social impacts during construction phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	High (Positive impact)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Influx of job seekers	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Loss of farm labour	Low	Low

	(Negative impact)	(Negative impact)
Risk of stock theft, poaching and damage to farm infrastructure	Medium (Negative impact)	Low (Negative impact)
Risk of veld fires	Medium (Negative impact)	Low (Negative impact)
Impact of heavy vehicles and construction activities	Low (Negative impact)	Low (Negative impact)
Loss of farmland	High (Negative impact)	Low (Negative impact)

Operational phase

The key social issues affecting the operational phase include:

Potential positive impacts

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- The establishment of infrastructure to generate renewable energy.

The operational phase will create ~ 60 - 100 permanent employment opportunities as the overall site is built out. Of this total ~ 80% will be for low and semi-skilled workers. The majority of the beneficiaries are therefore likely to be historically disadvantaged (HD) members of the community. Given the location of the proposed facility the majority of permanent staff is likely to reside in De Aar.

In terms of accommodation options, a percentage of the non-local permanent employees may purchase a house in De Aar, possibly Britstown or Hanover, while others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the local economy. The benefits to the local economy will extend over the 25 - 30 year operational lifespan of the project.

The establishment of a solar based Renewable Energy Hub in the region will also create significant economic opportunities for the area and go a long way to offsetting the negative socio-economic impacts, such as job losses, associated with the scaling down of the railway linked activities in De Aar over the last 10-15 years. The significance of this impact is rated as High Positive.

The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a Positive High social benefit for society as a whole.

Due the large number of PV facilities proposed in the Emthanjeni Local Municipality it is recommended that the municipality investigates the Community Trust model developed by the Theewaterskloof Municipality in the Western Cape. In this regard the Theewaterskloof Municipality has made it a requirement for all potential renewable energy operators to become a member of and contribute to a Community Trust. In terms of the structure of the Trust, a percentage of the revenue from the renewable energy operations is allocated to projects identified in the municipality's IDP. Of this total, 50% of the revenue is allocated to infrastructure projects and the remaining 50% to social projects and initiatives, such as skills development and training. It is recommended that a similar model be investigated by the Emthanjeni LM in consultation with developers in the area.

Potential negative impacts

- Influx of job seekers to the area;
- Loss of farm workers to jobs associated with the operational phase;
- The visual impacts and associated impact on sense of place; and
- Potential impact on tourism.

The significance of the potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. However, the impact on individuals who are directly impacted on by job seekers (i.e. contract HIV/ AIDS) was assessed to be of Medium-High negative significance.

The visual impacts on landscape character associated with large renewable energy facilities, such as PV facilities, are highlighted in the research undertaken by Warren and Birnie (2009). In the South African context, the majority of South Africans have a strong connection with and affinity for the large, undisturbed open spaces that are characteristic of the South African landscape. The impact of large, solar energy plants on the landscape is therefore likely to be a key issue in South Africa, specifically given South African's strong attachment to the land and the growing number of solar energy applications. However, the the proposed site is traversed by four existing power lines associated with the Hydra Substation, which is located adjacent to the site. The visual integrity of the site has therefore been impacted by the existing energy related infrastructure located both on and adjacent to the site.

The significance of the impacts associated with the operational phase are summarised in Table 2.

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	High (Positive impact)
Promotion of renewable energy projects	Medium (Positive impact)	High (Positive impact)
Influx of job seekers	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Loss of farm labour	Low (Negative)	Low (Negative)
Visual impact and impact on sense of place	Medium (Negative impact)	Medium (Negative impact)
Impact on tourism	Low (Positive and Negative)	Low (Positive and Negative)

Cumulative impacts

The cumulative impacts associated with solar energy facilities, such as the proposed facility, are largely linked to the impact on sense of place and visual impacts. With regard to the area, a number of PV facilities have been proposed in and around De Aar. The relevant environmental authorities should therefore be aware of the potential cumulative impacts when evaluating applications. However, the area has been impacted by existing power lines associated with the Hydra Substation. The significance of the potential cumulative social impacts, specifically the impact on the landscape, is therefore rated to be low. However, it is recommended that the environmental authorities consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken with regard to the optimal number of PV facilities in the area. In addition, the siting and number of individual components of the plant should be informed by findings of the relevant visual impact assessments, specifically with respect to the visual impact on farmsteads and important roads in the area.

The proposed facility also has the potential to result in significant positive cumulative impacts, specifically with regards to the establishment of De Aar as a renewable solar energy hub. The reduction in rail traffic in South Africa over the last 10 - 15 years has had a significant negative socio-economic impact on the economy of De Aar and its inhabitants. The proposed establishment of a number of solar energy facilities near De Aar will create a number of socio-economic opportunities for the town, which, in turn, will result in a positive social benefit. The significance of this impact is rated as High Positive.

Transmission lines

The findings of the SIA indicate that the impacts associated with the proposed overhead power lines will be low.

Potential health impacts

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of PV cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing PV modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in nature and or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks essentially concern workers at the cell manufacturing plant and therefore fall outside the scope of the EIA.

No-development option

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed facility. This also represents a negative social cost.

Decommissioning phase

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of PV facilities, the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 25 - 30 years post commissioning. The decommissioning phase is therefore likely to create additional construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low Negative.

ACED Renewables De Aar should also investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 25 - 30 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

RECOMMENDATIONS

The findings of the SIA indicate that the development of the proposed PV facility will create employment and business opportunities for locals during both the construction and operational phase of the project. The mitigation measures listed in the report should be implemented in order to enhance these positive impacts. In addition, the proposed establishment of a number of solar energy facilities near De Aar will create socio-economic opportunities for the town, which, in turn, will result in a positive social benefit. These benefits will assist to offset the negative impacts on the town of De Aar associated with the reduction in rail traffic in South Africa over the last 10-15 years. The significance of this impact is rated as High Positive.

ACED Renewables De Aar, in consultation with the Emthanjeni Municipality, should also investigate the opportunities for establishing a Community Trust that is linked to other proposed solar energy projects in the area. The revenue for the trust would be derived from the income generated from the sale of energy. The Community Trust should be linked to funding and supporting projects and initiatives identified in the Emthanjeni IDP. The mitigation measures listed in the report to address the potential negative impacts during the construction phase should also be implemented.

The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed PV facility is therefore supported by the findings of the SIA.

However, the potential impacts associated with large, solar energy facilities on an area's sense of place and landscape cannot be ignored. These impacts are an issue

that will need to be addressed by the relevant environmental authorities, specifically given the large number of applications for solar facilities in the area.

IMPACT STATEMENT

The findings of the SIA undertaken for the proposed PV facility indicate that the development will create employment and business opportunities for locals during both the construction and operational phase of the project. The proposed development also supports the Emthanjeni Municipality's policy of developing the area as a Renewable Energy Hub and represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

In addition, the visual integrity of the site has been impacted by the existing power related infrastructure associated with the Hydra substation and associated power lines. It is therefore recommended that the facility as proposed be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
SECTION 1: INTRODUCTION	1
1.1 INTRODUCTION	1
1.2 TERMS OF REFERENCE.....	2
1.3 PROJECT LOCATION	2
1.4 PROJECT DESCRIPTION	2
1.5 APPROACH TO STUDY.....	6
1.5.1 Definition of social impacts.....	6
1.5.2 Timing of social impacts	7
1.6 ASSUMPTIONS AND LIMITATIONS	7
1.6.1 Assumptions	7
1.6.2 Limitations.....	8
1.7 SPECIALIST DETAILS.....	8
1.8 DECLARATION OF INDEPENDENCE	9
1.9 REPORT STRUCTURE	9
SECTION 2: DESCRIPTION OF STUDY AREA	10
2.1 INTRODUCTION	10
2.2 ADMINISTRATIVE CONTEXT	10
2.3 PROVINCIAL CONTEXT.....	10
2.4 SOCIO-ECONOMIC OVERVIEW OF THE PROPOSED PROJECT AREA	14
2.4.1 Emthanjeni Local Municipality.....	14
2.5 HISTORY OF DE AAR	15
2.6 SURROUNDING LAND USES.....	16
SECTION 3: POLICY AND PLANNING CONTEXT.....	21
3.1 INTRODUCTION	21
3.2 NATIONAL LEVEL ENERGY POLICY	21
3.2.1 NATIONAL ENERGY ACT (ACT No 34 OF 2008).....	21
3.2.2 White Paper on the Energy Policy of the Republic of South Africa	21
3.2.3 White Paper on Renewable Energy	22
3.2.4 Integrated Resource Plan for Electricity (2010-2030)	23
3.3 PROVINCIAL LEVEL POLICY AND PLANNING.....	25
3.3.1 Northern Cape Province Provincial Growth and Development Strategy 25	
3.4 DISTRICT LEVEL PLANNING AND SPATIAL POLICY CONTEXT	27
3.4.1 Pixley ka Seme District Municipality Integrated Development Plan 2009-2012.....	27
3.4.2 District Renewable Energy Hub (Draft Concept Document).....	29
3.5 MUNICIPAL LEVEL PLANNING AND SPATIAL POLICY CONTEXT	29
3.5.1 Emthanjeni Local Municipality Integrated Development Plan (2010)	29
3.6 INTERNATIONAL EXPERIENCE WITH SOLAR ENERGY PLANTS	31
SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES	32
4.1 INTRODUCTION	32
4.2 IDENTIFICATION OF KEY SOCIAL ISSUES	32
4.3 POLICY AND PLANNING ISSUES.....	32
4.4 SOCIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE	34
4.4.1 Creation of employment and business opportunities.....	34
4.4.2 Presence of construction workers in the area.....	37
4.4.3 Influx of job seekers to the area	39
4.4.4 Loss of farm labour to the construction phase	41

4.4.5	Increased risk of stock theft, poaching and damage to farm infrastructure	43
4.4.6	Increased risk of veld fires	44
4.4.7	Impact of construction vehicles	46
4.4.8	Damage to and loss of farmland	47
4.5	SOCIAL IMPACTS ASSOCIATED WITH OPERATIONAL PHASE.....	49
4.5.1	Creation of employment and business opportunities	49
4.5.2	Development of clean, renewable energy infrastructure	51
4.5.3	Influx of job seekers to the area	52
4.5.4	Loss of farm labour	54
4.5.5	Visual impact and impact on sense of place.....	55
4.5.6	Impact on tourism	57
4.6	ASSESSMENT POWER LINE OPTIONS.....	58
4.7	POTENTIAL HEALTH IMPACTS	59
4.8	ASSESSMENT OF NO-DEVELOPMENT OPTION	59
4.9	ASSESSMENT OF CUMULATIVE IMPACTS.....	60
4.10	ASSESSMENT OF DECOMMISSIONING PHASE.....	63
	SECTION 5: KEY FINDINGS AND RECOMMENDATIONS.....	65
5.1	INTRODUCTION	65
5.2	SUMMARY OF KEY FINDINGS	65
5.2.1	Policy and planning issues.....	65
5.2.2	Construction phase	66
5.2.3	Operational phase.....	67
5.2.4	Assessment of cumulative impacts	69
5.2.5	Transmission line options.....	70
5.2.6	Potential health impacts	70
5.2.7	Assessment of no-development option	70
5.2.8	Decommissioning phase	70
5.3	CONCLUSIONS AND RECOMMENDATIONS	71
5.4	IMPACT STATEMENT	71
	ANNEXURE A	73
	ANNEXURE B	74
	ANNEXURE C	76

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Savannah Environmental (Pty) Ltd appointed by ACED Renewables De Aar as the environmental consultants to manage the Environmental Impact Assessment (EIA) process for the establishment of a proposed Photovoltaic(PV) Solar Energy Facility and associated infrastructure on a site located approximately 10 km east of the town of De Aar in the Northern Cape Province (Figure 1.1).

Tony Barbour Consulting was appointed by Savannah Environmental to undertake a specialist Social Impact Assessment (SIA) as part of the EIA process. The terms of reference for the study included a scoping level assessment followed by a detailed assessment of the social issues as part of the EIA. This report contains the findings of the Draft SIA undertaken as part of the EIA process.

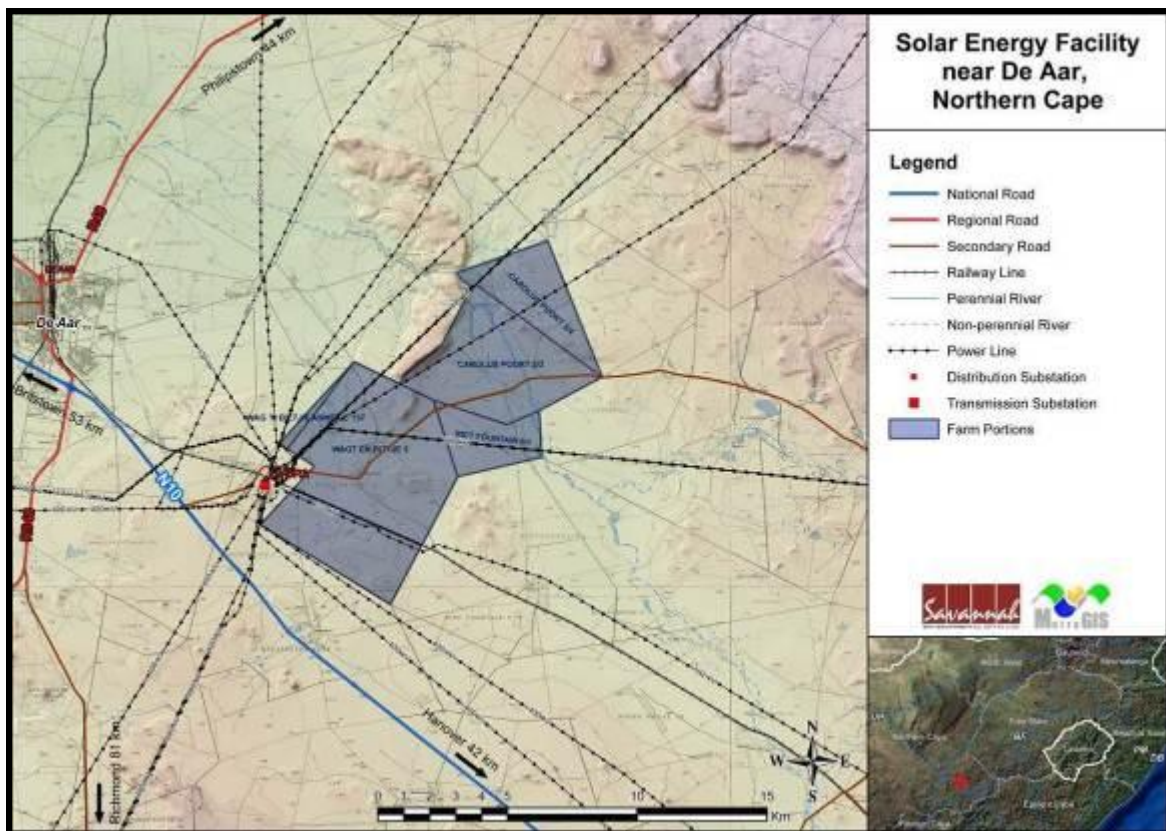


Figure 1.1: Location of the proposed PV facility site (MetroGIS, 2011)

1.2 TERMS OF REFERENCE

The terms of reference for the SIA require:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility.
- A description and assessment of the potential social issues associated with the proposed facility.
- Identification of enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

1.3 PROJECT LOCATION

The proposed PV facility is located north of the N10 (between De Aar and Hanover), approximately 10 km east and north east of the town of De Aar. The affected farms are:

- Carolus Poort 3 (Portion 3);
- Carolus Poort 3 (Portion 4);
- Wag en Bittje 5 (remaining extent of Portion 5);
- Riet Fountain 6 (Portion 1) and Wag 'n Bietjie Annex C 137.

The proposed site is falls within the the Emthanjeni Local Municipality (NC073), which is one of eight local municipalities that make up the Pixley ka Seme District Municipality. De Aar is the administrative seat of the Emthanjeni Local Municipality. Other towns in the area are Britstown (~ 60 km north west of the site) and Hanover (~ 40 south east of the site). Kimberly, the provincial capital of the Northern Cape Province, is located ~ 300 km north east of the site.

1.4 PROJECT DESCRIPTION

An area of approximately 60km² is being considered for the establishment of the proposed PV facility which will have a proposed maximum generating capacity of 400 MW. Photograph 1.1 illustrates a typical array of PV panels. The initial proposal included a Concentrated Solar Power (CSP) component with a generating capacity of 100 MW. This component of the project has been dropped due to constraints regarding water availability.

The energy generated by the facility will be fed into the Eskom grid via the Hydra Substation. The project is therefore an Independent Power Producer (IPP) project.



Photograph 1.1: Example of Photovoltaic array (Source: www.wapa.gov)

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity.

Solar PV facilities consist of the following components:

The photovoltaic cell

A photovoltaic (PV) cell is made of silicone which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel.

The inverter

The photovoltaic effect produces electricity in direct current. Therefore an inverter must be used to change it to alternating current.

The support structure

The PV panels are fixed to a support structure set at an angle so to receive the maximum amount of solar radiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics. The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

The basic infrastructure associated with the proposed PV facility would include:

- PV solar panels with a generating capacity of ~ 400 MW;
- Up to 5 on-site substations to facilitate the connection between the PV facility and the Eskom electricity grid;
- Mounting Structure to support the PV panels which will either be rammed directly into the ground or fixed using concrete where required due to ground conditions;
- Cabling between the project components, to be lain underground where practical;
- Up to 5 overhead power lines (i.e. up to 400 kV) to connect the facility with the existing Eskom electricity network via the Hydra Substation (Photograph 1.2 and Figure 1.2) or to the existing power lines in the area;

- Internal access roads; and
- Workshop area for maintenance and storage.



Photograph 1.2: Hydra Substation

The overall aim of the design and layout of the facility is to maximise electricity production through exposure to the solar radiation, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts. The use of solar energy for power generation can be described as a non-consumptive use of natural resources which emits zero greenhouse gas emissions. The generation of renewable energy contributes to South Africa's electricity generating market which has been dominated by coal-based power generation.

Based on the information provided by the construction of the facility will take place in stages; if built in 75 MW blocks construction would take between 7 - 18 months. However, the entire 400 MW would be constructed over a 3 - 7 year period. Approximately 300-500 employment opportunities are expected to be created during peak construction. The total capital expenditure associated with the construction phase will be ~ R 10-12 billion. The operational phase is expected to create ~ 60 - 100 employment opportunities for a period of 25-30 years.

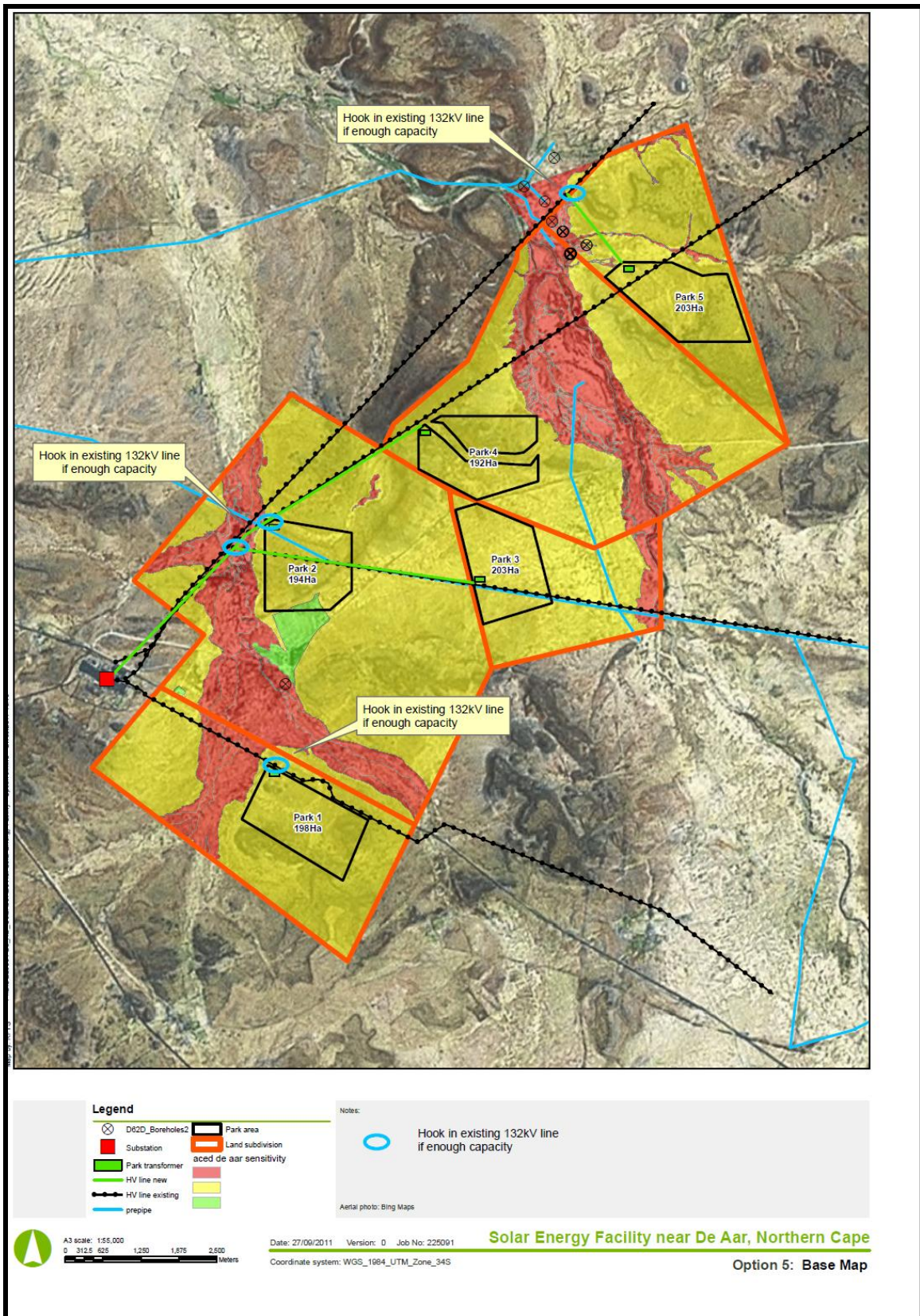


Figure 1.2: Location of PV components and 132-400 kV transmission lines

1.5 APPROACH TO STUDY

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project. This requires a site visit to the area and consultation with affected individuals and communities. As part of the process a basic information document was prepared and made available to key interested and affected parties. The aim of the document was to inform the affected parties of the nature and activities associated with the construction and operation of the proposed development to enable them to better understand and comment on the potential social issues and impacts.
- Assessing and documenting the significance of social impacts associated with the proposed intervention.
- Identifying alternatives and mitigation measures.

In this regard the study involved:

- Review of demographic data from the 2001 Census Survey;
- Review of relevant planning and policy frameworks for the area;
- Site specific information collected during the site visit to the area and interviews with interested and affected parties;
- Review of information from similar studies, including the EIAs undertaken for other renewable energy projects;
- Identification and assessment of the social issues associated with the proposed project.

The identification of potential social issues associated with proposed facility is based on observations during the project site visit, review of relevant documentation, experience with similar projects and the area. Annex A contains a list of the secondary information reviewed and interviews conducted. Annex B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.5.1 Definition of social impacts

Social impacts can be defined as "The consequences to human populations of any public or private actions (these include policies, programmes, plans and/or projects) that alter the ways in which people live, work, play, relate to one another, organise to meet their needs and generally live and cope as members of society. These impacts are felt at various levels, including individual level, family or household level, community, organisation or society level. Some social impacts are felt by the body as a physical reality, while other social impacts are perceptual or emotional" (Vanclay, 2002).

When considering social impacts it is important to recognise that social change is a natural and on-going process (Burdge, 1995). However, it is also important to recognise and understand that policies, plans, programmes, and/or projects implemented by government departments and/or private institutions have the potential to influence and alter both the **rate** and **direction** of social change. Many social impacts are not in themselves “impacts” but change process that may lead to social impacts (Vanclay, 2002). For example the influx of temporary construction workers is in itself not a social impact. However, their presence can result in range of social impacts, such as increase in antisocial behaviour. The approach adopted by Vanclay stresses the importance of understanding the processes that can result in social impacts. It is therefore critical for social assessment specialists to think through the complex causal mechanisms that produce social impacts. By following impact pathways, or causal chains, and specifically, by thinking about interactions that are likely to be caused, the full range of impacts can be identified (Vanclay, 2002).

An SIA should therefore enable the authorities, project proponents, individuals, communities, and organisations to understand and be in a position to identify and anticipate the potential social consequences of the implementation of a proposed policy, programme, plan, or project. The SIA process should alert communities and individuals to the proposed project and possible social impacts, while at the same time allowing them to assess the implications and identify potential alternatives. The assessment process should also alert proponents and planners to the likelihood and nature of social impacts and enable them to anticipate and predict these impacts in advance so that the findings and recommendations of the assessment are incorporated into and inform the planning and decision-making process.

However, the issue of social impacts is complicated by the way in which different people from different cultural, ethnic, religious, gender, and educational backgrounds etc. view the world. This is referred to as the “social construct of reality.” The social construct of reality informs people’s worldview and the way in which they react to changes.

1.5.2 Timing of social impacts

Social impacts vary in both time and space. In terms of timing, all projects and policies go through a series of phases, usually starting with initial planning, followed by implementation (construction), operation, and finally closure (decommissioning). The activities, and hence the type and duration of the social impacts associated with each of these phases are likely to differ.

1.6 ASSUMPTIONS AND LIMITATIONS

1.6.1 Assumptions

Strategic importance of the project and no-go option

It is assumed that the strategic importance of promoting renewable energy, including solar energy, is supported by the national and provincial energy policies.

Technical suitability

It is assumed that the development site identified by represents a technically suitable site for the establishment of a PV facility.

Fit with planning and policy requirements

Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

However, the study recognises the strategic importance of solar energy and the technical, spatial and land use constraints required for such facilities.

Generic issues relating to renewable energy

A number of the key authorities in the Northern Cape Province have been interviewed as part of the SIAs for other solar energy projects. For the purpose of the SIA it is assumed that the generic comments relating to renewable energy, and specifically solar energy, also apply to the PV facility.

1.6.2 Limitations

Demographic data

The demographic data used in the study is largely based on the 2001 Census¹. While this data does provide useful information on the demographic profile of the affected area, the data are dated and should be treated with care. Where possible reference is made to the latest demographic data contained in local Integrated Development Plans and other documents.

In addition, there is no longer any access to Census 2001 data at Ward level via the Municipal Demarcation Board. As such, the social baseline for the Emthanjeni Local Municipality (ELM) (NC073) has been described at Local Municipal level only.

1.7 SPECIALIST DETAILS

The lead author of this report is an independent specialist with 20 years of experience in the field of environmental management. His qualifications include a BSc, BEcon (Hons) and an MSc in Environmental Science. In terms of SIA experience Tony Barbour has undertaken in the region of 120 SIA's and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007.

¹ The last comprehensive national census was conducted in 2001. Census 2001 provided demographic and socio-economic data from National to Municipal Ward level. An interim Community Survey (sample based) was undertaken in 2007, but provided information only on provincial and municipal levels. The next comprehensive national census is planned for 2011.

Daniel Rogatshnig has an MSc in Environmental Science and has five years of experience as an environmental consultant. He has also worked on a number of SIAs with Tony Barbour.

1.8 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour and Daniel Rogatschnig, the specialist consultants responsible for undertaking the study and preparing the Draft SIA Report, are independent and do not have vested or financial interests in PV facility being either approved or rejected.

1.9 REPORT STRUCTURE

The report is divided into five sections, namely:

- Section 1: Introduction
- Section 2: Overview of the study area
- Section 3: Summary of key policy and planning documents relating to solar energy and the area in question
- Section 4: Identification and assessment of key social issues
- Section 5: Summary of key findings and recommendations

SECTION 2: DESCRIPTION OF STUDY AREA

2.1 INTRODUCTION

Section 2 provides an overview of:

- The administrative context;
- The provincial context;
- The policy and planning environment affecting the proposed PV facility;
- The local socio-economic environment;
- Surrounding land uses.

2.2 ADMINISTRATIVE CONTEXT

The study area is located within the Emthanjeni Local Municipality (ELM) (NC073), which is one of the eight B-Municipalities that constitute the Pixley ka Seme District Municipality (PkSDM) (NC7). The District Municipality also includes one District Management Area (DMA) (NCDMA07) located in the northwestern region of the District.

The ELM is approximately 11 390 km² in size (~11% of the greater Pixley ka Seme District Municipality) and is bordered in the north by the DMA, in the east by the Renosterberg Local Municipality and Umsobomvu Local Municipality, in the south by the Ubuntu Local Municipality and in the west by the Kareeberg Local Municipality. The largest towns within the ELM are De Aar, Britstown and Hanover. The administrative centre of the municipality is De Aar, which lies approximately 300 km south east of the provincial capital of Kimberley. De Aar is a major railway junction that links Gauteng, Cape Town, Port Elizabeth and the Port at Coega, and Namibia. The municipality is divided into 7 administrative wards.

2.3 PROVINCIAL CONTEXT

The proposed PV facility is located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361,830 km², and constitutes approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Pixley ka Seme, Namakwa, Siyanda, and John Taolo Gaetsewe DM, twenty-six Category B municipalities and five district management areas. The site itself is located in the Emthanjeni Local Municipality (ELM) (NC073), one of the eight B-Municipalities that constitute the Pixley ka Seme District Municipality (PkSDM) (NC7).

Population

Despite having the largest surface area, the Northern Cape has the smallest population of 822 727 (Census 2001) or 1.8% of the population of South Africa. The population has declined by 2.1% from 1996 (840 321) to 2001 (822 727), resulting in a decrease in the population density, of an already sparsely populated province,

from 2.32 to 2.27 persons per km². Of the five districts, Frances Baard has the largest population of 303 239. The other districts and their respective populations are Siyanda (209 889), Karoo (164 607), Kgalagadi (36 881) and Namakwa (108 111). The population can be classified as a young population with 57.7% of the population being younger than 30 years old. The female proportion makes up approximately 51.2% of the total with males making up the remaining 48.8%. The 2001 Census data indicates a significant shift in the 20 – 24 cohort occurs, which can possibly be attributed to, amongst others, people in this age group moving to other provinces in search of better career and job opportunities and tertiary education. Research indicates that approximately 36% of the migrants from the Northern Cape moved to the Western Cape, while 19.4% moved to the North West (19.4%), 18.5% to Gauteng and 12.8% to the Free State (12.8%). In addition, there has also been an increase in migration from the rural areas to the larger towns in the province over the last five years. This movement is in response to the improved access to opportunities and services within the larger urban centers. This trend is reflected in the increase in the proportion of people living in urban areas from 75.2% in 1996 to 82.7% in 2001

Education

In terms of education levels 15.1% of the population had no education at all, while 71.3% have primary or secondary education. Those with a higher educational qualification accounted for 3.7% of the population (Figure 2.1). These figures indicate an increase in all categories since 1996, except for the no schooling category, which decreased by 4.9% indicating a higher percentage of people attending school.

The information contained in Figure 2.1, indicates that, in general, there has been an improvement in the educational qualifications of the labour force in the Northern Cape. There has also been an increase in the proportion of the labour force that has a secondary and tertiary education. This would appear to be the result of an increase in access to education since 1994, in particular, amongst new entrants to the labour force.

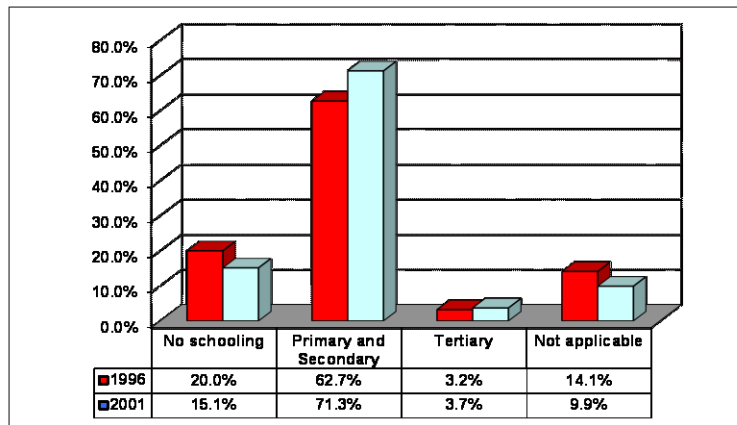


Figure 2.1: Percentage of people by level of education for 1996 and 2001 (Source: Northern Cape Province PGDS)

Economic development

The Human Development Index² (HDI) for the province, which covers four indexed factors – life expectancy, adult literacy, GDP per capita (adjusted for real income) and education attainment, for the Northern Cape as a whole is 0.58, which is substantially below the South African figure of 0.72.

For the Northern Cape, the areas of lowest Human Development Index include the South Eastern region (Noupoort and Richmond) and the hinterland of Kimberley (Griekwastad, Campbell and Douglas) – for these areas the HDI varies between 0.47 to 0.51. Over the past 8 years there has been little to no variance in the HDI figures, indicating no increase or decrease in the overall standard of living. In contrast, the Kimberley and Springbok areas have the highest HDI of 0.63 to 0.62 respectively, primarily due to the broader economic opportunities and access to services such as infrastructure, schools, and health facilities. Similarly, there has been no significant change over the past 8 years.

The above trend is unlikely to change in the near future, mainly due to the marginal economic base of the poorer areas, and the consolidation of the economic base in the relatively better off areas.

In terms of per capita income, the Northern Cape Province has the third highest per capita income of all nine Provinces; however, income distribution is extremely skewed, with a high percentage of the population living in extreme poverty. The measure used in the PGDS document to measure poverty is the percentage of people living below the poverty line or breadline is used³. The poverty line indicates a lack of economic resources to meet basic food needs. Figure 2.2 indicates the percentage of household income below the poverty breadline of R800 in the Northern Cape Province, the highest being Karoo at 48% and the lowest being Namakwa at 36%.

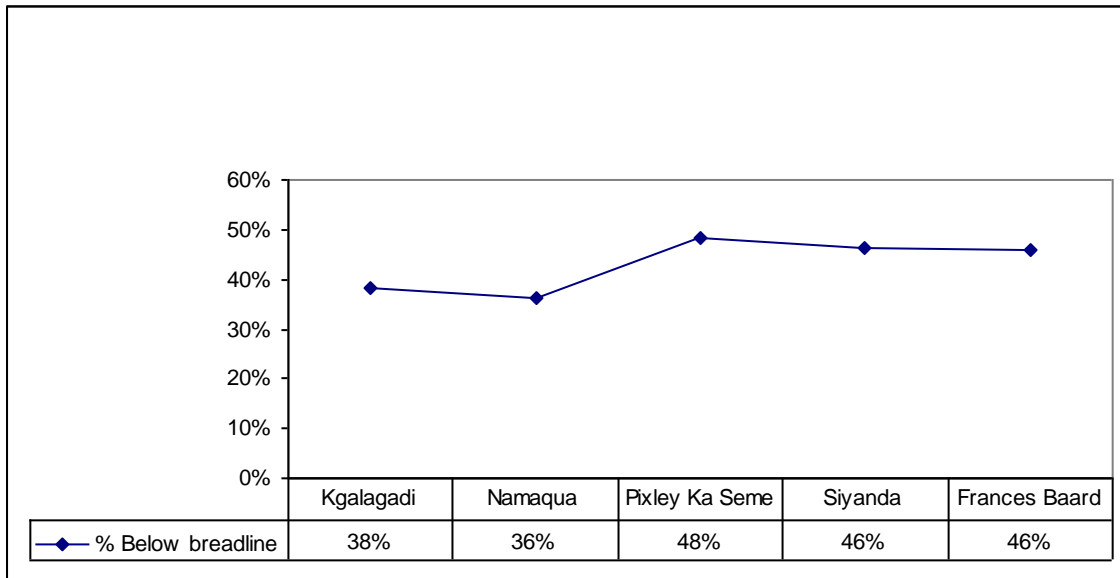


Figure 2.2: Percentage of household income below the poverty breadline by district (Source: Northern Cape PGDS)

² The closer the HDI to 1.0, the higher the level of “living condition.” For example, Sweden has an index of 0.91 defined as high, South Africa at 0.72 is defined as middle, and Lesotho at 0.47 is defined as low.

³ In terms of the poverty line, a person is considered poor if his or her consumption or income level falls below some minimum level necessary to meet basic needs. The minimum level is usually called the poverty line. In South Africa the poverty income level is set at R800/month.

Economic sectors

In terms of economic importance, the Northern Cape's share of the country's Gross Domestic Product (GDP) in 2002 was 2%, the lowest contribution of the nine provinces. However, although the Northern Cape Province has the smallest economy of the nine provinces, Gross Domestic Product of the Region (GDPR) per capita is higher than the national average. In terms of economic activities, the economy of Northern Cape is heavily dependent on the primary sectors of the economy, which in 2002 made up 31.0% of GDPR. The largest sector is mining which has declined in contribution to the GDPR from 25.8% in 1996 to 23.7% in 2002. Agriculture, on the other hand, increased in its contribution from 6.2% to 7.3%.

A worrying characteristic of the economy is the limited amount of processing of the primary commodity output in mining and agriculture that takes place in the Northern Cape. This is reflected in the fact that manufacturing contributes only 4.2% towards GDPR. All the industries in the secondary sector have decreased in their contribution to the GDPR, with electricity and water sector showing the greatest decrease of 0.7% and the construction industry making the lowest contribution of 1.9% to the GDPR of the Northern Cape. At the same time the contribution to regional GDPR by industries in the tertiary sector increased, with the exception of the wholesale and retail industry, which decreased by 1.1%. Figure 2.3 illustrates the percentage contribution of the various economic sectors to the GDPR of the Northern Cape

Employment

Of the economically active population in the Northern Cape, 55.5% were employed while 26.1% could not find employment. This unemployment figure is lower than the national figure of 29.5%. Significant for this province, however, is that a third of the total population is younger than 15 years old and approximately 45% of the potential labour force is younger than 30 years. At the same time, unemployment is the highest among the youth with unemployment rates of 54% and 47% in the 15 - 19 and 20 - 24 year-old age groups. There has been an increase in the economically active population from 35.9% in 1996 to 38.1% in 2001. The unemployment rate for the same period has increased from 28.3% to 33.4%. In terms of employment there has been a decrease in the number of people that are formally employed from 196 219 in 1996 to 193 980 in 2001. The largest decrease was in the private household sector, showing a loss of 4 859 jobs.

The most important sectors in terms of employment in 2002 were agriculture, hunting, forestry, and fishing (28.4%), community, social and personal services (19.8%), wholesale and retail trade (12.7%), and private households (11.4%) (Table 2.3).

Table 2.3: Formal employment by sector (Source: Northern Cape PGDS)

Sectors	1996	1996 % of persons employed per sector	2001	2001 % of persons employed per sector
Primary				
Agriculture, hunting; forestry and fishing	48646	24.8	55016	28.4
Mining and quarrying	18556	9.5	15493	8.0
Secondary				
Manufacturing	8812	4.5	10598	5.5

Electricity; gas and water supply	2397	1.2	1385	0.7
Construction	10402	5.3	8971	4.6
Tertiary				
Wholesale and retail trade	23099	11.8	24671	12.7
Transport; storage and communication	9963	5.1	6366	3.3
Financial, insurance, real estate and business services	7733	3.9	10989	5.7
Community, social and personal services	39724	20.2	38463	19.8
Private Households	26887	13.7	22028	11.4
Total		196219		193980

2.4 SOCIO-ECONOMIC OVERVIEW OF THE PROPOSED PROJECT AREA

As indicated in Section 1.6.2 Limitations, it is no longer possible to access Census 2001 data at Ward level via the Municipal Demarcation Board. As a result it was not possible to obtain ward level data for the Emthanjeni Local Municipality. The social baseline for this part of the study area is therefore described at Local Municipal level only.

2.4.1 Emthanjeni Local Municipality

Information provided below is mainly derived from the latest ELM IDP document (2009-2013), the 2007 Community Survey and the 2001 Census.

Dominant economic sectors (GDP)

Economically, the Emthanjeni Municipality contributed approximately 25% of the greater district's local economy in the year 2000. According to the LM IDP, the largest sectors within the municipality are the following:

- Community Services (36%);
- Transport (24%);
- Finance (13%);
- Trade (11%);
- Agriculture (7%);
- Electricity (4%);
- Manufacturing (3%); and
- Construction (2%).

De Aar is at the centre of the economy of the Municipality. Its railway junction links Gauteng with Cape Town, Port Elizabeth and the Port at Coega, and Namibia. De Aar also has the largest abattoir in the Southern Hemisphere and the surrounding sheep farms are also major suppliers of wool for both the local and international market.

Population and population groups

The Pixley ka Seme District's total population was estimated at 166 849 people, with the ELM accounting for ~23% (38 228) of that figure (Community Survey, 2007). The average population growth between 2001 and 2010 was estimated at 0.60% (Emthanjeni IDP, 2010). In 2001, approximately 92% of the population in the Emthanjeni LM lived in the three major urban centres of De Aar, Britstown and Hanover. Given the size of the Municipality and the relatively small total population size, the population density within the Municipality generally is low at 3.4 people per km². However, the population density in the three urban nodes of De Aar, Brits town and Hanover can be expected to be significantly higher than that of the surrounding rural areas. According to the Emthanjeni IDP (2010), the municipal population is largely Coloured (57.5%), followed by Black African (35.3%), White (7.1%) and Asian (<1%).

Age profile

The age profile of the population reveals that approximately 65.2% of the population falls within the economically active age bracket of between 15-64 years of age. Approximately 30% of the population is 15 years old or less while the remaining 5% of the population are 64 years old or older. According to the Municipal IDP, 31% of the population falls within the school going age group of 7 to 19 years.

Education

Broadly, the level of education within the Municipality is low. In 2001 just under 20% of the population (1 in 5) had no schooling, while approximately 1/10 of those who completed some form of Secondary education (~36%) progress to obtain education at University/Technikon level (~3.5%). Between 2001 and 2007, the education levels improved marginally with the number of people who had no form of education decreasing to 15% and those who completed some form of tertiary education increasing to just over 5%.

Employment

Unemployment within the Municipality is estimated at 23.1% of the total labour force, which is below the Northern Cape average of ~27% while 43.5% of the population is not economically active⁴. The latter are made up of made up of scholars/students, homemakers/housewives, pensioners, the medically unfit, seasonal workers not currently employed, and those who choose not to work. The Municipal IDP and supporting documents do not provide any detail regarding the relative size of the each of the economic sector's contribution to employment in the LM.

2.5 HISTORY OF DE AAR

The history of De Aar is closely linked to the history of South Africa's railway system. Owing to its central location, the government bought a portion of the farm De Aar for building a junction on the first railway line from Cape Town to Kimberley built in 1881. The junction was originally called Bronger Junction after the Colonial railway

⁴ The term "not economically active" refers to people of working age not actively participating in the economy, such as early retirees, students, the disabled and home-makers.

engineer at the time, William Brounger. However, the name reverted to the name of the farm, namely De Aar. The junction played a key strategic role for the English during the Second Boer War. In 1889 two brothers, Issac and Wolf Friedlander, who ran the local trading store and hotel at the junction bought the De Aar Farm. After the Anglo Boer War a small town was established on the farm and a municipality was created in 1903. The town's first mayor, Dr Harry Baker was elected in 1907.

Due to its central location De Aar is the second-most important railway junction in the country. The lines from the Eastern and Western Cape, as well as the northern provinces, Zimbabwe and Namibia all meet in De Aar. In the mid-1960's there were 110 km of track within the precincts of the town, and trains passed through at the rate of 92 per day, increasing considerably during peak periods. As a railway and bridge-building depot the local South African Railways workshops played an important role in South Africa's rail network and were a major source of employment for the town.

However, over the last 10-15 years the move away from rail transport to road transport has affected significantly on the town's economy. Despite this De Aar remains the main commercial and distribution centre for a large area of the central Great Karoo. In addition, as a declared industrial growth point, with ample, very reasonably priced industrial sites, affordable labour and the necessary infrastructure, De Aar is the ideal place to establish an industry in the Northern Cape. Major production activities of the area include wool production and livestock farming.

2.6 SURROUNDING LAND USES

The proposed site covers an area of $\sim 60\text{km}^2$ and is located on Carolus Poort 3 (Portion 3), Carolus Poort 3 (Portion 4), Wagt en Bittje 5 (remaining extent of Portion 5) and Riet Fountain 6 (Portion 1) and Wag 'n Bietjie Annex C 137. The site is bounded by low hills to the north-west and south east. The remainder of the site is relatively flat (Photograph 2.1 and 2.2). The land uses on the site are confined to livestock farming, specifically cattle and sheep.



Photograph 2.1: View of the site looking north-west from the Hydra Road



Photograph 2.2: View looking south west from the Hydra Road with the Hydra substation and associated power lines in the background

In terms of infrastructure, the Hydra Road cuts across the site from south west to the north east and essentially bisects the site in two. The railway that links Port Elizabeth with Sishen cuts across the southern section of the site. In addition, four power lines associated with the Hydra Substation, which is located adjacent to the site's south western boundary, traverse the site (Photograph 2.3).



Photograph 2.3: View of existing power lines that traverse the site

Road access to the proposed site is from the N10, which is located to the south of the site, and the Hydra Road, which runs in a north easterly direction from the intersection with the N10 and links up with the R369 (Figure 2.1). The Bletterman Station is located adjacent to the west boundary of the site (Photograph 2.4). The Bletterman Station is no longer operational. However, the siding could be utilised for the transport of material for the construction phase. The visual character of the area and its sense of place have therefore been altered by the existing infrastructure and adjacent land uses, such as the Hydra and Bletterman Substations.

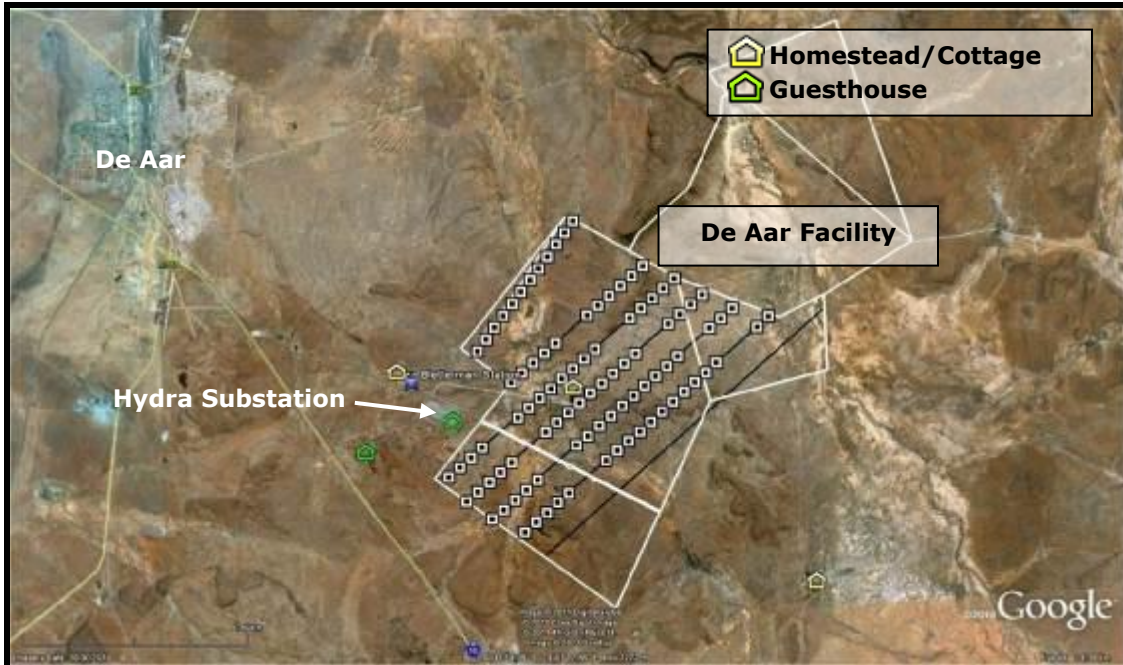


Figure 2.1: Location of PV site relative to key access roads, adjacent land uses, houses and guest cottages



Photograph 2.4: Bletterman Railway Station

There are two occupied homesteads and two guesthouses located near the site (Figure 2.1 and Photograph 2.5, 2.6 and 2.7).



Photograph 2.5: Homestead located in the middle of the site



Photograph 2.6: Kampfontein Guest Farm located near the junction of the N10 and Hydra Road



Photograph 2.7: Homestead and Eskom labour camp located south west of the proposed site

The closest towns to the site are De Aar (~ 10 km north west), Britstown (~ 65 km west) and Hanover (~ 40 km south east). The majority of the population in the area resides in these three towns. De Aar is a major railway junction that links Gauteng, Cape Town, Port Elizabeth and the Port at Coega, and Namibia. The dominant land uses in the area are agricultural, with beef cattle and sheep (mutton and wool) representing the dominant agricultural activities (Photograph 2.8).



Photograph 2.8: Cattle grazing in the study area

SECTION 3: POLICY AND PLANNING CONTEXT

3.1 INTRODUCTION

Section 3 provides an overview of the policy and planning environment affecting the proposed PV facility. For the purposes of the meeting the objectives of the EIA the following policy and planning documents were reviewed, namely:

- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Pixley ka Seme District Municipality Integrated Development Plan 2009-2012;
- District Renewable Energy Hub (Draft Conceptual Plan, 2010); and
- Emthanjeni Local Municipality Integrated Development Plan 2010;

The section also provides a summary some of the key social issues associated with solar facilities based on international experience.

3.2 NATIONAL LEVEL ENERGY POLICY

3.2.1 NATIONAL ENERGY ACT (ACT No 34 OF 2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar:

“To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (...); to provide for (...) increased generation and consumption of renewable energies...” (Preamble).

3.2.2 White Paper on the Energy Policy of the Republic of South Africa

Investment in renewable energy initiatives, such as the proposed PV facility, is supported by the White Paper on Energy Policy for South Africa (December 1998). In this regard the document notes:

“Government policy is based on an understanding that renewables are 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”.

The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly **solar** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented;
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options; and,
- Addressing constraints on the development of the renewable industry.

The White Paper also acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country’s renewable energy resource base is extensive and many appropriate applications exist.

The White Paper also notes that renewable energy applications have specific characteristics that need to be considered. Advantages include:

- Minimal environmental impacts in operation in comparison with traditional supply technologies;
- Generally lower running costs, and high labour intensities.

Disadvantages include:

- Higher capital costs in some cases
- Lower energy densities
- Lower levels of availability, depending on specific conditions, especially with sun and wind based systems

3.2.3 White Paper on Renewable Energy

This White Paper on Renewable Energy (November, 2003) (further referred to as the White Paper) supplements the *White Paper on Energy Policy*, which recognises that the medium and long-term potential of renewable energy is significant. This Paper sets out Government’s vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes, that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol, Government is determined to make good the country’s commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties(COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual.

Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (in this regard, also refer to the objectives of the National Energy Act).

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is:

10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW) (Executive Summary, ix).

3.2.4 Integrated Resource Plan for Electricity (2010-2030)

The current iteration of the Integrated Resource Plan (IRP) for South Africa, initiated by the Department of Energy (DoE) after a first round of public participation in June 2010, led to the Revised Balanced Scenario (RBS) that was published in October 2010. The document outlines the proposed generation new build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation. In addition to all existing and committed power plants, the RBS included a nuclear fleet of 9.6 GW; 6.3 GW of coal; 11.4 GW of renewables; and 11 GW of other generation source

A second round of public participation was conducted in November/December 2010, which led to several changes to the IRP model assumptions. The main changes were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP) and wind options; the inclusion of learning rates, which mainly affected renewables; and the adjustment of investment costs for nuclear units, which until then represented the costs of a traditional technology reactor and were too low for a newer technology reactor (a possible increase of 40%).

Additional cost-optimal scenarios were generated based on the changes. The outcomes of these scenarios, in conjunction with the following policy considerations, led to the Policy-Adjusted IRP:

- The installation of renewables (solar PV, CSP and wind) were brought forward in order to accelerate a local industry;

- To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6 GW was included in the IRP;
- The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) was maintained;
- Energy efficiency demand-side management (EEDSM) measures were maintained at the level of the RBS.

The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9.6 GW of nuclear; 6.3 GW of coal; 17.8 GW of renewables; and 8.9 GW of other generation sources. The Policy-Adjusted IRP has therefore resulted in an increase in the contribution from renewables from 11.4 GW to 17.8 GW.

Table 3.1 indicates the new capacities of the Policy commitment. The dates shown in Table 3,1 indicate the latest that the capacity is required in order to avoid security of supply concerns. The document notes that projects could be concluded earlier than indicated.

Table 3.1: Commitments before next IRP

	New build options							
	Coal (PF, FBC, imports, own build)	Nuclear	Import hydro	Gas – CCGT	Peak – OCGT	Wind	CSP	Solar PV
	MW	MW	MW	MW	MW	MW	MW	MW
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	300
2013	0	0	0	0	0	0	0	300
2014	500 ¹	0	0	0	0	400	0	300
2015	500 ¹	0	0	0	0	400	0	300
2016	0	0	0	0	0	400	100	300
2017	0	0	0	0	0	400	100	300
2018	0	0	0	0	0	400 ⁴	100 ⁴	300 ⁴
2019	250	0	0	237 ³	0	400 ⁴	100 ⁴	300 ⁴
2020	250	0	0	237 ³	0	400	100	300
2021	250	0	0	237 ³	0	400	100	300
2022	250	0	1 143 ²	0	805	400	100	300
2023	250	1 600	1 183 ²	0	805	400	100	300
2024	250	1 600	283 ²	0	0	800	100	300
2025	250	1 600	0	0	805	1 600	100	1 000
2026	1 000	1 600	0	0	0	400	0	500
2027	250	0	0	0	0	1 600	0	500
2028	1 000	1 600	0	474	690	0	0	500
2029	250	1 600	0	237	805	0	0	1 000
2030	1 000	0	0	948	0	0	0	1 000
Total	6 250	9 600	2 609	2 370	3 910	8 400	1 000	8 400

■ Firm commitment necessary now
■ Final commitment in IRP 2012

1. Built, owned & operated by IPPs 2. Commitment necessary due to required high-voltage infrastructure, which has long lead time 3. Commitment necessary due to required gas infrastructure, which has long lead time 4. Possibly required grid upgrade has long lead time and thus makes commitment to power capacity necessary

Source: Integrated Resource Plan (IRP) for South Africa

The key recommendations contained in the Policy-Adjusted IRP Final Report (March 2011) that have a bearing on the renewable energy sector include:

General

- The dark shaded projects in Table 3.1 need to be decided before the next IRP iteration, with the identified capacities thereafter assumed as “committed” projects;
- The light shaded options should be confirmed in the next IRP iteration;
- All non-shaded options could be replaced during the next, and subsequent, IRP iterations if IRP assumptions change and thus affect the quantitative model results.

Solar energy

- Solar PV programme 2012-2015: In order to facilitate the connection of the first solar PV units to the grid in 2012, a firm commitment to this capacity is necessary. Furthermore, to provide the security of investment to ramp up a sustainable local industry cluster, the first four years from 2012 to 2015 require firm commitment;
- Solar PV 2016 to 2019: As with wind, grid upgrades might become necessary for the second round of solar PV installations from 2016 to 2019, depending on their location. To trigger the associated tasks in a timely manner, a firm commitment to these capacities is necessary in the next round of the IRP at the latest. By then, the assumed cost decreases for solar PV will be confirmed;
- CSP 2016: The 100 MW of CSP power, planned for 2016, needs firm commitment because of the long lead time of these projects;
- CSP 2017 to 2019: Because of the long lead time for CSP plants, a commitment to the capacity planned for 2017 to 2019 is necessary in the next round of the IRP at the latest. By then, the cost and technical assumptions for CSP plants will also be grounded on more solid empirical data;

Conclusions

The key conclusions that are relevant to the renewable energy sector include:

- An accelerated roll-out of renewable energy options should be allowed in order to derive the benefits of localisation in these technologies;
- A solar PV programme as envisaged in the Policy-Adjusted IRP should be pursued (including decentralised generation).

3.3 PROVINCIAL LEVEL POLICY AND PLANNING

3.3.1 Northern Cape Province Provincial Growth and Development Strategy

The Provincial Growth and Development Strategy (PGDS) notes that the most significant challenge that the government and its partners in growth and development are confronted with is the **reduction of poverty**. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The PGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include:

- Agriculture and agro-processing;
- Fishing and mariculture;
- Mining and mineral processing;
- Transport;
- Manufacturing; and

- Tourism.

However, the PGDS also notes that economic development in these sectors also requires:

- Creating opportunities for lifelong learning;
- Improving the skills of the labour force to increase productivity; and
- Increasing accessibility to knowledge and information.

The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development:

- Developing requisite levels of human and social capital;
- Improving the efficiency and effectiveness of governance and other development institutions; and
- Enhancing infrastructure for economic growth and social development.

Of specific relevance to the SIA the Northern Cape PGDS refers to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape, the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. In this regard the Northern Cape PGDS notes "the development of energy sources such as **solar energy**, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The Northern Cape PGDS highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised.

The NCPGDS also highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed PV facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

In this regard care will need to be taken to ensure that the proposed PV facility and other renewable energy facilities do not negatively impact on the regions natural environment. In this regard the Northern Cape PGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed PV facility; do not affect the tourism potential of the province.

The Northern Cape PGDS also notes that the Northern Cape Provincial Government will promote the preservation of agricultural biodiversity and the sustainable use of

soil and water through the application of legislation and related regulations where this is necessary

3.4 DISTRICT LEVEL PLANNING AND SPATIAL POLICY CONTEXT

3.4.1 Pixley ka Seme District Municipality Integrated Development Plan 2009-2012

The Pixley ka Seme District Municipality Integrated Development Plan (IDP) (2009-2012) is based on the requirements and guidance of the Municipal Systems Act (Act No. 32 of 2000) which identifies 5 broad strategic priority areas for consideration during the IDP process. These broad strategic priority areas are as follows:

- Infrastructure and Services;
- Social and Economic Development;
- Institutional Transformation;
- Democracy and Governance; and
- Financial Management/Viability.

More specifically, the 2009-2010 IDP forms the basis for the District to achieve the following:

- Support Government efforts to put the people at the centre of development, not merely as beneficiaries, but as drivers of transformation;
- Move faster and further in providing a better life for all;
- Strive to halve unemployment and poverty by the end of 2014;
- Create job opportunities and fight poverty through infrastructure development and service delivery, procurement and support for SMME's and Broad Based Black Economic Development;
- Speed up the delivery of free basic services;
- Work with National and Provincial Government to improve service delivery and access to basic services;
- Ensure that communities have access to clean water by the end of 2010;
- **Ensure that communities have access to electricity by the end of 2014;**
- Ensure that communities have access to decent sanitation by the end of 2010;
- Ensure that communities have access to decent housing by the end of 2010;
- Utilise distributed land for development and agricultural purposes;
- Provide the skills required for the District's economic development and growth;
- Provide infrastructure to facilitate economic growth and development that will increase capacity to provide basic services and contribute to a safe and healthy environment;
- Ensure community and public participation to allow citizens to identify the problems that their community face and partner in providing solutions;
- Build sustainable human settlements;
- Ensure that councillors are responsive, accountable and effective and that everybody is involved in local government understands and honours the duty to respect and serve the people.

The guidance of the strategic priorities forms the framework for the District analysis of the status quo across numerous sectors within the District. The District analysis, in turn, informs the development objectives for the municipality. The IDP development objectives highlighted in the Pixley ka Seme IDP include:

- **Objective 1:** *To accelerate the Provision of Water, Sanitation, Roads & Storm Water & Electricity Services in partnership with key stakeholders to meet millennium targets and improve the living conditions for all;*
- **Objective 2:** *To accelerate the Provision of quality Municipal health Services to all Communities in line with National Department of Health guidelines to ensure effective, affordable and accessible Municipal Health Services to all;*
- **Objective 3:** *To provide a comprehensive Disaster Management, Fire and Emergency Services that will ensure that all communities are safe and can get timely and adequate assistance and responses in time of need;*
- **Objective 4:** *To increase compliance to traffic legislation and licensing services within the Pixley Ka Seme Local Municipality area;*
- **Objective 5:** *To increase capacity of Pixley Ka Seme Local Municipality to have comprehensive town planning in support of economic growth and development;*
- **Objective 6:** *To facilitate provision of adequate housing services to meet community needs and stimulate economic growth and development;*
- **Objective 7:** *To develop and implement a comprehensive municipal IDP that will meet all the basic service backlogs, infrastructural shortages, institutional arrangement challenges, capacity building, etc. to strengthen public participation through Izimbizo, IDP Forums and other Communication platforms;*
- **Objective 8:** *To increase the capacity of Pixley Ka Seme Local Municipality promote tourist attraction areas and increase the participation and beneficiation of the previously marginalized communities;*
- **Objective 9:** *To ensure that Pixley Ka Seme Local Municipality maintains its clean audit record and have good financial management;*
- **Objective 10:** *To facilitate, support provision of comprehensive services to the communities through accelerated service delivery and ensuring that communities can have access to services which are closer to them;*
- **Objective 11:** *To increase the capacity of the Pixley Ka Seme Local Municipality, to provide efficient and effective support services to its administration and political office bearers;*
- **Objective 12:** *To increase the capacity of Pixley ka Seme to have comprehensive Transport Planning in support of economic growth and development;*
- **Objective 13:** *To enhance Pixley ka seme Local Municipality capacity to provide bulk infrastructure, capacitate and support in providing basic services and project Management;*
- **Objective 14:** *To accelerate water provision within Pixley Ka Seme and to ensure that all residents have access to clean water; and*
- **Objective 15:** *To facilitate provision of adequate services to meet community needs and stimulate economic growth and development.*

According to the Pixley ka Seme strategy plan, a key development objective is to provide access to electricity to all households in the District by 2014. To achieve this, the District Municipality aims to i) Fast track the delivery of free basic electricity and ii) co-ordinate the maintenance and upgrading of the existing electricity infrastructure. While no specific mention is made of the promotion of alternative energy sources, the proposed project would potentially support a number of the development goals and objectives of the Pixley ka Seme DM.

3.4.2 District Renewable Energy Hub (Draft Concept Document)

The LED Division of the Pixley ka Seme District Municipality has proposed the development of a Renewable Energy Hub along the N10 corridor and around the town of De Aar. The proposal is set out in a District Renewable Energy Hub Draft Conceptual Document (26 February 2010).

The draft concept document outlines the proposed strategy which is in line with both the National and Provincial policy with respect to renewable energy generation. A number renewable energy sources have been identified for the proposed District-wide Hub including:

- Solar;
- Wind;
- Bio-Mass (bio diesel and associated by-products); and
- Hydro-electric.

The draft concept document indicates that the district is well positioned for renewable energy development due to the ample availability of suitable land, the existence of adequate existing infrastructure (particularly with respect to the existing railway hub) to facilitate the growth of the industrial and manufacturing sectors, exposure to high insolation rates and steady winds as well as access to both surface and groundwater resources.

The Renewable Energy Hub is seen as a critical component to the revitalization of the both the broader District and the town of De Aar. In this regards it is envisaged that the Hub will attract both local and foreign investors and research institutions, which, in turn, will help to alleviate the increasing demand on electricity nationally as well as South Africa's dependence on fossil fuel. In addition the Hub will create employment and downstream business opportunities for local entrepreneurs.

As part of the broader development of De Aar and the District, the Pixley ka Seme District Municipality is in the process of drafting a development plan for an inland port and transport hub centered in and around De Aar and powered by renewable energy generated by the Renewable Energy Hub.

3.5 MUNICIPAL LEVEL PLANNING AND SPATIAL POLICY CONTEXT

3.5.1 Emthanjeni Local Municipality Integrated Development Plan (2010)

The Emthanjeni Local Municipality Integrated Development Plan (IDP) (2010) identifies a number of key performance areas (KPAs) in line with National guidelines. These KPAs address the outcome of an analysis of the status quo across numerous sectors within the ELM and include the following:

- Basic Service Delivery;
- Local Economic Development;
- Environmental Management;
- Social Development;
- Good Governance and Public Participation;
- Safety and Security;
- Cross-Cutting Issues;

- Municipal Financial Viability and Management; and
- Municipal Institutional Transformation.

These KPAs aim to utilise existing economic strengths and opportunities by transferring these into workable programmes and projects. These programmes and projects tend to reduce the current threats, and strengthen the weaknesses in the local economic environment. The IDP KPAs that are relevant to the proposed PV facility include:

- Basic Service Delivery: Energy is highlighted as one of the priority issues for the LM with respect to basic services; and,
- Local Economic Development (LED): Micro and macro-economic development and land use management are highlighted as one of the priority issues for the LM with respect to LED.

The Municipality identified a number of industrial and manufacturing projects that form part of their strategy for the economic development of the LM. These include amongst others:

- The development of N10 Corridor;
- Upgrading of the airport;
- Revitalization of the rail infrastructure;
- Development of industrial sites (Hanover / Britstown);
- Urban Renewal Programme (Renewal of Townships);
- A toilet paper Plant;
- A water purification Plant;
- An Iron Ore and Manganese Smelter Plant;
- Upgrading and maintenance of parks in Emthanjeni;
- A Logistics hub (De Aar); and
- **A Renewable Energy hub** (De Aar).

3.6 INTERNATIONAL EXPERIENCE WITH SOLAR ENERGY PLANTS

The proposed facility is a PV facility as opposed to a Concentrating Solar Power (CSP) plant⁵. In this regard the majority of the international experience is based on CSPs as opposed to PV facilities. In this regard the key differences in terms of potential impacts relate to the use of water and the visual impacts associated with the large tower structures associated with CSP plants.

CSP plants (like most conventional power plants) require large volumes of cooling water, which make them less suited to arid, water scarce environments, such as the Karroo. PV facilities on the other hand, such as the proposed PV facility, on the other hand, do not require cooling water, and as such are more suited to areas where water is a scarce resource.

In terms of visual impacts, parabolic troughs and power towers, where the solar energy from the solar reflectors is concentrated, as are associated with CSP facilities, are likely to have a higher visual impact than the solar panels associated with PV facilities. .

⁵ The original plan included a CSP component with a generation capacity of 100 MW. This component of the project has however been dropped due to constraints regarding water availability.

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 identifies the key social issues identified during the SIA study. The identification of social issues was based on:

- The Social Scoping Report prepared for the Scoping Report (Tony Barbour, June, 2011);
- Review of project related information, including other specialist studies;
- Interviews with key interested and affected parties;
- Experience of the authors of the area and the local conditions; and
- Experience with similar projects.

In identifying the key issues the following assumption is made:

- The area identified for the proposed PV facility meets the technical criteria required for such facilities.

4.2 IDENTIFICATION OF KEY SOCIAL ISSUES

The key social issues identified during the SIA can be divided into:

- The policy and planning related issues
- Local, site-specific issues

The local site-specific issues can in turn be divided into construction and operational related issues. These issues are discussed and assessed below. The potential impacts associated with the associated infrastructure (access road, pipeline and power line routes are also assessed.

4.3 POLICY AND PLANNING ISSUES

As indicated in Section 1.6, legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents.

The review of the relevant planning and policy documents was undertaken as a part of the SIA. The key documents reviewed included:

- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);

- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Pixley ka Seme District Municipality Integrated Development Plan 2009-2012;
- Emthanjeni Local Municipality Integrated Development Plan 2010.

The findings of the review indicated that solar energy was strongly supported at a national and local level. At a national level the White Paper on Energy Policy (1998) notes:

- Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future;
- The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly **solar** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

At a provincial level the NCPGDP notes that availability of inexpensive energy is a key requirement in order to promote economic growth in the Northern Cape. The NCGDS goes on to indicate that "the development of energy sources such as **solar energy**, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape".

The IRP 2010 also allocates 43% of energy generation in South Africa to renewables.

At a local level the Pixley ka Seme IDP identifies the promotion and utilization of renewable energy as core initiative that influences its policies, objectives, strategies and projects. As such, the proposed PV facility could play an important role in the District realising some of its key IDP objectives. The ELM IDP also identifies alternative energy projects as a key driver for local economic development. The IDP also identifies De Aar as a **Renewable Energy Hub**.

Based on this it is reasonable to assume that the establishment of PV facilities is supported. However, the NCPGDS also states that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile ecosystems and vulnerability to climatic variation. The document also indicates that due to the Province's exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed solar energy facility; do not affect the tourism potential of the Province.

The findings of the review of the relevant policies and documents pertaining to the energy sector therefore indicate that solar energy and the establishment of solar energy plants are supported at a national, provincial, and local level. It is therefore the opinion of the authors that the establishment of a solar energy plant on the proposed site is supported by national, provincial and local policies and planning documents.

4.4 SOCIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities and opportunity for skills development and on-site training

Potential negative impacts

- Impacts associated with the presence of construction workers on site
- Influx of job seekers to the area;
- Loss of farm labour to the construction phase;
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site
- Increased risk of veld fires associated with construction-related activities
- Threat to safety and security of farmers associated with the presence of construction workers on site
- Impact of heavy vehicles, including damage to roads, safety, noise and dust
- Potential loss of grazing land associated with construction-related activities.

Annexure C contains the management plan for addressing social impacts.

4.4.1 Creation of employment and business opportunities

Based on information provided by ACED De Aar the construction of the facility will take place in stages; if built in 75 MW blocks construction would take between 7 - 18 months. However, the entire 400 MW would be constructed over a 3 - 7 year period. . Approximately 300-500 people are expected to be required during the construction phase. The work associated with the construction phase will be undertaken by contractors and will include the establishment of the PV facility and the associated components, including, access roads, substations, And power lines. It is anticipated that approximately 70 % (2100-350) of the employment opportunities will be available to low skilled (construction labourers, security staff etc.), and semi-skilled workers (drivers, equipment operators etc.) and 30% (90-150) skilled personnel (engineers, land surveyors, project managers etc.). 70 % (210-350) of the construction related employment opportunities, specifically the skilled and semi-skilled opportunities, are likely to be available to local residents in the area, specifically residents from the towns of De Aar, Britstown, and Hanover. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities. However, the low education and skills levels in the area will hamper potential opportunities for local communities.

The capital expenditure associated with the construction phase will be in the region of R 10-12 billion. In terms of business opportunities for local companies, expenditure during the construction phase will create business opportunities for the regional and local economy. However, given the technical nature of the project and high import content associated with PV facilities opportunities for the local economy and the towns of De Aar, Britstown, and Hanover are likely to be limited. However, opportunities are likely to exist for local contractors and engineering companies in De Aar. Implementing the enhancement measures listed below can enhance these opportunities.

Based on information from other solar energy projects the total wage bill for the 3 year construction phase will be in the region of R 144-160 million. The monthly wage bill will be ~ R 4-5 million. The injection of income into the area in the form of rental for accommodation and wages will create opportunities for local businesses in De Aar Britstown and Hanover

The implementation of the proposed enhancement measures listed below would also enable the establishment of the proposed PV facility to support co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. In this regard the Northern Cape PGDS highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. The proposed PV facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site. The majority of construction workers are likely to be accommodated in the nearest local towns, specifically De Aar, Britstown, and Hanover. This will create opportunities for local hotels, B&Bs, guest farms and people who want to rent out their houses.

In terms of training and skills development, ACED Renewables De Aar has indicated that training and skills development will be provided during the construction phase. The majority of these opportunities are likely to be linked to the contractors appointed to manage the construction phase. The potential to implement an effective training and skills development programme during the construction phase will be enhanced by the fact that the construction phase will be phased. However, ACED Renewables De Aar will need to demonstrate a commitment to local employment targets and the implementation of a meaningful skills development and training programme in order to maximise the opportunities and benefits for members from the local community.

The hospitality industry in the local towns is also likely to benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other large construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

Table 4.1: Impact assessment of employment and business creation opportunities during the construction phase

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	With Enhancement
Extent	Local – Regional (2) (Rated as 2 due to potential opportunities for local communities and businesses)	Local – Regional (5) (Rated as 4 due the number of jobs (300) and the potential opportunities for local communities and businesses)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (32)	High (70)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement : See below		
Cumulative impacts: Opportunity to up-grade and improve skills levels in the area.		
Residual impacts: Improved pool of skills and experience in the local area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.		

Assessment of No-Go option

The potential employment and economic benefits associated with the proposed PV facility would however be forgone. The potential opportunity costs in terms of the capital expenditure, employment, skills development, and opportunities for local business are therefore regarded as a negative.

Recommended enhancement measures

In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

Employment

- Where reasonable and practical, the EPC contractors appointed by ACED Renewables De Aar should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contractors that are compliant with Black Economic Empowerment (BEE) criteria;
- Before the construction phase commences ACED Renewables De Aar/ its contractors should meet with representatives from the Emthanjeni Local Municipality to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase.

- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that ACED Renewables De Aar intends following for the construction phase.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- ACED Renewables De Aar should seek to develop a database of local companies, specifically BEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- The Emthanjeni Local Municipality, in conjunction with the local Chamber of Commerce and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

4.4.2 Presence of construction workers in the area

In terms of affected farmsteads, there are a relatively small number of farmsteads that will be affected. However, there are a number of potentially vulnerable farming activities, such as livestock farming. The potential threat to farming activities is discussed below. In addition, the presence of construction workers also poses a potential risk to family structures and social networks in the area. The most vulnerable communities include the communities in De Aar, Britstown, and Hanover.

While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can affect the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including:

- An increase in alcohol and drug use;
- An increase in crime levels;
- The loss of girlfriends and or wives to construction workers;
- An increase in teenage and unwanted pregnancies;
- An increase in prostitution; and
- An increase in sexually transmitted diseases (STDs).

ACED Renewables De Aar has indicated that they are committed to implementing a local employment policy, specifically for the low and semi-skilled employment opportunities associated with the construction phase. Employing members from the local community to fill the low-skilled job categories will reduce the risk and mitigate the potential impacts on the local communities. These workers will be from the local community and form part of the local family and social network and, as such, the

potential impact will be low. The use of local residents to fill the low skilled job categories will also reduce the need to house construction workers on the site. In this regard ACED Renewables De Aar has indicated that no construction personnel, apart from security, will be accommodated on the site. However, due to the potential mismatch of skills and low education levels, the potential employment opportunities for the members from these local communities may be low. This is an issue that will need to be addressed during the recruitment process. This issue also highlights the importance of implementing a training and skills development programme before the construction phase commences.

Table 4.2: Assessment of impact of construction workers on local communities

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	With Mitigation
Extent	Local (3) (Rated as 3 due to potential severity of impact on local communities)	Local (2) (Rated as 1 due to potential severity of impact on local communities)
Duration	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)	Low for community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)
Probability	Probable (3)	Probable (3)
Significance	Low for the community as a whole (27) Moderate-High for specific individuals who may be affected by STD's etc. (57)	Low for the community as a whole (24) Moderate-High for specific individuals who may be affected by STD's etc. (51)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation: See below		
Cumulative impacts: Impacts on family and community relations that may, in some cases, persist for a long period. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community. The development of other solar energy projects in the area may exacerbate these impacts.		
Residual impacts: See cumulative impacts.		

Assessment of No-Go option

There is no impact as it maintains the current status quo. However, the potential positive impacts on the local economy associated with the additional spending by construction workers in the local economy will be lost.

Recommended mitigation measures

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

- Where possible, ACED Renewables De Aar should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks;
- ACED Renewables De Aar should consider the establishment of a Monitoring Forum (MF) for the construction phase which should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers;
- ACED Renewables De Aar and the contractors should, in consultation with representatives from the MF, develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation;
- ACED and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis;
- The contractor should make the necessary arrangements for allowing workers from outside the area to return home over weekends and or on a regular basis during the 3 year construction phase. This would reduce the risk posed by construction workers to local family structures and social networks;
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site. This will make it possible to manage the potential impacts effectively.

4.4.3 Influx of job seekers to the area

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed ACED Renewables De Aar facility can be regarded as a relatively large construction project, the proposed establishment of a number of solar energy projects near De Aar is also likely to attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the manner in which they conduct themselves can affect the local community.

The two main areas of concern are associated with the influx of job seekers:

- Impacts on existing social networks and community structures;
- Competition for housing, specifically low cost housing;
- Competition for scarce jobs;
- Increase in incidences of crime. The concern is that these job seekers may not leave town immediately and, in some cases, may stay indefinitely.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.4.2. However, in some instances the potential impact on the community may be greater given that they are unlikely to have accommodation and may decide to stay on in the area. In addition, they will not have a reliable source of income. The risk of crime associated with the influx of job seekers it therefore likely to be greater.

Experience from other projects has also shown that the families of job seekers may also accompany individual job seekers or follow them later. In many cases the families of the job seekers that become “economically stranded” and the construction workers that decided to stay in the area, subsequently moved to the area. The influx of job seekers to the area and their families can also place pressure on the existing services in the area, specifically low income housing. In addition to the pressure on local services the influx of construction workers and job seekers can also result in competition for scarce employment opportunities. Further secondary impacts included increase in crime levels, especially property crime, because of the increased number of unemployed people. These impacts can result in increased tensions and conflicts between local residents and job seekers from outside the area.

The key lesson from other large construction projects is the importance of a developing and implementing a well-structured recruitment strategy aimed at employing locals and minimising the number of job seekers moving into the area. The Emthanjeni Local Municipality should also anticipate that the proposed establishment of De Aar as a renewable energy hub will result in the influx of job seekers to the area. The demand that this influx will have on local services should be borne in mind when the IDP is reviewed and up-dated.

Table 4.3: Assessment of impact of job seekers on local communities

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	With Mitigation
Extent	Local (3)	Local (2)
Duration	Permanent (5) (For job seekers that stay on the town)	Permanent (5) (For job seekers that stay on the town)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD’s etc. (10)	Minor for community as a whole (2) High-Very High for specific individuals who may be affected by STD’s etc. (10)
Probability	Probable (3)	Probable (3)
Significance	Medium for the community as a	Low for the community as a whole

	whole (36) Medium -High for specific individuals who may be affected by STD's etc. (54)	(27) Medium-High for specific individuals who may be affected by STD's etc. (51)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation: See below		
Cumulative impacts: Impacts on family and community relations that may, in some cases, persist for a long period. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.		
Residual impacts: See cumulative impacts.		

Recommended mitigation measures

It is almost impossible to stop people from coming to the area in search of a job, specifically given that the Emthanjeni Local Municipality has identified De Aar as a renewable energy hub. However, as indicated above, ACED Renewables De Aar should ensure that the employment criteria favour local residents in the area. In addition ACED should:

- ACED, in consultation with the Emthanjeni Local Municipality, should investigate the option of establishing a Monitoring Forum (see above) to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The Forum should also include the other proponents of solar energy projects in the area;
- Implement a policy that no employment will be available at the gate. This should be linked to the establishment of employment offices in De Aar, Britstown, and Hanover.

4.4.4 Loss of farm labour to the construction phase

Experience from other projects indicates that the loss of farm workers is an issue of concern. In most instances local farmers are unlikely to be in a position to compete with the salaries offered by the solar energy companies during the construction phase. As a result farm labourers may be tempted to resign from their current positions on farms. The loss of skilled and experienced farm labour would have a negative impact on local farmers.

While the proposed PV facility on its own is unlikely to result in a significant loss of farm labour, the proposed establishment of a number of solar energy projects near De Aar has the potential to impact on the farming sector. However, at the end of the day farm labour can be replaced. The potential impacts on farm operations are therefore likely to be temporary.

The potential impacts for the affected farmers associated with the loss of permanent farm labour to the construction phase are exacerbated by the security of tenure that permanent farm labourers enjoy in terms of the Extension of Security and Tenure Act (ESTA). Those farm labourers which are eligible under ESTA and who take up jobs during the construction phase will be entitled stay on in their houses on the farms in question. The net effect is that the farmer may have to incur the costs associated with the construction of new dwellings for new labour appointed to replace the labour lost to the construction phase. The farmer may also have to continue subsidizing services such as potable water to people who are no longer in his employ.

The farm workers that take up jobs during the construction phase are also at risk. While some farm workers may be re-employed once the construction has been completed, others may not be so fortunate. The low education levels associated with the farm worker community would effectively mean that alternative employment opportunities outside the agricultural sector will not be accessible to them. These farm workers and their families therefore stand to be negatively impacted upon in the medium to long term.

Table 4.4: Assessment of loss of farm labour to the construction phase

Nature: Potential impact on local farmers associated with loss of farm labour to the construction phase		
	Without Mitigation	With Mitigation
Extent	Local and Regional (3)	Local and Regional (3)
Duration	Short term (2) (Assumed that farm labour can be replaced)	Short term (2) (Assumed that farm labour can be replaced)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (27)
Status	Negative	Negative
Reversibility	Yes, if farm workers return of are replaced	Yes, if farm workers return of are replaced
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation: See below		
Cumulative impacts: Impacts on farm operations due to loss of experienced farm labour		
Residual impacts: See cumulative impacts.		

Recommended mitigation measures

While the proponent could liaise with local farmers in the area and take steps not to employ farm worker were possible, it is not possible to prevent farm workers from applying for work in other sectors. There are therefore no recommended mitigation measures. Also it is assumed that farm labour can be replaced. The impacts would therefore be temporary.

Farm workers who apply for construction related work should also be informed that the nature of the work is temporary. In addition they should be informed of the potential negative consequences of their actions, which include the potential loss of their permanent farm job.

4.4.5 Increased risk of stock theft, poaching and damage to farm infrastructure

The presence of construction workers on the site increases the potential risk of stock theft and poaching. The movement of construction workers on and off the site also poses a potential threat to farm infrastructure, such as fences and gates, which may be damaged. Stock and game losses may also result from gates being left open and/or fences being damaged. This issue was not raised as a concern by the local farmers affected by the project.

Table 4.5: Assessment of impact of stock theft and damage to farm infrastructure

Nature: Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	With Mitigation
Extent	Local (4) (Rated as 4 due to potential severity of impact on local farmers)	Local (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate (6) (Due to reliance on agriculture and livestock for maintaining livelihoods)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses etc.	Yes, compensation paid for stock losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	Yes
Mitigation: See below		
Cumulative impacts: No, provided losses are compensated for		
Residual impacts: See cumulative impacts.		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

The mitigation measures that can be considered to address the potential impact on livestock, game, and farm infrastructure include:

- ACED should enter into an agreement with the affected landowners whereby the company will compensate for damages to farm property and disruptions to farming activities. This includes losses associated with stock theft and damage to property etc.;
- ACED should investigate the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. Should such a MF be required it should be established prior to commencement of the construction phase. The Code of Conduct should be signed by ACED, the neighbouring landowners and the contractors before the contractors move onto site;
- ACED should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in tender documents for contractors and the Code of Conduct to be signed between ACED, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below);
- The EMP must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;
- Contractors appointed by ACED should ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by ACED should ensure that construction workers who are found guilty of stealing livestock, poaching and/or damaging farm infrastructure should be charged as per the conditions contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.;
- The housing of construction workers on the site should be limited to security personnel.

4.4.6 Increased risk of veld fires

The presence of construction workers and construction-related activities on the site poses an increased risk of veld fires that in turn pose a threat to the livestock, wildlife, and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened.

- The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, winter months.
- The dominant agricultural activity in the broader area is stock farming (beef cattle and sheep). As such, the livelihoods of the farmers in the area are dependent on grazing on their farms. Any loss of grazing due to a fire would therefore impact negatively on the affected farmers livelihoods;
- The risk of fire related damage is exacerbated by the distance to fire-fighting vehicles located in the nearest town of De Aar.

Table 4.6: Assessment of impact of increased risk of veld fires

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires		
	Without Mitigation	With Mitigation
Extent	Local (4) (Rated as 4 due to potential severity of impact on local farmers)	Local (2) (Rated as 2 due to potential severity of impact on local farmers)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate-High due to reliance on livestock for maintaining livelihoods (8)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (42)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: See below		
Cumulative impacts: No, provided losses are compensated for.		
Residual impacts: See cumulative impacts.		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

As indicated above, ACED should enter into an agreement with the affected landowners whereby the company will compensate for damages. This includes losses associated veld fires. In addition, the potential increased risk of veld fires can be effectively mitigated. The detailed mitigation measures are outlined in the EMP for the construction and operation phases. The aspects that should be covered include:

- Contractor to ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months.
- Contractor to provide adequate fire fighting equipment on-site.
- Contractor to provide fire-fighting training to selected construction staff.
- As per the conditions of the Code of Good Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed

contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire fighting costs borne by farmers and local authorities.

In addition the landowners and developers should also ensure that they join the local fire protection agency.

4.4.7 Impact of construction vehicles

The movement of heavy construction vehicles during the construction phase has the potential to damage roads and create noise, dust, and safety impacts for other road users and local communities in the area, specifically the local farmers that use the Hydra Road which links the Hydra Substation with the N10. The initial plan is to transport equipment and components via road from Port Elizabeth. Information provided by ACED Renewables De Aar indicates that normal semi-trailers will be used with the expectation that each truck will carry approximately 100 - 150kw of panels. The total number of trips over the construction period will be ~3000 – 4000.

The findings of the SIA indicate that the current road use frequency in the area and specifically along the Hydra Road is low. The social impacts associated with the movement of construction related traffic along this road are therefore likely to be low. In addition, the option of raiing material from Port Elizabeth to De Aar should be investigated. This would reduce the potential impact on other road users along the N10.

Table 4.7: Assessment of the impacts associated with construction vehicles

Nature: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	Without Mitigation	With Mitigation
Extent	Local-Regional (3)	Local-Regional (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: See below		
Cumulative impacts: If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

As indicated above, ACED should enter into an agreement with the affected landowners whereby the company will compensate for damages. This includes losses associated with damage to local internal farm roads that are affected by the site. In addition, the potential impacts associated with heavy vehicles and dust can be effectively mitigated. The aspects that should be covered include:

- The contractor must ensure that damage caused to roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor.
- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits.

In addition, it is recommended that ACED Renewables De Aar investigate the option of using rail to transport materials and equipment from Port Elizabeth to De Aar.

4.4.8 Damage to and loss of farmland

The activities associated with the construction phase have the potential to result in the loss of land available for grazing. However, the farm owner, Mr van der Merwe, indicated that the project would not affect his farming activities. In this regard he indicated that ACED Renewables De Aar had assured him that his livestock would be able to graze between the PV panels. Mr van der Merwe has been farming in the area for the since 1979 and the farm has been in the family since 1952.

In addition, only one landowner is affected (Mr van der Merwe) and as in the case with other renewable energy projects, it is assumed that he has entered into a lease agreement with ACED. The loss of productive farmland would therefore be offset by the income from the lease agreement.

The final disturbance footprint can also be reduced by careful site design and placement of components. The impact on farmland associated with the construction phase can therefore be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. Recommended mitigation measures are outlined below.

Table 4.8: Assessment of impact on farmland due to construction related activities

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the PV facility and power lines will damage farmlands and result in a loss of farmlands for future farming activities.		
	Without Mitigation	With Mitigation
Extent	Local (3)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Moderate, due to importance of farming in terms of local livelihoods (6)	Low (4)
Probability	Definite (5)	Highly Probable (4)
Significance	High (75)	Low (28)
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated	Yes, disturbed areas can be rehabilitated
Irreplaceable loss of resources?	Yes, loss of farmland. However, disturbed areas can be rehabilitated	Yes, loss of farmland. However, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	Yes, however, loss of farmland cannot be avoided
Mitigation: See below		
Cumulative impacts: Overall loss of farmland could affect the livelihoods of the affected farmer, and the workers on the farm and their families. However, disturbed areas can be rehabilitated.		
Residual impacts: See cumulative impacts.		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

The potential impacts associated with damage to and loss of farmland can be effectively mitigated. The aspects that should be covered include:

- The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised;
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;
- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up a suitably qualified ecologist;
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

4.5 SOCIAL IMPACTS ASSOCIATED WITH OPERATIONAL PHASE

The key social issues affecting the operational phase include:

Potential positive impacts

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- The establishment of renewable energy infrastructure.

Potential negative impacts

- Influx of job seekers to the area;
- Loss of farm workers to jobs associated with the operational phase;
- The visual impacts and associated impact on sense of place;
- Potential impact on tourism.

Annexure C contains the management plan for the addressing social impacts.

4.5.1 Creation of employment and business opportunities

The proposed facility will create ~ 60 - 100 employment opportunities for 25+ years. Of this total approximately 80% (80) will be low and medium-skilled and 20% (20) high skilled positions. The proposed facility will therefore create potential employment opportunities in the Northern Cape Province and the Emthanjeni Municipality. In addition, the majority of the employment opportunities associated with the operational phase is therefore likely to benefit HD members of the community. However, given that the solar energy sector in South Africa is relatively new, the skilled positions may need to be filled by people from other parts of South Africa or even overseas.

It will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Emthanjeni IDP.

Given the location of the proposed facility the majority of permanent staff is likely to reside in the towns of De Aar, Britstown, and Hanover. In terms of accommodation options, a percentage of the non-local permanent employees may purchase houses in one of these towns, while others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the regional and local economy, which will benefit local businesses in these towns. The benefits to the local economy will extend over the operational lifespan of the project.

The local hospitality industry in De Aar is also likely to benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc.) who are involved in the company and the project but who are not linked to the day-to-day operations.

The Emthanjeni Local Economic Development (LED) Manager (MM) (Mr S Madyo) indicated that proposed establishment of PV facilities in the area was strongly supported by the Emthanjeni LM. In this regard the municipality had identified the establishment of a Renewable Energy Hub as one of the key economic opportunities for the area. The establishment of a solar based Renewable Energy Hub in the

region would create significant economic opportunities for the area and go a long way to offsetting the negative socio-economic impacts, such as job losses, associated with the scaling down of the railway linked activities in De Aar over the last 10-15 years.

Mr Bangani (NAFCOC representative) also expressed his support for the proposed PV facility and the potential benefits associated with the development. In this regard he indicated that local economy in De Aar had been negatively impacted by the decline in the role of the railways, the downscaling of the army base and relocation of Eskom stores to Colesberg. The proposed establishment of a renewable energy hub would create employment and skills development opportunities, which in turn would benefit local businesses. Mr Bangani also indicated that he hoped that the proposed development of renewable energy projects would help revitalise the railway sector in De Aar through the utilisation rail rather than road to transport equipment and machinery.

Due the large number of PV facilities proposed in the Emthanjeni Local Municipality it is recommended that the Emthanjeni LM follows the example of the Theewaterskloof LM in the Western Cape and investigates the establishment of a Community Trust. In this regard the the Theewaterskloof LM has made it a requirement for all potential renewable energy producers to become a member of and contribute to a Community Trust. In terms of the structure of the Trust, a percentage of the revenue from the operation is allocated to projects identified in the Theewaterskloof IDP. Of this total, 50% of the revenue is allocated to infrastructure projects and the remaining 50% to social projects and initiatives, such as skills development and training. It is recommended that a similar model be investigated by the Emthanjeni LM. The establishment of a Community Trust would also be in line with the socio-economic development requirements set out in the request for proposal documents for renewable energy projects released by the Department of Environmental Affairs.

Table 4.9: Impact assessment of employment and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	With Enhancement
Extent	Local and Regional (2)	Local and Regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Definite (5)
Significance	Medium (30)	High (70)
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: Creation of permanent employment and skills and development		

opportunities for members from the local community and creation of additional business and economic opportunities in the area

Residual impacts: See cumulative impacts

Assessment of No-Go option

The potential opportunity costs in terms of the loss of employment and skills and development training would be lost which would represent a negative impact.

Recommended enhancement measures

The enhancement measures listed in Section 4.4.1, i.e. to enhance local employment and business opportunities during the construction phase, also apply to the operational phase. In addition:

- ACED Renewables De Aar should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.
- ACED, in consultation with the Emthanjeni LM, should investigate the opportunities for establishing a Community Trust (see above comments).

4.5.2 Development of clean, renewable energy infrastructure

South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions (Cape Times, 15 November 2007). The establishment of a clean, renewable energy facility will therefore reduce, albeit minimally, South Africa's reliance on coal-generated energy and the generation of carbon emissions into the atmosphere.

The overall contribution to South Africa's total energy requirements of the proposed PV facility is relatively small. However, the 400 MW produced will help to offset the total carbon emissions associated with energy generation in South Africa. Given South Africa's reliance on Eskom as a power utility, the benefits associated with an IPP based on renewable energy are regarded as an important contribution.

Table 4.10: Development of clean, renewable energy infrastructure

Nature: Promotion of clean, renewable energy		
	Without Mitigation	With Mitigation (The provision of renewable energy infrastructure is in itself a mitigation measure)
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (48)	Medium (48)
Status	Positive	Positive

Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. This would represent a negative opportunity cost.

Recommended mitigation measures

The establishment of the proposed facility is a mitigation measure in itself. In order to maximise the benefits of the proposed project ACED Renewables De Aar should:

- Use the project to promote and increase the contribution of renewable energy to the national energy supply;
- Maximise the public's exposure to the project via an extensive communication and advertising programme;
- Implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project; and
- Investigate the opportunities for establishing a Community Trust. The revenue for the trust should be derived from the income generated from the sale of energy from the plant. The Community Trust should be linked to funding and supporting projects and initiatives identified in the Emthanjeni IDP.

4.5.3 Influx of job seekers to the area

While the proposed PV facility on its own is unlikely to result in an influx of job seekers during the operational phase, the proposed establishment of a number of solar energy projects near De Aar is likely to attract job seekers to the area. These issues are similar to the concerns associated with the influx of jobs seekers during the construction phase and include:

- Impacts on existing social networks and community structures;
- Competition for housing, specifically low cost housing;
- Pressure on local services, such as schools, clinics etc.;
- Competition for scarce jobs;
- Increase in incidences of crime.

Table 4.11 Assessment of impact of job seekers on local communities

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Permanent (5) (For job seekers that stay on the town)	Permanent (5) (For job seekers that stay on the town)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)	Minor for community as a whole (2) High-Very High for specific individuals who may be affected by STD's etc. (10)
Probability	Probable (3)	Probable (3)
Significance	Medium for the community as a whole (33) Medium -High for specific individuals who may be affected by STD's etc. (51)	Low for the community as a whole (27) Medium-High for specific individuals who may be affected by STD's etc. (51)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation: See below		
Cumulative impacts: Impacts on family and community relations that may, in some cases, persist for a long period. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.		
Residual impacts: See cumulative impacts.		

Recommended mitigation measures

It is almost impossible to stop people from coming to the area in search of a job. However, as indicated above, ACED Renewables De Aar should ensure that the employment criteria favour local residents in the area. In addition ACED Renewables De Aar should:

- ACED, in consultation with the Emthanjeni LM, should investigate the option of establishing a Local Community Forum to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The Forum should also include the other proponents of solar energy projects in the area;
- Implement a policy that no employment will be available at the gate. This should be linked to the establishment of labour offices and the use of experienced local labour brokers.

4.5.4 Loss of farm labour

Experience from other projects indicates that the loss of farm workers is an issue of concern. In most instances local farmers are unlikely to be in a position to compete with the salaries offered by the solar energy companies. As a result farm labourers may be tempted to resign from their current positions on farms. The loss of skilled and experienced farm labour would have a negative impact on local farmers.

While the proposed PV facility on its own is unlikely to result in a significant loss of farm labour, the proposed establishment of a number of solar energy projects near De Aar has the potential to impact on the farming sector. However, at the end of the day farm labour can be replaced. The potential impacts on farm operations are therefore likely to be temporary.

The potential impacts for the affected farmers associated with the loss of permanent farm labour are exacerbated by the security of tenure that permanent farm labourers enjoy in terms of the Extension of Security and Tenure Act (ESTA). Those farm labourers which are eligible under ESTA and who take up jobs during the construction phase are entitled stay on in their houses on the farms in question. The net effect is that the farmer may have to incur the costs associated with the construction of new dwellings for new labour appointed to replace the labour lost to the solar energy sector.

However, at the same time the employment opportunities associated with the solar energy sector may offer local farm workers with an opportunity to get better paid jobs which would benefit them and their families. These jobs may also enable them to move of the farms and into De Aar, which would improve their access to services such as schools and clinics etc. This would represent a positive social benefit for the farm workers in question.

Table 4.12: Assessment of loss of farm labour during the operational phase

Nature: Potential impact on local farmers associated with loss of farm labour to the operational phase		
	Without Mitigation	With Mitigation
Extent	Local and Regional (3)	Local and Regional (3)
Duration	Short term (2) (Assumed that farm labour can be replaced)	Short term (2) (Assumed that farm labour can be replaced)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (27)
Status	Negative	Negative
Reversibility	Yes, if farm workers return or are replaced	Yes, if farm workers return or are replaced
Irreplaceable loss of resources?	No	No

Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated
Mitigation:	See below
Cumulative impacts:	Impacts on farm operations due to loss of experienced farm labour
Residual impacts:	See cumulative impacts.

Recommended mitigation measures

While ACED could liaise with local farmers in the area and undertake not to employ farm worker were possible, it is not possible to prevent farm workers from applying for work in other sectors. There are therefore no recommended mitigation measures. Also it is assumed that farm labour can be replaced. The impacts would therefore be temporary.

4.5.5 Visual impact and impact on sense of place

The components associated with the proposed facility will have a visual impact and, in so doing, impact on the landscape and rural sense of the place of the area. However, the proposed site is located adjacent to the Hydra Substation and the site is traversed by existing power lines associated with said substation. Therefore the visual integrity of the site has already been severely impacted by existing infrastructure on the site. The impact of the proposed PV facility on the areas sense of place is therefore likely to be low.

The key findings of the specialist visual impact assessment (VIA) (MetroGIS, October, 2011) are summarized below.

Potential visual impact on users of main roads in close proximity to the proposed facility

Visual impacts on users of the secondary road (which traverses the site) within a radius of 2,5km of the proposed facility are expected to be of **moderate** significance, both before and after mitigation.

Potential visual impact on commuters travelling by rail in close proximity to the proposed facility

Commuters travelling by rail, and especially those travelling by luxury coach, may be impacted upon within a radius of 2,5km of the proposed facility. Visual impacts are expected to be of **low** significance, before and after mitigation.

Potential visual impact on residents of homesteads and settlements in close proximity to the proposed facility

The visual impact on the residents of Wag-n-Bietjie is expected to be of **moderate** significance and may be mitigated to **low**.

Potential visual impact on sensitive visual receptors within the region

The visual impact users of roads (i.e. the N10 and the R48), railway lines and secondary roads as well as residents of homesteads and settlements within the region beyond the 2,5km radius, is expected to be of **low** significance, both before and after mitigation. The limited number of receptors as well as the visual context of the site in close proximity to the Hydra Substation and the significant associated power line infrastructure is of relevance, and as such will reduce the probability of this impact occurring.

Potential visual impact on residents of urban centres within the region

The visual impact on residents of De Aar is expected to be of **low** significance, both before and after mitigation.

Potential visual impact of the proposed facility on the visual character of the landscape and the sense of place of the region

Despite the significant industrial type infrastructure in and around the town of De Aar, the greater landscape of the study area is characterised by wide-open spaces and little development. However, the proximity of the proposed facility to De Aar, the Hydra Substation and the numerous power lines has relevance, and as such reduces the probability of this impact occurring. In this respect, the anticipated visual impact of the facility on the visual character of the landscape, and by implication, on the sense of place, is expected to be of **low** significance, both before and after mitigation.

The overall findings of the VIA indicate that the anticipated visual impacts associated with the PV facility are not considered to be fatal flaws from a visual perspective, are not considered to be fatal flaws from a visual perspective. The main considerations in this regard are the relatively low occurrence of potential visual receptors, the proximity to the urban centre of De Aar and the visual context of existing industrial and electrical type infrastructure within the study area.

Table 4.13: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed solar facility and the potential impact on the areas rural sense of place.		
	Without Mitigation	With Mitigation
Extent	Local (4)	Local (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (56)	Medium (56)
Status	Negative	Negative
Reversibility	Yes, solar facility can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Potential impact on current rural sense of place		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

The recommendations contained in the VIA should be implemented.

4.5.6 Impact on tourism

The Northern Cape PGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile ecosystems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Therefore caution must be taken to ensure that the development of large renewable energy projects, such as the proposed solar energy facility, do not affect the tourism potential of the Province. However, based on the findings of the site visit, the proposed facility is not likely to impact on the tourism sector in the area or the Province. This is linked to the impacts on the visual integrity of the site associated with the existing infrastructure on the site. The significance of this issue is therefore rated as Low negative. In some instances the plant may also attract tourists to the area. However, the significance of this potential benefit is also rated as Low positive.

The findings of the VIA indicate that the anticipated visual impact of the facility on existing tourist routes, as well as on the tourism potential of the region, is expected to be Low, both before and after mitigation.

Table 4.14: Impact on tourism

Nature: Potential impact of the PV facility on local tourism		
	Without Mitigation	With Enhancement / Mitigation
Extent	Local (2)	Local (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24) (Applies to both - and +)	Low (27) (Applies to both - and +)
Status	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: Potential negative and or positive impact on tourism in the Kai! Garib Municipality Area.		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

The No-Development option would represent a lost opportunity to create a facility that has the potential to attract visitors to the area. This would represent a negative opportunity cost.

Recommended enhancement measures

In terms of mitigating the visual impacts, it is virtually impossible to hide the facility. The impact on the sense of place of the area cannot therefore be effectively mitigated. In terms of efforts to enhance the proposed benefits to tourism:

- ACED Renewables De Aar should liaise with representatives from the Emthanjeni LM and local tourism representatives to raise awareness of the proposed facility;
- ACED should investigate the option of establishing a renewable energy interpretation centre at entrance to the site. The centre should include a viewing area where passing visitors can stop and view the site;
- In order to maximise the benefits of the interpretation centre to the broader community, it is recommended that the information on the project and solar energy be presented in the three main languages of the Northern Cape Province, namely Afrikaans, English and Setswana.

4.6 ASSESSMENT POWER LINE OPTIONS

The proposed facility includes the establishment of five overhead power lines (maximum 400 kV) feeding into the Eskom electricity network at the Hydra Substation or looping in to the existing power lines in the vicinity. As indicated above, the proposed site is traversed by four existing power lines associated with the Hydra substation, which is located adjacent to the proposed site. As such, the visual integrity of the site has already been impacted. The social impacts associated with the required additional power lines will therefore be Low negative.

The findings of the VIA indicate that the visual impact associated with the new power line is rated to be of **low** significance both before and after mitigation, provided the new power lines align with existing power line routes.

Table 4.15: Assessment of transmission line options

Nature: Potential visual impact and impact on sense of place associated with power lines		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	

Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Limited visual and impact on sense of place		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

The recommendations contained in the VIA should be implemented. The measures listed above to address the potential impacts associated with the construction phase also apply to the construction of the power line.

4.7 POTENTIAL HEALTH IMPACTS

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of photovoltaic cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing photovoltaic modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in nature and or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks essentially concern workers at the cell manufacturing plant and therefore fall outside the scope of the EIA.

4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

As indicated above, South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions (Cape Times, 15 November 2007).

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

Table 4.16: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy		
	Without Mitigation	With Mitigation
Extent	Local-International (5)	Local-International (5)

Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	High (60)	High (60)
Status	Negative	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
Residual impacts: See cumulative impacts		

Recommended enhancement measures

The proposed facility should be developed and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented. However, the impact of large solar facilities on the sense of place and landscape are issues need to be addressed in the location, design and layout of the proposed plant.

4.9 ASSESSMENT OF CUMULATIVE IMPACTS

Although there appear to be no guidelines for solar facilities, the Australian Wind Farm Development Guidelines (Draft, July 2010) indicate that the cumulative impact of multiple wind farm facilities is likely to become an increasingly important issue for wind farm developments in Australia. This finding is also likely to apply to PV facilities and is also likely to be the case in South Africa. The key concerns in terms of cumulative impacts are, as in the case of wind farms, also likely to be linked to visual impacts and the impact on rural, undeveloped landscapes.

The Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues raised in these guidelines as to what defines a cumulative impact are also regarded as pertinent to solar facilities, specifically given that the key issue of concern is likely to relate to the impact on rural, undeveloped landscapes. The relevant issues raised in the by Scottish Natural Heritage include:

- Combined visibility (whether two or more wind farms (solar facilities) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms (solar facilities) along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms (solar facilities) in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one wind farm (solar facility) at a time, but if each successive stretch of the road is dominated by views of a wind farm (solar facility), then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010). It is reasonable to assume that these issues will also apply to PV facilities.

Research on wind farms undertaken by Warren and Birnie (2009) also highlights the visual and cumulative impacts on landscape character. The paper notes that given that aesthetic perceptions are a key determinant of people’s attitudes, and that these perceptions are subjective, deeply felt and diametrically contrasting, it is not hard to understand why the arguments become so heated. Because landscapes are often an important part of people’s sense of place, identity and heritage, perceived threats to familiar vistas have been fiercely resisted for centuries. The paper also identifies two factors that important in shaping people’s perceptions of wind farms’ landscape impacts. The first of these is the cumulative impact of increasing numbers of wind farms (Campbell, 2008). The research found that if people regard a region as having ‘enough’ wind farms already, then they may oppose new proposals. The second factor is the cultural context. This relates to people’s perception and relationship with the landscape. In the South African context, the majority of South Africans have a strong connection with and affinity for the large, undisturbed open spaces that are characteristic of the South African landscape. The concerns raised with regard to wind farms and the impact on landscapes are also likely to apply to solar facilities.

The impact of solar facilities on the landscape is therefore likely to be a key issue in South Africa, specifically given South African’s strong attachment to the land and the growing number of solar plant applications. With regard to the area, a number of PV facilities have been proposed for the area in and around De Aar. The Northern Cape Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications. However, as indicated above, the proposed site is traversed by four existing power lines associated with the Hydra substation, which is located adjacent to the proposed site. The visual integrity of the site has therefore been impacted by the existing energy related infrastructure located both on and adjacent to the site.

The findings of the VIA indicate that the construction of the PV Facility and ancillary infrastructure will increase the cumulative visual impact of industrial type infrastructure within the region. This is relevant in light of the significant electricity related infrastructure within the region (i.e. the power lines and the hydra substation). Other solar energy facilities are also proposed in the greater study area, but have not yet been approved.

Table 4.17: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one PV facility and the potential impact on the areas rural sense of place and character of the landscape.		
	Without Mitigation	With Mitigation
Extent	Local and regional (2)	Local and regional (2)

Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (24)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Enhancement:	See below	
Cumulative impacts:	Impact on other activities whose existence is linked to linked to rural sense of place and character of the area, such as tourism, bird watching, and hunting.	
Residual impacts:	See cumulative impacts	

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures

The establishment of a number of large solar facilities in the area does have the potential to have a negative cumulative impact on the areas sense of place and the landscape. The environmental authorities should consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken with regard to the optimal number of such plants in an area.

In addition to the potential negative impacts, the proposed PV facility also has the potential to result in significant positive cumulative impacts, specifically with regards to the establishment of De Aar as renewable solar energy hub. The reduction on the rail traffic in South Africa over the last 10-15 years has had a significant negative socio-economic impact on the economy of De Aar and its inhabitants. The proposed establishment of a number of solar energy facilities near De Aar will create a number of socio-economic opportunities for the town which in turn will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development, and training opportunities, creation of downstream business opportunities and stimulation of the local property market.

Table 4.18: Cumulative impacts on local economy

Nature: The establishment of a number of solar energy facilities in and around De Aar will create employment, skills development and training opportunities, creation of downstream business opportunities and stimulation of the local property market.		
	Without Enhancement	With Enhancement
Extent	Local and regional (3)	Local and regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)

Probability	Highly Probable (4)	Definite (5)
Significance	Medium (44)	High (70)
Status	Positive	Positive
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Positive impact on the local and regional economy through the creation of downstream opportunities and wage spend in the local economy		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo. This would represent a lost socio-economic opportunity for De Aar and the surrounding towns.

Recommended mitigation measures

The proposed establishment of solar energy hub should be supported.

4.10 ASSESSMENT OF DECOMMISSIONING PHASE

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 25 - 30 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

Given the relatively small number of people employed during the operational phase (~ 100), the decommissioning of the facility will have a limited negative social impact on the local community. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

Recommended mitigation measures

The following mitigation measures are recommended:

- ACED Renewables De Aar should ensure that retrenchment packages are provided for all staff who stand to lose their jobs when the plant is decommissioned;

- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;
- ACED Renewables De Aar should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 30 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

SECTION 5: KEY FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

Section 5 lists the key findings of the study and recommendations. These findings are based on:

- A review of the issues identified during the Scoping Process;
- A review of key planning and policy documents pertaining to the area;
- Semi-structured interviews with interested and affected parties;
- A review of social and economic issues associated with similar developments;
- A review of selected specialist studies undertaken as part of the EIA;
- A review of relevant literature on social and economic impacts; and
- The experience of the authors with other wind energy projects in South Africa.

5.2 SUMMARY OF KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning
- Construction phase impacts
- Operational phase impacts
- Cumulative Impacts
- Decommissioning phase impacts
- No-development option

The section also comments on the potential health impacts associated with solar facilities.

5.2.1 Policy and planning issues

The key documents reviewed included:

- The National Energy Act (2008)
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998)
- The White Paper on Renewable Energy (November 2003)
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014)
- Pixley ka Seme District Municipality Integrated Development Plan 2009-2012;
- Emthanjeni Local Municipality Integrated Development Plan 2010;

The findings of the review indicated that solar energy is strongly supported at a national, provincial, and local level. In this regard the Emthanjeni IDP identifies De Aar as a **Renewable Energy Hub**. Based on this the establishment of the proposed ACED Renewables De Aar PV facility is supported by the relevant policy and planning documentation.

5.2.2 Construction phase

The key social issues associated with the construction phase include:

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The construction phase is expected to extend over a period of 3 years and create approximately ~ 300-500 employment opportunities. It is anticipated that approximately 70% (210-350) of the employment opportunities will be available to low skilled (construction labourers, security staff etc.) and semi-skilled workers (drivers, equipment operators etc.) and 30% (90-150) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of the employment opportunities, specifically the skilled and semi-skilled opportunities, are likely to be available to local residents in the area, specifically residents from the towns of De Aar, Britstown, and Hanover. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities.

In terms of training and skills development, ACED have indicated that training and skills development will be provided during the construction phase of the project. The majority of these opportunities are likely to be linked to the contractors appointed to manage the construction phase. The implementation of an effective training and skills development programme during the construction phase will be enhanced by the fact that the construction phase is spread out over 3 years. However, ACED will need to demonstrate a commitment to local employment targets and the implementation of a meaningful skills development and training programme in order to maximise the opportunities and benefits for members from the local community.

The capital expenditure associated with the construction phase will be in the region of R 10 billion. This represents one of the largest private investments in the local economy. The total wage bill for the 3 year construction phase will be in the region of R 144 million. This equates to a monthly wage bill of ~ R 4 million. The injection of income into the area in the form of rental for accommodation and wages will create opportunities for local businesses in De Aar Britstown and Hanover. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site. The benefits to the local economy will however be confined to the construction period (3 years).

Potential negative impacts

- Impacts associated with the presence of construction workers on site
- Influx of job seekers to the area;
- Loss of farm labour to the construction phase;
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site
- Increased risk of veld fires associated with construction-related activities
- Threat to safety and security of farmers associated with the presence of construction workers on site
- Impact of heavy vehicles, including damage to roads, safety, noise and dust
- Potential loss of grazing land associated with construction-related activities.

The significance of the potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. In addition, given that the majority of the low and semi-skilled construction workers can be sourced from the local area the potential risk to local family structures and social networks is regarded as low. However, the impact on individuals who are directly impacted on by construction workers and or job seekers (i.e. contract HIV/AIDS) was assessed to be of Medium-High negative significance.

Table 5.1 summarises the significance of the impacts associated with the construction phase.

Table 5.1: Summary of social impacts during construction phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	High (Positive impact)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Influx of job seekers	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Loss of farm labour	Low (Negative impact)	Low (Negative impact)
Risk of stock theft, poaching and damage to farm infrastructure	Medium (Negative impact)	Low (Negative impact)
Risk of veld fires	Medium (Negative impact)	Low (Negative impact)
Impact of heavy vehicles and construction activities	Low (Negative impact)	Low (Negative impact)
Loss of farmland	High (Negative impact)	Low (Negative impact)

5.2.3 Operational phase

The key social issues affecting the operational phase include:

Potential positive impacts

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- The establishment of infrastructure to generate renewable energy.

The operational phase will create ~ 60-100 permanent employment opportunities. Of this total ~ 80% (80) will be for low and semi-skilled workers. The majority of the beneficiaries are therefore likely to be historically disadvantaged (HD) members of the community. Given the location of the proposed facility the majority of permanent staff is likely to reside in De Aar.

In terms of accommodation options, a percentage of the non-local permanent employees may purchase a house in De Aar, or possibly Britstown or Hanover, while others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the local economy. The benefits to the local economy will extend over the 25-30 year operational lifespan of the project.

The establishment of a solar based Renewable Energy Hub in the region will also create significant economic opportunities for the area and go a long way to offsetting the negative socio-economic impacts, such as job losses, associated with the scaling down of the railway linked activities in De Aar over the last 10-15 years. The significance of this impact is rated as High Positive.

The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a Positive High social benefit for society as a whole.

Due the large number of PV facilities proposed in the Emthanjeni LM area it is recommended that the Emthanjeni LM investigates the Community Trust model developed by the Theewaterskloof LM in the Western Cape. In this regard the the Theewaterskloof LM has made it a requirement for all potential renewable energy operators to become a member of and contribute to a Community Trust. In terms of the structure of the Trust, a percentage of the revenue from the renewable energy operations is allocated to projects identified in the Theewaterskloof IDP. Of this total, 50% of the revenue is allocated to infrastructure projects and the remaining 50% to social projects and initiatives, such as skills development and training. It is recommended that a similar model be investigated by the Emthanjeni LM.

Potential negative impacts

- Influx of job seekers to the area;
- Loss of farm workers to jobs associated with the operational phase;
- The visual impacts and associated impact on sense of place;
- Potential impact on tourism.

The significance of the potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. However, the impact on individuals who are directly impacted on by job seekers (i.e. contract HIV/ AIDS) was assessed to be of Medium-High negative significance.

The visual impacts on landscape character associated with large renewable energy facilities, such as PV facilities, are highlighted in the research undertaken by Warren and Birnie (2009). In the South African context, the majority of South Africans have a strong connection with and affinity for the large, undisturbed open spaces that are characteristic of the South African landscape. The impact of large, solar energy plants on the landscape is therefore likely to be a key issue in South Africa, specifically given South African's strong attachment to the land and the growing

number of solar energy applications. However, the the proposed site is traversed by four existing power lines associated with the Hydra substation, which is located adjacent to the site. The visual integrity of the site has therefore been impacted by the existing energy related infrastructure located both on and adjacent to the site.

The significance of the impacts associated with the operational phase are summarised in Table 5.2.

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	High (Positive impact)
Promotion of renewable energy projects	Medium (Positive impact)	High (Positive impact)
Influx of job seekers	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Loss of farm labour	Low (Negative)	Low (Negative)
Visual impact and impact on sense of place	Medium (Negative impact)	Medium (Negative impact)
Impact on tourism	Low (Positive and Negative)	Low (Positive and Negative)

5.2.4 Assessment of cumulative impacts

The cumulative impacts associated with solar energy facilities, such as the proposed ACED Renewables De Aar PV facility, are largely linked to the impact on sense of place and visual impacts. With regard to the area, a number of PV facilities have been proposed for the area in and around De Aar. The Northern Cape Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications. However, the area has been impacted by existing power lines associated with the Hydra substation. The significance of the potential cumulative social impacts, specifically the impact on the landscape, is therefore rated to be low. However, it is recommended that the environmental authorities consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken with regard to the optimal number of PV facilities in the area. In addition, the siting and number of individual components of the plant should be informed by findings of the relevant VIAs, specifically with respect to the visual impact on farmsteads and important roads in the area.

The proposed ACED Renewables De Aar PV facility also has the potential to result in significant positive cumulative impacts, specifically with regards to the establishment of De Aar as renewable solar energy hub. The reduction in rail traffic in South Africa over the last 10-15 years has had a significant negative socio-economic impact on the economy of De Aar and its inhabitants. The proposed establishment of a number

of solar energy facilities near De Aar will create a number of socio-economic opportunities for the town, which, in turn, will result in a positive social benefit. The significance of this impact is rated as High Positive.

5.2.5 Transmission line options

The findings of the SIA indicate that the impacts associated with the proposed overhead power lines will be low.

5.2.6 Potential health impacts

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of photovoltaic cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing photovoltaic modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in nature and or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks essentially concern workers at the cell manufacturing plant and therefore fall outside the scope of the EIA.

5.2.7 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed PV facility. This also represents a negative social cost.

5.2.8 Decommissioning phase

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the PV facilities decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 25-30 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

Given the relatively small number of people employed during the operational phase (~60 - 100), the decommissioning of the facility will have a limited negative social impact on the local community. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

ACED should also investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 25-30 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The findings of the SIA indicate that the development of the proposed ACED Renewables De Aar PV facility will create employment and business opportunities for locals during both the construction and operational phase of the project. The mitigation measures listed in the report should be implemented in order to enhance them. In addition, the proposed establishment of a number of solar energy facilities near De Aar will create socio-economic opportunities for the town, which, in turn, will result in a positive social benefit. These benefits will assist to offset the negative impacts on the town of De Aar associated with the reduction in rail traffic in South Africa over the last 10-15 years. The significance of this impact is rated as High Positive.

ACED, in consultation with the Emthanjeni Municipality, should also investigate the opportunities for establishing a Community Trust that is linked to other proposed solar energy projects in the area. The revenue for the trust would be derived from the income generated from the sale of energy from the plant. The Community Trust should be linked to funding and supporting projects and initiatives identified in the Emthanjeni IDP. The mitigation measures listed in the report to address the potential negative impacts during the construction phase should also be implemented.

The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed ACED Renewables De Aar PV facility is therefore supported by the findings of the SIA.

However, the potential impacts associated with large, solar energy facilities on an areas sense of place and landscape cannot be ignored. These impacts are an issue that will need to be addressed by the relevant environmental authorities, specifically given the large number of applications for solar facilities in the area.

5.4 IMPACT STATEMENT

The findings of the SIA undertaken for the proposed PV facility indicate that the development will create employment and business opportunities for locals during both the construction and operational phase of the project. The proposed development also supports the Emthanjeni LM policy of developing the area as a Renewable Energy Hub and represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

In addition, the visual integrity of the site has been impacted by the existing power related infrastructure associated with the Hydra substation. It is therefore recommended that the facility as proposed be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the report.

ANNEXURE A

REFERENCES

Interviews⁶

- Mr Bangani, NAFCOC, 22/09/2011
- Mr S Madyo, LED Manager Emthanjeni LM, 21/09/2011;
- Mr van der Merwe, Landowner, 23/09/2011.

Printed sources

- Australian Environment Protection and Heritage Council (EPHC), *National Wind Farm Development Guidelines DRAFT* - July 2010;
- Barbour and Rogatschnig (April, 2011). *Social Impact Assessment for ACED Renewables De Aar PV facility*. Prepared for Savannah Environmental;
- MetroGIS (Pty) Ltd. Visual Impact Assessment Proposed *ACED Renewables De AarPV* facility (September, 2011).
- Emthanjeni Local Municipality Integrated Development Plan (IDP) (2010);
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Pixley ka Seme District Municipality Integrated Development Plan (IDP) (2009-2012)
- Republic of South Africa. The National Energy Act (2008);
- Republic of South Africa (December 1998). *White Paper on Energy Policy*.
- Republic of South Africa (2003). *White Paper on Renewable Energy*.
- Warren, Charles R. and Birnie, Richard V. (2009) 'Re-powering Scotland: Wind Farms and the 'Energy or Environment?' Debate', *Scottish Geographical Journal*, 125: 2, 97 – 126;
- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);

Internet sources

- www.demarcation.org.za (Census 2001 data).
- Google Earth 2009.

⁶ A municipal strike was in progress at the time of undertaking the site visit to the area. A number of local officials could therefore not be contacted.

ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Direct, indirect, and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected, and how it will be affected.
- The **extent**, where it will be indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score between 1 and 5 will be assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, where it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * medium-term (5–15 years) – assigned a score of 3;
 - * long term (> 15 years) - assigned a score of 4; or
 - * permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;
 - * 4 is low and will cause a slight impact on processes;
 - * 6 is moderate and will result in processes continuing but in a modified way;
 - * 8 is high (processes are altered to the extent that they temporarily cease); and
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely); and
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as positive, negative, or neutral.
- The *degree* to which the impact can be *reversed*.
- The *degree* to which the impact may cause *irreplaceable loss of resources*.
- The *degree* to which the impact can be *mitigated*.

The **significance** is determined by combining the criteria in the following formula:

$S = (E + D + M) P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

ANNEXURE C

ENVIRONMENTAL MANAGEMENT PROGRAMME: SIA

CONSTRUCTION PHASE

Creation of employment and business opportunities

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

Project component/s	Construction and establishment activities associated with the establishment of the PV facility, including infrastructure etc.	
Potential Impact	The opportunities and benefits associated with the creation of local employment and business should be maximised.	
Activity/risk source	The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities.	
Mitigation: Target/Objective	ACED, in discussions with the Emthanjeni Municipality, should aim to employ a minimum of 80% of the low-skilled workers from the local area. This should also be made a requirement for all contractors. ACED should also develop a database of local BEE service providers	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Attempt to employ a minimum of 80% of the low-skilled workers are sourced from the local area; Where required, implement appropriate training and skills development programmes prior to the initiation of the construction phase to ensure that 80% target is met. Skills audit to be undertaken to determine training and skills development requirements; Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities; Identify potential 	<ul style="list-style-type: none"> ACED & contractors ACED ACED ACED ACED 	<ul style="list-style-type: none"> Employment and business policy document that sets out local employment targets to be in place before construction phase commences. Where required, training and skills development programmes to be initiated prior to the initiation of the construction phase. Skills audit to determine need for training and skills development programme undertaken within 1 month of commencement of construction phase commences. Database of potential local BEE services providers to be completed before

opportunities for local businesses	construction phase commences.
Performance Indicator	<ul style="list-style-type: none"> • Employment and business policy document that sets out local employment and targets completed before construction phase commences; • 80% of semi and unskilled labour locally sourced. • Database of potential local BEE services providers in place before construction phase commences. • Skills audit to determine need for training and skills development programme undertaken within 1 month of commencement of construction phase.
Monitoring	<ul style="list-style-type: none"> • ACED and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

Impact associated with presence of construction workers

OBJECTIVE: Avoid the potential impacts on family structures and social networks associated with presence of construction workers from outside the area

Project component/s	Construction and establishment activities associated with the establishment of the PV facility, including infrastructure etc.	
Potential Impact	The presence of construction workers who live outside the area and who are housed in local towns can affect family structures and social networks.	
Activity/risk source	The presence of construction workers can affect negatively on family structures and social networks, especially in small, rural communities.	
Mitigation: Target/Objective	To avoid and or minimise the potential impact of construction workers on the local community. This can be achieved by maximising the number of locals employed during the construction phase and minimising the number of workers housed on the site.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> • Attempt to ensure that a minimum of 80% of the low-skilled workers are sourced from the local area. This should be included in the tender documents. Construction workers should be recruited from the local area in and around the towns of De Aar, Britstown, and Hanover. • Local construction workers should be able to provide 	<ul style="list-style-type: none"> • ACED and contractors • ACED 	<ul style="list-style-type: none"> • Identify suitable local contractors prior to the tender process for the construction phase. • Tender documents for contractors include conditions set out in SIA, including transport of workers home over weekends, transportation of workers home on completion of construction

<p>proof of having lived in the area for five years or longer.</p> <ul style="list-style-type: none"> • Identify local contractors who are qualified to undertake the required work. • Develop a Code of Conduct to cover the activities of the construction workers housed on the site. • Ensure that construction workers housed attend a brief session before they commence activities. The aim of the briefing session is to inform them of the rules and regulations governing activities on the site as set out in the Code of Conduct. • Ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct. • Ensure that construction workers who are found guilty of breaching the Code of Conduct are dismissed. All dismissals must be in accordance with South African labour legislation. • Provide opportunities for workers to go home over weekends. The cost of transporting workers home over weekends and back to the site should be borne by the contractors. • On completion of the construction phase all construction workers must be transported back to their place of origin within two days of their contract ending. The costs of transportation must be borne by the contractor. 	<ul style="list-style-type: none"> • ACED • ACED • ACED and contractors • ACED and contractors • Contractors • Contractors • Contractors • Contractors 	<p>phase, establishment of MF etc.,</p> <ul style="list-style-type: none"> • MF established before construction phase commences. • Code of Conduct drafted before construction phase commences. • Briefing session for construction workers held before they commence work on site.
--	--	--

Performance Indicator	<ul style="list-style-type: none"> • Employment policy and tender documents that sets out local employment and targets completed before construction phase commences; • 80% of semi and unskilled labour locally sourced; • Local construction workers employed have proof that they have lived in the area for five years or longer; • Tender documents for contractors include recommendations for construction camp; • MF set up prior to implementation of construction phase; • Code of Conduct drafted before commencement of construction phase; • Briefing session with construction workers held at outset of construction phase;
Monitoring	<ul style="list-style-type: none"> • ACED and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

Safety, poaching, stock theft and damage to farm infrastructure

OBJECTIVE: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities and the potential loss of stock and damage to farm infrastructure.

Project component/s	Construction and establishment activities associated with the establishment of the PV facility, including infrastructure etc.	
Potential Impact	Impact on safety of farmers and communities (increased crime etc.) and potential loss of livestock due to stock theft by construction workers and also damage to farm infrastructure, such as gates and fences.	
Activity/risk source	The presence of construction workers on the site can pose a potential safety risk to local farmers and communities and may result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.	
Mitigation: Target/Objective	To avoid and or minimise the potential impact on local communities and their livelihoods.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> • The housing of construction workers on the site should be limited to security personnel. • Consider establishing a MF with the adjacent farmers and develop a Code of Conduct for construction workers. • Inform all workers of the conditions contained in the Code of Conduct. • Dismiss all workers that do 	<ul style="list-style-type: none"> • ACED and contractors • ACED • ACED and contractor • Contractors 	<ul style="list-style-type: none"> • Establish MF before construction phase commences. • Develop Code of Conduct prior to commencement of construction phase. The Code of Conduct should be signed by ACED and the contractors before the contractors move onto site; • Inform all construction workers of Code of Conduct requirements before

<p>not adhere to the code of conduct for workers. All dismissals must be in accordance with South African labour legislation.</p> <ul style="list-style-type: none"> • Compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc. 	<ul style="list-style-type: none"> • Contractors 	<p>construction phase commences.</p> <ul style="list-style-type: none"> • Compensate farmers / community members within 1 month of claim being verified by ACED and or Contractor/s.
<p>Performance Indicator</p>	<ul style="list-style-type: none"> • Community MF in place before construction phase commences. • Code of Conduct developed and approved prior to commencement of construction phase. • All construction workers made aware of Code of Conduct within first week of being employed. • Compensation claims settled within 1 month of claim being verified by Community MF. 	
<p>Monitoring</p>	<ul style="list-style-type: none"> • ACED and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase. 	

Increase risk of veld fires

OBJECTIVE: To avoid and or minimise the potential risk of increased veld fires during the construction phase.

<p>Project component/s</p>	<p>Construction and establishment activities associated with the establishment of PV facility, including infrastructure etc.</p>	
<p>Potential Impact</p>	<p>Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences.</p>	
<p>Activity/risk source</p>	<p>The presence of construction workers and their activities on the site can increase the risk of veld fires.</p>	
<p>Mitigation: Target/Objective</p>	<p>To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.</p>	
<p>Mitigation: Action/control</p>	<p>Responsibility</p>	<p>Timeframe</p>
<ul style="list-style-type: none"> • Ensure that open fires on the site for cooking or heating are not allowed except in designated areas. • Provide adequate fire fighting equipment onsite. • Provide fire-fighting training to selected construction staff. • Compensate farmers / community members at full 	<ul style="list-style-type: none"> • ACED and contractors • ACED and contractors • Contractors • Contractors 	<ul style="list-style-type: none"> • Ensure that these conditions are included in the Construction Phase EMP. • Ensure that designated areas for fires are identified on site at the outset of the construction phase. • Ensure that fire fighting equipment and training is provided before the construction phase

market related replacement cost for any losses, such as livestock, damage to infrastructure etc.		commences.
<ul style="list-style-type: none"> Join Fire Protection Agency 		<ul style="list-style-type: none"> Compensate Farmers within 1 month of claim being verified by MF.
Performance Indicator	<ul style="list-style-type: none"> Conditions contained in the Construction EMP. Designated areas for fires identified on site at the outset of the construction phase. Fire fighting equipment and training provided before the construction phase commences. Compensation claims settled within 1 month of claim being verified by Community MF. 	
Monitoring	<ul style="list-style-type: none"> ACED and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase. 	

Impact of dust and noise due to heavy vehicles and damage to roads

OBJECTIVE: To avoid and or minimise the potential impacts of safety, noise and dust and damage to roads caused by construction vehicles during the construction phase.

Project component/s	Construction and establishment activities associated with the establishment of the PV facility, including infrastructure etc.	
Potential Impact	Heavy vehicles can generate noise and dust impacts. Movement of heavy vehicles can also damage roads.	
Activity/risk source	The movement of heavy vehicles and their activities on the site can result in noise and dust impacts and damage roads.	
Mitigation: Target/Objective	To avoid and or minimise the potential noise and dust impacts associated with heavy vehicles, and minimise damage to roads.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Implement dust suppression measures for heavy vehicles such as wetting roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. Ensure that all vehicles are road-worthy; drivers are qualified and are made aware of the potential noise, dust and safety issues. Ensure that drivers adhere to speed limits. Vehicles should be fitted with recorders to record when 	<ul style="list-style-type: none"> Contractors Contractors Contractors 	<ul style="list-style-type: none"> Ensure that these conditions are included in the Construction Phase EMP. Ensure that dust suppression measures are implemented for all heavy vehicles that require such measures during the construction phase commences. Ensure that drivers are made aware of the potential safety issues and enforcement of strict speed limits when they are employed. Fit all heavy vehicles with speed monitors before they are used in the construction

<ul style="list-style-type: none"> vehicles exceed the speed limit. Ensure that damage to roads is repaired before completion of construction phase; Consider option of using rail to transport material from Port Elizabeth to De Aar. 	<ul style="list-style-type: none"> Contractors ACED 	<ul style="list-style-type: none"> phase. Assess road worthy status of heavy vehicles at the outset of the construction phase and on a monthly basis thereafter; Ensure that damage to roads is repaired before completion of construction phase.
Performance Indicator	<ul style="list-style-type: none"> Conditions included in the Construction Phase EMP. Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase commences. Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. All heavy vehicles equipped with speed monitors before they are used in the construction phase. Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis. 	
Monitoring	<ul style="list-style-type: none"> ACED and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase. 	

Impact on farming activities

OBJECTIVE: To avoid and or minimise the potential impact on current and future farming activities during the construction phase.

Project component/s	Construction phase activities associated with the establishment of the PV facility and associated infrastructure.	
Potential Impact	The footprint of the solar energy plant and associated infrastructure will result in a loss of land that will impact on farming activities on the site.	
Activity/risk source	The footprint taken up by the solar energy plant and associated infrastructure.	
Mitigation: Target/Objective	To minimise the loss of land taken up by the PV facility and associated infrastructure and to enable farming activities to continue where possible, specifically grazing.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Minimise the footprint of the PV facility and the associated infrastructure. Rehabilitate disturbed areas on completion of the construction phase. Details of the rehabilitation programme should be contained in the EMP. 	<ul style="list-style-type: none"> Contractor and ACED ECO and Contractors 	<ul style="list-style-type: none"> Footprint for PV facility should be defined in the Construction EMP before construction phase commences. Rehabilitation should be on-going and completed within 3 months of the completion of the construction phase.

		<ul style="list-style-type: none"> Meeting/s with local farmers to discuss lease options should take place during the construction phase.
Performance Indicator	<ul style="list-style-type: none"> Footprint of PV facility included in the Construction Phase EMP. Meeting/s held with farmers during construction phase. 	
Monitoring	<ul style="list-style-type: none"> ECO must monitor indicators listed above to ensure that they have been met for the construction phase. 	

OPERATIONAL PHASE

Creation of employment and business opportunities

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

Project component/s	Day to day operational activities associated with the PV facility, including maintenance etc.	
Potential Impact	The opportunities and benefits associated with the creation of local employment and business should be maximised	
Activity/risk source	The operational phase of the PV facility will create approximately 30 full time employment opportunities.	
Mitigation: Target/Objective	In the medium to long term employ as many locals as possible to fill the full time employment opportunities.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> The entire workforce of 60 - 80 permanent staff will be based in local towns of De Aar, Britstown and Hanover. ACED should commit to implementing a 5-year training and skills development and training programme. The initial local content target is 30%; however, after 5 years the objective is to have all the employment opportunities taken up by locals. Identify local members of the community who are suitably qualified or who have the potential to be employed full time. 	<ul style="list-style-type: none"> ACED ACED 	<ul style="list-style-type: none"> Develop 5 year training and skills development programme during the construction phase Identify local members of the community who are suitably qualified or who have the potential to be employed full time during the construction phase.
Performance Indicator	<ul style="list-style-type: none"> 5 year training and skills development programme developed and designed before construction phase completed. Potential locals identified before construction phase completed. 	
Monitoring	<ul style="list-style-type: none"> ACED must monitor indicators listed above to ensure that they have been met for the operational phase. 	

DECOMMISSIONING PHASE

Impact of decommissioning

OBJECTIVE: To avoid and or minimise the potential impacts associated with the decommissioning phase.

Project component/s	Decommissioning phase of the PV facility	
Potential Impact	Decommissioning will result in job losses, which in turn can result in a number of social impacts, such as reduced quality of life, stress, depression etc. However, the number of people affected (275) is relatively small. Decommissioning is also similar to the construction phase in that it will also create temporary employment opportunities.	
Activity/risk source	Decommissioning of the PV facility	
Mitigation: Target/Objective	To avoid and or minimise the potential social impacts associated with decommissioning phase of the PV facility.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Retrenchments should comply with South African Labour legislation of the day 	<ul style="list-style-type: none"> ACED 	<ul style="list-style-type: none"> When PV facility is decommissioned
Performance Indicator	<ul style="list-style-type: none"> South African Labour legislation relevant at the time 	
Monitoring	<ul style="list-style-type: none"> ACED and Department of Labour 	