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SOCIAL STATEMENT

PART 1 EA AMENDMENT APPLICATION FOR THE EXTENSION OF THE VALIDITY PERIOD FOR ENVIRONMENTAL AUTHORISATION (12/12/20/2321/2/1)

LOERIESFONTEIN 3 PV SOLAR ENERGY FACILITY

JANUARY 2023

By

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1. INTRODUCTION AND BACKGROUND

South Africa Mainstream Renewable Power Loeriesfontein 3 (Pty) Ltd received the original Environmental Authorisation (EA) for the 100MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) and Grid Connection infrastructure on 29 October 2012 (DFFE Ref: 12/12/20/2321/2). Further to this, the original EA was amended on 10 July 2014 (DFFE Ref: 12/12/20/2321/2/A1), 27 October 2015 (DFFE Ref: 12/12/20/2321/2/AM2), 04 October 2017 (DFFE Ref: 12/12/20/2321/2/AM3) and 24 September 2019 (DFFE Ref: 12/12/20/2321/2/AM4). In addition, following the 2019 amendment, the EA was subsequently split into two separate EAs (1 for the 100MW PV SEF and 1 for the grid connection infrastructure), both dated 21 May 2021, as follows:

1) EA for the 100MW Loeriesfontein 3 PV SEF, 33/132kV Independent Power Producer (IPP) portion of the shared on-site substation (including Transformer) and associated infrastructure (DFFE Ref: 12/12/20/2321/2/1); and
2) EA for the 132kV Grid Alignment and 132kV Eskom Portion of the shared on-site substation to service the 100MW Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/2).

It should be noted that the split EAs for the Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/1) and Grid Connection infrastructure (DFFE Ref: 12/12/20/2321/2/2) dated 21 May 2021 respectively replaced the original EA dated 29 October 2012, as well as the subsequent amendments.

The validity of the split EA for the 100MW Loeriesfontein 3 PV SEF and associated infrastructure lapsed on 29 October 2022, however, a Part 1 EA Amendment Application was submitted to the Department of Forestry, Fisheries and the Environment (DFFE) on 26 October 2022 to extend the validity of the EA by 5 years (i.e., EA lapses on 29 October 2027). It is important to note that according to Regulation 28(1B) of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 (as amended), *"an environmental authorisation which is the subject of an amendment application contemplated in this Chapter remains valid pending the finalisation of such amendment application."* The Part 1 EA Amendment Application was acknowledged by the DFFE on 07 November 2022 and additional information was requested to be submitted to the DFFE for consideration. Following this, assessments are to be undertaken to motivate why the Department should extend the validity period of the EA for a further 5 years.

As part of the Part 1 EA Amendment Application, separate comparative assessments are required for:

- 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF), 33/132kV IPP Portion of the Shared On-site Substation (including the Transformer) and associated infrastructure, near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/1.
- 132kV Grid Alignment (i.e., Overhead Power Line) and 132kV Eskom Portion of the Shared On-site Substation for the 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/2,

This Social Statement is for the EA extension application for the 100 MW Loeriesfontein 3 PV SEF (DFFE Ref No. 12/12/20/2321/2/1) specifically. The EA extension application for the Grid Connection infrastructure has been assessed and reported on as part of a separate standalone report.

2. PROJECT DESCRIPTION AND LOCATION

The 100MW Loeriesfontein 3 PV SEF and associated infrastructure will comprise the following (as authorised as part of split EA dated 21 May 2021 with reference: 12/12/20/2321/2/1):

- PV array with a height of between 5-10m on approximately 405,77 hectares.
- Internal cabling network to connect the PV panels to the substation.
- A new substation of approximately 10 800m^2 and associated transformers (IPP portion of the shared on-site substation).
- Access roads of 6-10m wide which includes an internal road network.
- Temporary construction area.
- Administration and warehouse building with a maximum area of up to 5000m^2.

The project site is located to the north of the town of Loeriesfontein (approx. 60km), in the Hantam Local Municipality, Northern Cape Province (Figure 1).

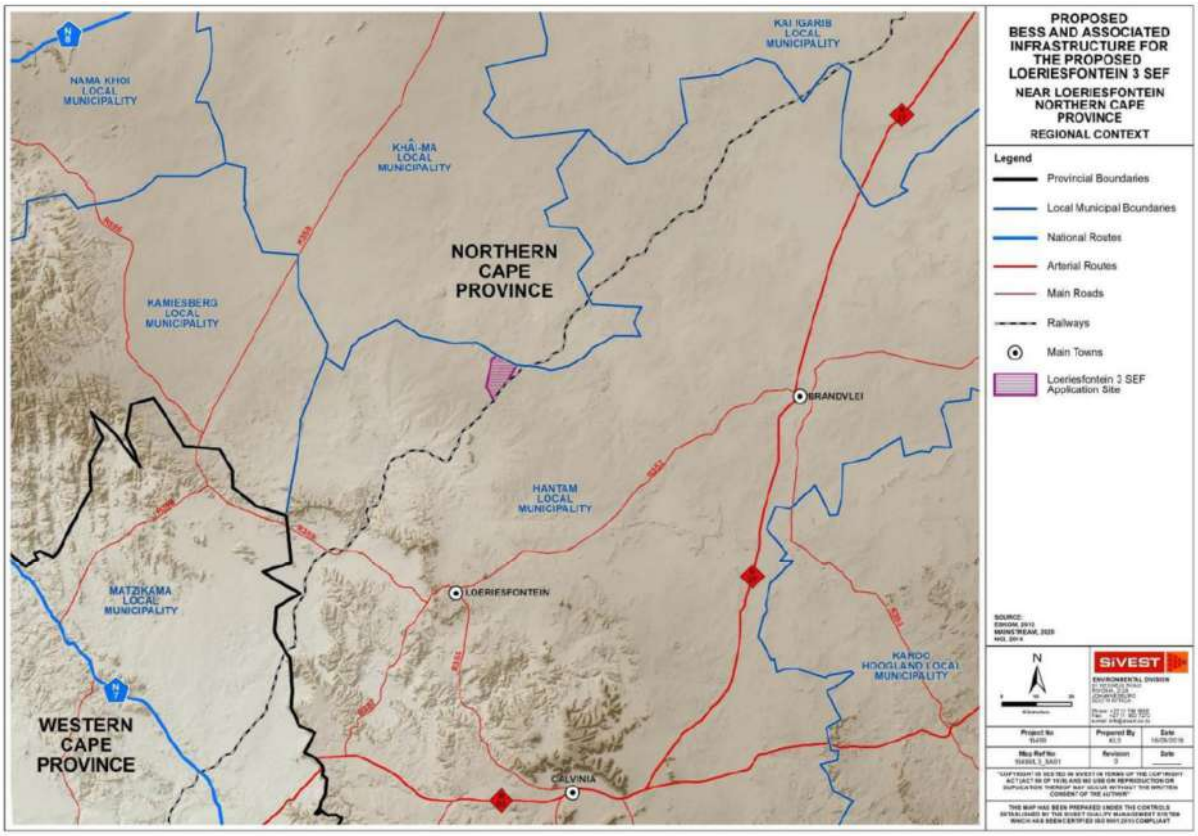


Figure 1: Location of 100 MW Loeriesfontein 3 PV SEF

3. TERMS OF REFERENCE

The Terms of Reference (ToR) for the specialist inputs into the provision of a specialist statement for the Application for Amendment of the EA to extend the validity period require:

- Description of the status (baseline) of the environment that was assessed during the initial assessment.
- Confirmation of the current status of the assessed environment.
- Description and assessment of any changes to the environment that has occurred since the initial EA was issued, if any.

- Indication if the impact rating as provided in the initial assessment remains valid; if the mitigation measures provided in the initial assessment are still applicable; or if there are any new mitigation measures which need to be included into the EA/EMPr, should the request to extend the commencement period, and other proposed amendments, be granted by the Department.
- Indication if there are any new assessments and/or guidelines which are now relevant to the authorised development which were not undertaken as part of the initial assessment, must be taken into consideration, and addressed in the specialist statement/ report.
- Description and an assessment of the surrounding environment, in relation to new developments or changes in land use which might impact on the authorised project, the assessment must consider the following:
  - Similar developments within a 30km radius.
  - Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land.
  - Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
  - The cumulative impacts significance rating must also inform the need and desirability of the proposed development.
  - A cumulative impact environmental statement on whether the proposed development must proceed.

The study must conclude the following:

- Has the baseline status of the receiving environment changed significantly since the original Socio-Economic Assessment in 2012?
- Is the initial impact rating undertaken during the initial assessment still valid?
- Are the mitigation measures provided in the initial assessment (or subsequent updated assessments) still applicable?
- Are there any new mitigation measures that should be added to the EA/EMPr, should the DFFE approve the amendments?
- Describe any update/new mitigations (or refer to them in the EMPr update report), where relevant.
- Are the proposed amendments, including proposed extension of the validity period, acceptable (relative to your area of expertise)?

4. APPROACH TO PREPARING SOCIAL STATEMENT

The approach to preparing the Social Statement for the Part 1 EA Amendment Application for the extension of the validity period is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (DEADP, 2007). These guidelines are based on international best practice. The approach to preparing the Social Statement included:

- A review of the findings of the Socio-Economic Assessment undertaken by MasterQ Research in 2012 as part of the original EIA undertaken by SIVEST (March 2012).
- Review of key national policy and planning documents that are relevant to the renewable energy sector.
- Review of the latest policy and planning documents for the study area.
- Review of the baseline socio-economic data for the study area.
- Interviews with affected landowners.

Interviews were conducted with the following affected landowners in November/December 2022, as part of the Social Statement[1].

- Lindveld, Mr Sakkie (telephonic 2022-12-09). Lindveld Trust - Aan de Karee Doorn Pan
- 213/1; 213/2.
- Lombard, Mr Frans (telephonic 2022-12-09). Aan de Karee Doorn Pan 213/RE; Karee Doorn Pan 214/1.
- Strauss, Mr Wynand (telephonic 2022-12-12). Bitterputs 187/RE.
- Van der Merwe, Mr Francois (telephonic 2022-12-12). Rona Rupert Trust – Sous 226/RE.
- Versfeld, Mr Charles (telephonic 2022-12-12). Buchu Fontein 184.
- Versfeld, Mr Fred (telephonic 2022-12-14). Buchu Fontein 184.

5. SPECIALIST DETAILS

Tony Barbour is an independent specialist with 30 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 300 SIAs, including ~ 140 SIAs for renewable energy facilities, 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 A contains a copy of Mr Barbour's CV.

6. DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour, the specialist consultant responsible for undertaking the study and preparing the Social Statement, is independent and does not have any vested or financial interests in the proposed PV SEF being either approved or rejected. A signed declaration is contained in Annexure B.

7. OVERVIEW OF BASELINE CONDITIONS

The overview of socio-economic and social baseline conditions can be divided into two sections, firstly an overview of key policy and planning documents that are relevant to the renewable energy sector and the relevant study area, and secondly an overview of municipal level demographic data for the study area.

7.1 Policy and planning documents

Section 1.6, Legislative Context (p12) of the Socio-Economic Assessment (MasterQ Research 2012) provides an overview of the legislative context reviewed as part of the study. The following policies are discussed.

- Constitution of the Republic of South Africa (Act No. 108 of 1996).
- The Occupational Health and Safety Act (Act No. 85 of 1993).
- Extension of Security of Tenure Act (Act 62 of 1997) (ESTA).
- National Environmental Management Act (NEMA), No. 107 of 1998, as amended and Environment Conservation Act, No. 73 of 1989, as amended.
- The Environmental Impact Regulations of 21 April 2006.
- Relevant Labour Relations legislation.

[1] The site- and site adjacent land owners were all notified of the current application and purpose of the Social Study by e-mail. Maps were attached indicating the proposed infrastructure in relation to the properties of each. All owners were telephonically contacted, with one requesting additional technical information from Mainstream (Mr van der Merwe), while another (Mr Lombard) requested a call-back, but then could not be contacted on 3 successive days (messages were left).

The Socio-Economic Assessment did not undertake a review of policies and legislation that was relevant to renewable energy at the times. The Socio-Economic Assessment also did not undertake a review of relevant local planning documents, such as the Hantam and Namakwa Municipality Integrated Development Plans.

Given that the Socio-Economic Assessment was undertaken in 2012, there have been changes to some key national policy documents, specifically the Integrated Resource Plan (2010), and local planning documents, including relevant Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDF).

As part of the amendment process, the latest local policy documents have been reviewed, including:

- National Energy Act (2008).
- White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2019).
- National Infrastructure Plan (NIP) (2012 and 2021).
- National Development Plan (2011).
- Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015).
- Northern Cape Provincial Growth and Development Plan (NCPGDP) (2014)
- Northern Cape Provincial Spatial Development Framework (NCSDF) (2012)
- Namakwa District Municipality Integrated Development Framework (2019/2020 Revision).
- Namakwa District Climate Change Response Plan (2017-2022).
- Hantam Local Municipality Integrated Development Plan (2022-2023).

A detailed annual review of the Independent Power Producers Procurement Programme (IPPPP) is also undertaken each year by the Department of Energy, National Treasury and DBSA. The most recent was in December 2021. Annexure C contains a summary of the review of these documents.

7.2 Overview of local socio-economic conditions

Section 4 of the Socio-Economic Assessment (MasterQ Research 2012), Current Status Quo, provides an overview of the socio-economic baseline conditions in the study area. The section notes that the baseline profile mostly focused on the local municipal area, but reference was made to the district and the province, where deemed necessary. The section is structured according to the following social change processes:

- Geographical processes: land use patterns.
- Demographical processes: the composition of the local community.
- Economic processes: the way in which the local people make a living and the economic activities in the society.
- Institutional and Legal processes: the role and efficiency of the local authority and other service providers in the area in terms of their capacity to deliver services to the local area.
- Socio-cultural processes: How the local population behave, interact, and relate to each other, their environment, and the belief and value systems that guide these interactions.

The Socio-Economic Assessment was undertaken in 2012 and the baseline socio-economic conditions are therefore dated. Annexure D contains a contains a summary of the baseline socio-economic conditions for the Hantam Local Municipality based on the latest available information from the 2016 Community Household Survey and other sources. Annexure D also contains an overview of the current land uses in the study area.

As indicated in Annexure D, the study area settlement pattern remain sparse, with permanent inhabitation limited. No new dwellings have been constructed on the site- or adjacent properties since 2012. The nearest dwellings are still located >5 km from the site. The relevant properties continue to be used for extensive grazing, mainly seasonal (summer) grazing. Very few dedicated permanent employment opportunities are associated with the study properties. Still no tourism receptors are located within any significant proximity to the site.

The only significant changes since 2012 are associated with renewable energy projects. These relate to actual and potential changes in land use (additional), visual changes (turbines and other infrastructure), and increased use of the Granaatboskolk public gravel road (which links the study area properties to Loeriesfontein), especially by heavy vehicle traffic during construction. With the exception of Bitterputs 187/RE located directly to the north of the site, all study properties are associated with operational, proposed, or potential REF projects (See Table 6, Annexure D).

8. ASSESSMENT OF SOCIO-ECONOMIC AND SOCIAL ISSUES

8.1 Introduction

Section 5 of the Socio-Economic Assessment (MasterQ Research 2012), Impact Assessment (p56), identifies and assesses the socio-economic impacts associated with pre-construction phase (p58), Construction Phase (p63) and Operations and Maintenance Phase (p73). Section 5.4, Impact Matrix (p84), describes and assess the impacts for the Construction Phase (5.4.1, p84) and Operational Phase (5.4.2, p85). Mitigation and enhancement measures are also identified.

8.2 Construction Phase

The construction phase impacts identified in the 2012 Report are listed below. The significance ratings are summarized in Table 1:

- The creation of local jobs and income during construction.
- Conflict between workers and landowners and local residents.
- Health risks associated with workers spreading Sexually Transmitted infections including HIV.

Table 1: Summary of construction phase impacts

Impact	Significance without Enhancement/Mitigation	Significance with Enhancement/Mitigation
Employment and output creation	Low (+)	Medium (+)
Social Mobilisation	Low (-)	Low (-)
Health and Safety	High (-)	Low (-)

8.3 Operational Phase

The operational phase impacts identified in the 2012 Report are listed below. The significance ratings are summarized in Table 2:

- Employment and output creation. The creation of local jobs and income during the operation of the PV plant
- Tax income. Increase in central and local tax income during operations.
- Corporate Social Investment. 1.5% of expected revenue of RR1bn will be retained for development in the form of an enterprise development fund (0.4%) and socio-economic development fund (1.1%). An additional 5% of profits (est. at R46m per

annum) is expected to be paid out as a community dividend as part of a community development fund.
- Agricultural output. Displacing existing agricultural production
- Tourism. Diverting/Attracting tourism from or to area
- Property prices. Change in property prices adjacent to the new development (positive or negative)
- Sense of place. The presence of wind farm and associated infrastructure such as the substation and the transmission power lines would change the landscape of the area from open spaces to 'spoilt' which could affect the way in which people related to the land and the sense of connectedness they have with the area, in short, their sense of place.

Table 2: Summary of operational phase impacts

Impact	Significance without Enhancement/Mitigation	Significance with Enhancement/Mitigation
Employment and output creation	Medium (+)	Medium (+)
Tax income	Low (+)	Low (+)
Corporate Social Investment	Low (+)	Medium (+)
Agricultural output	Low (-)	Low (-)
Tourism	Low (-)	Low (-)
Property prices	Low (-)	Low (-)
Sense of place	Low (-)	Low (-)

9. COMMENT ON FINDINGS

9.1 Construction Phase

The socio-economic issues associated with the construction phase identified in the Socio-Economic Assessment (MasterQ Research, 2012) as listed in Table 1 were:

- The creation of local jobs and income during construction.
- Conflict between workers and landowners and local residents.
- Health risks associated with workers spreading Sexually Transmitted infections including HIV.

These issues correspond to:

- Creation of employment and business opportunities.
- Impacts associated with the presence of construction workers on local communities.

Based on the authors experience, the significance ratings contained in the Socio-Economic Assessment (MasterQ Research, 2012) as reflected in Table 1 and 2 remain valid. The mitigation measures listed are also regarded as appropriate.

However, several potential social issues associated with the construction phase were not assessed. These are outlined below:

- Safety and security risks to local farmers and farming operations.
- Influx of job seekers.
- Nuisance impacts such as noise, dust and safety impacts associated with construction related activities and vehicles.
- Potential risk of grass fires.

The author has undertaken in the region of 140 SIAs for renewable energy projects, including renewable energy projects located in the study area. Based on the findings of these SIAs, the significance of all the potential negative impacts with mitigation is likely to be Low Negative. The negative impacts can therefore be effectively mitigated. Table 3 provides a summary of the potential significance ratings for the additional social impacts associated with the construction phase of the Loeriesfontein 3 PV SEF[2].

A key issue that was raised by local landowners was the impact of construction traffic on the Granaatboskolk Road during the construction of Mainstream's Loeriesfontein and Khobab WEFs, and the current construction of Solar Capital Orange PV. The road will also be impacted by the construction of the Dwarsrug WEF in 2023. The Kokerboom 1-4 WEFs and other proposed REFs would also use the road. The cumulative impacts on the road are therefore an issue that should be addressed. Local farmers in the area indicated that the option of surfacing the road should be considered by the renewable energy companies operating in the area.

Table 3: Additional social impacts during construction phase

Impact	Significance without Mitigation/Enhancement	Significance with Mitigation/Enhancement
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)
Nuisance impacts such as noise, dust and safety impacts associated with construction related activities and vehicles	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)

The following mitigation measures for the construction phase should be included in the EMPr (over and above those already recommended as part of the original assessment).

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.
- 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 to ensure that construction related activities that pose a potential fire risk, such as welding, are effectively 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.

[2] These findings are also informed by interviews with affected landowners undertaken in 2022.

- Contractor to provide fire-fighting training to selected construction staff.
- In the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.

In addition, the cumulative impact on the Granaatboskolk Road associated with construction traffic involved in the construction of renewable energy facilities in the area should be addressed.

9.2 Operational Phase

The socio-economic issues associated with the operational phase identified in the Socio-Economic Assessment (MasterQ Research, 2012) as listed in Table 2 were:

- Employment and output creation.
- Tax income.
- Corporate Social Investment.
- Agricultural output.
- Tourism.
- Property prices.
- Sense of place.

Based on the authors experience, these accurately reflect the issues associated with PV SEFs. The significance ratings as listed in Table 2 are also regarded as accurate and remain valid for the Loeriesfontein 3 PV SEF. The mitigation measures listed are also regarded as appropriate. The significance of all the potential negative impacts with mitigation is likely to be **Low Negative**. The negative impacts can therefore be effectively mitigated.

10. ASSESSMENT OF CUMULATIVE IMPACTS

The potential cumulative impacts associated with the proposed Loeriesfontein 3 PV SEF include the cumulative impact on the areas sense of place, cumulative impact on services, specifically during the construction phase, and cumulative impact on the local economy.

10.1 Cumulative impact on sense of place

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

- Combined visibility (whether two or more renewable energy facilities will be visible from one location).
- Sequential visibility (e.g., the effect of seeing two or more renewable energy facilities along a single journey, e.g., road or walking trail).
- The visual compatibility of different wind farms 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 renewable energy facility at a time, but if each successive stretch of the road is dominated by views of renewable energy facilities, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010).

The project is not located within a Renewable Energy Development Zone (REDZ). However, as indicated in Figure 2, there are several renewable energy facilities located in the vicinity of the site, specifically to the south of the site. The potential for cumulative impacts associated with combined visibility (whether two or more renewable energy facilities will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more renewable energy facilities along a single journey) therefore exists. However, the site is relatively remote and the renewable energy facilities are largely concentrated in the area to the south of the site. While this does not necessarily reduce the cumulative visual impact on the areas sense of place, it does assist to confine the impact to a relatively concentrated area.

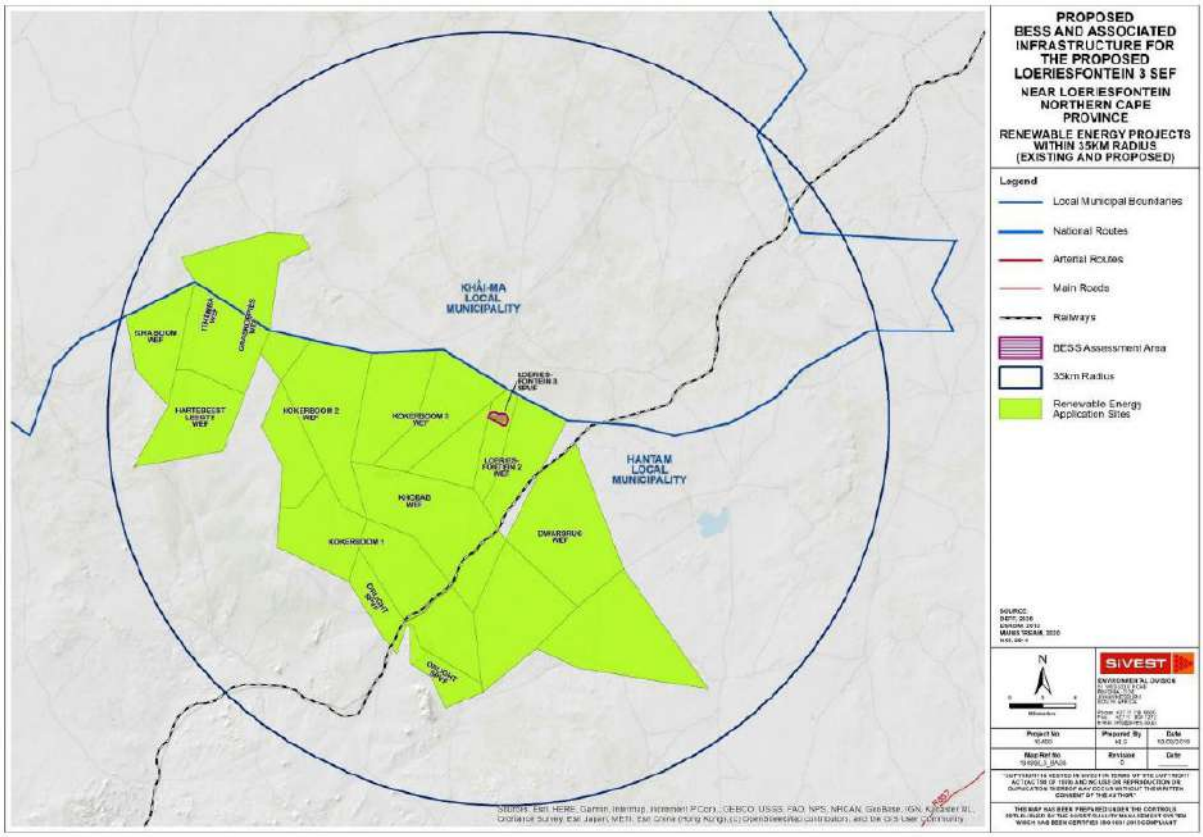


Figure 2: Location of other renewable energy facilities within a 30 km radius of the site

Based on SIAs undertaken by the author for other renewable energy projects located in the study area, the significance of the cumulative impact on sense of place is rated as **Medium Negative** with mitigation (Table 4).

Table 4: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one renewable energy facility and the potential impact on the area's 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 (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (44)	Medium (48)
Status (positive/negative)	Negative	Negative
Reversibility	Yes. SEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		

The following mitigation measure for the operational phase should be included in the EMPr.

- The recommendations of the VIA should be implemented.

10.2 Cumulative impact on local services and accommodation

The establishment of the proposed Loeriesfontein 3 PV SEF and the other renewable energy facilities in the HLM has the potential to place pressure on local services in nearby towns, specifically in the town of Loeriesfontein. Services affected include medical, education and accommodation. This pressure will be associated with the influx of workers to the area associated with the construction phases, and to a lesser extent, the operational phases. Due to the lack of accommodation in Loeriesfontein the construction of existing wind farms in the area have involved the establishment of on-site construction camps. The potential impact on local services can be mitigated by employing local community members.

However, this impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of a renewable projects in the area. These benefits will create opportunities for investment in the HLM, including the opportunity to up-grade and expand existing services.

Based on SIAs undertaken by the author for other renewable energy projects located in the vicinity of Loeriesfontein, the significance of the cumulative impact on local services and accommodation is rated as **Low Negative** with mitigation (Table 5).

As indicated above, the cumulative impact on the Granaatboskolk Road associated with construction traffic involved in the construction of renewable energy facilities in the area has been raised as a key concern. The option of surfacing the road or implementing an effective maintenance and repair program should be investigated[3].

[3] As per the EIA report Mainstream indicated that after construction Mainstream's use of the road will be minimal, ~ about 5-10 vehicles per day. However, Mainstream is prepared to collaborate with local landowners on road improvement activities.

Table 5: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities in the HLM 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 (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Medium (30)
Status (positive/negative)	Negative	Negative
Reversibility	Yes. WEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		

The following mitigation measures for the operational phase should be included in the EMPr.

The Northern Cape Provincial Government, in consultation with the HLM and the proponents involved in the development of renewable energy projects in the HLM, should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the HLM.

The option of surfacing the Granaatboskolk Road or implementing an effective maintenance and repair program should be investigated[4].

10.3 Cumulative impact on local economy

The establishment of a number of renewable energy facilities in the area, including the Loeriesfontein 3 PV SEF, will create socio-economic opportunities for the HLM, which, in turn, will result in positive social benefits. The positive cumulative impacts include the creation of employment, skills development and training opportunities, and downstream business opportunities. The potential cumulative benefits for the local and regional economy are associated with both the construction and operational phase of renewable energy projects and extend over a period of 20-25 years.

[4] As per the EIA report Mainstream indicated that after construction Mainstream's use of the road will be minimal, ~ about 5-10 vehicles per day. However, Mainstream is prepared to collaborate with local landowners on road improvement activities.

Based on SIAs undertaken by the author for other renewable energy projects located in the study area and other parts of South Africa, the significance of the cumulative impact on the local economy is rated as **High Positive** with enhancement (Table 6).

Table 6: Cumulative impact on local economy

Nature: The establishment of a number of renewable energy facilities in the ELM 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 (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Definite (5)
Significance	Medium (33)	High (60)
Status (positive/negative)	Positive	Positive
Reversibility	Yes. WEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		

The following mitigation measures for the operational phase should be included in the EMPr.

- The proponent should liaise with the HLM and local business sector to identify strategies aimed at maximising the potential benefits associated with the project.
- Local skills development and training program should be developed and implemented in consultation with the HLM.

11.CONCLUSION

11.1 Status of baseline

Land uses

There has been negligible change in the land uses and farming activities on the affected farm properties. The baseline has therefore not changed significantly as a site-specific level.

Socio-economic environment

The socio-economic baseline conditions in Loeriesfontein and the HLM have changed since 2012, when the Socio-Economic Assessment and EIA were undertaken. These changes include increase in population, changes in economic activities, specifically the impact on COVID-19 on the local economy (2019-2020/22). These changes do not however have a material bearing on the findings of the Socio-Economic Assessment undertaken in 2012. Annexure B contains an up-dated summary of the socio-economic baseline conditions in the HLM.

Policy and planning documents

A number of the policy and planning documents referred to in the 2012 Socio-Economic Assessment (MasterQ Research, 2012) are outdated. The Socio-Economic Assessment also did not include a review of the local planning and policy documents, specifically the IDP and SDF. This has been undertaken as part of this assessment. Annexure A contains a summary of the latest key policy and planning documents.

11.2 Impact ratings

The impact ratings of the socio-economic and social impacts identified and assessed in the 2012 Socio-Economic Assessment (MasterQ Research, 2012) remain valid. The associated mitigation measures remain applicable.

As indicated above, a number of additional negative social impacts associated with the construction were not assessed in the 2012 Socio-Economic Assessment, namely:

Construction phase

- Safety and security risks to local farmers and farming operations (-).
- Potential risk of grass fires (-)
- Nuisance impacts such as noise, dust and safety impacts associated with construction related activities and vehicles (-).

The author has undertaken in the region of 140 SIA for renewable energy projects, including renewable energy projects located in the study area. Based on the findings of these SIAs, the significance of all the potential negative impacts associated with the construction phase with mitigation is likely to be Low. The negative impacts can therefore be effectively mitigated.

11.3 Mitigation measures

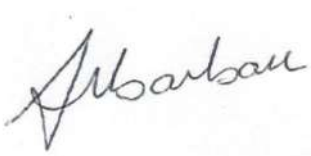
The mitigation measures to address the socio-economic and social impacts identified in the 2012 Socio-Economic Assessment (MasterQ Research, 2012) remain valid. The mitigation and enhancement measures to address the additional socio-economic and social issues identified are listed above.

11.4 Cumulative impacts

The potential cumulative impacts associated with the proposed Loeriesfontein 3 PV SEF include cumulative impact on the areas sense of place, cumulative impact on services, specifically during the construction phase, and cumulative impact on the local economy. Based on the findings of SIAs undertaken by the author for other renewable energy projects located in the study area, the significance of the cumulative impact on sense of place, local services and the local economy are rated as **Medium Negative, Low Negative and High Positive** respectively.

12.CONCLUDING STATEMENT

Based on the review of the 2012 Socio-Economic Assessment (MasterQ Research, 2012) and associated documentation, the proposed amendments, including the proposed extension of the validity period, for the Loeriesfontein 3 PV SEF are acceptable from a social and socio-economic perspective.



Tony Barbour
Tony Barbour Environmental Consulting
18 January 2023

ANNEXURE A

Tony Barbour
ENVIRONMENTAL CONSULTING AND RESEARCH

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Tony Barbour's experience as an environmental consultant 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 renewable energy developments, infrastructure projects, dams, pipelines, and roads. 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, Nigeria, Senegal, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Sudan, Senegal, and Armenia.

ANNEXURE B

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):

20 December 2022

Date:

ANNEXURE C

POLICY AND PLANNING UP-DATE

NATIONAL POLICY ENVIRONMENT

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

White Paper on 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.
- 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.

White Paper on Renewable Energy

The White Paper on Renewable Energy (November 2003) (further referred to as the White Paper) supplements the *White Paper on Energy Policy*, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out

Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol[5], Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual. In this regard, the IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables.

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

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels.

Integrated Resource Plan (2019)

South Africa's National Development Plan (NDP) 2030 offers a long-term plan for the country. It defines a desired destination where inequality and unemployment are reduced, and poverty is eliminated so that all South Africans can attain a decent standard of living. Electricity is one of the core elements of a decent standard of living. In formulating its vision for the energy sector, the NDP took as a point of departure the Integrated Resource Plan (IRP) 2010–2030 promulgated in March 2011. The IRP is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, taking into account security of supply and the environment (minimize negative emissions and water usage).

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.

[5] The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia).

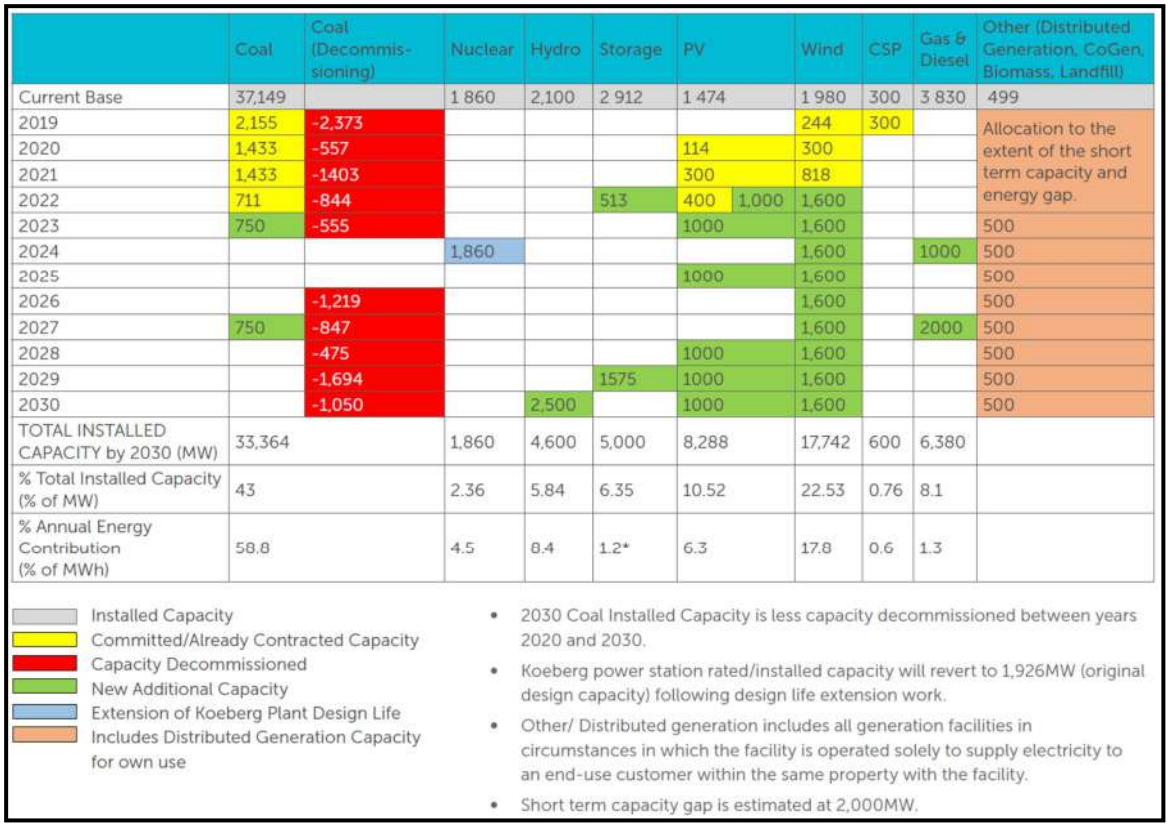
The IRP notes that South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. The energy sector contributes close to 80% towards the country's total Green House Gas (GHG) emissions of which 50% are from electricity generation and liquid fuel production alone. A transmission from a fossil fuel-based energy sources is therefore critical to reducing GHG emissions. In September 2021 South Africa released its latest emission targets, indicating that it intended to limit Green House Gas (GHG) emissions to 398-510 MrCo2e by 2025, and 350-420 MrCo2e by 2030. These emissions are significantly lower than 2016 emission targets and will see South Africa's emissions decline in absolute terms from 2025, a decade earlier than planned (World Resource Institute, 2021).

The IRP (2019) notes that 39 730 MW of new generation capacity must be developed. Of the 39 730 MW determined, about 18 000 MW has been committed to date. This new capacity is made up of 6 422 MW under the REIPPP with a total of 3 876 MW operational on the grid. 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 addition, IPPs have commissioned 1 005MW from two Open Cycle Gas Turbine (OCGT) peaking plants.1 005 MW from OCGT for peaking has also been commissioned (IRP 2019, page 14).

In terms of IRP (2019) 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.
- 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 (Decommis-sioning)	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	

Figure 2.1: Summary of energy allocations and commitments based on the 2019 IRP

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 five 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 2022 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.

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.

New Growth Path Framework

Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. 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 to create jobs, through a series of partnerships between the State and the private sector. The Green Economy is one of the five priority areas, 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.

National Infrastructure Plan

Government adopted a National Infrastructure Plan (NIP) 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 aim of the NIP is support 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 included three energy SIPs, namely SIP 8, 9 and 10.

- SIP 8: Green energy in support of the South African economy.
- SIP 9: Electricity generation to support socio-economic development.
- SIP 10: Electricity transmission and distribution for all.

The NIP 2050 was gazetted for public comment on 10 August 2021[6]. The first phase of the NIP 2050 focuses on four critical network sectors that provide a platform, namely, energy, freight transport, water, and digital infrastructure. In line with the NDP, the vision for the energy sector is to promote:

- Economic growth and development through adequate investment in energy infrastructure" (generation, transmission, and distribution) and reliable and efficient energy service at competitive rates, while supporting economic growth through job creation by stimulating supply chains.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution, reduce water usage and mitigate the effects of climate change.

[6] Gazette No. 44951

The NIP 2050 notes that by 2030, the NDP set a target that more than 90% of the population should enjoy access to grid connected or off-grid electricity by 2030. To realise this vision, South Africa's energy system will be supported by effective policies, institutions, governance systems, regulation and, where appropriate, competitive markets. In terms of energy mix, NIP 2050 notes that coal will contribute significantly less to primary-energy needs in the future, while gas will have an important enabling role, energy supply will be ***increasingly dominated by renewable energy resources– especially wind and solar which are least cost and where South Africa has a comparative advantage.***

NIP 2050 also notes that South Africa is signatory of the Paris Agreement which aims to achieve Net Zero greenhouse gas emissions by 2050. To achieve this will require a shift to a least cost energy path that is increasingly reliant on renewables. For South Africa this is imperative for the following reasons:

- SA cannot afford to overspend while dramatically expanding capacity
- Renewables can be built quickly and in modular form thereby avoiding many of the challenges associated with mega projects.
- Trade partners are expected to increasingly impose border carbon taxes harming SA exports.
- SA will need to commit to emission reductions as a global citizen.

PROVINCIAL AND LOCAL POLICY ENVIRONMENT

Northern Cape Province Provincial Growth and Development Strategy

The 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 Socio-Economic Assessment the NCPGDS make 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 SEF 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 SEF and other REFs do not negatively impact on the region's 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. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed solar energy facility, do not affect the tourism potential of the province.

Northern Cape Spatial Development Framework

Northern Cape Provincial Spatial Development Framework (NCSDF) (2012) lists a number of sectoral strategies and plans 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).

Under Section B 14.4, Energy Sector, the NCSDF (2012), notes the total area of high radiation in South Africa amounts to approximately 194 000 km^2 of which the majority falls within the Northern Cape. It is estimated that, if the electricity production per km^2 of mirror surface in a solar thermal power station were 30.2 MW and only 1% of the area of high radiation were available for solar power generation, then generation potential would equate to approximately 64 GW. A mere 1.25% of the area of high radiation could thus meet projected South African electricity demand in 2025 (80 GW) (NCPSDF, 2012). However, the SDF does indicate that this would require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres.

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.
- 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 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.

Namakwa District Municipality Integrated Development Plan

The Namakwa District Municipality IDP (2019/2020) notes that the vision of the Namakwa DM is: 'Namakwa District, the centre of excellence'. The Mission statement for the MD includes:

- Stimulating radical economic and social transformation.
- Fostering partnerships with relevant role-players.
- Supporting and capacitating local municipalities.
- Maintaining transparent and accountable processes.
- Providing local leadership.

Key developmental issues facing the DM include:

- The DM has a large cohort of people in the economically active age category (15-64). This highlights the need for local employment creation.
- The youthful population group (15-34) has increased by 2.4%, further emphasizing the need for local employment creation.
- Between 2004 and 2014, the urbanization rate in the DM has increased from 77.3% to 91.2% and that in the NKLM from 88.4% to 95.3%. These increases in urbanization have increased pressure on local authorities to provide municipal and social services.
- The DM's economic outlook is depressed. This is linked to limited new mining activity and the ongoing drought.

Key developmental priorities identified for the DM include:

- Economic diversification, specifically the development of local agricultural and mining manufacturing sectors.
- New mining and renewable energy projects should be supported.

The IDP notes support for the commitments made in terms of the Paris Accord on Climate Change. The IDP notes that the DM is located in an arid region, prone to droughts, and therefore very vulnerable to global warming.

Namakwa District Climate Change Response Plan

The Namakwa District Climate Change Response Plan (2017-2022) was developed through the Local Government Climate Change Support program. It includes a climate change vulnerability assessment and associated climate change responses which address these vulnerabilities. The vulnerability assessment identified 17 of the DM's socio-economic indicators which are both very exposed and highly sensitive to climate change but have very low capacity to adapt. These included the agricultural sector, tourism, water-dependent municipal services and the coastal and marine environment.

Priority responses are identified for the key sectors, including agriculture, biodiversity and habitat conservation, human health, and human settlements. These include mainstreaming climate change preparedness into all future IDPs, and implementation of a Namakwa Renewable Energy Strategy which supports the development and use of non-fossil sources of energy.

Hantam Local Municipality Integrated Development Plan

The Vision for the HM is "Hantam, a place of service excellence and equal opportunities, creating a better life for all". The Mission Statement associated with the vision is "To create an inclusive, people centred municipality through social cohesion, good governance and sustainable development where all can reach their full potential"

The IDP lists 5 Strategic Objectives (SO), namely:

- SO 1: Infrastructure Development and Basic Service Delivery.
- SO 2: Institutional Development and Municipal Transformation.
- SO 3: Economic Development.
- SO 4 Municipal financial sustainability and viability.
- SO 5: Good governance and public participation.

SO 3, Economic Development is relevant to the development.

SWOT analysis was undertaken in 2022 as part of the IDP process. The following outcomes are relevant to the development.

Strengths
- Economic opportunities available in municipal area.
- Established renewable energy facilities near Loeriesfontein.

Weaknesses
- Unemployment / Poverty – higher grant dependency; more indigent households; inability to pay municipal accounts.
- Emigration out of area and rural/urban migration.
- Load-shedding – pumping of water and sewerage is not possible during load-shedding.
- Migration of locally skilled workers. Skills for renewable energy not available locally.
- Low quality of education; science and mathematics are not subjects in schools.
- Large-scale economic investment opportunities not contributing to Hantam economy (e.g. SKA).
- No support or investment opportunities for local entrepreneurs.

- Drought – agricultural development stagnant, water service delivery more expensive, boreholes not sustainable.

Opportunity
- The possibility of renewable energy generation for own use through public private partnerships.
- Create opportunities for small scale entrepreneurs at entrances to towns.
- Build a Training College providing tertiary education.

Threats
- Lack of skills development opportunities.
- Lack of youth development programmes.
- Early school dropout of learners.
- What can be done to determine and ensure payment of municipal rates and taxes by renewable energy facilities.
- Condition of gravel roads limits road use by communities and tourists.
- Limited funding available for SMMEs.
- Climate change is a threat to our existence (in particular to the sustainability of water sources).

In terms of describing the municipal area, the IDP notes that the HM is a small-town sub-region with a mix of sparsely populated towns and low levels of development despite the strategic location of some towns in terms of road and rail transport corridors. Calvinia serves as the main agricultural service centre with the associated transport infrastructure shaping the (original) spatial structure of the town. Of relevance the IDP notes that Loeriesfontein has in recent years experienced phenomenal investment in infrastructure and services with associated employment opportunities due to the social responsibility programmes by Independent Power Producers. In this regard almost a quarter of all land development applications submitted to the Municipality between 2011 and 2015 were for large-scale renewable energy generation projects.

OVERVIEW RENEWABLE ENERGY SECTOR IN SOUTH AFRICA

The section below provides an overview of the potential benefits associated with the renewable energy sector in South Africa based on the information contained in the Independent Power Producers Procurement Programme (IPPPP): An Overview (December 2021), Department of Energy, National Treasury and DBSA.

Independent Power Producers Procurement Programme (IPPPP): An Overview

The document presents an overview of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) undertaken by the Department of Energy, National Treasury, and the Development Bank of South Africa in December 2021. The programme's primary mandate is to secure electrical energy from the private sector for renewable and non-renewable energy sources. With regard to renewables, the programme is designed to reduce the country's reliance on fossil fuels, stimulate an indigenous renewable energy industry and contribute to socio-economic development and environmentally sustainable growth. The IPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership.

The Integrated Resource Plan for electricity (IRP) provides South Africa's long-term plan for electricity generation. It primarily aims to ensure security of electricity supply, minimise the cost of that supply, limit water usage and reduce greenhouse gas (GHG) emissions, while allowing for policy adjustment in support of broader socio-economic

developmental imperatives. The IRP 2019 was promulgated in October 2019 and replaced the IRP 2010 as the country's official electricity infrastructure plan.

It calls for 37 696MW of new and committed capacity to be added between 2019 and 2030 from a diverse mix of energy sources and technologies as ageing coal plants are decommissioned and the country transitions to a larger share of renewable energy. By2030, the electricity generation mix is set to comprise of 33 364MW (42.6%) coal, 17 742MW (22.7%) wind, 8 288MW (10.6%) solar photovoltaic (PV), 6 830MW(8.7%) gas or diesel, 5 000MW (6.4%) energy storage, 4 600MW (5.9%) hydro, 1 860MW (2.4%) nuclear and 600MW (0.8%) concentrating solar power (CSP). Additionally, a short-term gap at least 2000MW is to be filled between 2019 and 2022, thereby further raising new capacity requirements, while distributed or embedded generation for own-use is positioned to add 4 000MW between 2023 and 2030. The IRP is intended to be frequently updated, which could impact future capacity allocations from various energy sources and technologies.

Energy supply
By the end of December 2021, the REIPPPP had made the following significant impacts.

- 6 323 MW of electricity had been procured from 92 RE Independent Power Producers (IPPs) in BW1-4.
- 5 661 MW of electricity generation capacity from 85 IPP projects has been connected to the national grid.
- 71 073GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013.

Renewable energy IPPs have proved to be very reliable. Of the 85 projects that have reached COD, 77 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 77 projects is 14 117GWh, which is 95% of their annual energy contribution projections (P50) of 14 924GWh over a 12-month delivery period. Thirty-one (31) of the 77 projects (40%) have individually exceeded their P50 projections.

Comparatively, the following statistics were presented at the REIPPPP Bid Window 6 Bidders Conference on 7 July 2022 by the IPP Office based on data as of March 2022 following seven bid rounds (IPP Office, 2022[7]):

- 92 IPPs have been selected as preferred bidders.
- 6 323 MW of electricity capacity procured.
- 5 826 MW already operational from 87 IPPs.
- 74 805 GWh energy generated by Renewable Energy sources.

Energy costs
In line with international experience, the price of renewable energy is increasingly cost competitive when compared with conventional power sources. The REIPPPP has effectively captured this global downward trend with prices decreasing in every bid window. Energy procured by the REIPPPP is progressively more cost effective and has approached a point where the wholesale pricing for new coal-and renewable-generated energy intersect.

Through the competitive bidding process, the IPPPP effectively leveraged rapid, global technology developments and price trends, buying clean energy at lower and lower rates with every bid cycle, resulting in SA getting the benefit of renewable energy at some of

[7] IPP Office (2022). RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAMME (REIPPPP) BID WINDOW 6 BIDDERS' CONFERENCE, 7 JULY 2022 [online]. Accessed July 2022. https://www.ipp-renewables.co.za/PressCentre/GetPressRelease?fileid=16a21004-f9fd-ec11-9578-2c59e59ac9cd&fileName=BW6%20Bidders%20Conference%20Consolidated.pdf.

the lowest tariffs in the world. The price for wind power has dropped by 50% to R0.94/kWh, while solar PV has dropped with 75% to R1.14/kWh between BW1 and BW4.

Prices contracted under the REIPPPP for all technologies are well below the published REFIT prices. The REIPPPP has effectively translated policy and planning into delivery of clean energy at very competitive prices. As such it is contributing to the national aspirations of secure, affordable energy, lower carbon intensity and a transformed 'green' economy. with the BW4 price directly comparable with the per kWh price of new coal generation. Solar PV has dropped most significantly with a price decrease of 75% to R1.10/kWh between BW1 and BW4. This compares with the industry estimates in April 2020 of R1.45/kWh for Medupi. Considering the on-going delays incompletion, indications are that these costs may even be significantly higher.

Investment

The document notes that the REIPPPP has attracted significant investment in the development of the REIPPs into the country. The total investment (total project costs[8]), including interest during construction, of projects under construction and projects in the process of closure is R209.6 billion (this includes total debt and equity of R209 billion, as well as early revenue and VAT facility of R0.5 billion).

The REIPPPP has attracted R42 billion in foreign investment and financing in the seven bid windows (BW1 – BW4). This is almost double the inward FDI attracted into South Africa during 2015 (R22.6 billion). The document notes that the share of foreign investment and equity showed an increase in the most recent bid window (2S2), suggesting that the REIPPPP continued to generate investor confidence despite the poor economic conditions in South Africa in recent years.

Comparatively, based on the information presented at the REIPPPP Bid Window 6 Bidders Conference on 7 July 2022 by the IPP Office (IPP Office, 2022), approximately R209.6 billion investment has been attracted for energy infrastructure in all bid windows; and as at March 2022 an actual R1.9 billion contribution was realised for socio-economic development.

South African citizen shareholding

The importance of retaining local shareholding in IPPs is key condition of the procurement requirements. The RFP notes that bidders are required to have South African Equity Participation of 40% in order to be evaluated. South African (local) equity shareholding across BW1-4 equates to 52% (R31.4 billion) of the total equity shareholding (R61.0 billion) was held by South African's across BW1 to BW4, 1S2 and 2S2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R29.6 billion and contributes 49% of total equity.

The REIPPPP also contributes to Broad Based Black Economic Empowerment (BBBEE) and the creation of black industrialists. In this regard, Black South Africans own, on average, 34% of projects that have reached financial close (BW1-BW4), which is 4% higher than the 30% target. This includes black people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.

On average, black local communities own 9% of projects that have reached financial close. This is well above the 5% target. In addition, an average of 21% shareholding by black people in engineering, procurement, and construction (EPC) contractors has been attained for projects that have reached financial closure. This is higher than 20% target. The

[8] Total project costs means the total capital expenditure to be incurred up to the commercial operations date in the design, construction, development, installation, and or commissioning of the project)

shareholding by black people in operating companies of IPPs has averaged 30% (against the targeted 20%) for the 85 projects in operation (i.e. in BW1–4).

The target for shareholding by black people in top management has been set at 40%, with an average 68% achieved to date. The target has therefore been significantly exceeded.

Community shareholding and community trusts

The regulations require a minimum ownership of 2.5% by local communities in IPP projects as a procurement condition. This is to ensure that a substantial portion of the investments has been structured and secured as local community equity. An individual community's dividends earned will depend on the terms of each transaction corresponding with the relevant equity share. To date all shareholding for local communities have been structured through the establishment of community trusts. For projects in BW1 to BW4, qualifying communities will receive R25.5 billion net income over the life of the projects (20 years). The report notes that the bulk of the money will however only start flowing into the communities from 2028 due to repayment obligations in the preceding years (repayment obligations are mostly to development funding institutions). However, despite the delay this represents a significant injection of capital into mainly rural areas of South Africa. If the net projected income for the first seven bid windows (BW1-BW4) was structured as equal payments overtime, it would represent an annual net income of R1.27 billion per year.

Income to all shareholders only commences with operation of the facility. Revenue generated to date by the 85 operational IPPs amounts to R149.9 billion.

Procurement spend

In addition to the financial investments into the economy and favourable equity structures aimed at supporting BEE, the REIPPPP also targets broader economic and socio-economic investment. This is through procurement spend and local content.

The total projected procurement spend for BW1 to BW4 during the construction phase was R71.1 billion, while the projected operations procurement spend over the 20 years operational life is estimated at 75.2 billion. The combined (construction and operations) procurement value is projected as R146.3 billion of which R92.1 billion has been spent to date. For construction, of the R71.1 billion already spent to date, R71 billion is from the 85 projects which have already been completed. These 85 projects had planned to spend R64.2 billion. The actual procurement construction costs have therefore exceeded the planned costs by 11% for completed projects.

Preferential procurement

The share of procurement that is sourced from Broad Based Black Economic Empowered (BBBEE) suppliers, Qualifying Small Enterprises (QSE), Exempted Micro Enterprises (EME) and women owned vendors are tracked against commitments and targeted percentages. The IA target requirement for BBBEE is 60% of total procurement spend. However, the actual share of procurement spend by IPPs from BBBEE suppliers for construction and operations combined is currently reported as 83%, which is significantly higher than the target of 60%, but also the 71% that had been committed by IPPs. BBBEE, as a share of procurement spend for projects in construction, is also reported as 84% with operations slightly lower at 74%.

The majority of the procurement spend to date has been for construction purposes. Of the R76 billion spent on procurement during construction, R64.3 billion has reportedly been procured from BBBEE suppliers, achieving 84.6% of total procured. Actual BBBEE spend during construction for BW1 and BW2 alone was R25.5 billion, 81% more than the 14.1 billion planned by the IPPs. The R64.3 billion spent on BBBEE during construction is 30% more than the R49.7 billion that had originally been anticipated by all IPPs procured in BW1-4.

Total procurement spend by IPPs from QSE and EMEs has amounted to R28.1 billion (construction and operations) to date, which exceeds commitments by 250% and is 30% of total procurement spend to date (while the required target is 10%). QSE and EME's procurement spend for construction was 31% of construction procurement to date and 26% of operational procurement, exceeding the 10% targets set. QSE and EME share of construction procurement spend totals R23.8 billion, which is 5.4 times the planned spend for construction of R4.4 billion during this procurement phase.

In terms of procurement from women-owned vendors to date, 5% of total construction procurement spend has been from woman-owned vendors (against a targeted 5%), and 6% of operational procurement spend has been realised from woman-owned vendors to date, thereby exceeding the targeted 5%. In terms of construction spend, R 4.1 billion was undertaken by women-owned vendors, which is almost double the R 1.8 billion expected to be spent for the construction of projects that have reached financial close.

The REIPPPP has therefore created significant employment opportunities for black South African citizens and local communities beyond planned targets. This highlights the importance of the programme in terms of employment equity and the creation of more equal societies.

Local Content[9]

The report notes that the REIPPP programme represents the country's most comprehensive strategy to date in achieving the transition to a greener economy. Local content minimum thresholds and targets were set higher for each subsequent bid window. The report notes that for a programme of this magnitude, with construction procurement spend alone estimated at R71.1 billion, the result is a substantial stimulus for establishing local manufacturing capacity. The local content strategy has created the required incentives for a number of international technology and component manufactures to establish local manufacturing facilities.

The documents notes that for the portfolio as a whole, the expectation would reasonably be for local content spend to fall between 25% and 65% of the total project value (considering the range of targets and minimum requirements). Local content commitments by IPPs amount to R66.3 billion or 45% of total project value (R148.2 billion for all bid windows).

Actual local content spend reported for IPPs that have started construction amounts to R63.3 billion against a corresponding project value (as realised to date) of R127.2 billion. This means that 50% of the project value has been locally procured, exceeding the 45% commitment from IPPs and the thresholds for BW1 – BW4 (25-45%).

To date, the R63.3 billion local content spend reported by active IPPs is already 96% of the R66 billion local content expected. This is with 6 projects still in construction, and 85 of the 91 active projects having reached COD (i.e. 93% of the active portfolio complete). For the 85 projects that have reached COD, local content spend has been R 58.72 billion of a committed R58.67 billion, which is 0.1 more than the planned local spend.

Leveraging employment opportunities

To date, a total of 63 291 job years[10] have been created for South African citizens, of which 48 110 job years were in construction and 15 182 in operations. These job years should rise further past the planned target as more projects enter the construction phase.

[9] Local content is expressed as a % of the total project value and not procurement or total project costs.

[10] The equivalent of a full-time employment opportunity for one person for one year

Employment opportunities across BW1-4 are 143% of the planned number during the construction phase (i.e. 33 707 job years), with 6 projects still in construction and employing people. The number of employment opportunities is therefore likely to continue to grow beyond the original expectations.

By the end of December 2021, 85 projects had successfully completed construction and moved into operation. These projects created 44 172 job years of employment, compared to the anticipated 30 488. This was 45% more than planned.

The report notes that employment thresholds and targets were consistently exceeded across the entire portfolio. The average share of South African citizens of total South Africa based employees for BW1 – BW4 was 91% during construction (against a target of 80%), while it was 96% during operations for BW1 – BW4 (against a target of 80%). The report notes that the construction phase offers a high number of opportunities over shorter durations, while the operations phase requires fewer people, but over an extended operating period.

To date, 48 110 job years for SA citizens were achieved during construction, which is 43% above the planned 33 707 job years for active projects. These job years are expected to rise further since 6 projects are still in construction.

In terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. For active projects, the expectation for local community participation was 13 284 job years. To date 25 272 job years have been realised (i.e. 90% more than initially planned), with 6 projects still in, or entering, construction. The number of black SA citizens employed during construction also exceeded the planned numbers by 74%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 44% and 48% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

The share of black citizens employed during construction (81%) and the early stages of operations (85%) has significantly exceeded the 50% target and the 30% minimum threshold. Likewise, the share of skilled black citizens (as a percentage of skilled employees) for both construction (71%) and operations (82%) has also exceeded the 30% target and minimum threshold of 18%. The share of local community members as a share of SA-based employees was 48% and 70% for construction and operations respectively – significantly exceeding the minimum threshold of 12% and the target of 20%.

Socio-economic development (SED) contributions

An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard, IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward SED initiatives. These contributions accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education, and skills development.

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2%, which is 101% higher than the minimum

threshold level. To date (across BW1-4) a total contribution of R22.8 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.1 billion. Of the total commitment, R18.5 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

As a percentage of revenue, SED obligations become effective only when operations commence, and revenue is generated. Of the 91 IPPs that have reached financial close (BW1–BW4), 85 are operational. The SED contributions associated with these 85 projects has amounted to R 1.8 billion to date.

In terms of ED and SED spend, education, social welfare, and health care initiatives have a SED focus. SED spend on education has been almost double the expenditure on enterprise development. This is despite enterprise development being a stand-alone commitment category in terms of the IA. This is, in part, due to the fact that some early childhood development programmes have also been incorporated in educational programmes. IPPs have supported 1 388 education institutions with a total of R437 million in contributions, from 2015 to the end of June 2021. A total of 1 276 bursaries, amounting to R210.8 million, have been awarded by 67 IPPs from 2015 until the end of June 2021. The largest portion of the bursaries were awarded to African and Coloured students (97.4%), with women and girls receiving 56.3% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 57.2%, followed by the Eastern Cape (20.2%) and Western Cape (14.1%). Enterprise development and social welfare are the focus areas that have received the second highest share of the contributions to date.

Enterprise development contributions

The target for IPPs to spend on enterprise development is 0.6% of revenues over the 20-year project operational life. However, for the current portfolio, IPPs have committed an average of 0.63% or 0.03% more than the target. Enterprise development contributions committed for BW1-4, amount to R7.2 billion. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R358 million per annum. 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.

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. A total contribution of R504.1 million has already been made to the local communities (i.e. 94%of the total R537.9 million enterprise development contributions made to date).

Contribution to cleaner energy and water savings

As part of the global commitment, South Africa is targeting an emissions trajectory that peaks at 34% below a "business as usual" case in 2020, 42% below in 2025 and from 2035 declines in absolute terms. The REIPPPP contributes constructively to economic stability, energy security and environmental sustainability.

The emission reductions for the programme during the preceding 12 months (June 2019-June 2020) is calculated as 15.1 million tonnes CO_2 ($MtonCO_2$) based on the 14 835 GWh energy that has been generated and supplied to the grid over this period. This represents 75% of the total projected annual emission reductions ($20.5MtonCO_2$) achieved with only partial operations. A total of 72.1 Mton CO_2 equivalent reduction has been realised from programme inception to date.

The March 2019 Report also notes that since operation, the IPPs have saved 42.8 million kilolitres of water related to fossil fuel power generation. This saving will have increased with the increase in energy generated by renewable energy since 2019. The REIPPPP

therefore contributes significantly towards meeting South Africa's GHG emission targets and, at the same time, supporting energy security, economic stability, and environmental sustainability.

ANNEXURE D

OVERVIEW OF THE STUDY AREA

ADMINISTRATIVE CONTEXT

The Hantam Municipality (HM) is one of six local municipalities that make up the Namakwa District Municipality (NDM) (Figure 1). The town of Clavinia is the administrative seat of the HM. The PV SEF is located in Ward 5 of the HM. The closest settlement to the PV SEF is Loriesfontein located ~ 25km to the south of the site.

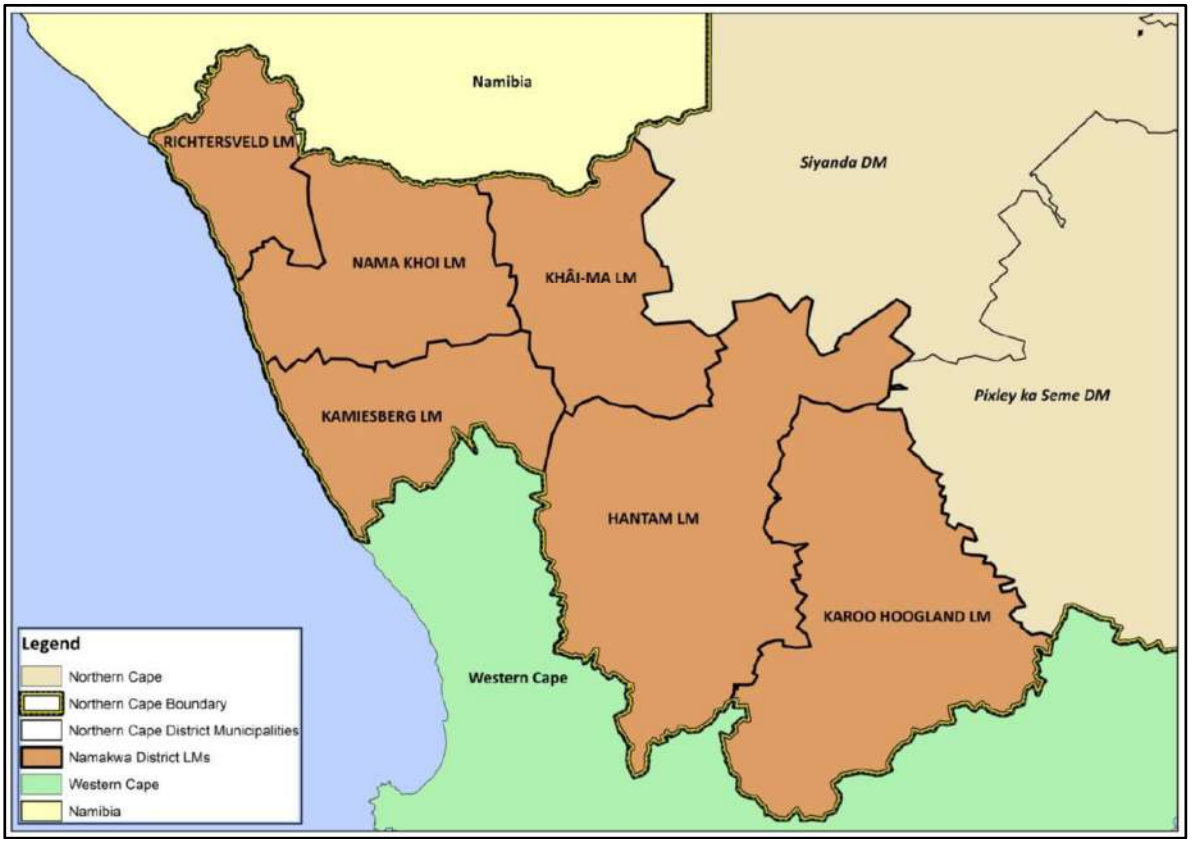


Figure 1: Local municipalities within Nama District Municipality

SOCIO-ECONOMIC OVERVIEW

Demographics

Population

The population in the HM in 2016 was 21 541. The number of households was 6 893, with an average household size of 3.1. The IDP (2021/22) indicates the population growth rate in HM municipality for the 2015—2020 period was a negative -0.4% with a marginal increase (0.16%) in the number of households over the same period. Overall, the Hantam municipal area is characterised by negative population growth and, thus, changing dynamics, i.e. the number of persons and the number of households has decreased since 2000 when the population was 22 405. The population in 2020 was estimated to be 21 083.

The population of Ward 5 in 2011 was 3 523. The total number of households was 1 196, with an average household size of 2.9.

Most of the population in the HM is Coloured (86%), followed by Whites (12.6%) and Black Africans (0.9%). The dominant language within the Municipality is Afrikaans (97.3%) (Household Community Survey, 2016). In terms of Ward 5, the majority of the population was also Coloured (83.2%), followed by Whites (14%) and Black Africans (2.2%). The dominant language was Afrikaans (92.3%) (Census 2011).

Based on the 2016 Household Community Survey 32.1% of the population of the HM were under the age of 18, 59% were 18 to 64 and the remaining 8.9% were 65 and older. Based on these figures the dependency ratio for the HM in 2016 was 69%. The 2011 figures for Ward 5 were 28.8% under the age of 18, 61.3% between 18 to 64 and the remaining 9.9% 65 and older. Based on these figures the dependency ratio for Ward 5 was 63%. The dependency ratio for the NDM and Northern Cape was 63% and 73% respectively.

The traditional approach to measuring the dependency ratio is to use figures of 0-14 years of age and 15-65, and 65 and over. However, it is likely to be more accurate given that the majority of the population under the age of 18 are or should be at school and are likely to be residing with their parents as opposed to working. 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. A high dependency ratio also reflects the limited employment opportunities in the area and represent a significant risk to the local and district municipality.

Households, house types and ownership

The number of households in the HM was 6 893 in 2016. There was a total of 1 196 (2011) households in Ward 5. Of these 94% were formal houses and 2.8% were shacks. The majority of dwellings in Ward 5 are therefore formal structures. In terms of ownership, 50.3% of houses were owned and fully paid off, 4.7% were owned, but not paid off, 14.4% were rented and 27.4% were occupied rent free. The high number of rent-free dwellings in Ward 5 is likely to be linked to farm workers residing on farms.

Approximately 42% of the households in Ward 5 were headed by women. The figure is higher than the district level (36.5%) provincial level (38.5%). Women headed households tend to be more vulnerable and reflect a lack of employment opportunities in the area, which result in the men leaving to seek employment in larger towns, such as Malmesbury, Cape Town and Saldanha Bay.

Household income

Based on the data from the 2011 Census, 6.9% of the population of the HM had no formal income, 2.6 % earned under R 4 800, 4.8% earned between R 5 000 and R 10 000 per annum, 21.1% between R 10 000 and 20 000 per annum and 24.7% between R 20 000 and R 40 000 per annum (Census 2011)[11]. The figures for Ward 5 were 8.8%, 2.6%, 5.9%, 24.3% and 24.8% respectively.

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 60% of the households in the HM and 66.4% in Ward 5 live close to or below the poverty line. The figure for the NDM is 58.1%.

[11] There is no data on household income from the 2016 Household Community Survey for the HM Ward 5.

The low-income levels reflect the limited formal employment opportunities in the area. 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 HM. This in turn impacts on the ability of the NM to maintain and provide services. The current (2022) percentage of households living on or below the poverty line is likely to be higher due to the impact of the COVID-19 pandemic.

Employment

The official unemployment rate in the HM in 2016 was 6%, with 45.6% falling within the not economically active group and 3.2% being classified as discouraged work seekers. The figures for Ward 5 (2011) were 3.5%, with 48.3% falling within the not economically active group and 1.3% being classified as discouraged work seekers. The unemployment rate was lower than the district (11.1%) and provincial (14.5%) rate. However, the current (2022) unemployment rates are likely to be higher due to the impact of the COVID-19 pandemic.

Education

The data from the 2016 Community Survey indicates that 9.9% of the population in the NM over 20 years of age had no education, 6.6% had a primary school level education and 29.8% had passed matric. 1.3% had achieved an undergraduate degree and 1.4% a postgraduate qualification. The matriculation figures are higher than the NDM (27.1%) and provincial figure (29.1%) (2016). However, the figures for no education are higher than the district (4.4%) and provincial figures (7.9%). This is likely to due to the rural nature of the HM and the challenges faced by farm workers children to access schools.

The figures for Ward 5 indicate that 17.3%% of the population had no education. This figure is significantly higher than the district (4.4%) and provincial level (7.9%). This is likely to due to the rural nature of Ward 5 and the challenges faced by farm workers children to access schools. The figures for the percentage of the population over the age of 20 with matric (19.2%) was also lower that the district figure (21.5%), but marginally lower than the provincial level (25.2%) (2011). Only 2.8% had achieved an undergraduate degree and 0.9% a postgraduate qualification (Table 1). The low percentage the population with an undergraduate and or postgraduate qualifications in Ward 5 is likely to have implications in terms of meeting local employment targets during the construction phase.

Table 1: Population by highest educational level

Column	Hantam Ward 5		Namakwa		Northern Cape	
None	17.3%	408	6.3%	4,794	11.1%	76,861
Other	0%	1	0.2%	184	0.3%	1,746
Some primary	21.7%	511	17.1%	12,928	16.8%	116,114
Primary	8.5%	200	9.7%	7,332	6.2%	43,111
Some secondary	25.3%	596	37.9%	28,744	34.2%	236,956
Grade 12 (Matric)	19.2%	452	21.5%	16,290	25.2%	174,210
Undergrad	2.8%	66	2.4%	1,825	2.7%	18,802
Post-grad	0.9%	20	1%	729	1.2%	8,254
N/A	4.3%	101	3.9%	2,946	2.4%	16,755

Source: Wazimap: 2011 Census

Municipal service levels

Access to water

Based on the 2016 Household Community Survey, 84.4% of households in the HM were supplied by the regional or local service provider. Based on the 2011 Census, 75.6% of households in Ward 5 were provided with water by a local or regional service provider while 18.6% relied on boreholes (Table 2). The high number of households that rely on boreholes reflects the rural nature of Ward 5.

Table 2: Population by water access

Column	Hantam Ward 5		Namakwa		Northern Cape	
Service provider	75.6%	2,665	85.2%	98,720	85.4%	978,825
Borehole	18.6%	656	8.2%	9,536	5.9%	67,242
N/A	1.8%	64	0.4%	437	0.2%	2,329
Tanker	1.2%	43	0.8%	877	2.1%	24,299
Other	2.7%	96	5.4%	6,272	6.4%	73,167

Source: Wazimap: 2011 Census

Sanitation

Based on the 2016 Household Community Survey, 91.1% of households in the HM had access to flush toilets, while 4.2% relied on pit toilets and 1.2% had no access to sanitation facilities. Based on 2011 Census, 51.4% of the households in Ward 5 had flush toilets, 33.1% relied on pit latrines with ventilation, and 7.1% had no access to sanitation facilities. The figures in terms of access to flush toilets are lower than the district and provincial figures (Table 3).

Table 3: Population by sanitation access

Column	Hantam Ward 5		Namakwa		Northern Cape	
Flush toilet	51.4%	618	70.8%	24,456	66.3%	207,095
Pit latrine with ventilation (VIP)	33.1%	398	15.2%	5,247	9%	27,988
None	7.1%	85	5.6%	1,940	8.2%	25,586
Bucket latrine	3.5%	42	1.4%	483	3.9%	12,170
Other	5%	60	7%	2,401	12.7%	39,686

Source: Wazimap: 2011 Census

Refuse collection

82.5% of the households in the HM had their waste collected by a service provider, while 13.6% relied on their own waste dump. 74.7% of the households in Ward 5 had their waste collected by a service provider on a regular basis, while 13.7% relied on their own dump. (Table 4). The high number of households that rely on their own waste dump both within the HM and Ward 5 reflects the rural nature of the area and the challenges associated with providing services over large distances.

Table 4: Population by refuse access

Column	Hantam Ward 5		Namakwa		Northern Cape	
Service provider (regularly)	74.7%	2,633	85.4%	98,900	67.4%	771,733
Own dump	13.7%	483	9%	10,418	21.7%	248,965
None	5.6%	196	1.7%	1,943	4.9%	56,171
Communal dump	2%	69	0.5%	556	1.4%	16,213
Other	4%	142	3.5%	4,025	4.6%	52,779

Source: Wazimap: 2011 Census

HEALTH CARE SERVICES

The HM IDP (2021/22) notes the number of health facilities in the municipal area has remained the same in recent years. The IDP indicates that the estimated that a threshold population of about 40 000 can be served by a primary health clinic. Table 5 lists the health care facilities in the municipal area, which include 2 Community Health Centres, 3 Clinics, and a small District Hospital.

Table 5: Health Care Facilities in the HM

Facility	2019
Community Health Centre	2
Clinic	3
District Hospital; Small District Hospital	1
Correctional Centre	2
EMS Station	4
EHS LG Service	1
EHS Prov Service	1
Mobile Service	2
Total (health facilities)	**16**

ECONOMIC OVERVIEW

The IDP indicates that the HM has a relatively small economy, making up about 12% of 2020 Gross Value Added (GVA) of the NDM, down from 13% in 2016. The primary sector contributed about 22% or R352 million in 2020 and the secondary sector 7.3% or R117 million in 2020. The table below provides a summary by subsector of the municipality's GDP in 5-year increments from 1995.9 Also included are percentage growth rates by subsector for two 5-year increments, i.e. 2010 -2015 and 2015-2020.
Of relevance the IDP notes that between 2015 and 2020 the electricity, gas and water subsector had the highest percentage growth rate of 76% due to the establishment of renewable energy generation facilities in the municipal area.

In summary, the economy in the HM is characterised by the following:

- It is a small-town sub-region with low levels of development despite the strategic location in terms of road and rail transport corridors.
- High rate of unemployment, poverty, and social grant dependence.
- Prone to significant environmental changes/shifts owing to long-term structural changes such as ***climate change*** — less rainfall, more droughts and an increase in extreme weather events — energy crises and other shifts.
- Geographic similarity in economic sectors, growth factors and settlement patterns.
- Economies of scale not easily achieved owing to the size of towns.

- A diverse road network with trunk, main and divisional roads of varying quality.
- ***Potential in renewable energy generation.***
- Largely a tertiary-sector based economy with agriculture as the only other notable subsector activity.

OVERVIEW OF LOCAL STUDY AREA AND LAND USES

The study area settlement pattern remains sparse, with permanent inhabitation limited. No new dwellings have been constructed on the site- or adjacent properties since 2012. The nearest dwellings are still located >5 km from the site. The relevant properties continue to be used for extensive grazing, mainly seasonal (summer) grazing. Very few dedicated permanent employment opportunities are associated with the study properties. Still no tourism receptors are located within any significant proximity to the site.

The only significant changes since 2012 are associated with renewable energy projects. These relate to actual and potential changes in land use (additional), visual changes (turbines and other infrastructure), and increased use of the Granaatboskolk public gravel road (which links the study area properties to Loeriesfontein), especially by heavy vehicle traffic during construction. With the exception of Bitterputs 187/RE located directly to the north of the site, all study properties are associated with operational, proposed, or potential REF projects (Table 6).

Table 6: Overview of site- and adjacent properties

OWNER	FARM	USE	COMMENT
Lindveld brothers	Aan die Karee Doorn Pan 213/2	2 x inhabited dwellings; Grazing; Loeriesfontein WEF	Loeriesfontein 3 PV site
	Aan die Karee Doorn Pan 213/2		Loeriesfontein WEF substation – feeds into Helios MTS
Lombard, Mr Gys	Aan die Karee Doorn Pan 213/RE	Grazing; No permanent inhabitation	Kokerboom 3 and 4 WEFs proposed on Lombard properties (2016 ff); Proposed to feed into Helios MTS
	Karee Doorn Pan 214/1		
Strauss, Mr Wynand	Bitterputs 187/RE	Permanent inhabitation; Grazing	No proposed or existing REF or Eskom infrastructure
Rona Rupert Trust	Sous 226/RE	Grazing; No permanent inhabitation; Khobab WEF	Feeds into Helios MTS; Helios MTS is located on 226/1 within 226/RE
Versfeld brothers	Buchu Fontein 184	Permanent inhabitation; Grazing	Property currently investigated for potential WEF (Charles Versfeld, pers. comm)

Two Wind Energy Facilities (WEFs) have been constructed on the site- and adjacent properties, namely Loeriesfontein WEF and Khobab WEF (Photographs 1, 2 and 3). The PV site is located on one (Aan de Doorn Pan 213/2) of the two properties (also Aan de Doorn Pan 213/1) constituting the Loeriesfontein Wind Energy Facility (WEF). The Khobab WEF is located adjacent to the south of the Loeriesfontein WEF on Sous 226/RE. Both WEFs consist of 61 turbines at around 150 m hub height. Both were commissioned in December 2017. Both projects feed into Helios MTS adjacent to the Granaatboskolk Rd south of the site via OHL 132 kV lines. As discussed below, two more REFs are envisaged to be constructed on near-adjacent properties by 2024.

Photograph 1: Loeriesfontein WEF under construction, seen from, the Granaatboskolk gravel road, December 2016.

Photograph 2: Khobab WEF substation under construction, seen from, the Granaatboskolk gravel road, December 2016.

Photograph 3: The Granaatboskolk gravel road seen during the construction of Khobab WEF, December 2016.

OTHER REFS

The project is not located within a Renewable Energy Development Zone. Nevertheless, the DFF&E's renewable energy website indicates that a significant number of REFs have been proposed or are proposed within a 35 km range of the site (Figure 2). Historic proposals are located to the west, south and east of the site, but properties to the north are now also being investigated for potential proposals (not yet indicated on Figure 2).

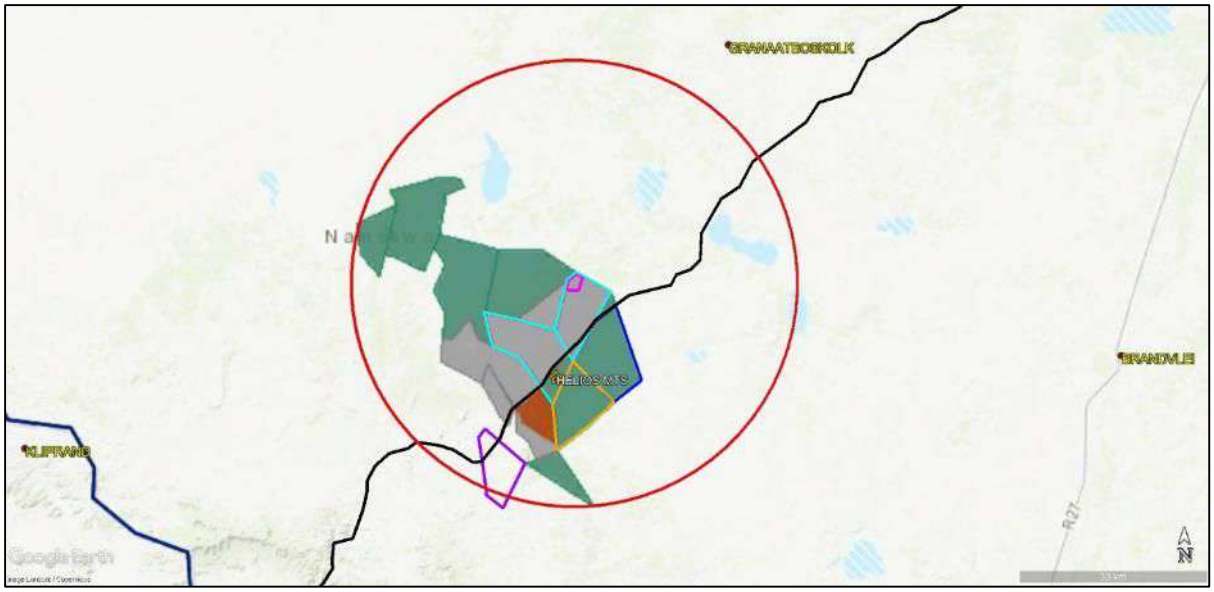


Figure 2: Loeriesfontein 3 PV site (pink outline) in relation to other REFs located within a 35 km radius (red circle) of the centre of the site. Also indicated are the operational Khobab and Loeriefontein WEFs (light blue outlines), the Solar Capital Orange PV currently under construction (orange), the soon to be constructed Dwarsrug WEF (dark blue), and the currently proposed Lesaka PVs (purple) (Source: https://egis.environment.gov.za/renewable_energy)**.**

As indicated, two operational WEFs are located in significant proximity to the site. In addition, a third WEF is slated for construction in 2023-4, while a PV SEF is currently under construction in the immediate study area. The Dwarsrug WEF adjacent to the north-east of the Loeriesfontein WEF, received preferred bidder status in Round 5, and is envisaged for construction by April 2024. South-East of the Loeriesfontein WEF, construction has recently commenced on Solar Capital's Orange (= Hantam 3 = Loeriesfontein Project 3) PV project on Narossies 228, ~ 8 km east of Helios MTS.