SOCIAL ASSESSMENT

BASELINE SCOPING REPORT

RPM SOLAR PV FACILITY

NORTH WEST PROVINCE

APRIL 2022

Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Savannah Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed 80 MW RPM PV Solar Energy Facility (SEF) located approximately 6 km east of the town of Rustenburg in the North West Province. The project site is situated within the Rustenburg Local Municipality (RLM). Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process. This report contains the findings of the Scoping Level SIA for the proposed PV SEF.

SUMMARY OF KEY FINDINGS

KEY FINDINGS

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

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

The findings of the Social Baseline Scoping Report are based on a review of relevant documents and the authors experience with undertaking SIAs for a number of renewable energy projects throughout South Africa. The issues will be confirmed and assessed during the Assessment Phase of the EIA process.

POLICY AND PLANNING ISSUES

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The PKSDM SDF and IDP and ULM IDP also support the development of renewable energy. The development of the proposed SEF is therefore supported by key policy and planning documents.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

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

Potential negative impacts
- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.

- Increased safety and security risks to local communities associated with the construction related activities and presence of construction workers on the site.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.

OPERATIONAL PHASE

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

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

Potential negative impacts
- Potential visual impacts and associated impacts on sense of place.

CUMULATIVE IMPACTS

The cumulative impacts include:

- Cumulative impact on sense of place.
- Cumulative impact on local services and accommodation.
- Cumulative impact on local economy.

NO-DEVELOPMENT OPTION

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

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

ACRONYMS

DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
HD	Historically Disadvantaged
EIA	Environmental Impact Assessment
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
NWP	North West Province
NWPPGDS	North West Province Provincial Growth and Development Strategy
MW	Megawatt
PGDS	Provincial Growth and Development Strategy
RLM	Rustenburg Local Municipality
SDF	Spatial Development Framework
SEF	Solar Energy Facility
SIA	Social Impact Assessment

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Savannah Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed 80 MW RPM PV Solar Energy Facility (SEF) located approximately 6 km east of the town of Rustenburg in the North West Province. The project site is situated within the Rustenburg Local Municipality (RLM) (Figure 1.1).

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process. This report contains the findings of the Scoping Level SIA for the proposed PV SEF.

Figure 1.1: Location of RPM PV Solar Energy Facility (red arrow)

1.2 TERMS OF REFERENCE

The terms of reference for the Scoping Level SIA require:

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

The impacts and associated significance ratings will be confirmed during the Assessment Phase.

1.3 PROJECT DESCRIPTION

SRPM Solar (Pty) Ltd is proposing the development of the 80 MW RPM Photovoltaic (PV) Solar Energy Facility (SEF) and associated infrastructure on Remaining portions 5, 8, 14, 16, 19, and 45 of Farm Waterval No. 303. The development footprint is approximately 265ha. The project is in support of the Paris Agreement and the United Nations Sustainable Development Goals. In this regard Sibanye-Stillwater has set a goal to achieve net-zero emissions by 2040. This goal is underpinned by the company's energy and decarbonisation strategy and associated intervention. Coal-based electricity contributes to 88% of the company's Scope 1 and 2 carbon emissions. Replacement of this electricity with renewable alternatives thus forms our primary decarbonisation level. By 2030, Sibanye-Stillwater aims to have a minimum of 20% of electricity requirements provided from renewable energy sources. On this basis, it is understood that three on-site PV plants are to be developed at the SA PGM operations as part of Sibanye-Stillwater's strategy to address its Energy and Decarbonisation goals.

The project will make use of single axis tracking PV technology (Photograph 1.1). Monofacial or bifacial panels are both considered. The project will comprise which once installed, will stand approximately 3.5m above ground level. The solar panels will include centralised inverter stations with mega volt (MV) distribution transformers located internally. The onsite infrastructure will include:

- Solar PV array comprising of PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the project components.
- On-site facility substation to facilitate the connection between the solar PV facility and Eskom electricity grid.
- Combined gatehouse, site offices and storage facilities.
- Battery Energy Storage Facilities.
- Temporary laydown areas.
- Access roads, internal roads and fencing around the development area.

Photograph 1.1: Typical PV SEF facility

1.4 APPROACH TO STUDY

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

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

In this regard the study involved:

- Review of socio-economic data for the study area.
- Review of relevant planning and policy frameworks for the area.

- Review of information from similar studies, including the SIAs undertaken for other renewable energy projects.
- Identification and assessment of the social issues associated with the proposed project.

A site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with interested and affected parties. Annexure A contains a list of the secondary information reviewed. Annexure B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.5 ASSUMPTIONS AND LIMITATIONS

1.5.1 Assumptions

Identification of social issues
As indicated above, a site visit will be undertaken during the Assessment Phase of the SIA. The identification of social issues is based on the authors experience with undertaking in the region of 130 SIAs for solar and wind energy facilities and the associated infrastructure (substations, transmission lines, roads etc.). Based on this the author is confident that the majority of social issues have been identified.

Technical suitability
It is assumed that the development site represents a technically suitable site for the establishment of the proposed PV SEF and associated infrastructure.

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

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

1.5.2 Limitations

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

Site visit
A site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with interested and affected parties. However, as indicted above, the author is confident that the majority of social issues have been identified.

1.6 SPECIALIST DETAILS

Tony Barbour is an independent specialist with 26 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 300 SIAs and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. Annexure C contains a copy of CV for Tony Barbour.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour, the specialist consultant responsible for undertaking the study and preparing the Scoping Level SIA Report, is independent and does not have a vested or financial interest in the proposed development being either approved or rejected. Annexure D contains a copy of signed declaration of independence.

1.8 REPORT STUCTURE

The report is divided into four sections, namely:

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

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values, and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing, and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the "policy and planning fit[1]" of the proposed development therefore constitutes a key aspect of the Social Impact Assessment (SIA). In this regard, assessment of "planning fit" conforms to international best practice for conducting SIAs.

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of meeting the objectives of the SIA the following policy and planning documents were reviewed:

- 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 Energy Plan (2016).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- National Development Plan (2011).
- New Growth Path Framework.
- National Infrastructure Plan.
- North West Provincial Growth and Development Strategy (2004-2014)
- North West Provincial Renewable Energy Strategy (2012).
- Rustenburg Municipality Spatial Development Framework-Draft (2018).
- Rustenburg Municipality Integrated Development Plan (2021/22).

The section also provides a review of the renewable energy sector in South Africa.

2.2 NATIONAL POLICY ENVIRONMENT

2.2.1 National Energy Act (Act No 34 of 2008)

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

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

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

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

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

"Government policy is based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential".

"Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future".

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

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

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

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

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

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

Disadvantages include:

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

2.2.3 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[2], 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.

2.2.4 Integrated Energy Plan (2016)

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

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

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.

[2] 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).

- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

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

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

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

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

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of renewable energy, the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special focused programmes to promote further development in the technology, as well as solar roll-out programmes, should be pursued.

In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.

By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across

all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs.

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

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

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

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

The IEP notes that a diversified energy mix with a reduced reliance on a single or a few primary energy sources should be pursued. In terms of renewable energy, wind and solar are identified as the key options.

Wind

Wind energy should continue to play a role in the generation of electricity. Allocations to ensure the development of wind energy projects aligned with the IRP2010 should continue to be pursued.

Solar

- Solar should play a much more significant role in the electricity generation mix than it has done historically and constitutes the greatest share of primary energy (in terms of total installed capacity) by 2050. The contribution of solar in the energy mix comprises both CSP and solar PV.
- Investments should be made to upgrade the grid in order to accommodate increasing solar and other renewable energy contributions.

With reference to the Renewable Energy Independent Power Producer (REIPP) Procurement Programme, the IEP notes:

- The REIPP Procurement Programme should be extended, and new capacity should be allocated through additional bidding windows in order ensure the ongoing deployment of renewable energy technologies.
- Experience and insights gained from the current procurement process should be used to streamline and simplify the process.
- The implementation of REIPP projects in subsequent cycles of the programme should be aligned with the spatial priorities of provincial and local government

structures in the regions that are selected for implementation, in line with the Spatial Development Frameworks. This will ensure that there is long-term, sustainable infrastructure investment in the areas where REIPP projects are located. Such infrastructure includes bulk infrastructure and associated social infrastructure (e.g., education and health systems). This alignment will further assist in supporting the sustainable development objectives of provincial and local government by benefiting local communities.

The IEP indicates that Renewable Energy Development Zones (REDZs) have been identified and describe geographical areas:

- In which clusters (several projects) of wind and solar PV development will have the lowest negative impact on the environment while yielding the highest possible social and economic benefit to the country.
- That are widely agreed to have strategic importance for wind and solar PV development.
- Where the environmental and other authorisation processes have been aligned and streamlined based on scoping level pre-assessments and clear development requirements.
- Where proactive and socialised investment can be made to provide time-efficient infrastructure access.

The proposed site is not located within an REDZ.

2.2.5 Integrated Resource Plan

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

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

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

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

- 1 500MW of coal.
- 2 500MW of hydro.
- 6 000MW of solar PV.
- 14 400MW of wind.
- 1 860MW of nuclear.
- 2 088MW for storage.
- 3 000MW of gas/diesel.
- 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	

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

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

Figure 2.1: Summary of energy allocations and commitments

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

In terms of renewable energy four bidding rounds have been completed for renewable energy projects under the RE IPP Procurement Programme. The most dominant technology in the IRP2019 is renewable energy from wind and solar PV technologies, with wind being identified as the stronger of the two technologies. There is a consistent annual allocation of 1 600MW for wind technology commencing in the year 2022 up to 2030. The solar PV allocation of 1 000MWs per year is incremental over the period up to 2030, with no allocation in the years 2024 (being the year the Koeberg nuclear

extension is expected to be commissioned) and the years 2026 and 2027 (presumably since 2 000MW of gas is expected in the year 2027). The IRP 2019 states that although there are annual build limits, in the long run such limits will be reviewed to take into account demand and supply requirements.

2.2.6 National Development Plan

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

2.2.7 The New Growth Path Framework

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

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

2.2.8 National Infrastructure Plan

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

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

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

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

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

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

SIP 9: Electricity generation to support socio-economic development

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

SIP 10: Electricity transmission and distribution for all

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

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 North West Provincial Growth and Development Strategy[3]

The NWP Provincial Growth and Development Strategy (PGDS) was drafted in 2004 and aims to provide a framework for the 10-year period up to 2014. The PGDS is aligned with amongst others, the United Nations endorsed Millennium Development Goals and Objectives 2015, and the 2003 National Spatial Perspective. The PGDS largely relies on Census 2001 for demographic and other statistical data and is therefore dated. An up-dated version does not appear to be available.

The PGDS notes that the NWP is a medium-size province, covering ~10% of the total national surface area, accounting for ~ 8% of the national population, and contributing ~ 7% to the national economy. Except for the mining sector (~23.5% of provincial GDP in 2002), private sector activity in the NWP is very modest. Other development challenges include low population densities (largely rural province); inadequate infrastructure, and enormous service delivery backlogs; a predominantly poor population with high levels of illiteracy and dependency; great inequalities between rich and poor, and disparities between urban and rural; and the HIV/Aids pandemic.

Both the primary immediate and long term objectives of the PGDS are therefore to address poverty and unemployment, while simultaneously improving the low level of expertise and skills.

The following cross-supporting economic development pillars support the NWP's economic growth and development strategy up to 2014:

- Growth and Investment.
- Agricultural and Rural Development.

[3] The Provincial Growth and Development Strategy (2004-2014) and Renewable Energy Strategy (2012) are both dated. However, it would appear that these documents have not been updated.

- Mining and Energy.
- Manufacturing.
- Tourism.
- Construction and Infrastructure.
- SMMEs.
- Training and Skills Development.

The mining and energy pillar focuses mainly on beneficiation, Mining Charter compliance, small-scale mining opportunities and addressing mine decommissioning impacts. Renewable energy and solar energy facilities are not addressed under this pillar or within the PGDS. In terms of the tourism pillar, the PGDS notes that the province faces a host of challenges, including infrastructural and transport connectivity. According to the PGDS, provincial government's objectives are to diversify its tourism industry through promoting cultural tourism and the entertainment and hospitality industries, to build human capital amongst tour operators, and to promote heritage sites as international tourism destinations. Sectoral growth targets, aimed at directing investment in the NWP while fostering employment creation, are outlined in the PGDS. The Transport and communication sector (seen as key to unlocking other sectors) is specifically singled out for growth. Deliberate provision is made for a more diversified future economy, in which tourism and manufacturing would play an increasingly important role.

SMME development is identified as key vehicle for meeting the dual challenges of growth and equitability, with an envisaged added potential for job creation, albeit currently often in the informal sector. The PGDS envisages that 60-80% of all future economic activities in provincial agriculture, mining, manufacturing, trade, and tourism should be SMME focused, but indicates that policy would ultimately be aligned with evolving national policy.

Skills development and training are identified as key enabling factors for labour market access. It is envisaged that skills development should constitute part of a broader, integrated effort at promoting job creation, and that the focus should be on growing skills and vocational training, mainly in the services and financial sectors. Companies would be encouraged to promote employee development through on-the-job learning and learner ships. The development of a focused Adult Basic Education and Training (ABET) strategy is envisaged to address high illiteracy levels, and to facilitate further education and training (FET).

2.3.2 North West Provincial Renewable Energy Strategy

The Renewable Energy Strategy (RES) (2012) notes that the North West Province is the fourth largest electricity consuming province in South Africa (12%). The bulk of electricity is currently obtained from conventional coal-fired plants in Mpumalanga. Approximately 63% of the electricity supplied to the NWP is consumed in its mining sector. Many rural communities within the NWP are affected by energy poverty – a legacy of historic neglect and underdevelopment – and make use of wood fuel, with impacts on the environment and health. At the same time, the emerging renewables sector holds potential for employment creation, green manufacturing, and commercial energy generation (linked to the IPP). The key objectives of the RES are therefore to:

- Reduce the North West Province's contribution to climate change;
- alleviate energy poverty; and
- Promote economic development and job creation in the province by developing a green economy.

Various renewable energy source options were investigated in the RES. Solar (photovoltaic as well as solar water heaters), Municipal Solid Waste, hydrogen and fuel cell technologies, biomass, and energy efficiency were identified as sub-sectors/ sources which hold the greatest competitive potential in the NWP.

With regard to solar, the RES notes that the NWP has a very good potential with daily average solar radiation rates of greater than 8 000 MJ/m^2. Only the Northern Cape Province (NCP) receives more radiation than the NWP.

During the status quo assessment no barriers to the generation and use of solar PV systems within the NWP were identified, except for the only slightly lower levels of solar irradiation levels compared to the NCP and parts of Limpopo. The RES notes that this could potentially be offset by sufficient economies of scale. The NWP has sufficient land area available, and the electricity grid infrastructure is good in the areas of high economic activity and in the proximity of the numerous mines and related large industries concentrated in certain areas of the NWP. The infrastructure in the NWP is also generally good in the same areas. This implies that, although the NWP is not a preferred destination for Solar PV projects, it can be made one if some of the general barriers are removed for project developers by the Province.

Based on the above, for following key actions are proposed for the NWP with regard to Solar PV:

- Identify a suitable entity linked to the NWPG to drive the opportunities associated with solar PV projects under the RE IPP.
- The NWP should initiate a project as part of the implementation plan to identify suitable areas within the NWP which complies with the following requirements:
  - Suitable and proven measured levels of solar irradiation.
  - Long-term lease or option agreements possible.
  - Good grid infrastructure in close proximity.
  - Suitable connection point into the electricity grid.
  - Low impact on agriculture and environment.
  - Suitable access to and around site for effective execution.
  - In close proximity to communities that could benefit from local economic development and job creation.
- The NWPG should also explore the possibility of packaging the most suitable and viable land areas for solar PV project developers to attract them to the NWP.
- The NWP should focus on developing the local content of components for the PV industry.

2.3.3 Rustenburg Municipality Spatial Development Framework

The Draft SDF (2018) notes that the development of the of the urban landscape has also been driven by the development of the municipality's mobility routes linking the North-West province with Gauteng province. Development within the municipality has grown along the N4 transit corridor. The development of the mining industry within the municipality has also played a key role in terms of the evolution of the spatial development patterns. In this regard the development of Rustenburg over the past 20 – 25 years is closely linked with the development of platinum mining in the region. The RLM benefitted significantly from the increase in platinum output between 1994 and 2009, which grew by 67%. This resulted in Rustenburg having the third fastest growing economy of metropolitan cities in South Africa prior to 2012, outperformed only by Johannesburg and Ekurhuleni (Euconomix, 2016).

Section 4, spatial proposals, outlines the land use proposals for the RLM. Mining related land uses are of relevance to the proposed development. The SDF notes that mining in the RLM predominantly occurs in a belt which runs north of and parallel to the Magaliesberg and extends from Pilanesberg in the north, past Rustenburg towards Marikana. These mining activities are not only the corner stone of the local economy of Rustenburg, but also largely within the North West Province.

The SDF notes that it is important that the necessary infrastructure is created and maintained to ensure the continued optimal operation of these mining activities. This would include energy related infrastructure, such as the proposed solar energy facilities. The SDF also notes that mining activities and infrastructure can have a significant impact on the current and future spatial structure of the urban area through the physical constraints it poses. These negative potential interactions between the mining activities and proposed future urban development should therefore be minimised as far as possible.

Figure 2.2 provides a spatial representation of the potential development opportunities within the RLM. The proposed development is located within Development Zone III (Mining). The area is also identified as Potential Mining in terms of the Environmental Management Zones listed in the RLM Environmental Management Framework (EMF) (Figure 2.3). The establishment of the proposed SEF is therefore compatible with the land use proposals reflected in the SDF and EMF.

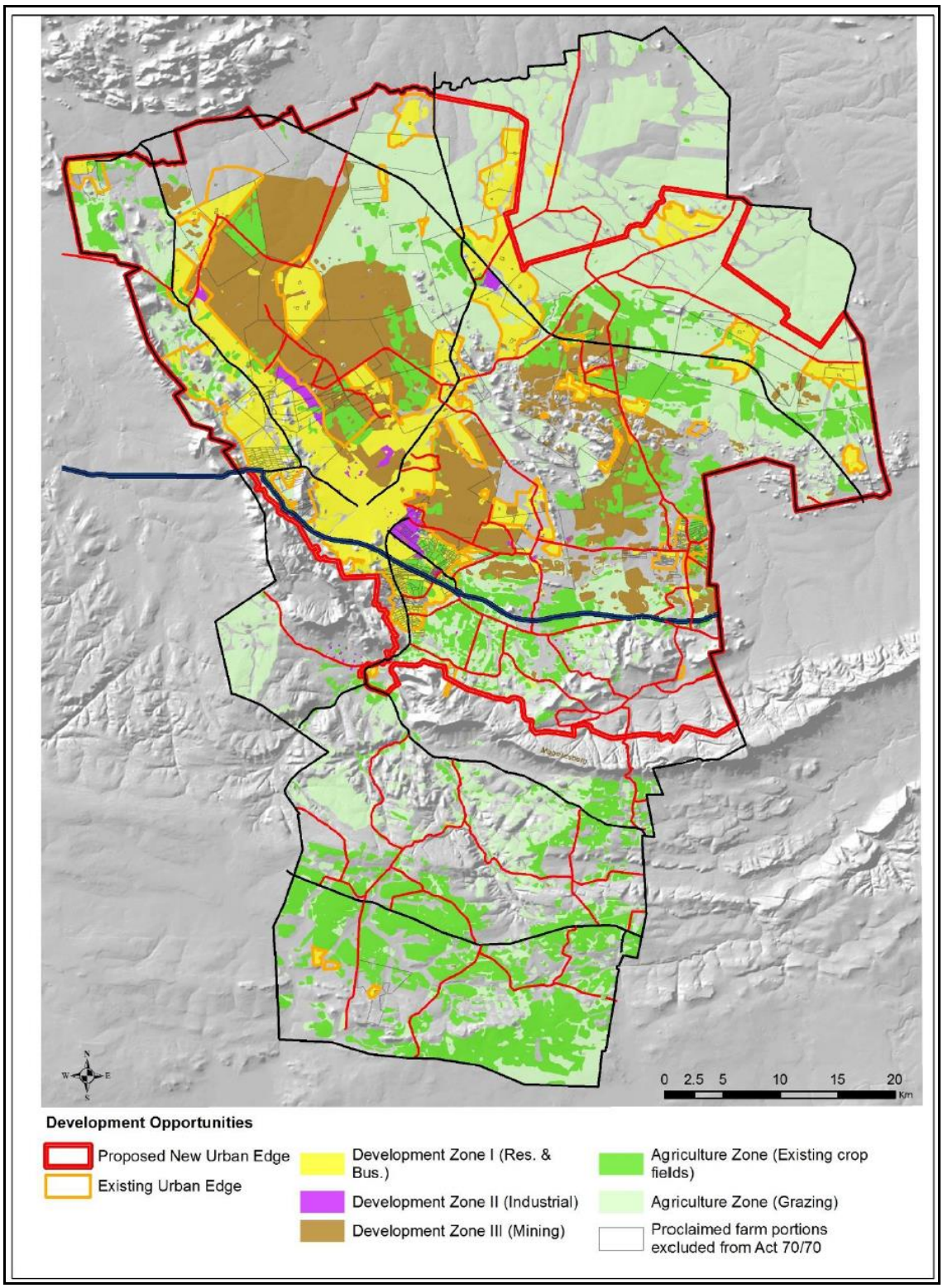


Figure 2.2: Development Zones within the RLM

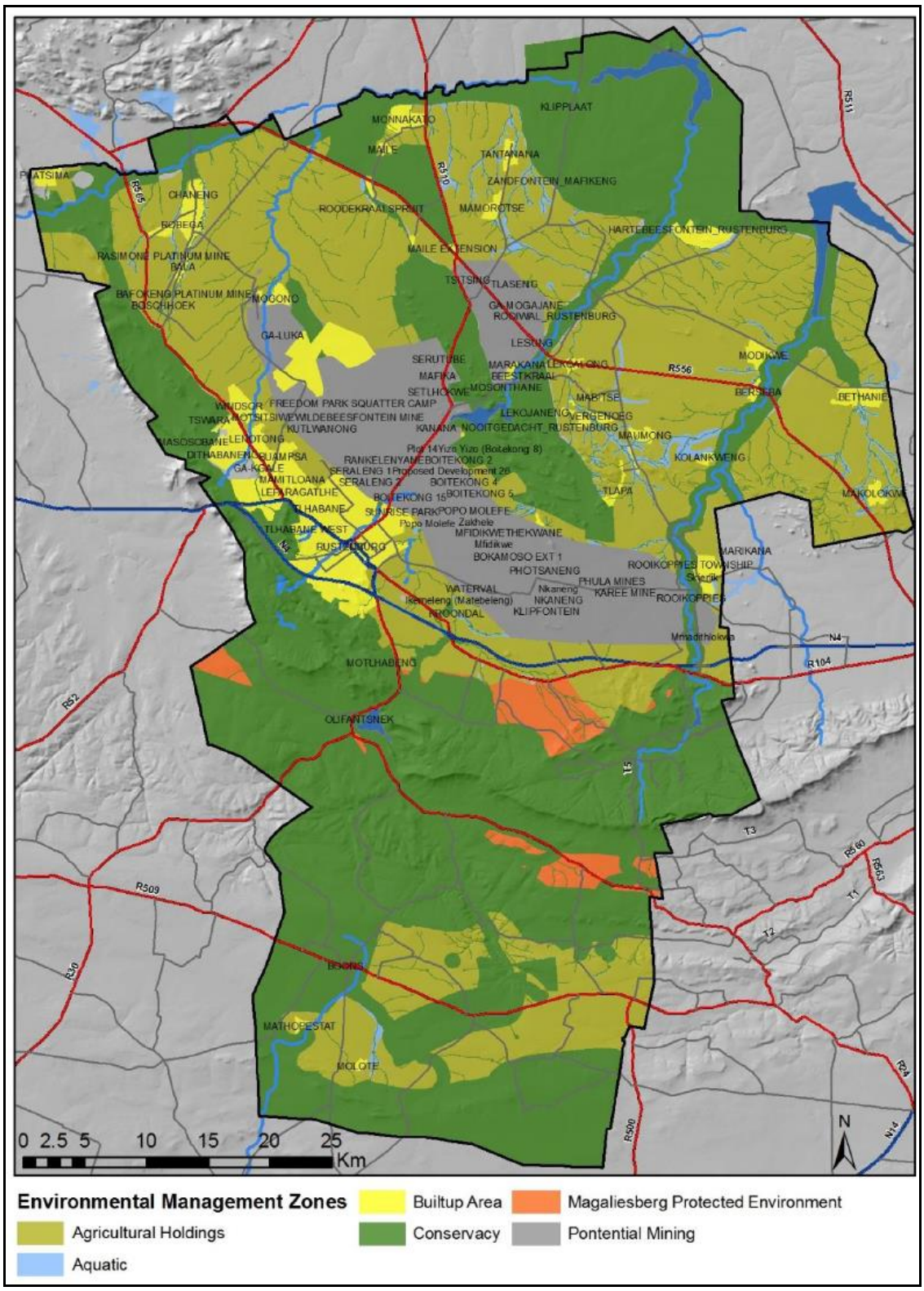


Figure 2.3: Environmental Management Zones within the RLM (Source: RLM EMF)

2.3.4 Rustenburg Municipality Integrated Development Plan

The vision for the RLM is "A world class city where all communities enjoy a high quality of life and diversity". The mission statement associated with the vision is "To continuously improve the quality of life. Economic growth and eradicate poverty through best practice, sustainability and inclusive governance".

The IDP lists seven strategic priorities, namely:

- Ensure a sustainable municipal financial viability and management.
- Efficient provision of quality basic services and Infrastructure within a well-planned spatial structure.
- Drive diversified economic growth and job creation.
- Maintain, a clean, green, safe, and healthy environment for all.
- Transform and maintain vibrant and sustainable rural development.
- Uphold good governance and public participation principles.
- Drive optimal municipal institutional development, transformation, and capacity building.

Diversified growth, job creation and the promotion of clean and green environment are of specific relevance to the proposed development. The strategic priorities are underpinned by eleven municipal goals, of which the following are relevant to the proposed development:

- Goal 3: A well designed, habitable, clean, and green city
- Goal 5: A new post mining world city.
- Goal 6: A smart prosperous city.
- Goal 7: A vibrant, creative, and innovative city.
- Goal 11: City of sustainable and efficient resource management.

The IDP also identifies five strategic local economic development goals. The following are relevant to the proposed development:

- An enabling and conducive business environment to enhance RLM competitiveness as a destination of choice for tourism, investment, and trade.
- Accelerated and shared economic growth through skills development and enterprise development to promote an entrepreneurial culture that will contribute towards improving the livelihoods of the RLM communities.

Section 3.3.4.3, Greenhouse gasses and climate change, refers to the risks posed to the RLM by climate change. The initiatives identified to address the risks that are relevant to the development include:

- Decarbonization of Electricity –transition from coal powered electricity to renewable energy.
- Dercabonization of Economy-transition to Green Economy projects (LED).

A SWOT analysis was undertaken as part of the IDP process. The following are relevant:

Strengths

- Mining Town

Weaknesses

- Limited access to strategically located land

- High rate of losses in water and electricity

Opportunities
Opportunities for green energy/alternative sources
- Municipality strategically located along the N4 corridor
- Potential for agricultural, tourism and mining related sectors.

Threats
- Declining mining economy
- Ageing and failing Infrastructure.
- Low levels of skills and education.
- High dependency rate (Growing indigent register)
- Undiversified economy
- High unemployment rate
- Low level of household income
- Influx of migrant workers
- Vandalism and theft from infrastructure network

2.4 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. Given that South Africa supports the development of renewable energy at national level, the intention is not to provide a critical review of renewable energy. The focus is therefore on the contribution of renewable energy, specifically in terms of supporting economic development.

The following documents were reviewed:

- Independent Power Producers Procurement Programme (IPPPP): An Overview (June 2020), Department of Energy, National Treasury and DBSA.
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS.
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.
- WWF SA, Renewable Energy Vision 2030, South Africa, 2014.
- Jacqueline M. Borel-Saladin, Ivan N. Turok, (2013). The impact of the green economy on jobs in South Africa), South African Journal of Science, *Volume 109 /Number 9/10, September/October 2013.*
- The potential for local community benefits from wind farms in South Africa, Louise Tait (2012), Master's Thesis, Energy Research Centre University of Cape Town.

2.4.1 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 June 2020. 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.

Energy supply
By the end of June 2020, the REIPPPP had made the following significant impacts.

- 6 422MW of electricity had been procured from 112 RE Independent Power Producers (IPPs) in seven bid rounds.
- 4 276 MW of electricity generation capacity from 68 IPP projects has been connected to the national grid.
- 49 461GWh 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 68 projects that have reached COD, 64 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 64 projects is 11 079GWh, which is 93% of their annual energy contribution projections (P50) of 11 882GWh over a 12-month delivery period. Twenty-eight (24) of the 64 projects (38%) have individually exceeded their P50 projections.

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 the lowest tariffs in the world. The price for wind power has dropped by 50% to R0.91/kWh, 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[4]), including interest during construction, of projects under construction and projects in the process of closure is R209.7 billion (this includes total debt and equity of R209.2 billion, as well as early revenue and VAT facility of R0.5 billion).

The REIPPPP has attracted R41.8 billion in foreign investment and financing in the seven bid windows (BW1 – BW4, 1S2 and 2S2). 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

[4] 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)

window (2S2), suggesting that the REIPPPP continued to generate investor confidence despite the poor economic conditions in South Africa in recent years.

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. In terms of local equity shareholding, 52% (R31.5 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 R29.5 billion and contributes 48% of total equity.

The REIPPPP also contributes to Broad Based Black Economic Empowerment and the creation of black industrialists. In this regard, Black South Africans own, on average, 33% of projects that have reached financial close (BW1-BW4), which is 3% 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 shareholding by black people in operating companies of IPPs has averaged 24% (against the targeted 20%) for the 68 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 67% 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, 1S2 and 2S2, qualifying communities will receive R26.9 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, 1S2 and 2S2) was structured as equal payments overtime, it would represent an annual net income of R1.34 billion per year.

Income to all shareholders only commences with operation of the facility. Revenue generated to date by the 68 operational IPPs amounts to R105 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, 1S2 and 2S2 during the construction phase was R73.1 billion, while the projected operations procurement spend over the 20 years operational life is estimated at 76.8 billion. The combined (construction and operations) procurement value is projected as R149.9 billion of which R81 billion has been spent to date. For construction, of the R70.2 billion already spent to date, R57.7 billion is from the 68 projects which have already been completed. These 68 projects had planned to spend R52.9 billion. The actual procurement construction costs have therefore exceeded the planned costs by 9% 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%. However, these figures have not been verified and the report notes that they are reported with caution.

The majority of the procurement spend to date has been for construction purposes. Of the R70.2 billion spent on procurement during construction, R59 billion has reportedly been procured from BBBEE suppliers, achieving 87% 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 R59 billion spent on BBBEE during construction is 15% more than the R51.1 billion that had originally been anticipated by all IPPs procured.

Total procurement spend by IPPs from QSE and EMEs has amounted to R24.7 billion (construction and operations) to date, which exceeds commitments by 96% and is 30% of total procurement spend to date (while the required target is 10%). QSE and EME's procurement spend for construction was R 22 billion, which is 4.4 times the targeted spend for construction of R4.9 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 3.2 billion was undertaken by women-owned vendors, which is almost double the R 1.9 billion estimated 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[5]

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

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

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 R73.1 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 R67.6 billion or 45% of total project value (R151.1billion for all bid windows).

Actual local content spend reported for IPPs that have started construction amounts to R57.6 billion against a corresponding project value (as realised to date) of R114 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 R57.6 billion local content spend reported by active IPPs is already 87% of the R66billion local content expected. This is with23 projects still in construction, and 68 of the 91active projects having reached COD (i.e. 75% of the active portfolio complete). For the 68 projects that have reached COD, local content spend has been R 46.96 billion of a committed R46.55 billion, which is 0.9 more than the planned local spend.

Leveraging employment opportunities

To date, a total of 52 603 job years[6] have been created for South African citizens, of which 42 355 job years were in construction and 10 248 in operations. These job years should rise further past the planned target as more projects enter the construction phase. Employment opportunities across all five active bid windows are 126% of the planned number during the construction phase (i.e. 33 707 job years), with 23 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 June 2020, 68 projects had successfully completed construction and moved into operation. These projects created 33 449 job years of employment, compared to the anticipated 23 619. This was 42% 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 91% 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, 42 355 job years for SA citizens were achieved during construction, which is 26% above the planned 33 707 job years for active projects. These job years are expected to rise further since 23BW4 projects are still in or entering, construction.

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

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 22 935 job years have been realised (i.e. 73% more than initially planned), with 23 projects still in, or entering, construction. The number of black SA citizens employed during construction also exceeded the planned numbers by 53%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 43% and 49% 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 (84%) 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 (69%) and operations (80%) 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 49% and 68% for construction and operations respectively – 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 2.2%, which is 125% higher than the minimum threshold level. To date (across seven bid windows) a total contribution of R23.1 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.2 billion. Of the total commitment, R18.8 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–BW41), 68 are operational. The SED contributions associated with these 68 projects has amounted to R 1.2 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 1 123 education institutions with a total of R312

million in contributions, from 2015 to the end of June 2020. A total of 1 142 bursaries, amounting to R183.8 million, have been awarded by 55 IPPs from 2015 until the end of June 2020. The largest portion of the bursaries were awarded to African and Coloured students (97%), with women and girls receiving 56% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 61%, followed by the Eastern Cape (18%) and Western Cape (14%). 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 to BW4, 1S2 and 2S2 amount to R7.2 billion. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 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. Up until the end of June 2020 a total of R 384.2 million had already been made to the local communities located in the vicinity of the 68 operating IPPs. This represents 93% of the total R384.2 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. These commitments are incorporated into the National Development Plan in Outcome 10 and sub-utcome3. 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 11.5 million tonnes CO2 (MtonCO2) based on the 1 1313 GWh energy that has been generated and supplied to the grid over this period. This represents 56% of the total projected annual emission reductions (20.5MtonCO2) achieved with only partial operations. A total of 50.2 Mton CO2 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.

2.4.2 Green Jobs Study

The study notes that South Africa has one of the most carbon-intensive economies in the world, therefore making the greening of the electricity mix a national imperative. Within this context the study notes that the green economy could be an extremely important trigger and lever for enhancing a country's growth potential and redirecting its development trajectory in the 21st century. The attractiveness of wind and solar technologies is not only supported by local conditions, but also by the relatively mature stage of their technological development.

The aim of the Green Jobs study was to provide information on the net direct job creation anticipated to emerge in the formal economy across a wide range of technologies/activities that may be classified as green or contributing to the greening of the economy. The study looked at the employment potential for a number of green sectors, including power generation, over three consecutive timeframes, namely, the short term (2011 – 12), medium term (2013 – 17) and long term (2018 – 25). The analysis attempts to estimate the employment potential associated with: building, construction and installation activities; operations and maintenance services; as well as the possible localisation spin-offs for the manufacturing sector as the domestic production of equipment, parts and components benefits from preferential local procurement.

It is also worth noting that the study only considered direct jobs in the formal economy. Multiplier effects were not taken into account. As a result, the analysis only captures a portion of the potential employment impact of a greening economy. International studies have indicated that there are considerable backward and forward linkages through various value chains of production, as well as of indirect and induced employment effects. The employment figures can therefore be regarded as conservative.

The analysis reveals the potential of an unfolding green economy to lead to the creation of approximately 98 000 new direct jobs, on average, in the short term, almost 255 000 in the medium term and around 462 000 employment opportunities in the formal economy in the long term. The number of jobs linked to the power generation was estimated to be ~ 12 500 in the short term, 57 500 in the medium term and 130 000 in the long term. Power generation jobs therefore account for 28% of the employment opportunities created in the long term. However, the report notes that the contribution made by a progressively expanding green energy generation segment increases from 14% of the total in the short term, or just over 13 500 jobs, to more than 28% in the long term (166 400) (Table 2.3). The study also found that energy generation is expected to become an increasingly important contributor to green job creation over time, as projects are constructed or commissioned.

Table 2.3: Net direct employment potential estimated for the four broad types of activity and their respective segments in the long term, and an indication of the roll-out over the three timeframes

Broad green economy category		Segment	Technology/product	Total net direct employment potential in the long-term	Net direct manufacturing employment potential in the long-term	Total net direct employment potential (ST, MT, LT)	Net direct manufacturing employment potential (ST, MT, LT)
ENERGY GENERATION	Renewable (non-fuel) electricity	Wind power	Onshore wind power	5 156	2 105	VL, L, M	L, M, H
			Offshore wind power				
		Solar power	Concentrated solar power	3 014	608	N, VL, M	N, VL, M
			Photovoltaic power	13 541	8 463	M, H, H	H, VH, VH
		Marine power	Marine power	197	0	N, N, VL	N, N, N
		Hydro power	Large hydro power	272	111	VL, VL, VL	VL, M, VL
			Micro-/small-hydro power	100	0	VL, VL, VL	N, N, N
	Fuel-based renewable electricity	Waste-to-energy	Landfills	1 178	180	VL, VL, L	VL, VL, L
			Biomass combustion	37 270	154	VL, H, VH	VL, VL, L
			Anaerobic digestion	1 429	591	VL, VL, L	VL, L, M
			Pyrolysis/Gasification	4 348	2 663	VL, L, M	VL, H, H
			Co-generation	10 789	1 050	L, M, H	M, H, H
	Liquid fuel	Bio-fuels	Bio-ethanol	52 729	6 641	M, H, VH	L, H, VH
			Bio-diesel				
ENERGY GENERATION SUB-TOTAL				**130 023**	**22 566**		
ENERGY & RESOURCE EFFICIENCY		Green buildings	Insulation, lighting, windows	7 340	838	L, M, M	L, M, M
			Solar water heaters	17 621	1 225	L, H, H	L, M, H
			Rain water harvesting	1 275	181	VL, VL, L	VL, VL, L
		Transportation	Bus Rapid Transport	41 641	350	VH, VH, VH	H, M, L
		Industrial	Energy efficient motors	-566	4	VL, VL, VL	VL, VL, VL
			Mechanical insulation	666	89	VL, VL, VL	VL, VL, VL
ENERGY & RESOURCE EFFICIENCY SUB-TOTAL				**67 977**	**2 686**		
EMMISIONS AND POLLUTION MITIGATION		Pollution control	Air pollution control	900	166	N, VL, VL	N, L, L
			Electrical vehicles	11 428	10 642	VL, L, H	N, H, VH
			Clean stoves	2 783	973	VL, VL, L	VL, L, M
			Acid mine water treatment	361	0	VL, VL, VL	N, N, N
		Carbon Capture and Storage		251	0	N, VL, VL	N, N, N
		Recycling		15 918	9 016	M, H, H	H, VH, VH
EMMISIONS AND POLLUTION MITIGATION SUB-TOTAL				**31 641**	**20 797**		
NATURAL RESOURCE MANAGEMENT		Biodiversity conservation & eco-system restoration		121 553	0	H, VH, VH	N, N, N
		Soil & land management		111 373	0	VH, VH, VH	N, N, N
NATURAL RESOURCE MANAGEMENT SUB-TOTAL				**232 926**	**0**		
TOTAL				**462 567**	**46 049**		

(Source: Green Jobs Study, 2011)

Notes:

- VH = very high (total employment potential > 20 000 direct jobs; manufacturing employment potential > 3 000 direct jobs);
- H = high (total employment potential > 8 000 but < 20 000; manufacturing employment potential > 1 000 but < 3 000);
- M = medium (total employment potential > 3 000 but < 8 000; manufacturing employment potential > 500 but < 1 000);
- L = low (total employment potential > 1 000 but < 3 000; manufacturing employment potential > 150 but < 500);
- VL = very low (total employment potential > 0 but < 1 000; manufacturing employment potential > 0 but < 150);

- N = negligible/none (total employment potential = 0; manufacturing employment potential = 0).

Of relevance the study also notes that the largest gains are likely to be associated with operations and maintenance (O&M) activities, particularly those involved in the various natural resource management initiatives. In this regard, operations and maintenance employment linked to renewable energy generation plants will also be substantial in the longer term. The employment growth momentum related to building, construction and installation activities peaks in the medium term, largely propelled by mass transportation infrastructure, stabilising thereafter as green building methods become progressively entrenched.

In addition, as projects related to a greening economy are progressively commissioned, the potential for local manufacturing also become increasingly viable. Employment gains in manufacturing are also expected to be relatively more stable than construction activities, since the sector should continue exhibiting growth potential as new and replacement components are produced, as additional markets are penetrated and as new green technologies are introduced. Manufacturing segments with high employment potential in the long term would include suppliers of components for wind and solar farms. The study does note that a shortage of skills in certain professional fields pertinent to renewable energy generation presents a challenge that must be overcome.

The study also identifies a number of advantages associated with renewable energy with a large 'technical' generation potential. In this regard, renewable energy, such as solar and wind, does not emit carbon dioxide (CO_2) in generating electricity and is associated with exceptionally low lifecycle emissions. The construction period for renewable energy projects are much shorter than those of conventional power stations, while an income stream may, in certain instances, be provided to local communities through employment and land rental. The study also notes that the greenhouse gases (GHG) associated with the construction phase are offset within a short period of time compared with the project's lifespan. Renewable power therefore provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa, renewable energy source is not dependent on water (as compared to the massive water requirements of conventional power stations), has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

Of relevance, the study also notes that renewable energy projects in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues.

2.4.3 Powering the Future: Renewable Energy Roll-out in South Africa

The study notes that South Africa has higher CO_2 emissions per GDPppp (2002 figures) from energy and cement production than China or the USA (Letete, T et al). Energy accounts for 83% of the total GHG emissions (excluding land use, land use change and forestry) with fuel combustion in the energy industry accounting for 65% of the energy emissions of South Africa (DEA, 2011).

Within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. Acid mine drainage from abandoned mines in South Africa impacts on water quality and poses the biggest threat to the country's limited water resources. Huge volumes of water are also

required to wash coal and cool operating power stations. Eskom uses an estimated 10 000 litres of water per second due to its dependency on coal (Greenpeace, 2012).

The report notes that the concerns relating to whether South Africa can afford renewable energy arise out of the perception that renewable energy (RE) is expensive while fossil and nuclear technologies are cheap. The premise also ignores life cycle costing of the technologies which is favourable to renewable technologies where the sources of fuel are free or cheap.

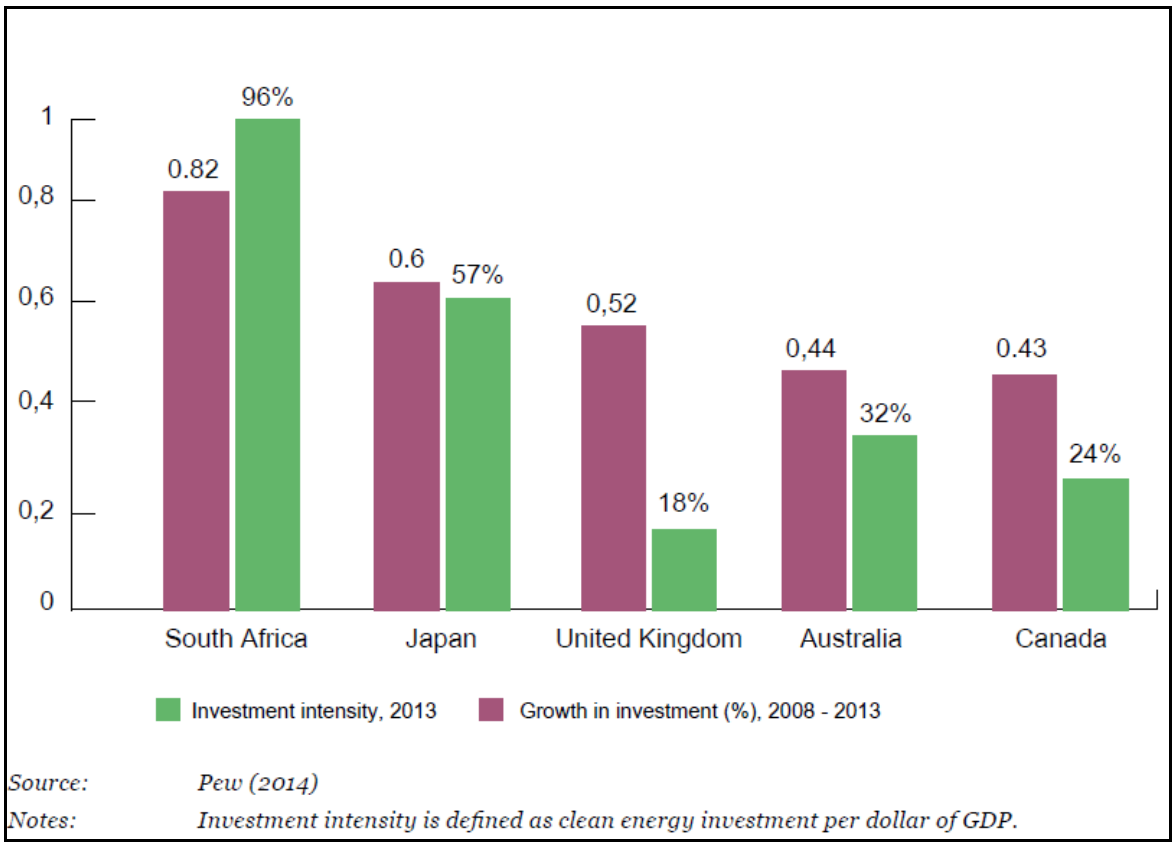
2.4.4 WWF SA Renewable Energy Vision 2030

In its vision the WWF motivated for a more ambitious plan, suggesting that the IRP should provide for an 11-19% share of electricity capacity by 2030, depending on the country's growth rate over the next fifteen years. The vision is to increase renewable energy at the expense of new coal-fired and nuclear capacity. The report notes that in addition to the obvious environmental benefits of this scenario, it will enable South Africa to add flexibility to energy supply capacity on an on-demand basis.

The report notes that Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) introduced in 2011, has by all accounts been highly successful in quickly and efficiently delivering clean energy to the grid. Increasingly competitive bidding rounds have led to substantial price reductions. In this regard, the study indicates that in three years, wind and solar PV have reached pricing parity with supply from new coal-fired power stations from a levelised cost of electricity (LCOE) perspective.

In bidding window 3 of August 2013, the average tariffs bid for wind and solar PV were R0,66/kWh and R0.88/kWh respectively, well below the recent estimates of R1.05/kWh for supply from the coal-fired Medupi and Kusile power stations (Papapetrou 2014).

The report also notes that the REIPPPP has several contracting rounds for new renewables supply. A robust procurement process, extension of a 20-year sovereign guarantee on the power purchase agreement (PPA) and, especially, ideal solar power conditions, have driven the investment case for RE in South Africa. In this regard, South Africa has been identified as one of the worlds' leading clean energy investment destinations (Figure 2.1).



Source: *Pew (2014)*

Notes: *Investment intensity is defined as clean energy investment per dollar of GDP.*

Figure 2.1: South Africa leads as a clean energy investment destination

With regard to local economic development, the REIPPPP sets out various local economic development requirements with stipulated minimum threshold and aspirational targeted levels, which each bidder must comply with. Based on the Broad-Based Black Economic Empowerment Codes, this requirement comprises the following components which make up a scorecard:

- Ownership by black people and local communities.
- Job creation.
- Local content.
- Management control.
- Preferential procurement.
- Enterprise development.
- Socio-economic development.

The final award is based on a combined evaluation in which price determines 70% of the ranking and performance on the local economic development scorecard the remaining 30%. This gives non-price criteria a much heavier weighting than they would normally enjoy under Government's preferential procurement policy.

Job creation, local content and preferential procurement accounted for the bulk of possible points on the scorecard in REIPPPP Round 3. Consequently, a requirement to source goods and services locally is considered to be the central driver of project costs associated with local economic development. In terms of local content, the definition of local content is quite broad, being the value of sales less the costs associated with imports. However, through successive bidding rounds, the definition has become subject to more detailed definition, with an expanding list of exclusions and increased

targeting in terms of key components identified by the Department of Trade and Industry for local manufacturing. This has benefitted local manufacturers and suppliers.

The WWF study considers a low and high growth renewable energy scenario. The capital requirements for the low growth scenario are estimated at R474 billion over the period 2014-2030 (2014 Rand value), rising to R1.084 trillion in the high-growth scenario, in which 35 GW of capacity is built. Each annual round of purchasing 2 200 MW of RE capacity would cost approximately R77 billion in 2014 Rand value terms. In relative economic terms, this equates to 2% of the GDP per annum or approximately one quarter of Government's planned annual investment in infrastructure over the medium term. In the low economic growth scenario, which is arguably the more realistic one, the average annual new liability over the period is approximately R40 billion.

The study also points out that infrastructure spend is more beneficial than other government expenditure due to the infrastructure multiplier effect. This refers to the beneficial impact of infrastructure on economic growth in both the short term, resulting from expansion in aggregate demand, as well as in the longer term (six to eight years) due to enhanced productive capacity in the economy. A recent USA study on highway expenditure revealed the infrastructure multiplier to be a factor of two on average, and greater during economic downturns (Leduc & Wilson 2013). This means that one dollar spent on infrastructure raises GDP by two dollars. If the same were to hold true, as similar analysis suggests it would (Kumo 2012, Ngandu et al 2010), this indicates that the construction of renewable energy plants could be a valuable economic growth driver at a time when fears of recession abound.

The report concludes that the WWF is optimistic that South Africa can achieve a much more promising clean energy future than current plans allow for. With an excellent solar resource and several good wind-producing pockets, the country is an ideal candidate for a renewable energy revolution.

The report indicates that the levelised cost of producing renewable energy already competes favourably with the three main alternatives, namely coal, gas and nuclear. In addition, renewable energy would contribute to a more climate-resilient future and insulate South Africa from dependence on expensive and unreliable fuel sources priced in dollars. Critical from a planning perspective, the report notes that renewable energy can also provide added flexibly on an 'as needed' basis, as electricity demand grows. This is vital in a highly uncertain environment.

2.4.5 The impact of the green economy on jobs in South Africa

The paper notes that greening the economy is particularly important in South Africa for two basic reasons: (1) the exceptional level of unemployment that the country is experiencing and (2) the high carbon impact of the economy.

In terms of employment, the paper refers to the IDC *Green Jobs R*eport (2011). In summary, the short-term (next 2 years) estimate of total net employment potential is 98 000 jobs, and the long-term (next 8 years) employment potential is 462 567 jobs. Natural resource management is predicted to lead to the greatest number of these at 232 926 long-term jobs. Green energy generation is estimated to produce 130 023 long-term jobs, with energy and resource efficiency measures adding another 67 977 long-term jobs.

The paper notes that the Green Jobs Report was prepared by seventeen primary researchers from three prominent organisations, namely the IDC, the Development Bank of South Africa, and Trade and Industrial Policy Strategies. Many role players from other organisations were also consulted, including the World Wide Fund for Nature, the Green Building Council, the Economic Development Department and private companies involved in green industries.

Despite questions surrounding the employment estimates contained in the Green Jobs Report, green economic activity does appear to generate more local jobs than fossil-fuel-based industries. Some of the estimates also indicate the potential for significant employment. The paper concludes that the figures represent a promising starting point that warrants further research and policy involvement in greening the economy in South Africa.

2.4.6 The potential for local community benefits[7]

In her thesis, Tait[8] notes that the distributed nature of renewable energy generation can induce a more geographically dispersed pattern of development. As a result, RE sites can be highly suited to rural locations with otherwise poor potential to attract local inward investment therefore enabling to target particularly vulnerable areas.

In her conclusion, Tait notes that the thesis has found positive evidence for the establishment of community benefit schemes in the wind sector in South Africa. These benefits would also apply to solar projects. The BBBEE requirements for developers as set out in the DoE's IPPPP for renewables is the primary driver for such schemes. The procurement programme, in keeping with the objective of maximising the economic development potential from this new sector, includes a specific focus on local communities in which wind farms are located.

The procurement programme, typical of all Government tendering processes, includes a BBBEE scorecard on which renewable energy projects are evaluated. However, the renewables scorecard appears to play an important part in a renewed focus on the broad-based Aspects of the legislation, as enforced by a recent national review of the BBBEE Act. In this regard, the renewables scorecard includes specifications for local communities in respect of broad-based ownership schemes, socio-economic development and enterprise development contributions. This approach to legislating social responsibilities of business in all sectors definitely has a South African flavour, borne out of the political history of the country and the imperatives for social transformation laid out in the constitution.

While Tait notes that it is still early days for the development of this sector and one cannot determine the impact that such benefit schemes may have, it is clear though that targeted development expenditure will be directed to multiple rural communities and there seems to be a strong potential to deliver socio-economic benefits.

[7] Similar benefits are also likely to be associated with solar energy projects.
[8] The potential for local community benefits from wind farms in South Africa, Louise Tait (2012), Master's Thesis, Energy Research Centre University of Cape Town

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

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

- The administrative context.
- Demographic overview of local municipality.
- Economic overview of the local municipality.
- Site and surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The Rustenburg Local Municipality (RLM) is one of five municipalities that make up the Bojanala District Municipality (BDM). The other four are the Moretele, Madibeng, Kgetlengrivier and Moses Kotane Local Municipality (Figure 3.1). The town of Rustenburg is the administrative seat of the RLM.

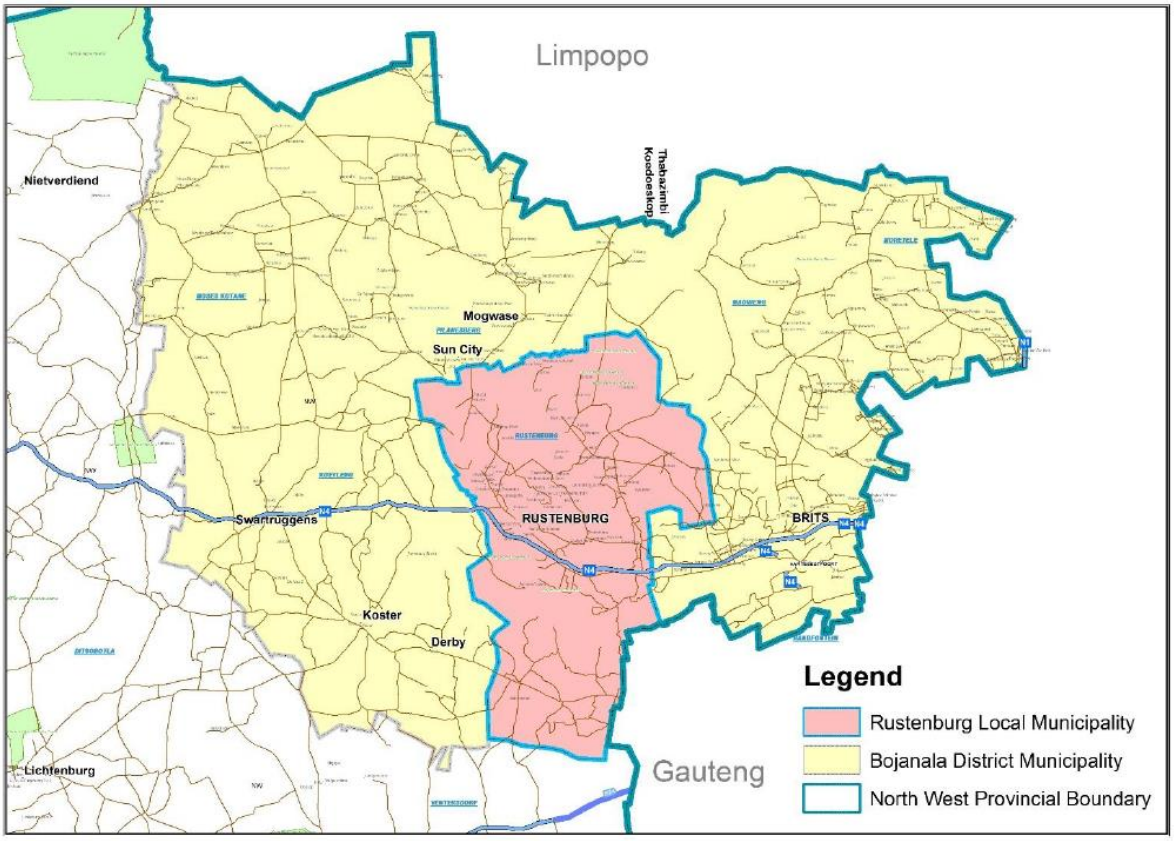


Figure 3.1: Location of Rustenburg Local Municipality

3.3 DEMOGRAPHIC OVERVIEW

Population

The population of the RLM in 2016 was 626 522 (Community Household Survey 2016). Of this total, 34% were under the age of 18, 63% were between 18 and 64, and the remaining 3% were 65 and older. The figures for the economically active age group of 18-65 for the BDM and North West were 58.8% and 57.7% respectively. The RLM IDP (2021/22) indicates that the population of the RLM in 2020 was 719 000.

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, while the North West Province was 54.5%. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e. they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the RLM in 2016 was 58.7%. The relatively low dependency ratio compared to other LMs reflects the employment and economic opportunities associated with the mining sector in the area.

In terms of race groups, Black Africans made up 93.1% of the population on the RLM, followed by Whites, 6.1% and Coloureds, 0.6%. The main first language spoken in the RLM and was Setswana, 63.9% followed by Isixhosa (10.1%) and Afrikaans (5.6%).

Households and house types

There were a total number of 262 576 (2016) households in the RLM. Of these 51.2% (were formal houses, 29% were shacks and 13.8% were flats in backyards. A high percentage of the dwellings in the RLM are therefore informal structures. The high number of informal structures reflects the influx of jobseekers to the area in search of employment associated with the mining sector and the challenges faced by the local authorities in terms of addressing the housing backlog. In terms of ownership, 36% of the households in the RLM owned and had fully paid off their houses, and 9% were in the process of paying them off. 30% of the households rented their properties, while 14.4% occupied their properties rent free. The figures in terms of ownership and properties being fully paid off were lower than the rate for the BDM (54.9%) and North West (56.3%). This is likely due the higher property prices in Rustenburg and issues associated with affordability.

In terms of household heads, 24.3% of the households in the RLM were headed by women. This figure was lower than the district (30.1%) and provincial (35.2%) figure. This is due to the employment opportunities linked to the mining sector in the RLM and the reduced need for men to leave their homes and seek work elsewhere. Despite the figures for the RLM being lower than the district and provincial averages, women headed households tend to be more vulnerable.

Household income
Based on the data from the 2011 Census, 17.6% of the households in the RLM had no formal income, 2.8% earned less than R 4 800, 4.2% earned between R 5 000 and R 10 000 per annum, 11.2% between R 10 000 and R 20 000 per annum and 17.4% between R 20 000 and 40 000 per annum.

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 53.2% of the households in the RLM live close to or below the poverty line. This figure was lower than the district (61.8%) and provincial (66.9%) figure. The lower poverty levels in the RLM are linked to the employment and income opportunities are largely associated with the mining sector. 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. Low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the RLM. This in turn impacts on the ability of the RLM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the RLM that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

Employment
The official unemployment rate in the RLM in 2016 was 17.7%, while 49.2% were employed, and 30.3% were regarded as not economically active. The unemployment rates for the RLM are lower than the Provincial rate of 17.1% and the District rate of 18.8%. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in the RLM. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education
In terms of education levels, the percentage of the population over 20 years of age in the RLM with no schooling was 4.8% (2016), compared to 8.7% and 5.5% for the North West Province and BDM in 2016 respectively. The percentage of the population over the age of 20 with matric was in the RLM was 36.3%, compared to 31% (2016) and 34.1% for the North West and BDM respectively. The higher education levels are linked to the well-developed infrastructure and services in the RLM, which in turn are linked to the benefits associated with the mining sector.

3.4 MUNICIPAL SERVICES

Electricity
Based on 2016 survey, 84.6% of households in the RLM had access to electricity, while 11.2% had no access to electricity. Of the households that had access to electricity, 76.7% had in house pre-paid meters, and 7.9% had conventional meters.

Access to water
Based on the 2016 survey information, 95.2% of households in the RLM were supplied by a local or regional service provider, while 4.8% relied on their own sources. Of the

households supplied by service providers, 54.5% had piped water in their yards and 31% had piped water in their houses, while 9.3% relied on community stands or taps. The relatively low number of households with piped water in their houses reflects the high percentage of shacks (29%) in the RLM.

Sanitation
59.3% of the households in the RLM had access to flush toilets (2016), while 36.1% relied on pit toilets and 1.9% did not have access to formal sanitation. The high percentage of households that relied on pit toilets reflects the high percentage of shacks (29%) in the RLM.

Refuse collection
72.6% of the households in the RLM had access to regular refuse removal service, while 12.2% disposed of their waste at their own dump and 4.4% had no access to refuse services (2016).

3.5 ECONOMIC OVERVIEW

The GDP of the RLM was R 72.9 billion in 2020 (up from R 37.4 billion in 2010). This made up 47.04% of the total GDP of the BDM in 2020, an increase from 43.74% in 2010. As indicated in Figure 3.2, the RLM was the largest contributor to the BDM GDP in 2020. In terms of the North West economy, the RLM contributed 24.65% to the GDP of North-West Province in in 2020. The RLM is therefore a key contributor to both the district and provincial economy.

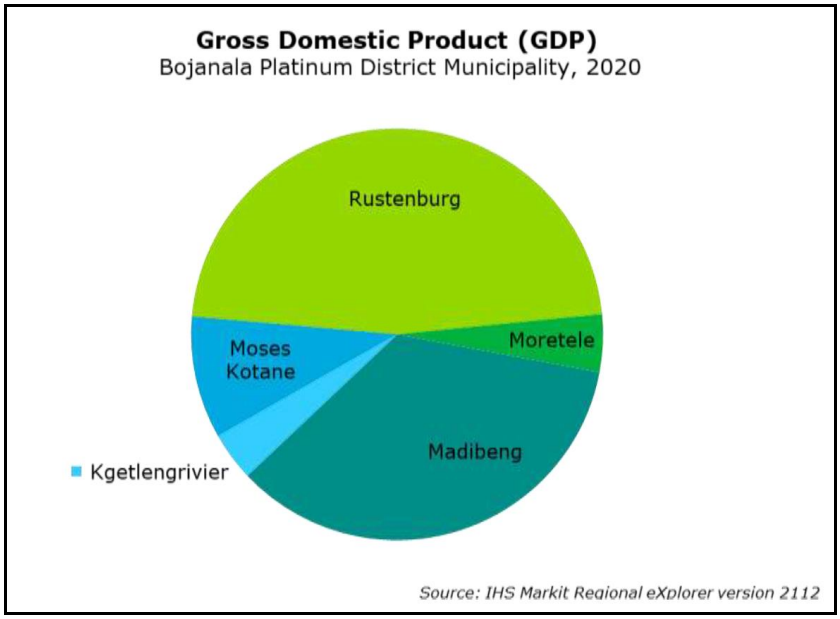


Figure 3.2: Contribution of local municipalities to district municipality GDP (2020)

The primary sector, specifically mining, contributed 77.2% towards the GVA of the RLM in 2020. This figure is significantly higher than the national economy (11.1%). The tertiary sector contributed a total of 18.4% (ranking second), while the secondary sector contributed 4.5% (Figure 3.3).

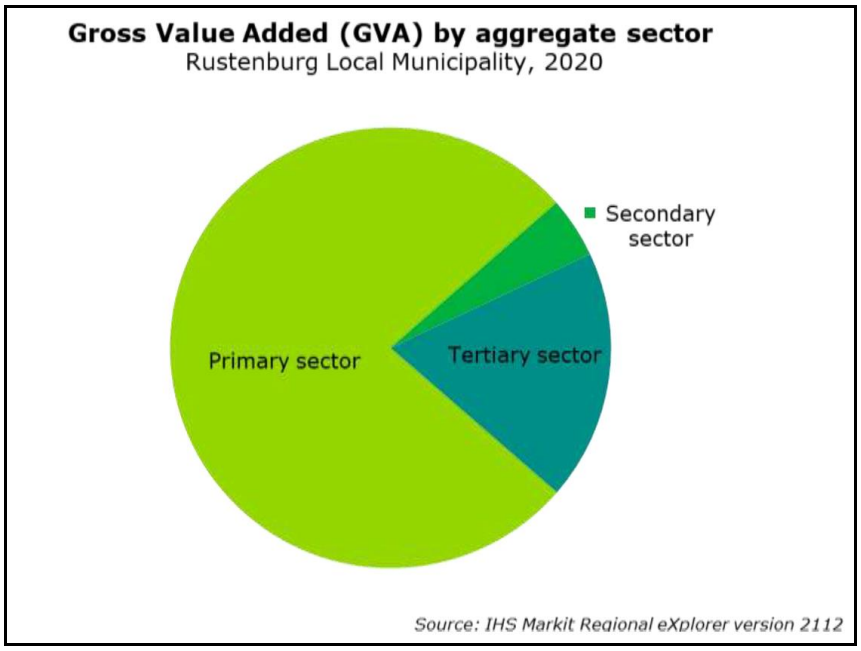


Figure 3.3: Gross Value Added (GVA) by aggregate economic sector – RLM 2020

In terms of key sectors, the mining sector was the largest economic sector within the RLM accounting for 76.6% of the total GVA of the local municipality's economy, followed by the community services sector (6.4%) and finance sector with 5.2%. The agriculture sector only contributed 0.56% of the total GVA (Figure 3.4).

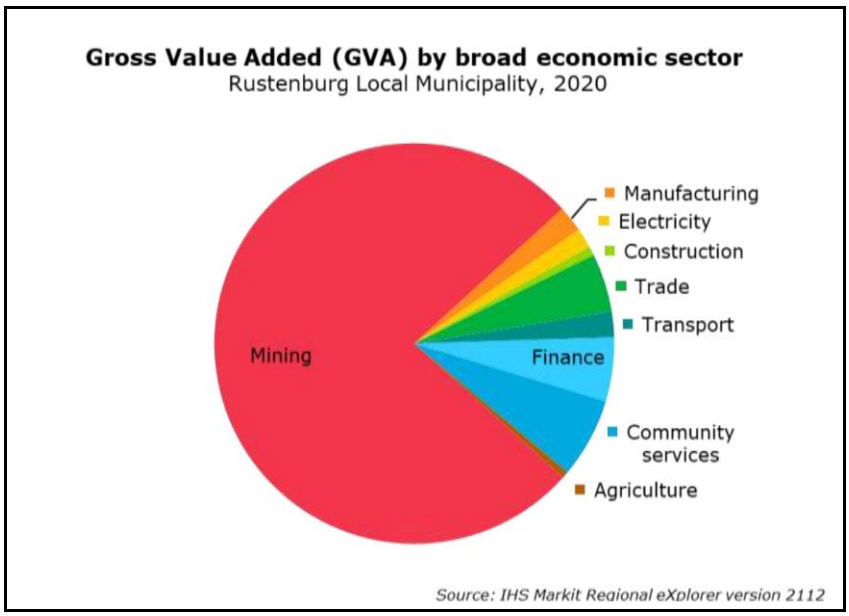


Figure 3.4: Gross Value Added (GVA) by broad economic sector – RLM 2020

In terms of employment, the mining sector accounted for 31.6% of total employment in the RLM, followed by the trade sector (18.1%). The agriculture sector only employed 2.6%. The unemployment rate in RLM in 2020 (based on the official definition of unemployment) was 30.81%, which is an increase of 9.07 percentage

points. The unemployment rate for South Africa was 29.64% in 2020, which is an increase of 4.71 from 24.93% in 2010.

3.6 OVERVIEW OF STUDY AREA[9]

As indicated above, the RLM is one of five municipalities that make up the Bojanala District Municipality (BDM). The town of Rustenburg is the administrative seat of the RLM. The RLM IDP notes that four major elements have shaped the historical development of the settlement patterns in the RLM area, namely:

- The town of Rustenburg which represents the centre of population concentration, administrative functions, and business-related activities.
- The Magaliesberg Mountain Range which traverses the municipal area south of the town of Rustenburg and the site. The mountains have inhibited urban expansion in a south westerly direction.
- The national and provincial road network, specifically the N4 and the R 565 and R510. The N4, links Rustenburg with Botswana and Namibia to the west, and Tshwane and Mozambique to the east. The Rustenburg/Sun City Road (R565) links Rasimone, Luka and Phokeng to Rustenburg; and the Rustenburg/Thabazimbi Road (R510) links Tlaseng, Kanana and Boitekong to Rustenburg.
- The Platinum Mines that run parallel to the north of the Magaliesberg Mountain Range, which have played a key role in the settlement pattern in the municipal area. The IDP notes that the mines have fragmented urban development by creating physical barriers, such as transport facilities, pipelines, infrastructure and surface mining infrastructure between Rustenburg and the settlements located north of the mining belt, (e.g., Boitekong). The mines have also resulted in the development of isolated towns such as Luka, Kanana, Thekwane and Photsaneng in close proximity to the mining activities.

In terms of settlement patterns, four broad types of settlements can be distinguished in the RLM:

- Formal Urban Settlements, including Rustenburg, Tlhabane, Boitekong, Phatsima, Hartbeesfontein, Kroondal and Marikana.
- Tribal Settlements, which are mainly located on Bafokeng tribal land. Settlements include areas such as Phokeng, Kanana, Luka, Chaneng, Tlaseng, Rankelenyane, Thekwane and Photsaneng.
- Rural Settlements similar in nature to the tribal settlements, but which are not on Bafokeng tribal land.
- Informal Settlements that have largely developed along the mining belt and close to mine shafts. These include areas such as Wonderkoppies, Nkaneng, Zakhele, Popo Molefe and Freedom Park. The IDP notes that the 24 informal settlements in the RLM area are characterised by a lack of security of tenure and a lack of basic municipal services. Collectively these areas represent at least 24 000 households. The total number of households residing in informal structures (including backyard units and informal units in traditional authority areas) in the RLM municipal area is about 68 800 units.

The adjacent land uses to the site are largely industrial and include the Sibanye Stillwater and Anglo-American Platinum Concentrator Plants immediately to the north of the site, and the Rustenburg Base Metals Refinery and Anglo-American Precious

[9] The overview of the study area will be updated following the site visit during the Assessment Phase

Metals Refinery located 650m and ~ 3km to the east of the site, Kroondal Platinum Mine ~ 3km to the south east, and Bathopele Platinum Mine on the southern boundary (Figure 3.5). The adjacent study area has therefore been significantly altered by mining related activities. There are therefore no sensitive social receptors located within the immediate vicinity of the site.

The residential land uses include, the eastern suburbs of Rustenburg located approximately 3 km west of the site. The other settlements include Boitekong (3km north west), Entabeni (2.8km north east), Thekwane (5.2km north east), Mfidikoe (2km north east), Bokomosa (2.2km east), Phoshaneng (5km east), Nkaneng (6km east, and Waterkloof (1.5km south east) (Figure 3.5). As indicated above, the platinum mines have resulted in the development of settlements such as Thekwane and Photsaneng.

The R104 and N4 are located ~ 2.8km and 4km to the south of the site respectively and a railway line runs parallel to and within 300m of the northern boundary of the site.

Figure 3.5: Location of site (green) in relation to surrounding land uses

SECTION 4: OVERVIEW OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an overview of key social issues identified that will be assessed during the Assessment Phase. The identification of key issues was based on:

- Review of project related information.
- Experience/ familiarity of the author with the area and local conditions.
- Experience with similar projects.

The section is divided into the following sections:

- Compatibility with relevant policy and planning context ("planning fit").
- Social issues associated with the construction phase.
- Social issues associated with the operational phase.
- Social issues associated with the decommissioning phase.
- Social implications of "no development" alternative.
- Social implications associated with cumulative impacts.

Section 4 also provides an overview of the approach (plan of study) for undertaking the specialist Social Impact Assessment (SIA) during the Assessment Phase.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The North West Province Renewable Energy Strategy also supports the development of renewable energy. The development of the proposed PV SEF is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

Potential positive impacts

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

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to local communities associated with the construction related activities and presence of construction workers on the site.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.

4.3.1 Creation of local employment, training, and business opportunities

The construction phase of the PV SEF will extend over a period of approximately 12-18 months and create in the region of 200 employment opportunities. Members from the local communities in the area, specifically Rustenburg and the adjacent residential areas, would be in a position to qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information from similar projects the total wage bill will be in the region of R 25 million (2021 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The capital expenditure associated with the construction phase will be approximately R 1 billion (2022 Rand value). Given the well-developed mining sector the potential for local companies (engineering, civils etc.) in the RLM to benefit from the project is high. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

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

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

<table>
<tr><td colspan="4">Nature: Creation of employment and business opportunities during the construction phase</td></tr>
<tr><th>Issue</th><th>Nature of Impact</th><th>Extent of Impact</th><th>No-Go Areas</th></tr>
<tr><td>Creation of employment and business opportunities during the construction phase</td><td><u>Direct impacts:</u>
» Creation of temporary employment opportunities
» Creation of business and procurement opportunities
<u>Indirect impacts:</u>
» Support for local economy.
» Creation of training and skills development opportunities</td><td>Local-Regional</td><td>N/A</td></tr>
<tr><td colspan="4">Description of expected significance of impact
Evidence from the other renewable energy projects indicates that the construction phase of 65 MW SEF will extend over a period of approximately 12-18 months and create in the region of 200 employment opportunities. Members from the local communities in the area, specifically Rustenburg and surrounding areas, would be in a position to qualify for most of the low skilled and semi-skilled opportunities. The business-related opportunities will be linked to engineering services, hospitality (accommodation) and services sector (catering, security, transport etc.).</td></tr>
<tr><td colspan="4">Gaps in knowledge & recommendations for further study
» Collection of information on local skills and education levels.
» Collection of information on local hospitality and services sector.
Recommendations with regards to general field surveys</td></tr>
</table>

» Site visit and interviews with representatives from local municipality, and the hospitality and services sector. » Site visit and interviews with local chamber of commerce.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

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

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. Given the well-developed mining sector, local low, semi and skilled workers are likely to be available. The potential impact on the local community will therefore be negligible. The balance of semi-skilled and skilled workers will be accommodated in Rustenburg and surrounds.

Table 4.2: Assessment of impact of the presence of construction workers in the area on local communities

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential impacts on family structures and social networks associated with the presence of construction workers	Direct impacts: » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies Indirect impacts: » Impact on psychological well-being of local communities. » Resentment of outsiders and tension within local communities	Local-Regional	N/A

Description of expected significance of impact Evidence from the other renewable energy projects indicates that presence and behaviour of construction workers can impact negatively on local communities. Members from the local communities in the area would be at potential risk. However, number of non-local workers is likely to be low.
Gaps in knowledge & recommendations for further study » Collection of information on local skills and education levels. Employing local community members reduces the potential risks » Collection of information on accommodation options and capacity. » Collection of information on existing community challenges and needs. **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from local municipality and community representatives. » Site visit and interviews with representatives from hospitality sector with regard to accommodation options.

4.3.3 Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

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

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.3.1. Given the relatively small scale of the projects the potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible.

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

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential impacts on family structures, social networks and community services associated with the influx of job seekers	Direct impacts: » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies » Pressure on local services Indirect impacts: » Impact on psychological well-being of local communities. » Resentment of outsiders and tension within local communities	Local-Regional	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the construction phase can result in the influx of jobseekers to the area and that this has the potential to impact negatively on local communities. However, the potential for the influx of jobseekers is also influenced by the scale of the project. Small scale Projects are less likely to attract jobseekers			
Gaps in knowledge & recommendations for further study » Collection of information on existing community challenges and needs. **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from local municipality and community representatives.			

4.3.4 Risk to safety and security

The presence on and movement of construction workers on and off the site poses a potential safety threat to local communities in the vicinity of the site. However, the risks are usually associated with projects located in rural areas. The potential risks can be effectively mitigated by careful planning and managing the movement of construction workers on and off the site workers during the construction phase.

Table 4.4: Assessment of risk to local communities

Nature: Potential risk to local communities associated with the presence and activities of construction workers on site			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential risk to safety of local communities associated with the presence of construction workers on site	Direct impacts: » Break-ins and theft » Potential for attacks or harm to local community members. Indirect impacts: » Exposure to outside people to local communities. » Increased risk of theft.	Local	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the movement and activities of construction workers can impact on local communities. However, this is usually associated with projects located in rural areas and the risks are to local farmers.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local community members etc.			

4.3.5 Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated.

Table 4.5: **Assessment of the impacts associated with construction related activities**

Nature: Potential noise, dust and safety impacts associated with construction related activities			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Potential noise, dust and safety impacts associated with construction related activities	Direct impacts: » Dust impacts, and impact on local communities living int the vicinity of the site grazing. » Noise impacts, and impact on quality of life. » Safety of local communities due to movement of construction vehicles » Damage of local roads. Indirect impacts: » Limited indirect impacts	Local	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the activities associated with the construction phase do result in dust, noise and safety impacts that can impact on local communities.			

Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with representatives from local municipality and community representatives.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

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

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

Potential negative impacts
- Visual impacts and associated impacts on sense of place.

4.4.1 Improve energy security and support the renewable energy sector

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed SEF also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.

Table 4.8: Improve energy security and support renewable sector

Nature: Development of infrastructure to improve energy security and support renewable sector			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Improve SAs energy security and reduce reliance on coal	Direct impacts: » Improve energy security » Reduce reliance on coal. » Support renewable energy Indirect impacts: » Address climate change impacts	Local-International	N/A
Description of expected significance of impact South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. A review of the REIPPPP and establishment of renewable energy facilities not only addresses environmental issues associated with climate change and consumption of scarce water resources, but also create significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

4.4.2 Creation of employment opportunities

The proposed development will create in the region of 20 full time employment opportunities during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled 5%. Based on similar projects the annual operating budget will be in the region of R 24 million (2022 Rand values), including wages.

Table 4.9: Assessment of employment and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Creation of employment and business opportunities associated with the operational phase	Direct impacts: » Creation of employment opportunities » Creation of business and procurement opportunities Indirect impacts: » Support for local economy. » Creation of training and skills development opportunities	Local-Regional	N/A
Description of expected significance of impact The direct employment opportunities associated with the operational phase of renewable energy projects are relatively limited. However, a review of the REIPPPP indicates that the benefits associated with the operation of renewable energy projects are significant and extend beyond direct employment opportunities.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

4.4.3 Benefits associated with the socio-economic development contributions

The REIPPPP 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. Socio-economic development (SED) contributions are an important focus of the REIPPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.

Table 4.11: Assessment of benefits associated with socio-economic development contributions

Nature: Benefits associated with support for local community's form SED contributions			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Support for local economic development and investment	Direct impacts: » Support local economic development » Create employment opportunities » Create skills development and training opportunities » Improve basic services Indirect impacts: » Up-grade local municipalities and improve quality of life of local communities	Local-Regional	N/A
Description of expected significance of impact The revenue from the proposed SEF can be used to support a number of social and economic initiatives in the area, including: • Creation of jobs. • Education. • Support for and provision of basic services. • School feeding schemes. • Training and skills development. • Support for SMME's.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

4.4.4 Visual impact and impact on sense of place

The proposed REF has the potential to impact on the areas existing sense of place. However, the existing sense of place of the area has been impacted by mining and associated industrial activities. The potential impact on the areas sense of place will therefore be negligible. This will be confirmed during the assessment phase and the findings of the Visual Impact Assessment (VIA).

Table 4.12: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Impact on rural sense of place	Direct impacts: » Change in rural sense of place Indirect impacts: » Potential impact on property values.	Local	N/A
Description of expected significance of impact Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on property values.			
Gaps in knowledge & recommendations for further study » Collection of information on location of potentially sensitive land uses and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local farmers and representatives from local municipality and local landowners.			

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

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

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms 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 and the associated infrastructure 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).

As indicated above, the potential impact of the proposed REF and associated infrastructure on the areas sense of place is likely to be negligible. The cumulative impacts are also likely to be very low. This will be confirmed during the assessment phase.

Table 4.15: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one REF and the potential impact on the area's rural sense of place and character of the landscape.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Cumulative impact on rural sense of place	Direct impacts: » Change in rural sense of place Indirect impacts: » Potential impact on property values and hospitality operations.	Local-Regional	N/A
Description of expected significance of impact The establishment of renewable energy projects do have the potential to have a cumulative impact on an areas sense of place. The significance will depend on the location and number of REFs proposed. This will be informed by the findings from the site visit and review of the VIA.			
Gaps in knowledge & recommendations for further study » Collection of information on location of existing farming and hospitality operations and activities. **Recommendations with regards to general field surveys** » Site visit and interviews with local landowners and the municipality etc.			

4.6 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The establishment of a number of REFs has the potential to place pressure on local services and accommodation, specifically during the construction phase. As indicated above, the majority of skilled, semi-skilled and low-skilled workers for the construction phase will be sourced from the RLM. This potential pressure on local services and accommodation is therefore likely to be negligible.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the RLM. These benefits will create opportunities for investment in the RLM, including the opportunity to up-grade and expand existing services and the construction of new houses.

Table 4.16: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed SEF, in the RLM has the potential to place pressure on local services, specifically medical, education and accommodation			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Cumulative impact on local services, including accommodation, medical and emergency services	Direct impacts: » Pressure on available services (medial, emergency etc.) » Pressure on available accommodation. Indirect impacts: » Potential impact on rentals and cost of services.	Local-Regional	N/A
Description of expected significance of impact			

The establishment of renewable energy projects do have the potential to have a cumulative impact on local services, specifically accommodation and emergency services. The significance will depend on the number of REFs proposed and timing of construction.
Gaps in knowledge & recommendations for further study » Collection of information on number REFs proposed and timing of construction phase. **Recommendations with regards to general field surveys** » Site visit and interviews with local municipal officials and representatives from hospitality associations etc.

4.7 CUMULATIVE IMPACT ON LOCAL ECONOMY

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

The review of the REIPPPP (June 2020) indicates that the SED contributions associated with 68 operational projects has amounted to R 1.2 billion to date. In terms of Enterprise Development (ED), R 7.2 billion has been committed for BW1 to BW4, 1S2 and 2S2. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 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. Up until the end of June 2020 a total of R 384.2 million had already been made to the local communities located in the vicinity of the 68 operating IPPs. This represents 93% of the total R384.2 million enterprise development contributions made to date).

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Table 4.17: Cumulative impacts on local economy

Nature: The establishment of renewable energy facilities and associated projects, such as the SEF, in the ULM will create employment, skills development and training opportunities, creation of downstream business opportunities.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Cumulative benefits in terms of creating employment, business, and skills development opportunities for the local municipality	Direct impacts: » Creation of employment, business, and skills development opportunities for the local municipality Indirect impacts: » Support local economic development.	Local-Regional	N/A
Description of expected significance of impact The establishment of renewable energy projects do have the potential to create benefits in terms of creating employment, business, and skills development opportunities for the local			

municipality. The significance will depend on the number of REFs proposed and timing of construction.
Gaps in knowledge & recommendations for further study » Collection of information on number REFs proposed and timing of construction phase. **Recommendations with regards to general field surveys** » Site visit and interviews with local municipal officials and representatives from hospitality associations etc.

4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

The primary goal of the Project is to assist in providing additional capacity to Eskom to assist in addressing the current energy supply constraints. The project also aims to reduce the carbon footprint associated with energy generation. As indicated above, energy supply constraints and the associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

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

Table 4.18: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to improve energy security and assist to support with the development of clean, renewable energy.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Lost opportunity to improve energy security and develop clean, renewable energy	Direct impacts: » Energy security » Creation of employment, business, and skills development opportunities for the local municipality Indirect impacts: » Address climate change.	Local-Regional	N/A
Description of expected significance of impact The establishment of renewable energy projects will improve energy security and create benefits in terms of creating employment, business, and skills development opportunities. These benefits would be foregone if the REF is not developed.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP. **Recommendations with regards to general field surveys** » N/A. Desktop review of REIPPPP.			

4.9 PLAN OF STUDY FOR SIA

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve:

- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds.
- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created and breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.;
- Site visit and interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.
- Review of key findings of the key specialist studies that have a bearing on the SIA, such as the Visual Impact Assessment (VIA). This information will also be used to inform the engagement with the affected landowners.
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction, operational and decommissioning phase of the project.
- Identification and assessment of cumulative impacts (positive and negative).
- Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts.
- Preparation of Social Impact Assessment (SIA) Report.

The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.

ANNEXURE A

REFERENCES

- 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 Energy Plan (2016).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- National Development Plan (2011).
- New Growth Path Framework.
- National Infrastructure Plan.
- North West Provincial Growth and Development Strategy (2004-2014)
- North West Provincial Renewable Energy Strategy (2012).
- Rustenburg Municipality Spatial Development Framework-Draft (2018).
- Rustenburg Municipality Integrated Development Plan (2021/22).

ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

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

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

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

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

S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

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

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

ANNEXURE C

Tony Barbour
ENVIRONMENTAL CONSULTING AND RESEARCH

10 Firs Avenue, Claremont, 7708, South Africa
(Tel) 27-21-761 2355 - (Fax) 27-21-761 2355 - (Cell) 082 600 8266
(E-Mail) tbarbour@telkomsa.net

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

EDUCATION

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

EMPLOYMENT RECORD

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

LECTURING

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

RELEVANT EXPERIENCE AND EXPERTISE

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

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

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

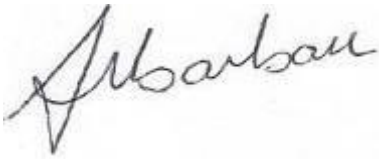
ANNEXURE D

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 April 2022

Date: