

SOCIAL IMPACT REPORT

HYPERION HYBRID DUAL FUEL THERMAL PLANT

NORTHERN CAPE PROVINCE

FEBRUARY 2021

Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Savannah Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed Hyperion Hybrid Thermal Power Plant located approximately 15 km north east of the town of Kathu in the Northern Cape Province. The project site is situated within the Gamagara Local Municipality (GLM), which is located within the John Taolo Gaetsewe District Municipality (JTGDM).

Tony Barbour Environmental Consulting was appointed by Savannah Environmental to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process. This report contains the findings of the SIA for the proposed Hyperion Thermal Power Plant.

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 SIA recognises the link between the proposed Hyperion Hybrid Thermal Power Plant and Hyperion PV facilities. The identification and assessment of social issues associated with proposed hybrid facility is therefore considered within the context of supporting the development of renewable energy in South Africa.

The findings of the SIA are based on a review of relevant documents, semi-informal interviews with affected stakeholder, and the authors experience with undertaking SIAs for similar project, including renewable energy projects located in the Northern Cape Province.

POLICY AND PLANNING ISSUES

The development of renewable energy is strongly supported at a national, provincial and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The proposed Hyperion hybrid thermal power facility compliments the development of renewable energy. In addition, the proposed development supports a number of objectives contained in the NCP Provincial Growth and Development Strategy and the JTGDM and GLM IDP, specifically promotion of socio-economic development, SMME's, job creation and private sector investment. The development of the proposed hybrid thermal power facility is therefore supported by key policy and planning documents.

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 phase will extend over a period of approximately 14 months and create in the region of 350 employment opportunities. Based on information provided by the proponent, approximately 75% of the jobs will benefit low-skilled workers, 25% semi-skilled and 5% high skilled. Members from the local communities in the area, specifically Kathu and Debeng, would qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 31 million (2020 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Kathu and other towns in the GLM.

The capital expenditure associated with the construction phase will be approximately R 1.5 billion (2020 Rand value). This will create opportunities for local companies and the regional and local economy. Due the key role played by the mining sector there are a likely to be a number of local contractors and engineering companies based in Kathu that will be suitably qualified to provide services and skills. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Nuisance impacts, such as noise, dust and safety, associated with construction related activities and vehicles;
- Impact on productive farmland.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be **Low Negative**. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. 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/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative for community as a whole)	Low (Negative for community as a whole)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

OPERATIONAL PHASE

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- The establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities.
- Benefits associated with socio-economic contributions to community development.

The proposed project will supplement South Africa’s energy and assist to improve energy security. In addition, it will also reduce the country’s reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts

- Noise impacts associated with the operation of the plant;
- Visual impacts and associated impact on sense of place.

The owner of Happy Rest (Galway 431/1), Ms Loubser, raised concerns about the potential impact of the facility on the areas current quiet, sense of place and the potential impact on the value of the property. The potential impact of lights at the facility on the areas undisturbed, dark sense of place at night was also raised as a concern. These issues should be address by the Noise and Visual Impact Assessment (VIA) specialist studies and the appropriate mitigation measures included in the design and operation of the facility.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. 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/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to improve energy security and support renewable sector	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefits associated with socio-economic contributions to community development	Medium (Positive)	High (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Low (Negative)
Noise impacts	Medium (Negative)	Low (Negative)

CUMULATIVE IMPACTS

Cumulative impact on sense of place

The potential visual impact of the proposed hybrid thermal plant and associated infrastructure on the areas sense of place in isolation is rated as **Low Negative** with mitigation. When considered within the context of other renewable energy projects in the area the cumulative impact on sense of place is rated as **Medium Negative** with mitigation.

Cumulative impact on local services and accommodation

The potential impact of the proposed hybrid thermal plant and associated infrastructure local services and accommodation in isolation is rated as **Low Negative** with mitigation. When considered within the context of other renewable energy projects in the area the cumulative impact is rated as **Medium Negative** with mitigation.

Cumulative impact on local economy

The potential impact of the proposed hybrid thermal plant and associated infrastructure on the local economy in isolation is rated as **Low Positive** with enhancement. When considered within the context of other renewable energy projects in the area the cumulative impact is rated as **High Positive** with enhancement.

NO-DEVELOPMENT OPTION

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, renewable energy. Given South Africa’s current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a significant negative social cost. The No-Development option is not supported by the findings of the SIA.

CONCLUSIONS

The findings of the SIA indicate that the proposed Hyperion hybrid thermal dual fuel project will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The project will also contribute to local economic development through socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation by merging thermal with solar hybrid solutions.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures listed in the SIA and other relevant specialist's studies, including the Noise Impact and Visual Impact Assessment, are implemented. The development of the proposed Hyperion hybrid thermal dual fuel project is therefore supported by the findings of the SIA.

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Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a <i>curriculum vitae</i> ;	Section 1.6, Annexure C
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.7, Annexure D
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A for SIA
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, Annexure B
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4, Section 5
(g) an identification of any areas to be avoided, including buffers;	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 3
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4, Section 5,
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4, Section 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 5.3
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	To be undertaken during Assessment Phase
(p) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

ACRONYMS

DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
HD	Historically Disadvantaged
EIA	Environmental Impact Assessment
GDF	Gamagara Development Forum
GLM	Gamagara Local Municipality
IDP	Integrated Development Plan
IPP	Independent Power Producer
JTGDM	John Taolo Gaetsewe District Municipality
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
NC	Northern Cape
NCPPGDS	Northern Cape Province Provincial Growth and Development Strategy
NCSDF	Northern Cape Spatial Development Framework
MW	Megawatt
PGDS	Provincial Growth and Development Strategy
SDF	Spatial Development Framework
SEF	Solar Energy Facility
SIA	Social Impact Assessment

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Savannah Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed Hyperion Thermal Power Plant located approximately 15 km north east of the town of Kathu in the Northern Cape Province. The project site is situated within the Gamagara Local Municipality (GLM), which is located within the John Taolo Gaetsewe District Municipality (JTGDM) (Figure 1.1).

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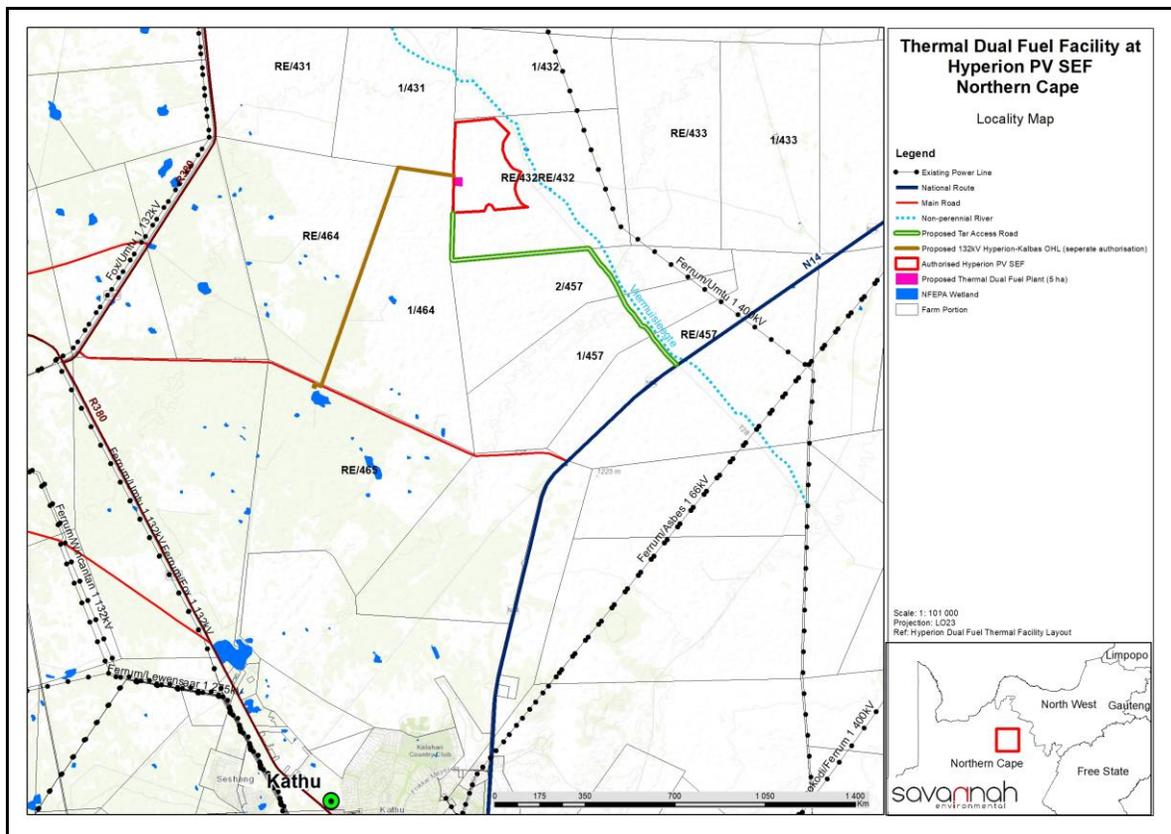


Figure 1.1: Location of Hyperion hybrid thermal power facility

1.2 TERMS OF REFERENCE

The terms of reference for the Scoping Level 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 development;

- A description and initial assessment of the potential social issues associated with the proposed development;
- Identification of potential enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

1.3 PROJECT DESCRIPTION

The Hyperion hybrid facility involves the construction of a thermal generation plant that will operate in combination with the authorised Hyperion 1 & 2 Solar PV Energy Facilities, and which will provide mid-merit power supply^[1] to the electricity grid. Where possible and where available, solar power will be utilised to meet the demand. However, where solar power is not available (typically between the hours of 5h00 and 07h00 and again between 18h00 and 21h30), thermal generation will be utilised. It is estimated that between 50% – 65% of the demand for supply from the hybrid facility will be met utilising solar power with the remaining 35 – 50 % being met utilising thermal generation. The hybrid facility has been designed and developed as a power balance system to manage electricity demand during peak periods to stabilise the grid, as well as provide back up support for base load generation in the event of unscheduled maintenance on Eskom’s coal fired power stations. The authorised Hyperion 1 and Hyperion 2 PV facilities each have an output capacity of 100MW. The thermal generation plant on its own will have an installed capacity of up to 75MW, to be operated on LPG. LPG will be transported by road to the site from a reputable South African supplier. .

The main infrastructure associated with the facility includes the following:

- Reciprocating Gas Engines
- Access road
- Truck entrance and parking facility
- Regasification plant and fuel preparation plant
- Dry cooling system for operating oils/chemicals
- Fuel off-loading facility
- Fuel storage facility
- Water demineralisation plant
- Cabling, O&M building, fencing, warehouses and workshops

The capital expenditure will be approximately R 1.5 billion (2020 Rand value) and will take 14 months to construct. The development will create approximately 350 and 20 employment opportunities during the construction and operational phase respectively.

^[1] A load-following power plant, also known as mid-merit, is a power plant that adjusts its power output as demand for electricity fluctuates throughout the day. Mid-merit power plants fill the gap between the peak load and base load

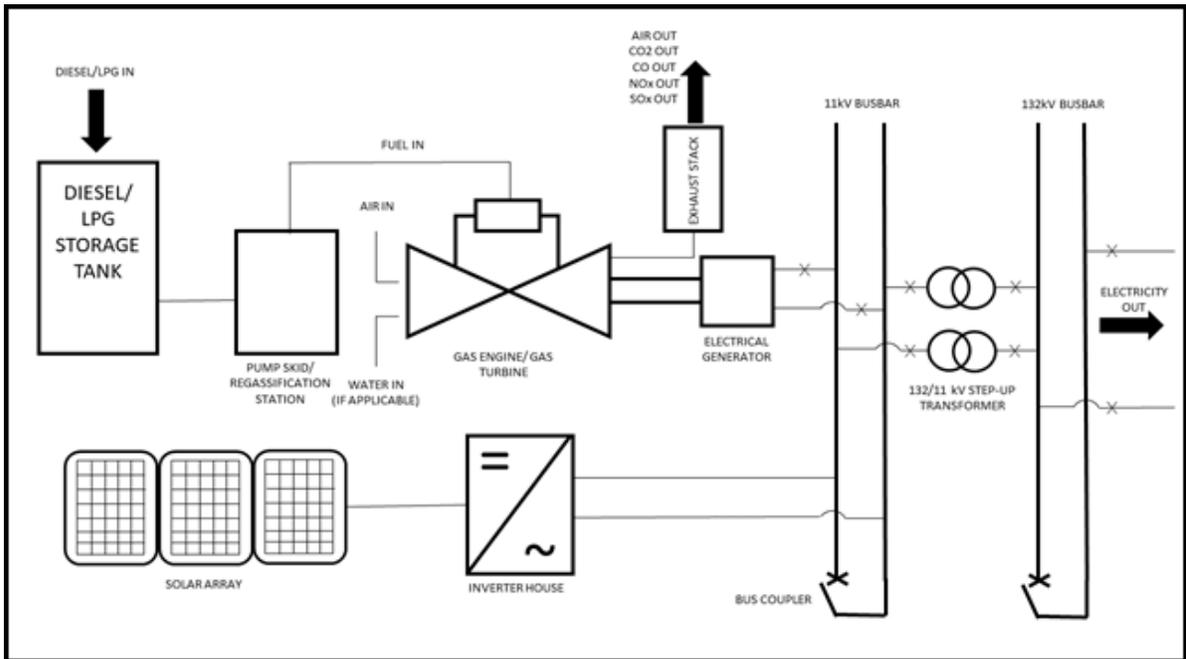


Figure 1.2: Layout of Hyperion hybrid thermal power facility

1.4 APPROACH TO STUDY

The approach to the SIA 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.
- 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 socio-economic data for the study area;
- Review of relevant planning and policy frameworks for the area;
- Review of information from similar studies, including the SIAs undertaken for other renewable energy projects;
- Due to the second COVID 19 wave, a site visit was not undertaken. However, telephonic interviews were undertaken with affected stakeholders and local landowners;
- Identification and assessment of the social issues associated with the proposed project.

Annexure A contains a list of the secondary information reviewed and stakeholders interviewed telephonically. Annexure B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.5 ASSUMPTIONS AND LIMITATIONS

1.5.1 Assumptions

Identification of social issues

As indicated above, due to the second COVID 19 wave, a site visit was not undertaken. However, telephonic interviews were undertaken with affected stakeholders and local landowners. The identification of social issues was also based on the authors experience with undertaking in the region of 120 SIAs for solar and wind energy facilities and the associated infrastructure (substations, transmission lines, roads etc.). Based on this the author is confident that the majority of social issues have been identified.

Technical suitability

It is assumed that the development site represents a technically suitable site for the establishment of the proposed thermal plant and associated infrastructure.

Strategic importance of the project

The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

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.

1.5.2 Limitations

Demographic data

Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.

Site visit

As indicated above, due to the second COVID 19 wave, a site visit was not undertaken. However, telephonic interviews were undertaken with affected stakeholders and local landowners. However, as indicated above, the author is confident that the majority of social issues have been identified. In addition, the findings of the specialist studies undertaken as part of the Hyperion PV projects, including the SIA, identified no fatal flaws. All impacts, including social impacts, associated with the project can also be mitigated to acceptable levels.

1.6 SPECIALIST DETAILS

Tony Barbour (Tony Barbour Environmental Consultant and Researcher), the lead author of this report is an independent specialist with 24 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has

undertaken in the region of 130 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. Annexure C contains a copy of CV for Tony Barbour.

Schalk van der Merwe, the co-author of this report, has an MPhil in Environmental Management from the University of Cape Town and has worked closely with Tony Barbour on a number of SIAs over the last twelve years.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour and Schalk van der Merwe, the specialist consultants responsible for undertaking the study and preparing the SIA, are independent and do not have a vested or financial interest in the proposed development being either approved or rejected. Annexure D contains a copy of signed declaration of independence.

1.8 REPORT STRUCTURE

The report is divided into five sections, namely:

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

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the “policy and planning fit¹” of the proposed development therefore constitutes a key aspect of the Social Impact Assessment (SIA). In this regard, assessment of “planning fit” conforms to international best practice for conducting SIAs.

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of meeting the objectives of the BA 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);
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- The National Development Plan (2011);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy;
- Northern Cape Spatial Development Framework (2012);
- Northern Cape Province Green Document (2017/2018);
- John Taolo Gaetsewe Integrated Development Plan (2019-2020);
- John Taolo Gaetsewe Spatial Development Framework (2017);
- Gamagara Integrated Development Plan (2019-2020).

The reference to key renewable energy policy documents is made within the context of the Hyperion hybrid thermal power facility’s link to the approved 75 MW Hyperion PV Solar Energy Facilities.

2.2 NATIONAL POLICY ENVIRONMENT

2.2.1 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 and wind:

“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 (...);

¹ Planning fit” can simply be described as the extent to which any relevant development satisfies the core criteria of appropriateness, need, and desirability, as defined or circumscribed by the relevant applicable legislation and policy documents at a given time.

to provide for (...) increased generation and consumption of renewable energies..."(Preamble).

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

Investment in renewable energy initiatives, such as the proposed SEF, 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; and
- Generally lower running costs, and high labour intensities.

Disadvantages include:

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

2.2.3 Integrated Energy Plan (2016)

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future

energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives are identified, namely:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term.
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy.
- The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply.
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met.

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As

a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.

By 2020, various import options become available and some new coal capacity is added along with new wind, solar and **gas** capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs.

In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, **gas** and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy.

An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered.

In terms of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with **natural gas** and coal making a smaller contribution.

The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type.

2.2.4 Integrated Resource Plan

The integrated resource plan (IRP) is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The IRP 2010 was intended to be a 'living plan' that would be periodically revised by the DoE. However, this was never done and resulted in an energy mix that failed to adequately meet the constantly changing supply and demand scenarios in South Africa, nor did it reflect global technological advancements in the efficient and responsible generation of energy.

On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment (Draft IRP). Following a lengthy public participation and consultation process the Integrated Resource Plan 2019 (IRP 2019) was gazetted by the Minister of Mineral Resources and Energy, Gwede Mantashe, on 18 October 2019, updating the energy forecast for South Africa from the current period to the year 2030. The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost.

Since the promulgated IRP 2010, the following capacity developments have taken place. A total 6 422MW under the government led Renewable Energy Independent Power Producers Programme (RE IPP Procurement Programme) has been procured, with 3 876MW currently operational and made available to the grid. In addition, IPPs have commissioned 1 005MW from two Open Cycle Gas Turbine (OCGT) peaking plants. Under the Eskom build programme, the following capacity has been commissioned: 1 332MW of Ingula pumped storage, 1 588MW of Medupi, 800MW of Kusile and 100MW of Sere Wind Farm. In total, 18 000MW of new generation capacity has been committed to.

Provision has been made for the following new additional capacity by 2030:

- 1 500MW of coal;
- 2 500MW of hydro;
- 6 000MW of solar PV;
- 14 400MW of wind;
- 1 860MW of nuclear;
- 2 088MW for storage;
- 3 000MW of gas/diesel; and
- 4 000MW from other distributed generation, co-generation, biomass and landfill technologies.

Figure 2.1 provides a summary of the allocations and commitments between the various energy sectors.

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400	1,000	1,600		
2023	750	-555				1000	1,600		500	
2024			1,860				1,600	1000	500	
2025						1000	1,600		500	
2026		-1,219					1,600		500	
2027	750	-847					1,600	2000	500	
2028		-475				1000	1,600		500	
2029		-1,694			1575	1000	1,600		500	
2030		-1,050		2,500		1000	1,600		500	
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
 Committed/Already Contracted Capacity
 Capacity Decommissioned
 New Additional Capacity
 Extension of Koeberg Plant Design Life
 Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.
- Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work.
- Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.
- Short term capacity gap is estimated at 2,000MW.

Figure 2.1: Summary of energy allocations and commitments

As indicated above, the changes from the Draft IRP capacity allocations see an increase in solar PV and wind, and a significant decrease in gas and diesel; and new inclusions include nuclear and storage.

In terms of renewable energy four bidding rounds have been completed for renewable energy projects under the RE IPP Procurement Programme. The most dominant technology in the IRP2019 is renewable energy from wind and solar PV technologies, with wind being identified as the stronger of the two technologies. There is a consistent annual allocation of 1 600MW for wind technology commencing in the year 2022 up to 2030. The solar PV allocation of 1 000MWs per year is incremental over the period up to 2030, with no allocation in the years 2024 (being the year the Koeberg nuclear extension is expected to be commissioned) and the years 2026 and 2027 (presumably since 2 000MW of gas is expected in the year 2027). The IRP 2019 states that although there are annual build limits, in the long run such limits will be reviewed to take into account demand and supply requirements.

2.2.5 National Development Plan

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

2.2.6 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard, the framework identifies investments in five key areas namely: energy, transport, communication, water and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard, clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

2.2.7 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan, Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, **electricity plants**, hospitals, schools and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPs). The SIPs cover social and economic

infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically-focussed SIPs;
- Three spatial SIPs;
- Three energy SIPs;
- Three social infrastructure SIPs;
- Two knowledge SIPs;
- One regional integration SIP;
- One water and sanitation SIP.

The three energy SIPS are SIP 8, 9 and 10.

SIP 8: Green energy in support of the South African economy

- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010);
- Support bio-fuel production facilities.

SIP 9: Electricity generation to support socio-economic development

- Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances;
- Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.

SIP 10: Electricity transmission and distribution for all

- Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.
- Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

2.2.8 Astronomy Geographic Advantage Act

The purpose of the Act (Act No 21 of 2007) is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Northern Cape Province Provincial Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS 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;
- Tourism.

However, the NCPGDS 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;
- 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. These are:

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

Of specific relevance to the SIA the NCPGDS makes reference 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 NCPGDS 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 NCPGDS also 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 solar energy 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 development and associated renewable energy facilities do not negatively impact on the regions natural environment. In this regard, the NCPGDS 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.

2.3.2 Northern Cape Provincial Spatial Development Framework

Northern Cape Provincial Spatial Development Framework (NCSDF) (2012) lists a number of sectoral strategies and plans that are to be read and treated as key

components of the PSDF. Of these there are a number that are relevant to the proposed STPs. These include:

- Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government;
- Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development;
- Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).

Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. The objectives are listed below:

- Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts;
- Enhance the efficiency of Eskom's power station at the Vanderkloof power station;
- In order to reinforce the existing transmission network and to ensure a reliable electricity supply in the Northern Cape, construct a 400 kV transmission power line from Ferrum Substation (near Kathu/Sishen) to Garona Substation (near Groblershoop). There is a national electricity supply shortage and the country is now in a position where it needs to commission additional plants urgently. Consequently, renewable energy projects are a high priority;
- Develop and institute innovative new energy technologies to improve access to reliable, sustainable and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector;
- Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013.

Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector.

- The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible;
- EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above;

- Renewable energy sources such as wind, solar, thermal, biomass and domestic hydroelectricity are to constitute 25% of the province's energy generation capacity by 2020.
- The following key policy principles for renewable energy apply:
 - Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation;
 - Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being;
 - Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements;
 - Allocation of functions: Government will allocate functions within the framework of the Constitution to competent institutions and spheres of government that can most effectively achieve the objectives of the energy policy;
 - The implementation of sustainable renewable energy is to be promoted through appropriate financial and fiscal instruments;
 - An effective legislative system to promote the implementation of renewable energy is to be developed, implemented, and continuously improved;
 - Public awareness of the benefits and opportunities of renewable energy must be promoted;
 - The development of renewable energy systems is to be harnessed as a mechanism for economic development throughout the province in accordance with the Sustainable Development Initiative (SDI) approach (refer to Toolkit D10) or any comparable approach;
 - Renewable energy must, first, and foremost, be used to address the needs of the province before being exported.

2.2.3 Northern Cape Climate Change Response Strategy

The key aspects of the PCCRS Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key Sectors to ensure proactive long term responses to the frequency and intensity of extreme weather events such as flooding and wild fire, with heightened requirements for effective disaster management".

Key points from MEC's address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, is identified as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The MEC also indicated that the NCP was involved in the processing a number of WEF and Solar Energy Facility EIA applications.

2.2.4 Northern Cape Province Green Document 2017/2018

The NCP Green Document was prepared by the Northern Cape Department of Economic Development and Tourism and provides an impact assessment of IPPs on the communities in the province located within a 50 km radius from existing facilities. The document notes that the NCP is nationally a leader in commercial-scale renewable energy projects. By 2018 a total of 23 IPP projects in the province had been integrated into the national grid. These projects include Solar PV, Concentrated Solar and WEFs. The document notes that through their economic development obligations these projects have already made a significant positive contribution to affected communities. Much of the effort has been directed at supporting local education. The document also notes that, as these projects are committed to 20-year minimum lifespans, the collectively hold a tremendous potential for socio-economic upliftment.

Key issues identified with regard to improving the potential beneficial impact of IPPs in the NCP include:

- Local community members abusing project benefits for personal gain;
- Difficulty in outreach to local community beneficiaries due to high local illiteracy levels;
- A lack of business skills generally hampers the successful establishment of local small enterprises which could benefit from projects;
- Community benefit obligations are currently met in a piecemeal and uncoordinated fashion;
- Anticipated community benefits are often frustrated by inadequate engagement and insufficient ongoing consultation;
- The scarcity of people skilled in maths and sciences in local communities hampers meaningful higher-level local skills development and employment; and
- Insufficient support from local municipalities for IPP development.

2.3.4 John Taola Gaetsewe District Municipality Integrated Development Plan

The vision of the John Taolo Gaetsewe District Municipality (JTGDM) as set out in the Integrated Development Plan (IDP)(2019-2020) is "Working together for a better life for all in the district". The mission statement associated with the vision is "Accelerating the implementation of integrated development initiatives and providing support to local municipalities".

The IDP lists five (5) key performance areas (KPAs), of which KPA2, Local Economic Development (LED) is relevant to the proposed development. In terms of LED the IDP highlights the importance to promoting economic development opportunities and creating employment opportunities. Of relevance to the development the IDP also notes that the dependence on fossil fuels makes the District economy extremely vulnerable to rising energy and fuel prices. In addition, the dependence on national energy sources leaves the District vulnerable.

The IDP lists a number of opportunities and challenges.

Opportunities

- Climatic Conditions favourable to generate alternative energy
- Influx of highly capable / suitably qualified people into the District
- Mineral Resources
- Availability of land
- Growing business sector
- Potential for secondary and manufacturing industries as a result of mining growth

Challenges

- High levels of unemployment and grant dependence
- Low educational and skills levels
- Extreme poverty
- Unemployed youth
- Inadequate health services
- Inadequate bulk supply of electricity
- Lack of SMME Development and inadequate SMME incubators
- Inability to sustain LED projects and to create a market value chain

The IDP also identifies the risks posed by climate change. The JTGDM receives between 500mm annual rainfall in the south-eastern and 200mm in the north-western part of the district, which is below the generally accepted average of 500mm per annum for dry land cropping. In addition to the low rainfall the area has high average temperatures and evaporation rates. These already challenging conditions are expected to get worse with climate change. The frequency of droughts, which are already a frequent occurrence in the area, is also expected to increase with climate change. Renewable energy and associated projects are therefore important.

2.3.5 John Taola Gaetsewe District Municipality Spatial Development Framework

The spatial vision of the 2017 Spatial Development Framework (SDF) for the JTGDM is to be become a district in which all its residents:

- Engage in viable and sustainable wealth-generating economic activities.
- Live in sustainable human settlements that are safe, vibrant and in balance with the environment.
- Participate in the governance of the district, including settlement formation and expansion, economic development, education, and the provision of basic services.

The SDF identifies a number of development objectives to support vision, the SDF, namely:

- Attract new business (especially manufacturing linked to other sectors e.g. mining, agriculture) to the district in a focused/core area.
- Create a spatial structure that would maximise accessibility of the dispersed population to a range of services and facilities.
- Support the diversification of the economy, whilst strengthening existing area-specific economic activities relating to specific regions.
- Promote expansion of the mining industry in such a way that its negative impacts are minimised and distressed mining communities are supported.
- Stimulate the agricultural sector through the strengthening of commercial farming and the creation of a new intensive agriculture and agro-processing SMME economy in densely populated rural areas with predominantly subsistence farming.
- Enhance tourism as a more important component integrated in the economy of the district.

The SDF identifies Catalytic Projects for the JTGDM, including the Gamagara Development Corridor, which refers to an stretching from Danielskuil and Postmasburg in the south to Hotazel and Moshaweng in the north. The Northern Cape Provincial SDF notes that the lack of infrastructure in this area poses a constraint to the growth of the mining industry as well as limiting the economic development of the area. The Gamagara Development Corridor is part of the Strategic Integrated Projects (SIPs). The SIPs are a product of the National Infrastructure Projects (NIP). Eighteen (18)

SIPs have been developed and approved to support economic development and address service delivery in the poorest provinces. The Gamagara Development Corridor constitutes the SIP 3 (South-Eastern node & corridor development – Increase manganese rail capacity in the Northern Cape and SIP 5 (Saldanha-Northern Cape development corridor - Expansion of iron ore mining production and beneficiation). The SDF also refers to the Kathu Supplier Park. The objective of the park is to provide an operating platform for businesses that support mining and other industries. Of relevant to the proposed project, the support for mining and associated support services will require a reliable and stable energy supply.

2.3.6 Gamagara Local Municipality Integrated Development Plan

The vision for the Gamagara Local Municipality (GLM) as set out in the IDP (2019/2022) is "To build a prosperous and sustainable communities". The mission statement linked to the vision is "By Providing universal, transparent access to quality and sustainable services, by promote social and economic development in a safe and healthy environment."

The IDP identifies a number of Strategic Objectives of which the creation of a conducive environment for economic development in the municipality is the most relevant to the proposed development. The key focus area of the objective is economic development, specifically the creation employment opportunities and skills development programmes for SMMEs. The foreword by the Municipal Manager in the 2017-2022 IDP notes that the municipality is not only growing into a mining megatown but also as a solar energy centre. The municipal manager indicate that this does not only place pressure the municipality in terms of infrastructure provision but also attracts people to the area. The impact of these projects on the environment and the planning process require a change of strategy going forward (IDP, 2017-2022).

Within the context of the establishment of Community Trusts linked the associated PV plants the strategic objective: Improve life for all through sustainable infrastructure investment and development, is also regarded as relevant. The key focus area of the strategic objective linked to infrastructure investment and development is the provision of basic services, including water. The focus in Ward 7, where the proposed project is located, is the establishment and equipping of boreholes to supply drinking water, the provision of access to electricity and establishment of libraries were appropriate.

A SWOT analysis undertaken as part of the IDP process identified a number of strengths and opportunities that are relevant to the proposed development, including high potential for economic growth and development. The influx of job seekers to the area was identified as a potential threat.

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

Section 3 provides a baseline description of the study area with regard to:

- The administrative context;
- Provincial context;
- Overview of district and local municipalities;
- Site and the surrounding land uses².

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Gamagara Local Municipality (GLM), which forms part of the John Taolo Gaetsewe District Municipality (JTGD) (Figure 3.1). The JTGD comprises of three Local Municipalities, namely, Gamagara, Ga-Segonyana and Joe Morolong LM. The GLM is a Category B local municipality that occupies an area of 2619 km². This constitutes approximately 10% of the JTGD. The municipal area consist of seven (7) wards, namely Ward 1, Kathu; Ward 2, Dibeng Township; Ward 3, Diepkloof, Skerpdraai and Olifanthoek Town; Ward 4: Ditloung and Welgelee; Ward 5, Sesheng and Mapoteng; Ward 6, Siyathemba, Rooisand and Smartietown, and Ward 7, Babatas, Dibeng Town and Bestwood. The project area is located in Ward 7, which is located to the north and north west of the town of Kathu, which is the administrative centre of the GLM.

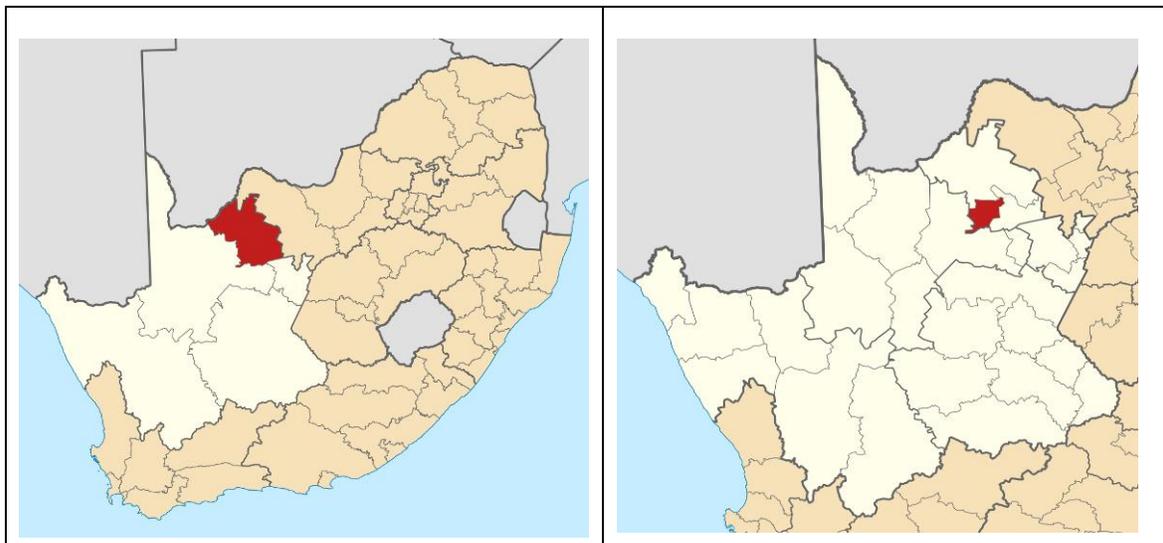


Figure 3.1: Location of John Taolo Gaetsewe District Municipality (left) and Gamagara Local Municipality (right) within the Northern Cape Province

² The description of the area and the surrounding land uses is largely based on the information contained in the EIAs prepared by Savannah Environmental for the Hyperion PV projects (PV1, 2, 3 and 4) in 2018 and 2019.

3.3 PROVINCIAL CONTEXT³

The proposed site 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, Karoo, Namakwa, ZF Mgcawu District Municipality (known before 1 July 2013 as Siyanda DM), and Kgalagadi DM, twenty-six Category B municipalities and five district management areas. The site itself is located in the GLM, which is one of three local municipalities that fall within the JTGDM.

Population

Despite having the largest surface area, the Northern Cape has the smallest population of 1 193 780 (Community Household Survey, 2016) or 2.2% of the population of South Africa. Of the five districts, Frances Baard has the largest population (32.5%), followed by ZF Mgcawu District Municipality (21.2%), John Taola Gaetsewe (20.3%), Pixley ka Seme (16.4%) and Namakwa (9.7%). The majority of the population in the Northern Cape Province are Black African (48.1%), followed by Coloureds (43.7%) and Whites (7.7%).

In terms of age, 36.5% of the Northern Cape population is between 15 and 34 years old, which is the highest age distribution, followed by 29.2% of those aged 35–64 years, while only 6.6% comprised those aged 65 years and older. Similarly, this pattern is also seen across all districts in the province. The district profile shows that the highest proportions of persons aged 15–34 years were recorded in Pixley Ka Seme, ZF Mgcawu and John Taolo Gaetsewe districts. The figures for these three districts were also above the provincial average of 36.5%. The proportion of persons aged 65 years and older was higher in Namakwa (9.5%) and Frances Baard (8.2%).

Education

Based on the information contained in the NCPSTDF the average adult education attainment levels in the Northern Cape are lower than the adult education attainment levels of South Africa as a whole. Approximately 19.7% of the Northern Cape adults have no schooling in comparison to South Africa's 18.1%. The Northern Cape has the second lowest percentage of adult individuals (5.5%) that obtained a tertiary education in South Africa. The LED Strategy for the Northern Cape indicates that Pixley ka Seme has the lowest adult education attainment levels in the Northern Cape with 27.3% of the adult population having no form of schooling, whilst John Taolo Gaetsewe is second with 25.4% having no schooling. The highest number of the adult population with tertiary education (6.4%) is located in Frances Baard.

The Northern Cape also has the smallest portion (11.1%) of highly skilled formal employees in South Africa, while Gauteng has the highest (14.3%). Linked to this the Northern Cape has the second largest portion of semi and unskilled formal employees in the country. A lack of skilled people often results in both the public and the private sector being unable to implement planned growth strategies and achieve the desired productivity, service delivery and service quality (NCSDF, 2012).

³ The information in this section is based on the Northern Cape Provincial Growth and Development Strategy 2004-2014. This document does not include 2011 Census Data. Where possible data from the 2011 Census and 2016 Community Household Survey has been used to update the information.

Economic development

Over the past 8 years there has been little to no variance in the Human Development Index (HDI) figures for the Northern Cape, indicating no increase or decrease in the overall standard of living⁴. This trend is unlikely to change in the foreseeable 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. It is important to note that the HDI for the Northern Cape (0.55) is substantially below the South African figure of 0.72. The HDI of 0.55 displays a pattern of semi-development, and there is a definite inequality between the different population groups, with the Whites having a higher development lifestyle than the African or Coloured groups.

The percentage of Northern Cape people living below the poverty line has decreased from 40% in 1995 to 27% in 2011, while the poverty gap has decreased from 11% in 1995 to 8% in 2011 (Figure 3.2). The goal set by the province is to decrease the percentage of people living below the poverty line to 20% by 2015 (NCSDF, 2012). The alleviation of poverty is one of the key challenges for economic development. Higher levels of economic growth are a key challenge for poverty eradication. Investment in people is pivotal to the eradication of poverty and inequality. Investment in people is also, to a large extent, about delivering social and economic infrastructure for education, welfare, health, housing, as well as transport and bulk infrastructure.

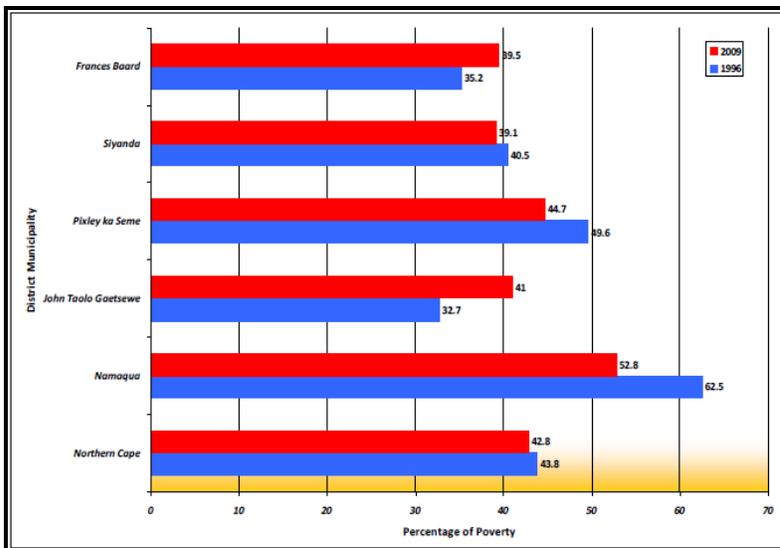


Figure 3.2: Percentage of people living in poverty in the Northern Cape (Source: Global Insight, 2009 as cited in the PGDS, July 2011)⁵.

⁴ The Human Development Index (HDI) was developed by the United Nations Development Programme (UNDP) based on the philosophy that the goal of development was to ensure that individuals live long, informed and comfortable lives. The HDI consists of three components: Longevity, which is measured by life expectancy at birth; Educational attainment, which is measured by two education variables, namely adult literacy and combined gross primary, secondary and tertiary enrolment ratio, and; Income, which is measured by gross domestic product (GDP) per capita. Performance in each dimension is expressed as a value between 0 and 1, and the HDI index gives an internationally accepted measure of the wellness (quality of life) of the population of the area under consideration. The closer the HDI is 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.

⁵ Siyanda DM is now called the ZF Mgcawu DM.

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 used⁶.

Economic sectors

The Northern Cape economy has shown significant recovery since 2000/2001 when it had a negative economic growth rate of -1.5% (LED Strategy). The provincial economy reached a peak of 3.7% in 2003/2004 and remained the lowest of all provinces. The Northern Cape is the smallest contributing province to South Africa's economy (only 2% to South Africa GDP per region in 2007).

The mining sector is the largest contributor to the provincial GDP, contributing 28.9% to the GDP in 2002 and 27.6% in 2008. The mining sector is also important at a national level. In this regard, the Northern Cape produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% if its manganese.

Agriculture and agri-processing sector is also a key economic sector. Approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme. Approximately 96% of the land is used for stock farming, including beef cattle and sheep or goats, as well as game farming. The agricultural sector contributed 5.8% to the Northern Cape GDP per region in 2007 which was approximately R1.3 billion, and it employs approximately 19.5% of the total formally employed individuals (NCSDP, 2012). The sector is experiencing significant growth in value-added activities, including game-farming. Food production and processing for the local and export market is also growing significantly.

The main agricultural produce of the Northern Cape include:

- High-value horticultural products such as table grapes, sultanas and wine grapes, dates, nuts, cotton, fodder, and cereal crops are grown along the Orange River.
- Wheat, fruit, groundnuts, maize and cotton in the Vaalharts irrigation scheme in the vicinity of Hartswater and Jan Kempdorp.
- Vegetables and cereal crops at the confluence of the Vaal River and the Orange Rivers in the vicinity of Douglas.
- Wool, mohair, karakul, Karoo lamb, ostrich meat and leather, and venison throughout most of the province.

Economic development in the Northern Cape is hampered by the vastness of the area and the remoteness of its communities in rural areas. Development is also hampered by the low education and skills levels in the province. As a result unemployment in the Northern Cape presents a major challenge.

Employment

According to Statistics South Africa Labour (2012) the community and social services sector is the largest employer in the province at 29%, followed by the agricultural

⁶ 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 for an individual or R 3 200 per month for a household of four.

sector (16%), wholesale and retail trade (14%), finance (8%) manufacturing (6%) and mining (6%), etc. (Figure 3.4).

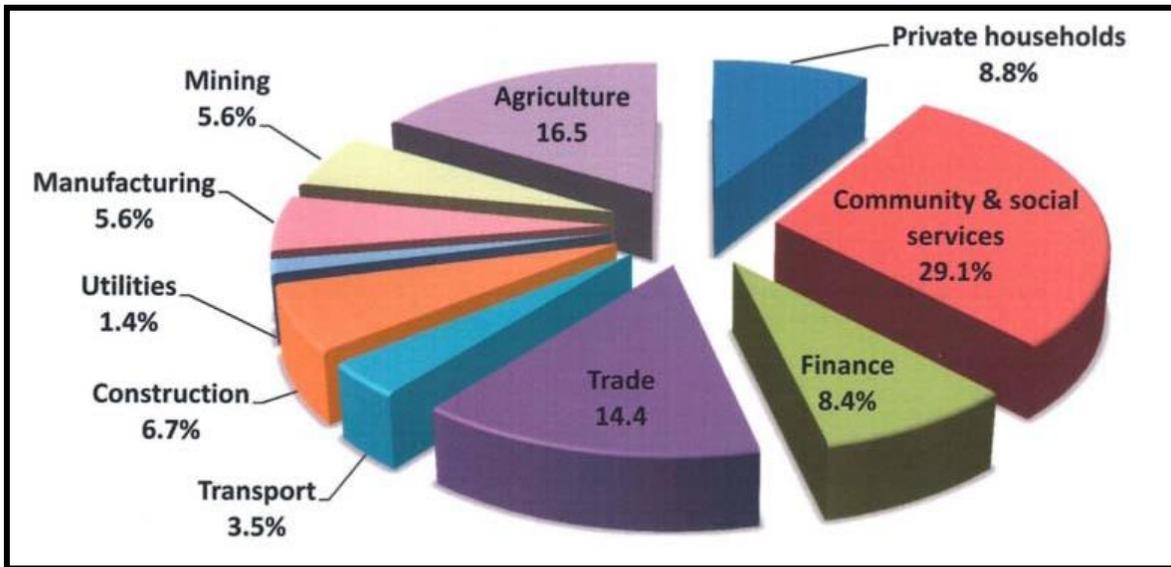


Figure 3.4: Employment by Economic Sector and Industry (Source: Statistics South Africa 2012).

3.4 DEMOGRAPHIC OVERVIEW

Population

The population of the GLM in 2011 was 41 617. There is no data from the 2016 Community Household Survey for the GLM. Of this total, 29.9% were under the age of 18, 67.5% were between 18 and 64, and the remaining 2.6% were 65 and older. The population of Ward 7 in 2011 was 1 529. Of this total, 20.3% were under the age of 18, 74.1% were between 18 and 64, and the remaining 5.6% were 65 and older. The GLM and Ward 17 therefore have a high percentage of the population that fall within the economically active group of 18-65 compared to the JTGDM and Northern Cape (55.1% and 58.5% respectively). This reflects the key role played by mining in the GLM and the presence of people working on the mines in the area.

The high percentage of population within the economically active age group means that there are fewer dependents. The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, while the Northern Cape Province was 55.7%. The high provincial dependency ratio is also reflected at a local municipal and ward level. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e. they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the GLM (2011) and Ward 7 (2011) were 48% and 35% respectively. These

figures are lower than the national and provincial level in 2011, 52.7% and 55.7% respectively⁷. The figure for the JTGDm was 63.3% in 2011. The lower dependency ratios reflect the key role played by the mining sector in the GLM.

In terms of race groups, Black Africans made up 55% of the population on the GLM, followed by Coloureds, 28.7% and Whites, 14%. In Ward 7, Whites made up 49.5% of the population, followed by Black Africans, 38.5%, and Coloureds, 10.9%. The main first language spoken in both the GLM and Ward 7 was Afrikaans (51.6% and 62.9% respectively), followed by Setswana (32.3% and 22.7% respectively).

Households and house types

There were a total number of 11 627 and 695 households in the GLM and Ward 7 in 2011 respectively. Of these 60.7% (GLM) and 63.9% (Ward 7) were formal houses. 21.3% of the structures in the GLM were shacks. The majority of dwellings in the GLM and Ward 7 are therefore formal structures. The majority of the properties in the GLM (42.9%) and Ward 7 (41.1%) were rented. This reflects the high number of workers from outside the area that work on the mines in the GLM. Approximately 26.8% of the households in the GLM and 15.7% of the households in Ward 7 were headed by women. These figures are lower than the rate for the JTGDm (42.7%) and Northern Cape (38.5%). Despite being lower than the district and provincial averages, women headed households tend to be more vulnerable.

Household income

Based on the data from the 2011 Census, 5.3% of the population of the GLM had no formal income, 1.8% earned less than R 4 800, 4.2% earned between R 5 000 and R 10 000 per annum, 13.4% between R 10 000 and R 20 000 per annum and 20.9% between R 20 000 and 40 000 per annum (2016). For Ward 7, 8.2% of the population had no formal income, 0.7% earned less than R 4 800, 1.9% earned between R 5 000 and R 10 000 per annum, 12% between R 10 000 and 20 000 per annum and 20% between R 20 000 and 40 000 per annum (Census 2011).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 45.6% of the households in the GLM and 42.8% in Ward 7 live close to or below the poverty line. The low-income levels reflect the rural nature of the local economy and the limited formal employment opportunities outside of the mining sector. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the GLM. This in turn impacts on the ability of the GLM to maintain and provide services.

⁷ A high dependency ratio can cause serious problems for a country if a large proportion of a government's expenditure is on health, social security & education, which are most used by the youngest and the oldest in a population. The fewer people of working age, the fewer the people who can support schools, retirement pensions, disability pensions and other assistances to the youngest and oldest members of a population, often considered the most vulnerable members of society.

Employment

The official unemployment rate in the FTLM in 2011 was 11.5%, while 53.6% were employed, 31.9% were regarded as not economically active and 2.9% were discouraged work seekers. The figures for Ward 7 in 2011 were 7% unemployed 77.1% employed, 14.3% not economically active and 1.6% discouraged work seekers. The unemployment rates for the GLM and Ward 7 are lower than the Provincial rate of 14.5% and the District rate of 13.5%. This reflects the key role played by the mining sector in the GLM. However, as shown following the 2008 financial crisis, employment in the mining sector can be impacted by fluctuating commodity prices.

Education

In terms of education levels, the percentage of the population over 20 years of age in the GLM and Ward 7 with no schooling was 9.9% and 10.4% (2011) respectively, compared to 11.1% for the Northern Cape Province in 2011. The percentage of the population over the age of 20 with matric was 29.5% and 34.6% respectively, compared to 25.2% for the Northern Cape. The higher education levels are likely to be linked to the investment by mining companies to ensure that the children of their employees have access to quality education. Without out this it would be difficult to attract skilled workers and their families to the area.

3.1 MUNICIPAL SERVICES

Access to water

Based on the 2011 Census information, 92.4% of households in the GLM were supplied by a service provider, while 3.6% relied on boreholes. For Ward 7 28.1% of households were provided with water by a local service provider, while 65.9% relied on borehole water. This reflects the rural nature on Ward 7.

Sanitation

85.8% of the households in the GLM had access to flush toilets, while 6.6% relied on pit latrines and 3.3% did not have access to formal sanitation. In Ward 7, 79.2% of the households had access to flush toilets, while 3.9% relied on pit latrines without ventilation. 8.8% of households had no form of formal sanitation.

Refuse collection

92.6% of the households in the GLM had access to regular refuse removal service, while 2.4% disposed of their waste at their own dump. In Ward 7, 53.3% of households had access to regular refuse removal service, 17.2% disposed of their waste at their own dump and 12.8% had not access to refuse removal services. The lower figures for Ward 7 reflect the rural nature of the area and the difficulty of providing municipal services to areas located at a distance from the main towns, such as Kathu.

3.5 ECONOMIC OVERVIEW

The primary sector represents the most important economic sector in the JTGDM. The primary sector consists of two main economic sectors, namely the mining and agricultural sector.

Mining is the largest contributor to the JTGDM economy with 65% of Gross Value Added (GVA)⁸. In terms of employment the community services sector (formal and informal employment combined) with a total of 14 600 employed people or 23.6% of total employment was the largest source of employment in the district municipality in 2018. The mining sector with a total of 13 200 (21.5%) employed the second highest.

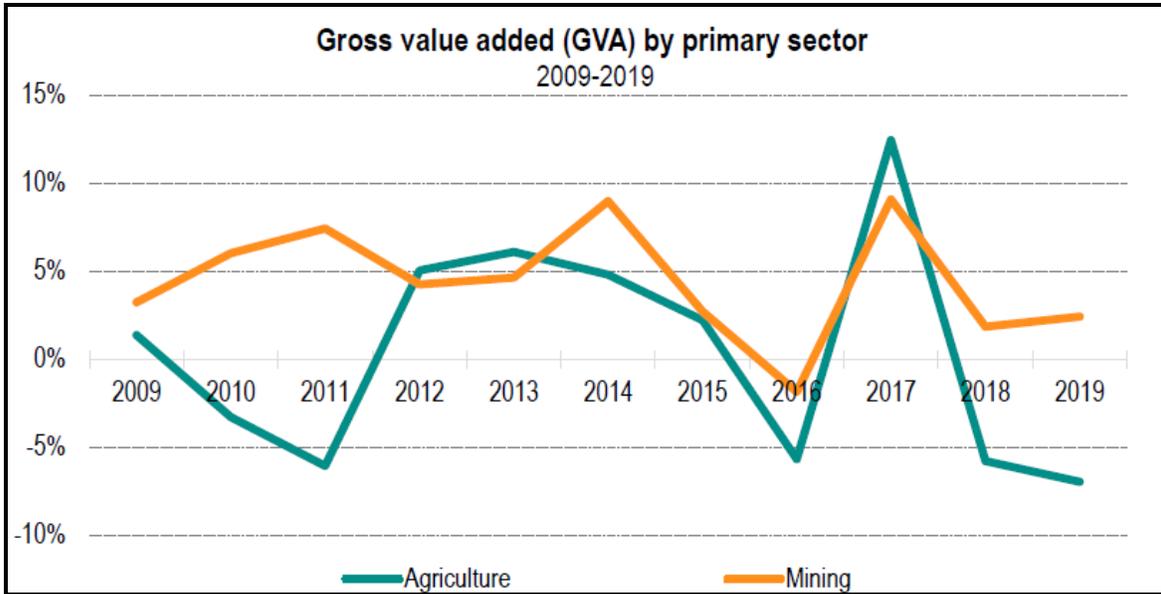
Mining in the area dates to the 1950's with the establishment of the Sishen mine, which is the largest open pit iron ore mine in the world. The Northern Cape provincial government, in collaboration with the national government, municipalities, communities and private sector role-players in the area, is exploring the possibility of developing a mining corridor along the main mining deposits and activities in the region. This is part of the two Strategic Integrated Projects (SIPs) i.e. SIP 3 (South-Eastern node & corridor development – Increase manganese rail capacity in the Northern Cape) and SIP 5 (Saldanha-Northern Cape development corridor). SIP 3 and SIP 5 are two of the eighteen (18) Strategic Integrated Projects (SIPs) which is a government programme i.e. National Infrastructure Plan to support economic development and address service delivery in the poorest provinces. SIP 3 involves the South-Eastern node & corridor development – Increase manganese rail capacity in the Northern Cape whilst SIP 5 is regarding the Saldanha-Northern Cape development corridor, known as Gamagara Corridor.

In terms of agriculture, the JTGDM and GLM is characterized by extensive tracts of land that are well suited to extensive, livestock based agriculture and the rural areas are used extensively for cattle, sheep, goat and game farming with limited intensive farming along some seasonal rivers. The area is also well known for its good commercial hunting in the winter. However, climate change poses a risk to the agricultural sector.

Table 3.1 reflects the average growth rate in the GVA for the mining and agricultural sectors from 2009 to 2019. Between 2009 and 2019, the agriculture sector experienced the highest positive growth in 2017 with an average growth rate of 12.4%. The mining sector also experienced its growth rate in 2017, 9.1%. However, both the agricultural and mining sectors experienced a decrease in growth after 2017. While the mining sector did recover in 2018, both sectors have been impacted by COVID-19 in 2020.

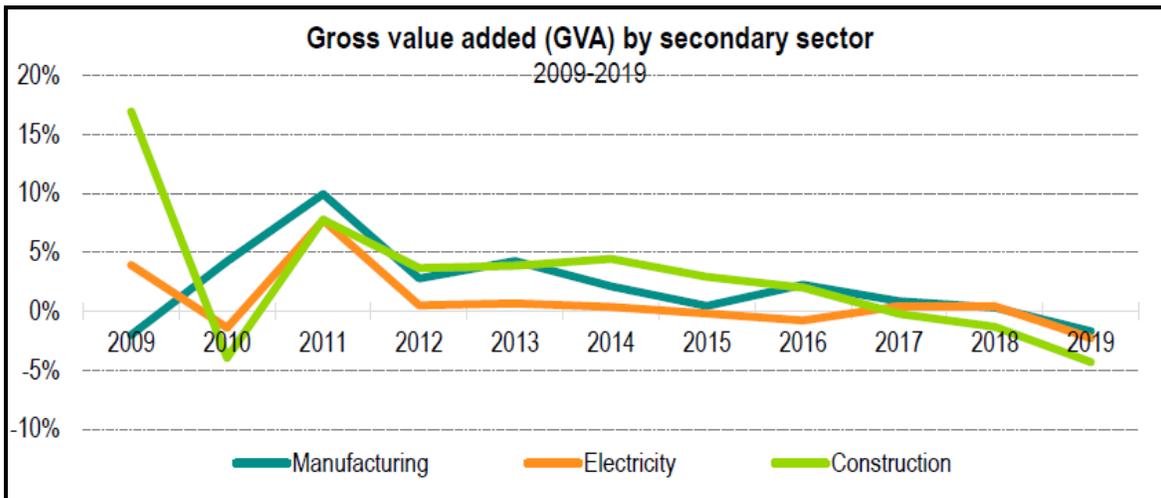
⁸ GVA is the value of output less the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry or sector. (Definition used by Organisation for Economic Co-operation and Development). In principle the simplest expression of the GVA is therefore: Value of goods and services produced minus cost of production.

Table 3.1: Gross Value Added Growth rates for primary sector



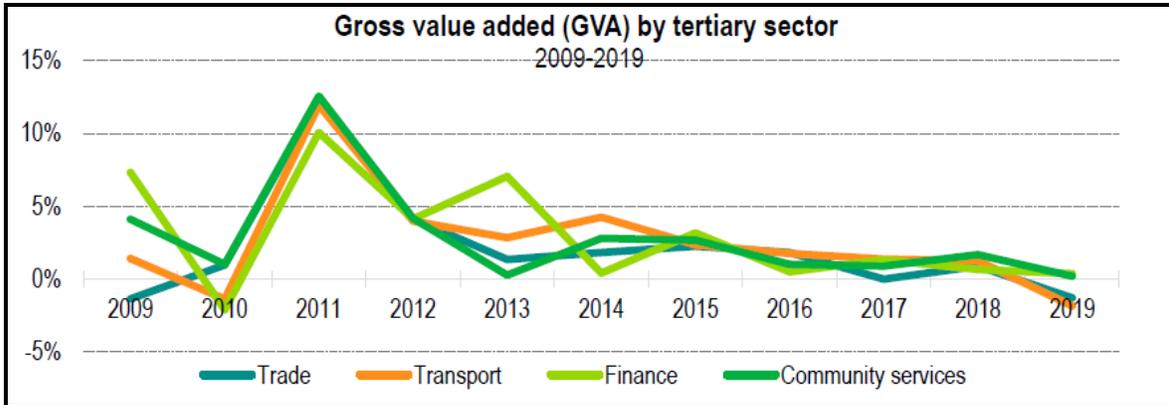
The secondary sector consists of three broad economic sectors namely the manufacturing, electricity and the construction sector. Between 2009 and 2019, the manufacturing sector experienced the highest positive growth in 2011 with a growth rate of 9.9%. The construction sector reached its highest growth in 2009 at 16.9%. However, post 2011 there has been overall decline in the growth rate of all the sub-sectors that make up the secondary sector (Table 3.2). This decline is likely to be exacerbated by the economic impact of COVID-19 in 2020.

Table 3.2: Gross Value Added Growth rates for secondary sector



The tertiary sector consists of the trade, transport, finance and the community services sectors: As indicated in Table 3.3, all of the sub-sectors experienced significant growth post between 2010 and 2011. However, as in the case of the secondary sector, post 2011 there has been overall decline in the growth rate of all the sub-sectors that make up the secondary sector (Table 3.3). This decline is likely to be exacerbated by the economic impact of COVID-19 in 2020.

Table 3.3: Gross Value Added Growth rates for tertiary sector



3.6 OVERVIEW OF STUDY AREA

The closest towns to the proposed development are Kathu and Dibeng, which are located approximately 16km and 18km to the south and west of the site respectively. Kuruman is located 34km north west of the site. There are a number of farmsteads located to the east and south east of the site. A number of these are located along the Vlermuisleegte River (Figure 3.5). An existing Concentrated Solar Plant (CSP) is located to the south west of the site (Figure 3.5). The key roads in the area are the N14 located approximately 6km to the south and R380 located approximately 9km west of the project site. Current access to the property is obtained via the T26 gravel road that joins the N14. In terms of infrastructure, there are number of power lines within the general vicinity of the site, including the Ferrum/Umtu 400kV power line which is located immediately to the north-east of the site and the Ferrum/Asbes 66kV power line located approximately 8.2km south east of the site and the Fox/Umtu 132kV power line located situated approximately 9km west of the site.

The landscape is flat to gently undulating. The Vlermuisleegte River (non-perennial river) is located to the east of the sites and is situated below the level of the surrounding plains which are covered in red Kalahari sands, thorn trees and grasses. The Vlermuisleegte River is the main regional drainage feature drains from the south east to the north west. The character of the area can be described as semi-natural rural. However, there are a number of solar energy developments in the area. However, the Visual Impact Assessments (VIAs) undertaken as part of the EIAs for the proposed Hyperion PVs note that it is unlikely that these projects will change the overall character of the landscape as experienced by the majority of receptors. This is due to the relatively flat topography that allows limited elevated views, the vegetation that will provide a large degree of screening and the fact that they are likely to be set back from major roads.

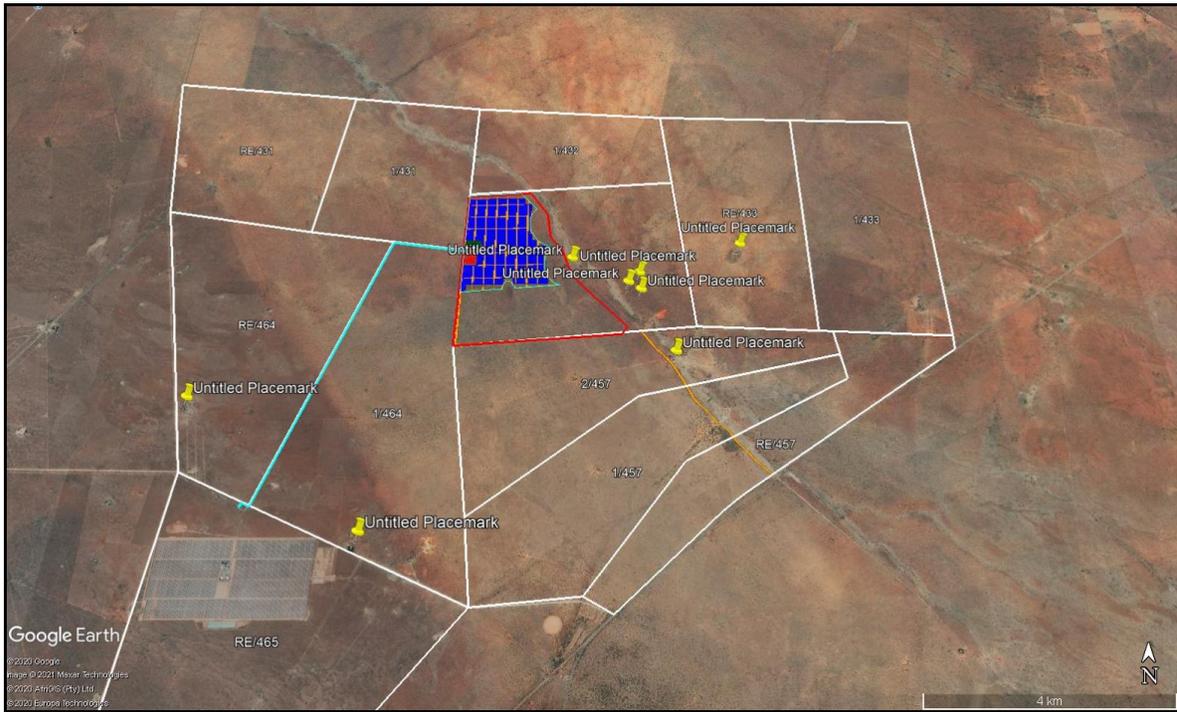


Figure 3.5: Location of dwellings (location pins) and CSP facility to south west

In terms of property ownership, the Hyperion site consists of two properties, namely Selsden 464/1 (Oupos) and Lyndoch 432/RE (Lyndoch). The proposed facility, approved Hyperion PV1 and PV2 facilities and sub-stations would be located on Lyndoch. The bulk of the Hyperion (combined facility) transmission line (Tx line) to Eskom’s Kalbas substation are located across Oupos. The two Hyperion site properties are adjacent to 8 properties, of which only 4 (in addition to Oupos) directly border onto the actual site property (Table 3.4 and Figure 3.5).

Table 3.4: Overview of potentially affected landowners

OWNER	PROPERTY	FARM	STATUS	LOCATION (Relative to TGF)
Anglo American	Kathu 465	Kathu	Adjacent	S of non-TGF site Ptn
Burger, Mr Schalk	Selsden 464/1	Oupos	Hyperion Site (Tx line only)	Site (non-TGF Ptn) W of TGF site portion
	Uitkoms 463/RE	Uitkoms	Adjacent	SE of non-TGF site Ptn
Knoesen, Mr Thomas	Lyndoch 432/RE	Lyndoch	Hyperion TGF Site	TGF Site
Loubser Family Trust	Galway 431/1	Happy Rest	Adjacent	W of TGF site portion
Saltrim Ranches	Selsden 464/RE	Salsden	Adjacent	W of non-TGF site Ptn
Steyn, Mr Nico	Bulcote 433/RE	Moedhou	Adjacent	E of TGF site portion
	Cowley 457/2	Sophiasmoed	Adjacent	S of TGF site portion
Saansveld Boerdery	Lyndoch 482/1	Lyndoch	Adjacent	N of TGF site portion
Vorster, Mr Johan	Cowley 457/1	Soetdoring	Adjacent	E of non-TGF site Ptn

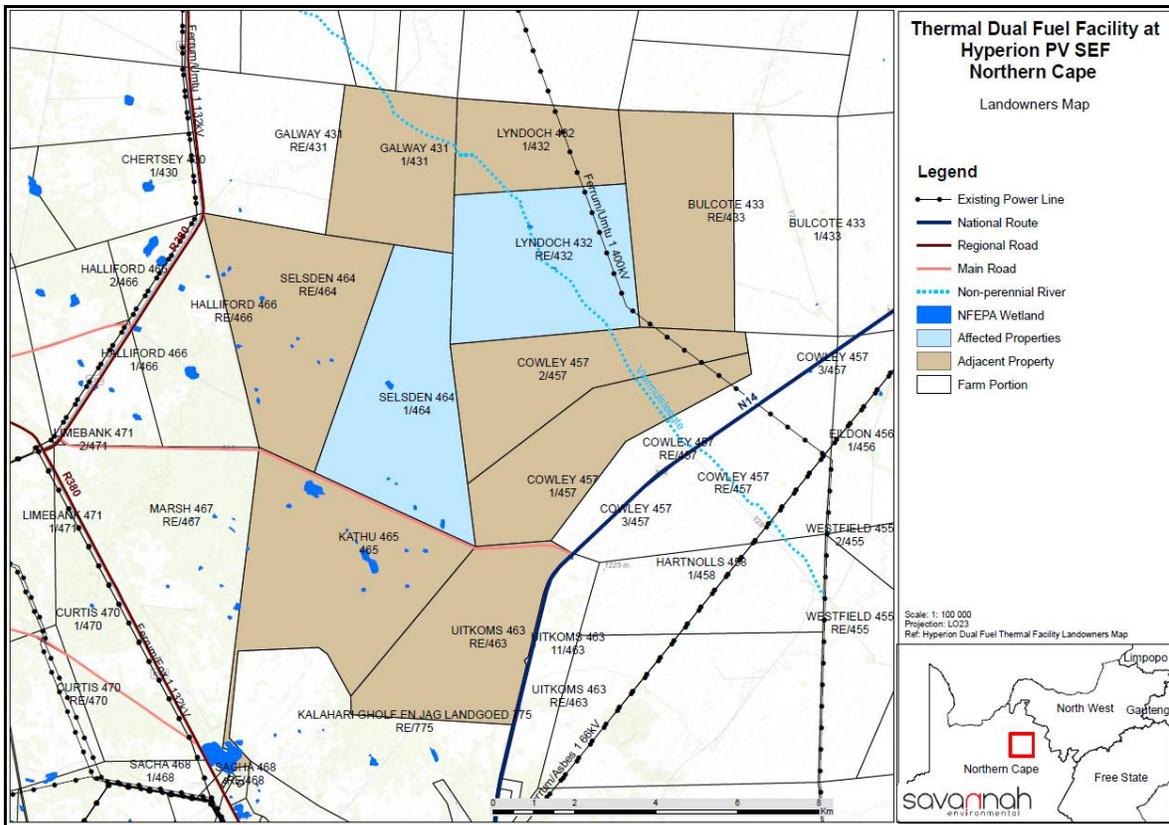


Figure 3.5: Location of affected and adjacent properties

Main dwellings and associated out-buildings (e.g., worker’s housing) are located on 8 of the 10 site and site-adjacent properties. All the relevant dwellings are inhabited, 7 as primary residences by their owners (4 of total), family or staff. One property, Happy Rest (Galway 431/1) is used as a weekend farm by Gauteng-based owners (Loubser Family Trust beneficiaries). Salsden forms part of a larger operation based in Hotazel (Table 3.5).

Only one farmstead is located <2 km of the TGF site (Lyndoch, across the approved Hyperion 1 and 2 SEFs), and an additional <3 km (Happy Rest, 2.8 km, minimal screening). As indicated, the property primarily serves as ancestral family farm turned into a weekend retreat for its city-living owners (Loubser family) who specifically cherish the ‘Kalahari farm’ sense of place. The balance of dwellings are located 4.3 to 8 km from the site.

Apart from Anglo-American’s Kathu Farm, all the relevant properties are primarily used for stock farming, mainly beef cattle farming, but on some also sheep and goat. Stock theft is an ongoing issue in the local area, requiring ongoing active management by the relevant owners. Small stock is especially vulnerable (Knoesen, Steyn, Vorster, pers. comm). A large engineering works (BPS Engineering) is located on Sophiasmoed. BPS currently services mines and other large operations in the area (steel constructions).

The 100 MW Kathu Solar Park is located on Kathu Farm. The remainder of the property is used by Anglo American (owner) as a biodiversity offset. It is not being used for any farming purpose, and is not inhabited (Voigt, pers. comm). Eskom’s small Kalbas

substation is also located on the property. A Solar PV facility is currently being investigated/ proposed (status unclear) on Salsden (Venter, pers. comm).

Table 3.5: Overview of land uses and relative location of inhabited dwellings

OWNER	FARM	LAND USE	INHABITED	DWELLING (from TGF plant)
Anglo American	Kathu	Kathu 100 MW Solar Park Biodiversity offset Eskom Kalbas substation	No	None
Burger, Mr Schalk	Oupos	Livestock farming	Yes (Parents)	6.1 km SSW
	Uitkoms	Livestock farming	Yes (Owner)	8 km SSE
Knoesen, Mr Thomas	Lyndoch	Livestock farming; Hyperion 1 & 2 SEFs (approved);	Yes (Owner)	1.8 km E (across SEFs)
Loubser Family Trust	Happy Rest	Family weekend retreat Livestock farming	Weekends	2.8 km NNW
Saltrim Ranches	Salsden	Livestock farming (based in Hotazel) PV Plant (investigated)	Yes (Overseer)	6.1 km SW
Steyn, Mr Nico	Moedhou	Livestock farming	Yes (Manager)	5.2 km E (across SEFs)
	Sophiasmoed	Livestock farming Engineering works	Yes (Owner)	4.3 km SE
Saansveld Boerdery	Lyndoch	Unclear (but likely stock farming)	No	None
Vorster, Mr Johan	Soetdoring	Livestock farming	Yes (Owner)	5.7 km SE

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an assessment of the key social issues identified during the study. The identification of key issues was based on:

- Review of project related information, including other specialist studies;
- Interviews with key interested and affected parties;
- Experience/ familiarity of the author with the area and local conditions;
- Experience with similar projects;

The assessment section is divided into the following sections:

- Assessment of compatibility with relevant policy and planning context (“planning fit”);
- Assessment of social issues associated with the construction phase;
- Assessment of social issues associated with the operational phase;
- Assessment of social issues associated with the decommissioning phase.
- Assessment of the “no development” alternative;
- Assessment of cumulative impacts.

The SIA also recognises the link between the proposed Hyperion hybrid thermal power facility and the two 75 MW Hyperion PV facilities (PV1 and 2). The identification and assessment of social issues associated with proposed hybrid thermal plant is therefore considered within the context of supporting the development of renewable energy in South Africa.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The development of renewable energy is strongly supported at a national, provincial and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The proposed Hyperion hybrid thermal power facility compliments the development of renewable energy. In addition, the proposed development supports a number of objectives contained in the NCP Provincial Growth and Development Strategy and the JTGDM and GLM IDP, specifically promotion of socio-economic development, SMME’s, job creation and private sector investment. The development of the proposed hybrid thermal power facility is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

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 local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Nuisance impacts, such as noise, dust and safety, associated with construction related activities and vehicles;
- Impact on productive farmland.

4.3.1 Creation of local employment, training, and business opportunities

The construction phase of hybrid thermal power facility will extend over a period of approximately 14 months and create in the region of 350 employment opportunities. Based on information provided by the proponent, approximately 75% of the jobs will benefit low-skilled workers, 25% semi-skilled and 5% high skilled. Members from the local communities in the area, specifically Kathu and Debeng, would be in a position to qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information provided by the proponent the total wage bill will be in the region of R 31 million (2020 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Kathu and other towns in the GLM.

Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment may be reduced. In addition, the low education and skills levels in the area may hamper potential opportunities for local communities. Where feasible the implementation of a training and skills development programme prior to the commencement of construction would also increase the potential to employ local community members. The number of low skilled and semi-skilled positions taken up by members from the local community will depend on the effective implementation of these enhancement measures by the proponent in consultation with the GLM.

The capital expenditure associated with the construction phase will be approximately R 1.5 billion (2020 Rand value). This will create opportunities for local companies and the regional and local economy. Due the key role played by the mining sector there are a likely to be a number of local contractors and engineering companies based in Kathu that will be suitably qualified to provide services and skills. Implementing the enhancement measures listed below can enhance these opportunities.

The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site.

The hospitality industry in the area will also 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 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)	Local – Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (40)	Medium (44)
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.		

Assessment of No Go option

There is no impact, as the current status quo will be maintained.

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 proponent 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 Broad Based Black Economic Empowerment (BBBEE) criteria;
- Before the construction phase commences the proponent should meet with representatives from the GLM 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 the proponent intends following for the construction phase of the project.
- 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

- The proponent should liaise with the GLM with regards the establishment of a database of local companies, specifically BBBEE 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;
- Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- The GLM, in conjunction with the local business sector 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.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly 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;
- An increase in sexually transmitted diseases (STDs), including HIV.

The proponent has indicated that workers will be accommodated on site.

As indicated above, most of the low and semi-skilled workers are likely to be sourced locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The number of skilled workers will be limited to 18. These workers will be accommodated in Kathu where a high number of contractors associated with the mining operations are also accommodated. The potential impact on the local community will therefore be negligible.

While the risks associated with construction workers at a community level will be low, at an individual and family level they may be significant, especially in the case of contracting a sexually transmitted disease or an unplanned pregnancy. However, given the nature of construction projects it is not possible to totally avoid these potential impacts at an individual or family level.

Table 4.2: Assessment of impact of the presence of construction workers in the area 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 (2)	Local (1)
Duration	Short term for community as a whole (2)	Short term for community as a whole (2)
Magnitude	Moderate for the community as a whole (6)	Low for community as a whole (4)
Probability	Probable (3)	Probable (3)
Significance	Medium for the community as a whole (30)	Low for the community as a whole (21)
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 of time. 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.		

Assessment of No Go option

There is no impact as the current status quo would be maintained.

Recommended mitigation measures

The potential risks associated with construction workers can be mitigated. The detailed mitigation measures should be outlined in the Environmental Management Plan (EMP) for the Construction Phase. Aspects that should be covered include:

- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories;
- The proponent should consider the option of establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from GLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community associated with construction workers;

- The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;
- The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area;
- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site;
- The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days of their contract coming to an end;
- It is recommended that no construction workers, except for security personnel, should be permitted to stay over-night on the site. However, as indicated above, due to the location of the site, on-site accommodation for workers may need to be provided.

4.3.3 Influx of job seekers

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 project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may 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 way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures;
- Competition for housing, specifically low-cost housing;
- Competition for scarce jobs;
- Increase in incidences of crime.

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 is 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 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, as a result 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 findings of the SIA indicate that economically motivated in-migration and subsequent labour stranding linked to the mining sector has and continues to take place. The proposed development is unlikely to result in an increase in in-migration to the area and the town of Kathu. The risks associated with the influx of job seekers are therefore likely to be low.

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 (2)	Local (1)
Duration	Permanent (5) (For job seekers that stay on the town)	Permanent (5) (For job seekers that stay on the town)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
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 of time. 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.		

Assessment of No Go option

There is no impact as the current status quo would be maintained.

Recommended mitigation measures

It is impossible to stop people from coming to the area in search of employment. However, as indicated above, the proponent should ensure that the employment criteria favour residents from the area. In addition:

- The proponent, in consultation with the GLM, should investigate the option of establishing a MF to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MF should also include the other proponents of solar energy projects in the area;
- The proponent should implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities;

- The proponent should implement a policy that no employment will be available at the gate.

4.3.4 Risk to safety, livestock and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

The potential risks (safety, livestock and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase. Mitigation measures to address these risks are outlined below.

Table 4.4: Assessment of risk to safety, livestock and damage to farm infrastructure

Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	With Mitigation
Extent	Local (3)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (33)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure 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

Key mitigation measures include:

- The proponent should enter into an agreement with local farmers in the area whereby damages to farm property etc. during the construction phase will be

compensated for. The agreement should be signed before the construction phase commences;

- Traffic movement and construction related activities should be contained within clearly designated areas;
- Strict traffic speed limits must be enforced;
- All farm gates must be closed after passing through;
- Contractors appointed by the proponent should provide daily transport for construction workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;
- The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site;
- The proponent should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction related activities and or workers. This should be contained in the Code of Conduct to be signed between the proponent, 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 Environmental Management Plan (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 the proponent must 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 the proponent must ensure that construction workers found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.5 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires are higher during the dry, windy winter months from May to October. In terms of potential mitigation measures the option of constructing a firebreak around the perimeter of the site prior to the commencement of the construction phase should be investigated. In addition, fire-fighting equipment must be provided on site.

Table 4.5: Assessment of impact of increased risk of grass fires

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	With Mitigation
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	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

The mitigation measures include:

- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;
- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;
- Smoking on site should be confined to designated areas;
- Contractor should 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 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 should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle;
- Contractor should provide fire-fighting training to selected construction staff;
- No construction staff, with the exception of security staff, to be accommodated on site over night;
- As per the conditions of the Code of 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.

4.3.6 Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. However, the surrounding area is sparsely populated and there are a limited number of farmhouses located within a 2-3 km of the site. The number of sensitive social receptors that would potentially be impacted is therefore limited. In addition, the impacts can be effectively mitigated.

Table 4.6: Assessment of the impacts associated with construction related activities

Nature: Potential noise, dust and safety impacts associated with construction related activities		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (15)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: See below		
Cumulative impacts: If damage to local farm 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

The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:

- The movement of construction vehicles on the site should be confined to agreed upon access road/s;
- The movement of heavy vehicles associated with the construction phase should be timed to avoid times days of the week, such as weekends, when the volume of traffic travelling along the access roads may be higher;

- Dust suppression measures should be implemented, such as wetting 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 and made aware of the potential road safety issues and need for strict speed limits.

4.3.7 Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can 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. Existing internal roads should be used where possible. This this requires careful site planning and management of operations. In the event that new roads are required, these roads should be rehabilitated on the completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

Table 4.7: 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 project etc. will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (36)	Low (20)
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 farmers, their families, and the workers on the farms 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:

- An Environmental Control Officer (ECO) should be appointed to monitor the construction phase;
- Existing internal roads should be used where possible. In the event that new roads are required, these roads should be rehabilitated on the completion of the construction phase;
- The footprint associated with the construction related activities (access roads, construction camps, workshop etc.) should be minimised;
- All areas disturbed by construction related activities, such as access roads on the site, construction camps 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 included in the EMP;
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- The establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities;
- Benefits associated with the socio-economic contributions to community development.

Potential negative impacts

- Noise impacts associated with the operation of the plant;
- Visual impacts and associated impact on sense of place.

4.4.1 Improve energy security and support the renewable energy sector

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. At the same time the project also reduces the carbon footprint by merging thermal with solar hybrid solutions, hence the location adjacent to the existing PV projects. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.

Improved energy security

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million

was spent by businesses on backup generators⁹. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more of revenue during due to load shedding period¹⁰.

Impact of a coal powered economy

The Green Jobs study (2011) notes that South Africa has one of the most carbon-intensive economies in the world, thus making the greening of the electricity mix a national imperative. The study notes that renewable energy provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa renewable energy is not as dependent on water as compared to the massive water requirements of conventional power stations), has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

The Greenpeace Report (powering the future: Renewable Energy Roll-out in South Africa, 2013), also notes that within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. These include acid mine drainage from abandoned mines in South Africa and the risk this poses on the country's limited water resources.

Benefits associated with REIPPPP¹¹

The overview of the IPPPP (2019) indicates that the REIPPPP has attracted R48.8 billion in foreign investment and financing in the seven bid windows (BW1 – BW4, 1S2 and IS2). This is more than double the inward FDI attracted into South Africa during 2015 (R22.6 billion). In terms of local equity shareholding, 48% (R31.5 billion) of the total equity shareholding (R66.7 billion) was held by South African's across BW1 to BW4, 1S2 and IS2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R 35.8 billion and contributes 52% to total equity. As far as Broad Based Black Economic Empowerment is concerned, Black South Africans own, on average, 31% of projects that have reached financial close, which is slightly above the 30% target.

The total projected procurement spend for during the construction phase was R75 billion, more than the projected operations procurement spend over the 20 years operational life (R72 billion). The combined (construction and operations) procurement value for BW1 to BW4, 1S2 and IS2 is projected as R147.6 billion, of which R50.1 billion has been spent to date. For construction, of the R46.4 billion already spent to date, R36.6 billion is from the 57 projects which have already been completed. These 51 projects had planned to spend R36.6 billion. The actual procurement construction costs have therefore exceeded the planned costs by 9% for completed projects. Of the R46.6 billion spent on procurement during construction, R41.1 billion has reportedly been procured from BBBEE suppliers, achieving 89% of total procured. Actual BBBEE spend during construction for BW1 and BW2 alone was R25.5 billion. The R41.1 billion

⁹ Goldberg, Ariel (9 November 2015). "The economic impact of load shedding: The case of South African retailers" (PDF). Gordon Institute of Business Science. p. 109

¹⁰ "How does load shedding affect small business in SA?". *The Yoco Small Business Pulse (3: Q1 2019)*: 3

¹¹ The Hybrid power facility will be bid as part of the RMIPPPP (Risk Mitigation Independent Power Producer Programme) and not the REIPPPP (Renewable Energy IPPPP). However, given the link to PV 1 and 2 the benefits of the REIPPPP are discussed.

spent on BBEE during construction already exceeded the R34.8 billion that had originally been anticipated by IPPs.

The report notes that for a programme of this magnitude, with construction procurement spend alone estimated at R75 billion, the result is a substantial stimulus for establishing local manufacturing capacity. The report also notes that the strategy has prompted several technology and component manufacturers to establish local manufacturing facilities. The report also notes that this will improve with greater certainty relating to subsequent bid windows and further determinations will continue to build on these successes. In terms of employment, to date, a total of 32 532 job years¹² have been created for South African citizens, of which 29 046 were in construction and 3 486 in operations. Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 80%, 41% and 52% of total job opportunities created by IPPs to date. These job years should rise further past the planned target as more projects enter the construction phase. The REIPPPP has also ensured that black people in local communities have ownership in the IPP projects that operate in or nearby their vicinities. On average, black local communities own 11% of projects that have reached financial close. This is well above the 5% target. The WWF (2014) study also notes that the REIPPPP requirement of 30% allocated to the local economic development has ensured that non-price criteria linked to socio-economic upliftment have a much heavier weighting than they would normally enjoy under Government's preferential procurement policy (WWF, 2014). The establishment of renewable energy facilities therefore not only address environmental issues associated with climate change and consumption of scarce water resources, but also create significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.

Table 4.8: Improve energy security and support renewable sector

Nature: Development of infrastructure to improve energy security and support renewable sector		
	Without Mitigation	With Mitigation
Extent	Local, Regional and National (4)	Local, Regional and National (5)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly Probable (4)	Definite (5)
Significance	High (64)	High (85)
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO ₂ emissions and impact on climate change
Can impact be mitigated?	Yes	
Enhancement: See below		

¹² The equivalent of a full-time employment opportunity for one person for one year

Cumulative impacts:

Overall reduction in CO₂ emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Northern Cape and South Africa.

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.

Recommended mitigation measures

Should the project be approved the proponent should:

- Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members;
- Maximise opportunities for local content, procurement and community shareholding.

4.4.2 Creation of employment opportunities

The proposed development will create 20 full time employment opportunities during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled 5%. The annual operating budget will be in the region of R 24 million (2020 Rand values), including wages.

Table 4.9: 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 (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Low (28)	Medium (40)
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

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

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.

4.4.3 Benefits associated with the socio-economic development contributions

Socio-economic development (SED) contributions are an important focus of the RMIPPPP (Risk Mitigation Independent Power Producer Programme) and REIPPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. The proposed hybrid thermal facility is also required to contribute a percentage of projected revenues to SED. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area. The revenue from the proposed hybrid thermal plant can be used to support a number of social and economic initiatives in the area, including:

- Creation of jobs;
- Education;
- Support for and provision of basic services;
- School feeding schemes;
- Training and skills development;
- Support for SMME's.

The SED contributions associated with the 64 IPPs has to date amounted to R 860.1 million. The majority of the spend has been on education and skills development (40.9%), followed by enterprise development (24.2%), social welfare (21.3%), general administration (9%) and health care (4.5%). In terms of education, the IPPs have supported 1 044 education institutions, with a total spend of R 236.7 million between 2015 and March 2018. It is estimated that these contributions have benefitted in the region of 375 737 learners. The province with the highest SED contribution has been the Northern Cape Province, followed by the Eastern Cape and Western Cape.

The Green Jobs study (2011), found that the case for renewable energy is enhanced by the positive effect on rural or regional development. Renewable energy facilities located in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues.

The establishment of Community Trusts projects do therefore create significant benefits for local rural communities. However, Community Trusts can also be mismanaged. This is an issue that will need to be addressed when setting up the trust. The GLM has established the Gamagara Development Forum (GDF) (<http://www.gdf-trust.co.za/>) which focuses on development in the area. Despite numerous attempts to contact representatives from the Gamagara Development Forum no response was received.

Table 4.10: Assessment of benefits associated with socio-economic development contributions

Nature: Benefits associated with support for local community's form SED contributions		
	Without Mitigation	With Enhancement¹³
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Medium (30)	High (65)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: Promotion of social and economic development and improvement in the overall well-being of the community		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the supporting the social and economic development in the area would be lost. This would also represent a negative impact.

Recommended enhancement measures

To maximise the benefits and minimise the potential for corruption and misappropriation of funds the following measures should be implemented:

- The proponents should liaise with the GLM and representatives from the GDF to identify projects that can be supported by SED contributions.
- Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community;
- Strict financial management controls, including annual audits, should be instituted to manage the SED contributions.

4.4.4 Visual impact and impact on sense of place

The components associated with the proposed hybrid thermal project and associated grid infrastructure¹⁴, specifically the gas turbines or reciprocating gas engines, regassification system, dry cooling system and fuel storage facility will impact on the areas current rural sense of place. However, the areas sense of place has been impacted by the existing and proposed PV solar energy facilities and associated infrastructure, including transmission lines. The potential impact on the areas sense of place is therefore likely to be limited.

¹³ Enhancement assumes effective management of the community trust

¹⁴ The overhead power lines will be assessed as part of a separate environmental assessment process.

However, the owner of Happy Rest (Galway 431/1), Ms Loubser, indicated that the property is a weekend, lifestyle type farm. Happy Rest is the only property currently used for weekend farming and is valued as the families 'Kalahari Farm'. The sense of place is associated with the quiet, animal sounds and dark, night skies. The farm dwelling is located approximately 2.8 km north west for the facility. The owners are concerned about the potential impact of the facility on the areas current quiet, sense of place and the potential impact on the value of the property. The potential impact of lights at the facility on the areas undisturbed, dark sense of place at night was also raised as a concern (Loubser, pers. comm).

These issues should be address by the Noise and Visual Impact Assessment (VIA) specialist studies and included in the design and operation of the facility.

Table 4.11: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	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, Hybrid energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: 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 Noise Impact and VIA should also be implemented.

4.4.5 Potential noise impacts

The operation of components associated with the proposed hybrid thermal project, specifically the gas turbines or reciprocating gas engines, regassification system, and dry cooling system may result in noise impacts for adjacent farmhouses. The issue of noise was raised by Mr Nico Steyn and Ms Cecile Loubser. Noise was related to operation of the plant, specifically at night, and traffic generated during the operational

phase. The affected landowners indicated that where possible this should be addressed in the design and operation of the facility.

As indicated above, Happy Rest (Galway 431/1), owned by Ms Loubser, is valued as the families 'Kalahari Farm'. The farms value and sense of place is associated with the quiet, animal sounds and night skies. The farm dwelling is located approximately 2.8 km north west for the facility. The owners are concerned about the potential impact of the facility on the areas current quiet, sense of place and potential impact on the value of the property (Loubser, pers. comm).

These issues should be address by the Noise Impact Assessment and included in the design and operation of the facility.

Table 4.12: Potential noise impacts

Nature: Potential noise impacts associated with the operation of the hybrid thermal facility on nearby farmhouses		
	Without Mitigation	With Enhancement / Mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (21)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: N/A.		
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 Noise Impact Assessment should be implemented.

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues are also likely to be relevant to solar facilities and associated infrastructure, including the proposed hybrid thermal plant. The relevant issues identifies by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms (SEFs and associated infrastructure) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms (SEFs and associated infrastructure) along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms (SEFs and associated infrastructure) 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 (SEF and associated infrastructure) at a time, but if each successive stretch of the road is dominated by views of a wind farm (SEF and associated infrastructure), 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 SEFs and associated infrastructure, including the proposed hybrid thermal plant. As indicated above, the potential impact of the proposed hybrid thermal plant and associated infrastructure on the areas sense of place was raised as concern by Ms Loubser, the owner of Happy Rest (Galway 431/1). This issue should be addressed as part of the VIA.

Table 4.13: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of the proposed hybrid thermal facility and associated grid infrastructure and the potential impact on the areas rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local and regional (2)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Medium (30)
Status (positive/negative)	Negative	Negative
Reversibility	High, hybrid energy plant components and other infrastructure can be removed	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: See below		

Assessment of No-Go option

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

Recommended mitigation measures

The recommendations of the VIA should be implemented.

4.6 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

Most of the workers during the construction phase will be sourced from the GLM. The establishment of the proposed hybrid thermal energy facility is therefore likely to have a negligible impact on local services in local towns, such as Kathu and Debeng. This will be confirmed during the assessment phase.

Any potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the GLM. These benefits will create opportunities for investment in the GLM, including the opportunity to upgrade and expand existing services and the construction of new houses. Socio-economic development (SED) contributions also represent an important focus of the REIPPPP and is aimed at ensuring that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. The proposed hybrid thermal facility is also required to contribute a percentage of projected revenues accrued over the 20-year period to SED.

This will provide revenue that can be used by the GLM to invest in up-grading local services where required. It should also be noted that it is the function of national, provincial and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the GLM.

Table 4.14: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed hybrid thermal project, in the GLM has the potential to place pressure on local services, specifically medical, education and accommodation.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local and regional (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Low (28)	Medium (36)
Status (positive/negative)	Negative	Negative
Reversibility	High, hybrid energy plant components and other infrastructure can be removed	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: See below		

Assessment on No-Go option

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

Recommended mitigation measures

The proponent should liaise with the GLM and Gamagara Development Forum to address potential impacts on local services.

4.7 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed hybrid thermal plant, will also create several socio-economic opportunities for the GLM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The review of the REIPPPP (March 2019) indicates that R 860.1 million has been generated by socio-economic development contribution associated with the current 64 operational IPPs. This has been spent on education and skills development (40.9%), followed by enterprise development (24.2%), social welfare (21.3%), general administration (9%) and health care (4.5%). In terms of education, the IPPs have supported 1 044 education institutions, with a total spend of R 236.7 million between 2015 and March 2018. It is estimated that these contributions have benefitted in the region of 375 737 learners. In addition, enterprise development contributions committed for BW1 to BW4, 1S2 and 2S2 amount to R7.2 billion. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of March 2019 a total of R 254.3 million had already been made to the local communities located in the vicinity of the 64 operating IPPs.

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes. In this regard the developers should liaise closely with the GLM and Gamagara Development Forum (<http://www.gdf-trust.co.za/>) to identify how to maximise the potential socio-economic opportunities associated with the proposed project. Representatives from the Gamagara Development Forum will be contacted during the Assessment Phase.

Table 4.15: Cumulative impacts on local economy

Nature: The establishment of renewable energy facilities and associated projects, such as the hybrid thermal energy project, in the GLM will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local and regional (1)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	Low (28)	High (65)
Status (positive/negative)	Positive	Positive
Reversibility	High, hybrid energy plant components and other infrastructure can be removed	
Loss of resources?	No	No
Can impacts be enhanced?	Yes	
Confidence in findings: High.		
Mitigation: See below		

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 the GLM.

Recommended mitigation measures

The proposed establishment of suitably sited renewable energy facilities and associated projects, such as the proposed hybrid thermal energy plant, within the GLM and NCP should be supported.

4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

The primary goal of the Project is to assist in providing additional capacity to Eskom to assist in addressing the current energy supply constraints. The project also aims to reduce the carbon footprint associated with energy generation by merging thermal with solar hybrid solutions. As indicated above, energy supply constraints and the associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore 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.

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, renewable energy. Given South Africa’s current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a significant 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 improve energy security and assist to support with the development of clean, renewable energy		
	Without Mitigation¹⁵	With Mitigation¹⁶
Extent	Local-International (4)	Local-International (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (56)	Moderate (56)
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 hybrid thermal facility should be developed and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented.

¹⁵ Assumes project is not developed

¹⁶ Assumes project is developed

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 relevant literature on social and economic impacts;
- The experience of the authors with other solar 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 SIA also recognises the link between the proposed Hyperion hybrid thermal energy plant and the Hyperion Solar PV facilities. The identification and assessment of social issues associated with proposed Hyperion hybrid thermal energy plant is therefore considered within the context of addressing energy security and supporting the development of renewable energy in South Africa.

5.2.1 Policy and planning issues

The development of renewable energy is strongly supported at a national, provincial and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The proposed Hyperion hybrid thermal power facility compliments the development of renewable energy. In addition, the proposed development supports a number of objectives contained in the NCP Provincial Growth and Development Strategy and the JTGDM and GLM IDP, specifically promotion of socio-economic development, SMME's, job creation and private sector investment. The development of the proposed hybrid thermal power facility is therefore supported by key policy and planning documents.

5.2.2 Construction phase impacts

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 phase will extend over a period of approximately 14 months and create in the region of 350 employment opportunities. Based on information provided by the proponent, approximately 75% of the jobs will benefit low-skilled workers, 25% semi-skilled and 5% high skilled. Members from the local communities in the area, specifically Kathu and Debeng, would qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 31 million (2020 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Kathu and other towns in the GLM.

The capital expenditure associated with the construction phase will be approximately R 1.5 billion (2020 Rand value). This will create opportunities for local companies and the regional and local economy. Due the key role played by the mining sector there are a likely to be a number of local contractors and engineering companies based in Kathu that will be suitably qualified to provide services and skills. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport and security, etc. associated with the construction workers on the site.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Nuisance impacts, such as noise, dust and safety, associated with construction related activities and vehicles;
- Impact on productive farmland.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be **Low Negative**. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. 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/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative for community as a whole)	Low (Negative for community as a whole)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

5.2.3 Operational phase impacts

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- The establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities;
- Benefits associated with socio-economic contributions to community development.

The proposed project will supplement South Africa’s energy and assist to improve energy security. In addition, it will also reduce the country’s reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts

- Noise impacts associated with the operation of the plant;
- Visual impacts and associated impact on sense of place.

The owner of Happy Rest (Galway 431/1), Ms Loubser, raised concerns about the potential impact of the facility on the areas current quiet, sense of place and the potential impact on the value of the property. The potential impact of lights at the facility on the areas undisturbed, dark sense of place at night was also raised as a concern. These issues should be address by the Noise and Visual Impact Assessment (VIA) specialist studies and the appropriate mitigation measures included in the design and operation of the facility.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. 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/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to improve energy security and support renewable sector	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefits associated with socio-economic contributions to community development	Medium (Positive)	High (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Low (Negative)
Noise impacts	Medium (Negative)	Low (Negative)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place

The potential visual impact of the proposed hybrid thermal plant and associated infrastructure on the areas sense of place in isolation is rated as **Low Negative** with mitigation. When considered within the context of other renewable energy projects in the area the cumulative impact on sense of place is rated as **Medium Negative** with mitigation.

Cumulative impact on local services and accommodation

The potential impact of the proposed hybrid thermal plant and associated infrastructure local services and accommodation in isolation is rated as **Low Negative** with mitigation. When considered within the context of other renewable energy projects in the area the cumulative impact is rated as **Medium Negative** with mitigation.

Cumulative impact on local economy

The potential impact of the proposed hybrid thermal plant and associated infrastructure on the local economy in isolation is rated as **Low Positive** with enhancement. When considered within the context of other renewable energy projects in the area the cumulative impact is rated as **High Positive** with enhancement.

5.2.5 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, renewable energy. Given South Africa’s current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a significant negative social cost. The No-Development option is not supported by the findings of the SIA.

5.3 CONCLUSIONS

The findings of the SIA indicate that the proposed Hyperion hybrid thermal dual fuel project will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The project will also contribute to local economic development though socio-

economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation by merging thermal with solar hybrid solutions.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures listed in the SIA and other relevant specialist's studies, including the Noise Impact and Visual Impact Assessment, are implemented. The development of the proposed Hyperion hybrid thermal dual fuel project is therefore supported by the findings of the SIA.

ANNEXURE A

INTERVIEWS

- Burger, Mr Schalk (telephonic 2020-01-20). Uitkoms 463/RE; Selsden 464/1.
- Knoesen, Mr Thomas (telephonic 2020-01-20). Lyndoch 432/RE.
- Laubser, Ms. Cecile (telephonic 2020-01-20). Galway 431/1.
- Steyn, Mr Nico (telephonic 2020-01-20). Bulcote 433/RE; Cowley 457/2.
- Venter, Mr Hendrik (telephonic 2020-01-20). Selsden 464/RE.
- Voigt, Mr Werner (telephonic 2020-01-21). Anglo American: Kathu 465.
- Vorster, Mr Johan (telephonic 2020-01-20). Cowley 457/RE; Cowley 457/1.

REFERENCES

- 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);
- The National Development Plan (2011);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy;
- Northern Cape Spatial Development Framework (2012);
- Northern Cape Province Green Document (2017/2018);
- John Taolo Gaetsewe Integrated Development Plan (2019-2020);
- John Taolo Gaetsewe Spatial Development Framework (2017);
- Gamagara Integrated Development Plan (2019-2020).
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS;
- Independent Power Producers Procurement Programme (IPPPP): An Overview (2017), Department of Energy, National Treasury and DBSA;
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.

ANNEXURE B: ASSESSMENT METHODOLOGY

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 either 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: CV

Tony Barbour

ENVIRONMENTAL CONSULTING AND RESEARCH

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Tony Barbour's has 26 years' experience in the field of environmental consulting and management. His experience includes working for ten years as a consultant in the private sector followed by four years at the University of Cape Town's Environmental Evaluation Unit. He has worked as an independent consultant since 2004, with a key focus on Social Impact Assessment. His other areas of interest include Strategic Environmental Assessment and review work.

EDUCATION

- BSc (Geology and Economics) Rhodes (1984);
- B Economics (Honours) Rhodes (1985);
- MSc (Environmental Science), University of Cape Town (1992)

EMPLOYMENT RECORD

- Independent Consultant: November 2004 – current;
- University of Cape Town: August 1996-October 2004: Environmental Evaluation Unit (EEU), University of Cape Town. Senior Environmental Consultant and Researcher;
- Private sector: 1991-August 2000: 1991-1996: Ninham Shand Consulting (Now Aurecon, Cape Town). Senior Environmental Scientist; 1996-August 2000: Steffen, Robertson and Kirsten (SRK Consulting) – Associate Director, Manager Environmental Section, SRK Cape Town.

LECTURING

- University of Cape Town: Resource Economics; SEA and EIA (1991-2004);
- University of Cape Town: Social Impact Assessment (2004-current);
- Cape Technikon: Resource Economics and Waste Management (1994-1998);
- Peninsula Technikon: Resource Economics and Waste Management (1996-1998).

RELEVANT EXPERIENCE AND EXPERTISE

Tony Barbour has undertaken in the region of 260 SIA's, including SIA's for infrastructure projects, dams, pipelines, and roads. All of the SIAs include interacting with and liaising with affected communities. In addition, he is the author of the Guidelines for undertaking SIA's as part of the EIA process commissioned by the Western Cape Provincial Environmental Authorities in 2007. These guidelines have been used throughout South Africa.

Tony was also the project manager for a study commissioned in 2005 by the then South African Department of Water Affairs and Forestry for the development of a Social Assessment and Development Framework. The aim of the framework was to enable the Department of Water Affairs and Forestry to identify, assess and manage social impacts associated with large infrastructure projects, such as dams. The study also included the development of guidelines for Social Impact Assessment, Conflict Management, Relocation and Resettlement and Monitoring and Evaluation.

Countries with work experience include South Africa, Namibia, Angola, Botswana, Zambia, Lesotho, Swaziland, Ghana, Senegal, Nigeria, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Sudan and Armenia.

ANNEXURE D: DECLARATION OF INDEPENDENCE

The specialist declaration of independence in terms of the Regulations_

I, Tony Barbour _____, declare that --

General declaration:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, Regulations and all other applicable legislation;

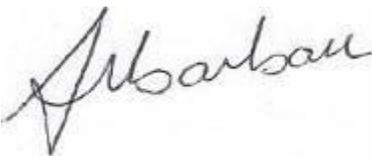
I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct;

and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:
 Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

21 January 2021
 Date: