

Starling PV Facility

Socio-economic Specialist Study

Report Prepared for

**South Africa Mainstream Renewable Power
Developments (Pty) Ltd**



Report Number 581877_SIA



Report Prepared by

 **srk** consulting

January 2023

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Socio-economic Specialist Study

South Africa Mainstream Renewable Power Developments (Pty) Ltd

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Profile and Expertise of Specialists

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by South Africa Mainstream Renewable Power Developments (Pty) Ltd (Mainstream) to undertake the Environmental Impact Assessment (EIA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA). SRK has conducted the Socio-Economic specialist study as part of the EIA process.

SRK Consulting comprises over 1 600 professional staff worldwide, offering expertise in a wide range of environmental and engineering disciplines. SRK's Cape Town environmental department has a distinguished track record of managing large environmental and engineering projects, extending back to 1979. SRK has rigorous quality assurance standards and is ISO 9001 accredited.

As required by NEMA, the qualifications and experience of the specialist are detailed below and Appendix B.

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Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by Mainstream. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Executive Summary

South Africa Mainstream Renewable Power Developments (Pty) Ltd (Mainstream) proposes to construct up to nine Photovoltaic (PV) facilities and associated infrastructure for the Stilfontein PV Cluster, including the Starling PV facility. The Stilfontein Cluster is located ~20 km south-west of Potchefstroom and ~6 km north-east of Stilfontein, in North West Province and within the Klerksdorp Renewable Energy Development Zone (REDZ).

The Starling PV facility comprises PV arrays with a total maximum export capacity of up to 150 MW on a notional development area (footprint) of ~220 to 405 ha, a Lithium-Ion BESS, 11-33kV overhead powerline(s) / underground cabling (whichever is preferred) between the PV facility and Starling on-site substation, IPP-side of the 11-33/132 kV Starling on-site substation on a notional development area (footprint) of ~4 ha and internal infrastructure and structures, including gravel roads, fencing, lighting, stormwater, water supply, septic/conservancy tanks and water storage infrastructure, laydown areas and offices.

The project lies within an area that has many socio-economic challenges and needs, expressed in lower education levels, more precarious employment, much lower income levels, a dominance of informal housing and poor access to basic services. Closure of local mines has significantly reduced economic opportunities in the area.

The local authority and adjacent businesses and landowners are generally supportive of the project.

Potential socio-economic benefits associated with the proposed project include investment contributing to the economy and generation of employment, income and skills during construction and operation, and increased community prosperity due to dividends from partial project ownership and SED / ED initiatives. Potential socio-economic impacts relate to reduced quality of life for nearby residents and (unlikely) social disruptions during construction, and reduced employment and funding during decommissioning.

The project has acceptable socio-economic impacts and desirable benefits, though careful management of benefits (governance of Community Trusts and cumulative economic stimulation) is critical. From a socio-economic perspective the project should be authorised and is preferred to the No-Go alternative.

The potential cumulative socio-economic impacts of the nine projects of the Stilfontein Cluster and/or any other renewable projects that may establish in the Klerksdorp REDZ are highly significant and positive, though additional negative distorting effects and social pressures may arise if several projects are implemented simultaneously, whereas staggered implementation might preclude such distortions.

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List of Abbreviations

ART	Antiretroviral treatment
BESS	Battery Energy Storage System
CapEx	Capital Expenditure
DEA&DP	(Western Cape) Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DKKDM	Dr Kenneth Kaunda District Municipality
EA	Environmental Authorisation
ED	Enterprise Development
EIA	Environmental Impact Assessment
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GIIP	Good International Industry Practice
GW	Giga Watts
HDI	Human Development Index
HIV	Human immunodeficiency virus
IAIA	International Association for Impact Assessment
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
LED	Local Economic Development
LM	Local Municipality
LRP	Livelihoods Restoration Plan
MERO	Municipal Economic Review and Outlook
MTS	Main Transmission Substation
MW	Mega Watts
NEMA	National Environmental Management Act 107 of 1998, as amended
NGO	Non-Governmental Organisation
OpEx	Operational Expenditure
PDI	Previously Disadvantaged Individual
PERO	Provincial Economic Review and Outlook
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SDF	Spatial Development Framework
SED	Socio-Economic Development
SEP	Socio-Economic Profile
SIA	Socio-economic Impact Assessment
SMMEs	Small and Medium Enterprises
SRK	SRK Consulting (South Africa) (Pty) Ltd

STC	Strategic Transmission Corridor
StatsSA	Statistics South Africa
TB	Tuberculosis
ToR	Terms of Reference
WEF	Wind Energy Facility

1 Introduction

1.1 Background

South Africa Mainstream Renewable Power Developments (Pty) Ltd (Mainstream) proposes to construct up to nine Photovoltaic (PV) facilities and associated infrastructure for the Stilfontein PV Cluster, including the Starling PV facility that is subject of this report. The Stilfontein Cluster is located ~20 km south-west of Potchefstroom and ~6 km north-east of Stilfontein, in the Dr Kenneth Kaunda District Municipality (DKKDM) in North West Province and within the Klerksdorp Renewable Energy Development Zone (REDZ) (see Figure 1-1 and Figure 1-2).

A Basic Assessment (BA) process in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended, is required to support an application for Environmental Authorisation (EA) for the project.

A Socio-economic Impact Assessment (SIA) is one of the investigations undertaken for the Stilfontein BA process. An SIA includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions (Vanclay F. , 2003).

1.2 Terms of Reference

The following Terms of Reference apply to the specialist study:

- Compile a socio-economic baseline of the study area, based on existing secondary public data and any primary data collected by the social specialist;
- Identify the potential social and economic impacts (including benefits) associated with the project, including, *inter alia*, impacts associated with loss of farmland (grazing), contribution to economic growth and job creation, quality of life, local community income and influx of workers / job seekers;
- Assess the direct, indirect and cumulative impacts of the proposed project, including alternatives, on the socio-economic environment using a prescribed impact assessment methodology;
- Recommend practicable mitigation measures to minimise / reduce impacts and enhance benefits and monitoring requirements, where possible;
- Identify and map potentially sensitive areas, buffer areas and preferred locations, if applicable;
- Compile an SIA Report compliant with Appendix 6 of the Environmental Impact Assessment (EIA) Regulations (2014), relevant guidelines and Part A of the Environmental Assessment Protocols (GN R320 of 2020), where applicable; and
- Update the SIA Report based on and provide responses to comments from stakeholders and/or the Competent Authority.

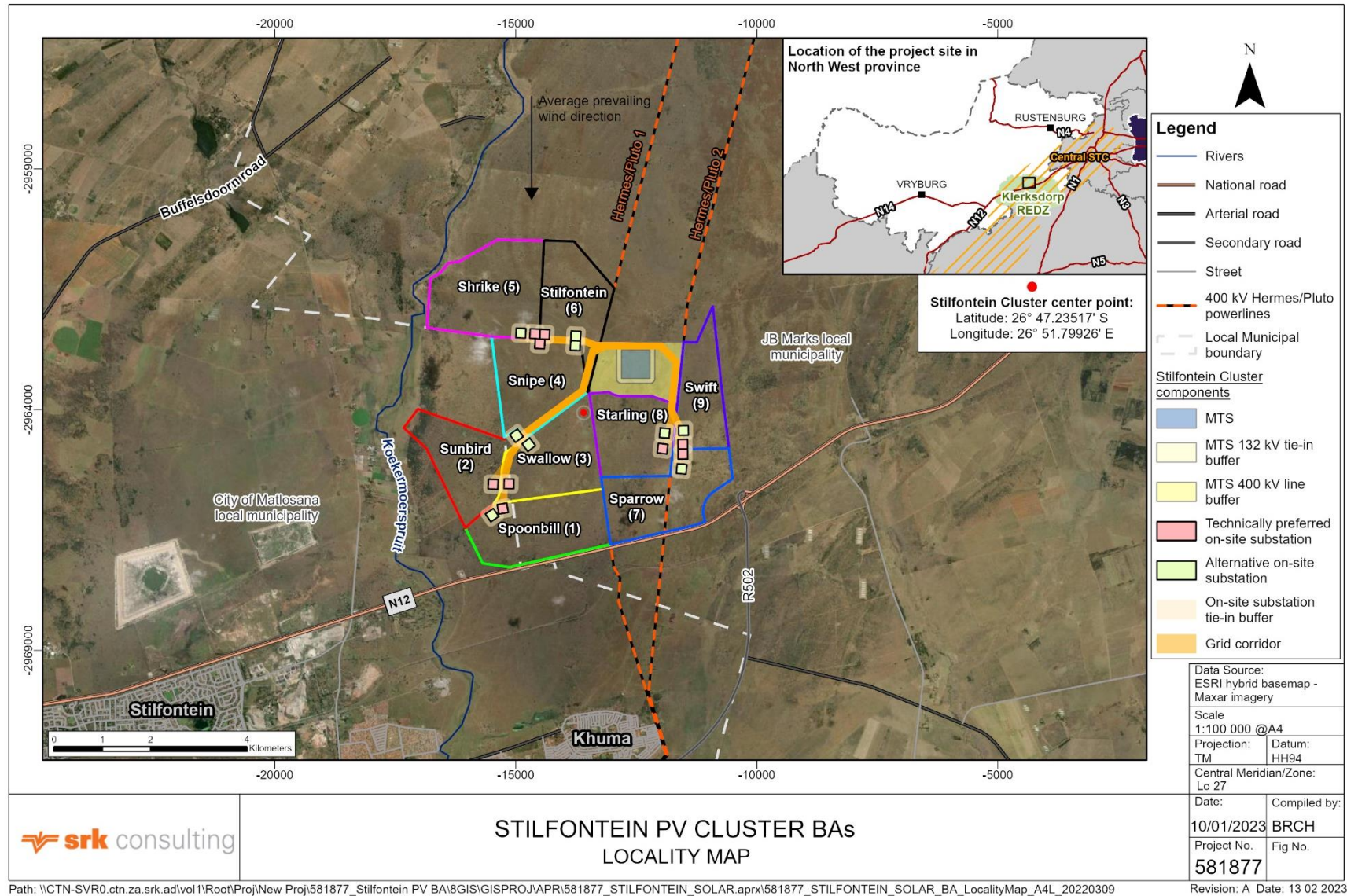


Figure 1-1: Location of the Stilfontein Cluster

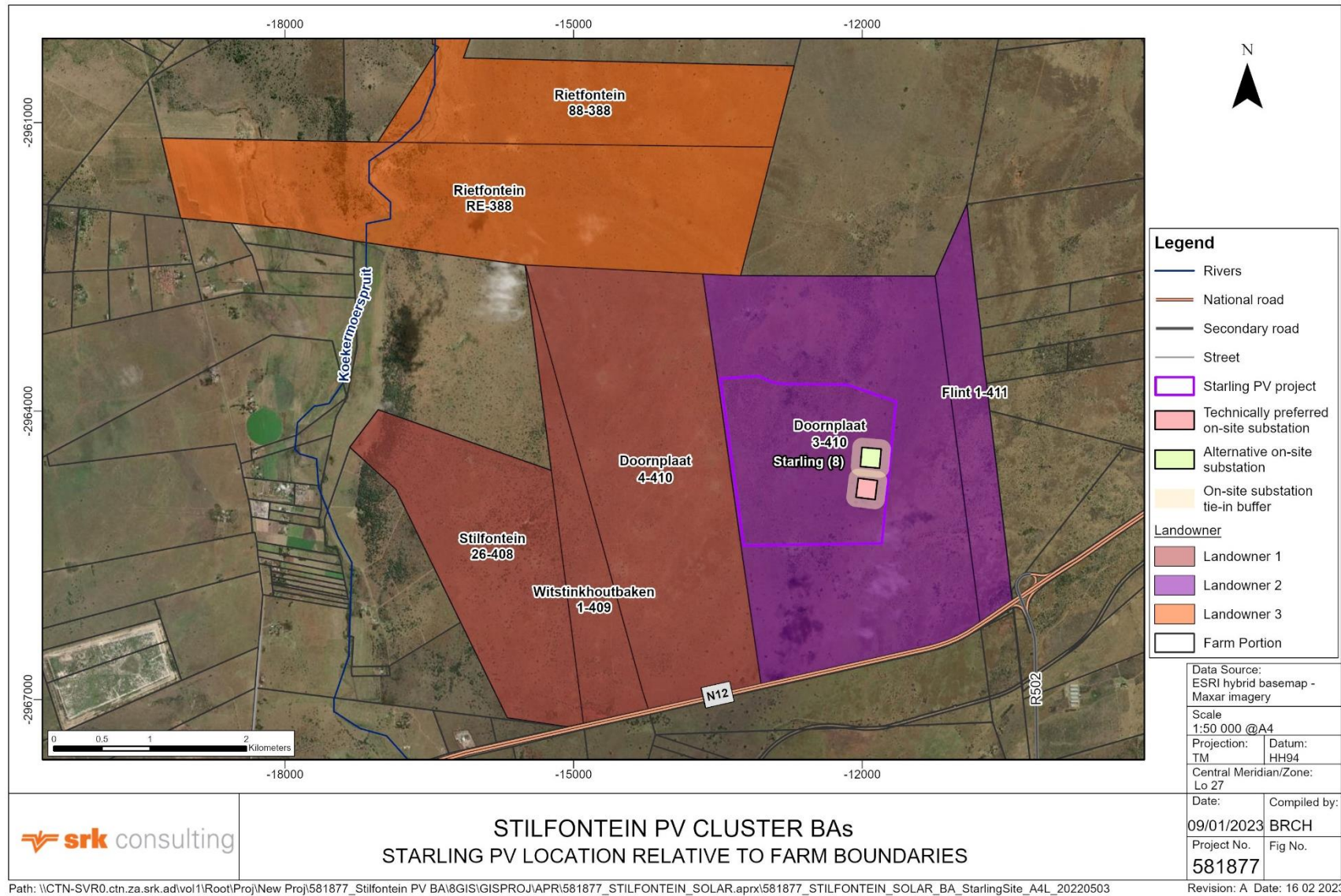


Figure 1-2: Location of the Starling Project

1.3 Content of the Report

The EIA Regulations, 2014 (R982 of 2014, as amended by R326 of 2017), prescribe the required content of a specialist report prepared in terms of the EIA Regulations, 2014. These requirements, and the sections of this SIA in which they are addressed, are summarised in Table 1-1.

Table 1-1: Required content of a specialist report

App 6	Item	Section
(a) (i)	Details of the specialist who prepared the report;	Page ii, App B
(a) (ii)	Expertise of that specialist to compile a specialist report, including a curriculum vitae,	Page ii, App B
(b)	A declaration that the specialist is independent in a form as may be specified by the competent authority;	App C
(c)	An indication of the scope of, and the purpose for which, the report was prepared;	1.2
(cA)	An indication of the quality and age of base data used for the specialist report;	2.2.1, 2.3
(cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	4
(d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	2.2.1, 2.2.2
(e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	2.2
(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;	5
(g)	An identification of any areas to be avoided, including buffers;	4.2.3, 6.1.4
(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;	n/a, see 4.2.3
(i)	A description of any assumptions made and any uncertainties or gaps in knowledge;	2.3
(j)	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	7
(k)	Any mitigation measures for inclusion in the EMPr;	Table 7-1
(l)	Any conditions for inclusion in the environmental authorisation;	Table 7-1
(m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Table 7-1
(n) (i)	A reasoned opinion whether the proposed activity or portions thereof should be authorised;	7.2
(n) (iA)	A reasoned opinion regarding the acceptability of the proposed activity or activities;	7.2
(n) (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, and where applicable, the closure plan;	Table 7-1
(o)	A description of any consultation process that was undertaken during the course of preparing the specialist report;	2.2.2
(p)	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	5
(q)	Any other information requested by the competent authority.	n/a

2 Approach

SIA is the process of identifying and managing the social issues of project development and includes the effective engagement of affected communities in participatory processes of identification, assessment and management of social impacts. Besides identifying and effectively mitigating negative impacts, SIA also focuses on enhancing the benefits of projects to impacted communities, in part to earn a project its 'social licence to operate' (Vanclay, Esteves, Aucamp, & Franks, 2015).

2.1 Guidelines

A number of South African and international guidelines inform socio-economic impact assessment. These include the Guidelines for Social Impact Assessment (Barbour, 2007) and Involving Economists in EIA Processes (Van Zyl, de Wit, & Leiman, 2005) published by the (Western Cape) Department of Environmental Affairs and Development Planning (DEA&DP) and the Guidance for Assessing and Managing Social Impacts of Projects (Vanclay, Esteves, Aucamp, & Franks, 2015) issued by the International Association for Impact Assessment (IAIA).

2.1.1 DEA&DP Guideline for Social Impact Assessment

The DEA&DP Guideline for Social Impact Assessment (Barbour, 2007) comprises the following key activities:

- Describe and obtain an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determine the need and scope of the SIA;
- Collect baseline data on the current social environment and historical social trends;
- Identify and collect data on the social impact assessment variables and social change processes related to the proposed intervention;
- Assess and document the significance of social impacts associated with the proposed intervention; and
- Identify alternatives and mitigation measures.

The Guideline elaborates that a social study should seek to, amongst others:

- Assess the proposed development in terms of its fit with the relevant legislative, policy and planning requirements;
- Identify and assess the factors that contribute to the overall quality of life (social wellbeing) of people not just their standard of living;
- Identify and assess the needs of vulnerable, at risk, groups and/or ethnic minorities or indigenous peoples;
- Clearly identify which individuals, groups, organisations and communities stand to benefit from the proposed intervention and those that stand to be negatively affected. In so doing the assessment must identify and emphasize vulnerable and underrepresented groups;
- Recognise that social, economic and biophysical systems and impacts are inextricably interconnected, and identify and understand the impact pathways created when changes in one domain trigger impacts across other domains;
- Acknowledge and incorporate local knowledge and experience into the assessment process; and
- Identify and assess developmental opportunities and not merely the mitigation of negative or unintended outcomes.

The Guideline further identifies areas where social specialist input is particularly warranted, namely areas:

- Where vulnerable communities are present;
- With high poverty and unemployment levels;
- Where access to services, mobility and community networks are affected;
- Where local livelihoods depend on access to and use of environmental resources and services;
- Of important tourism or recreation value; and
- Where the existing character and “sense of place” will be altered.

A number of these characteristics are not applicable to the area directly affected by the projects, as the project area consists of virtually uninhabited privately owned farms and projects will be implemented based on contractual agreements with owners. The projects are not expected to directly affect communities in the vicinity or impede access to resources used by those communities. Communities in the wider region can, however, be considered vulnerable, as the socio-economic baseline provided in Section 1.1 records low education levels, precarious employment types, low income levels and poor access to certain basic services in Ward 27 of the JB Marks Local Municipality (LM) and Ward 18 of the City of Mathlosana LM.

2.1.2 DEA&DP Guideline for Involving Economists in EIA Processes

The DEA&DP Guideline for Involving Economists in EIA Processes (Van Zyl, de Wit, & Leiman, 2005) provides guidance on the involvement of economic specialists in projects that fulfil certain criteria, e.g.

- Large, high intensity type projects (e.g. large infrastructure);
- Projects conceived because of their perceived strategic economic benefits (e.g. new roads, industrial development areas, etc.);
- Projects requiring a large workforce relative to the size of the existing workforce in the area;
- Projects that are likely to change spending patterns in an area (e.g. a toll road in a rural area);
- A change in land use from the prevailing use; and
- A land use that is in conflict with an adopted plan or vision for the area;

And in areas:

- Containing vulnerable communities;
- Where local livelihoods depend on environmental resources;
- Where ecosystems provide valuable services;
- That are protected areas or areas with intact wilderness qualities, or pristine ecosystems; and
- Of important tourism or recreation value.

The guideline focuses on the assessment of economic aspects, such as:

- Financial viability or justification for the project in the case of public sector projects that do not require financial viability (e.g. roads, housing projects and other public infrastructure);
- Distortions that lead to financial viability, but are not to the benefit of wider society creating a false ‘viability’ when seen from a broader, economic, perspective;
- Environmental externalities that are not accounted for in economic costs and benefits;

- Degree of fit with economic development planning in the area (i.e. does the project complement economic and spatial plans);
- Linkage effects that allow a project to generate added benefits in the form of employment, incomes, and increased production; and
- Macro-economic risks (i.e. whether the project has the potential to change exchange rates, interest rates or local factor and product prices, for large projects).

The proposed project triggers some of the criteria listed above: It is an infrastructure project with intended strategic public and economic benefits, notably by improving South African energy security and reducing national greenhouse gas emissions associated with energy generation. It also results in a change in land use in the area from low-intensity farming to energy generation, though landowners indicate that livestock farming can likely continue to some degree outside of the immediate project area. However, by and large the project does not qualify as a major infrastructure project.

The project is likely to change spending patterns in the area through Socio-Economic Development (SED) initiatives implemented by the project, and revenue accruing to communities who have a share in the project, as previously prescribed by Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bidding requirements (see Section 3.2)¹. Ownership would be likely to result substantial revenue accruing to the community over time, albeit likely some years after project start (see Section 6.2.3).

Social and economic impacts are closely related, which reflects in the similarity of criteria used to determine which projects warrant economic and social assessment. As noted above, few of the social or economic criteria signalling a sensitive receiving (socio-economic) environment or project apply directly to the proposed project.

As such, some but not all of the economic impacts listed above were excluded from the scope of work of this socio-economic study, which primarily focuses on socio-economic impacts related to project implementation and employment, and discusses the likely implications of the project for surrounding communities.

The Guideline for Involving Economists in EIA Processes is thus deemed of (only) partial relevance for this study.

2.1.3 IAIA Guidance for Assessing and Managing Social Impacts of Projects

Social impacts arise from changes to people's way of life, culture, community, political systems, environment, health and wellbeing, personal and property rights and fears and aspirations. In contrast to biophysical impacts, social impacts can arise the moment there is a rumour, awareness or announcement that something might happen. Social impacts are the result of complex patterns of intersecting impact pathways (Vanclay, Esteves, Aucamp, & Franks, 2015).

The IAIA Guidance for Assessing and Managing Social Impacts of Projects provides advice on good practice in the undertaking and appraisal of SIAs, and the adaptive management of projects to address the social issues. The guideline identifies four key phases and 26 key tasks of comprehensive SIA processes (see Figure 2-1), though applicability depends on the project context.

¹ Note that requirements of future REIPPPPs are not known and may change. As of mid-2021 IPPs can also sell limited quantities of independently-generated electricity to private end-users; such agreements are not subject to the REIPPPP socio-economic requirements.

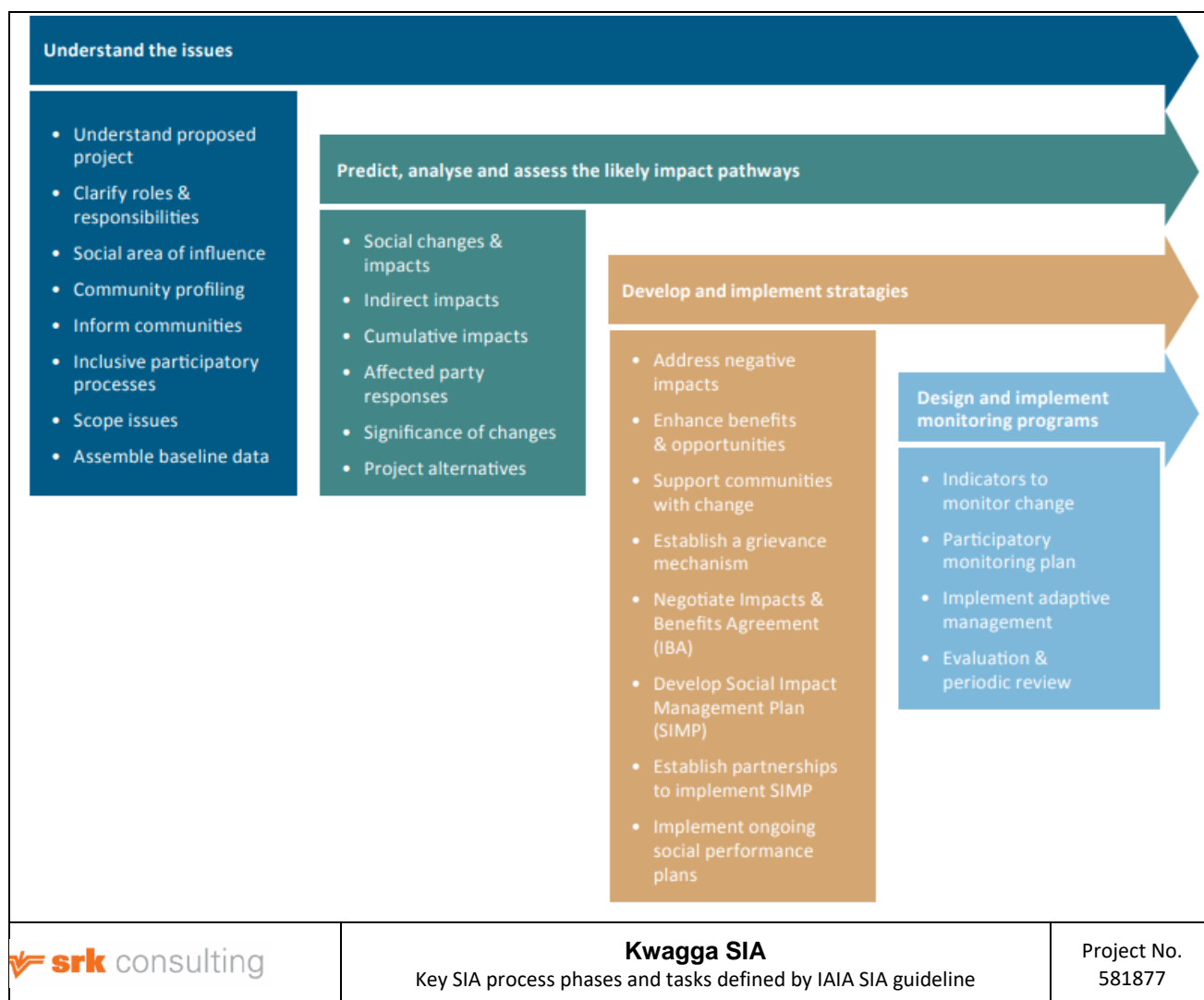


Figure 2-1: Key SIA process phases and tasks defined by IAIA SIA guideline

Source: (Vanclay, Esteves, Aucamp, & Franks, 2015)

2.2 Methodology

The following methodology was used to generate the baseline and impact assessment for the socio-economic specialist study.

2.2.1 Data Gathering

Existing secondary data from public literature, internet resources and previous studies, and primary data from telephonic interviews and email correspondence was used to compile a desktop socio-economic baseline for the affected areas, including the potentially affected communities and the local (wards) and regional (municipal) context. Sources included:

- Statistical data from Census 2011 and 2001 and the 2016 community survey;
- Provincial statistics;
- Relevant planning and policy frameworks for the area, such as SDFs and IDPs;
- Maps and aerial photographs of the area; and
- Previous studies in the project area.

The most recent available data was used and cross-checked against other sources where possible. The socio-economic data is deemed sufficient to paint a socio-economic picture of the region, and has been supplemented by information provided in interviews (see Section 2.2.2).

2.2.2 Interviews

SRK engaged with key stakeholders via phone and email as laid out in Table 2-1, to inform the SIA, notably baseline description and impact identification.

Remote engagement was deemed appropriate for this project for the following reasons:

- The project is located on privately owned land;
- The landowners are beneficiaries of the project and can be contacted via phone and email;
- There are no communities / settlements within several kilometres of the site; and
- Key stakeholders such as local councillors can be contacted via phone.

Table 2-1: Stakeholder engagement undertaken for the SIA

Stakeholder	Capacity	Engagement
Landowner	Rietfontein RE/388 and 88/388	Responded by email on 11 April 2022
Landowner	Stilfontein RE26/408, 21/409 and RE4/410	Telephonic interview on 22 April 2022
N. Rikhotso	JB Marks Local Municipality (Environmental Department)	Responded by email on 26 April 2022
F. Lephale	DKKDM: Environmental Health Department	Responded by email on 5 May 2022
F. Essrich	JB Marks Consumer and Ratepayers Association	Telephonic interview on 3 May 2022
Owner	Frontier Bullets	Responded by email on 11 April 2022
Owner	Klub Louico	Telephonic interview on 22 April 2022 Distributed project information by WhatsApp to neighbours
Owner	Neighbouring landowner	Requested information on 28 April 2022

The specialist also extensively and repeatedly attempted to engage with other stakeholders by phone and email, including representatives of the DKKDM, JB Marks and City of Matlosana LM, ward councillors and neighbouring business owners and landowners, but did not receive responses in time for incorporation to this report. Any future comments will be addressed and/or incorporated into the BA Report.

Stakeholder comments and perceptions are summarised in Section 5.

2.2.3 Data Analysis

The information was analysed to ascertain the socio-economic conditions and characteristics of the study area. Analysis involved the integration and comparison of data:

- From different sources for the same area, to derive a holistic picture of socio-economic conditions in any one area; and
- Across different timeframes to identify key trends.

The socio-economic baseline environment is described in Chapter 4.

2.2.4 Impact Assessment

Potential socio-economic impacts of the proposed project were identified based on the baseline data, project description, review of other studies for similar projects and professional experience.

The significance of the socio-economic impacts was assessed using the prescribed SRK impact rating methodology described in Appendix C. It includes the rating of impact significance determined by scale, duration, intensity and probability of an impact. This rating is then qualified with a confidence rating. The alternatives were comparatively assessed and the preferred alternative indicated.

Mitigation measures for the reduction of the significance of negative impacts (and enhancement of benefits) were identified and the impact significance re-rated assuming the effective implementation of mitigation measures.

In this context it must be noted, specifically with regards to social impacts, that:

- These impacts are not easily quantified and often need to be inferred rather than measured. A combination of insight into social processes in general and knowledge of the community under study is important to draw valid inferences;
- Social impacts are often multifaceted and inter-connected and therefore not easily disaggregated into separate impacts;
- Communities are dynamic and in a continual process of change. The announcement of the proposed Stilfontein PV Cluster project (prior to the commencement of the SIA) is one factor contributing to such change, but it is often difficult to identify when an impact is attributable to the project or to other factors (or a combination thereof); and
- Human beings are naturally continuously adapting to changes in their environment, including project impacts. As such, these impacts change in significance for those affected.

2.3 Assumptions and Limitations

As is standard practice, the study is based on a number of assumptions and is subject to certain limitations, which should be borne in mind when considering information presented in this report. The validity of the findings of the study is not expected to be affected by these assumptions and limitations:

- The assessment is based on information supplied to SRK, which is assumed to be accurate. This includes the proposed location and dimensions of the project as well as information on *inter alia* employment and community investments;
- It is assumed that the entire project footprint is developed and that technology alternatives will not affect the magnitude of social impacts;
- It is assumed that owners of the affected farms are appropriately compensated for any loss in income, crops, infrastructure or land incurred as a result of the project. The SIA does not, therefore, focus on impacts on private landowners. It is assumed that landowners have communicated any constraints associated with the placement of project infrastructure, due to e.g. homesteads, during project planning and development;
- This study does not motivate for or against the project, but rather seeks to give insight into the socio-economic character of the area and the significance of the anticipated socio-economic impacts created by the project. In the event that unacceptable social impacts are identified, this is clearly indicated in the report;
- The report is based largely on secondary data gathered during a desktop analysis. Limited primary data was also collected via phone interviews or email engagement with landowners and local councillors;

- The report is based on the most recent available census data that is from Census 2011 (full census) and the 2016 Community Survey (limited census). Given the low population growth rates recorded in the past and the remoteness of the area, the data is considered sufficient to paint a socio-economic picture of the region; and
- It is assumed that no significant developments or changes in the socio-economic characteristics will take place in the area of influence between data collection and submission of the report.

Other assumptions made in the report are explicitly stated in the relevant sections.

3 Project Description

3.1 Project Location

The project is located approximately 6 km north-east of the town of Stilfontein and 20 km south-west of Potchefstroom, directly north of the N12. The project lies within the Klerksdorp REDZ and the Central Strategic Transmission Corridor (STC) (see Figure 1-1 and Figure 1-2).

Stilfontein was established in 1949 as a residential centre for three large gold mines, the Hartebeesfontein, Buffelsfontein and Stilfontein mines (Wikipedia, 2021), now partially closed. Potchefstroom is one of the largest urban centres in North West Province and accommodates five tertiary institutions, including the Potchefstroom Campus of the North-West University. Industry (including steel, food and chemical processing), services and agriculture are important economic sectors (Wikipedia, 2021a).

The N12 National Road dual carriageway connects Kimberley and Klerksdorp (west of the project site) to Potchefstroom and Johannesburg (east of the project site). The project can be directly accessed from the N12.

The project area has a rural setting. It is dominated by grassland and low bushes. The existing 400 kV Hermes – Pluto 1 and 2 powerlines traverse the site in a north-south direction (see Figure 3-1). A few farmsteads and extensive agricultural lands are located in the Stilfontein Cluster project area.



Figure 3-1: View of the project area

Source: SRK, February 2022

3.2 Project Description

This section provides a concise description of the proposed project as provided at the time of assessment, focusing on elements relevant to the SIA. The general project description may still be refined, and a more detailed description is provided in the BAR for the project. Unless changes to the project description affect aspects directly assessed in this SIA, they are not expected to affect the findings of this study.

The project forms part of the proposed, larger Stilfontein PV Cluster, which comprises up to nine up to 150 MW PV facilities, as well as nine on-site substations, a Main Transmission Substation (MTS), 11-33 kV, 132 kV and 400 kV transmission lines, Battery Energy Storage Systems (BESS) and ancillary infrastructure. Separate EA applications will be submitted for the individual PV facilities and grid connections through separate BA processes.

The Starling PV facility comprises the following key components (see Figure 1-2):

- PV arrays with a total maximum export capacity of up to 150 MW on a notional development area (footprint) of ~220 to 405 ha;
- Lithium-Ion BESS;
- A 11-33kV overhead powerline(s) and / or underground cabling between the PV facility and Starling on-site substation;
- IPP-side of the 11-33/132 kV Starling on-site substation on a notional development area (footprint) of ~4 ha, with a 100 m wide buffer around the substation to accommodate powerline tie-ins at any point of the substation and other associated activities. Two alternative locations are identified for the substation (see Figure 1-2); and
- Internal infrastructure and structures, including gravel roads, fencing, lighting, stormwater, water supply and water storage infrastructure, laydown areas and offices.

Different solar cell and panel technologies are being considered; these do not meaningfully affect the significance of social impacts (see Section 6).

The project is located on private land, based on a contractual agreement with the landowner. No physical or economic displacement of third parties is required.

The project will utilise water during construction for domestic use (ablutions, drinking: ~225 m³ / month, civil works (compaction of fill material, cement batching etc.: ~400 m³ in total during construction) and dust suppression on roads (~15 l / m²). During operations, water is primarily required for PV panel cleaning (up to ~18 000 m³ / annum).

Capital expenditure (CapEx) is ~R1.1 billion, possibly more if a BESS is installed. Approximately 45% of PV CapEx and 15% of BESS CapEx will be expended in South Africa. The proportion of CapEx that will be spent in local areas (in North West Province) will be determined at detailed design stage. Operation expenditure (OpEx) is ~R600 million over the 20-year lifetime of the facility (or R32 million per year at 2022 prices).

The construction of the PV facility is expected to generate ~220 jobs (~100 skilled/semi-skilled and ~120 unskilled) during the 18-24 month construction period. Construction will primarily be undertaken by contractors, most of whom are expected to be Small and Medium Enterprises (SMMEs) from the Local and District Municipalities. Operation will create ~20 permanent jobs (half skilled, half unskilled) over the 20-year life span of the facility. No workers will be accommodated onsite.

DMRE sets out specific economic development targets or focus areas in its REIPPPP Bid Window Request for Proposal, which are either compulsory and/or influence the functionality score of a project bid. These change over time, and requirements that may be applicable to the project are not yet known. For context, Bid Window 5 (2021) included the following requirements that are relevant to socio-economic impacts of the project (DMRE, 2021):

- Employment:
 - Job creation - emphasises jobs for South African citizens, black people (including black women and black youth) and citizens from local communities;
 - Management Control - focuses on the involvement of black people (in particular black women) in Board Directorship, executive management and senior management roles of the Project Company;
 - Skill Development - focuses on the contributions made by the Project Company to improve the skills of employees, learners at higher education institutions and disabled persons; and

- Enterprise and Supplier Development - focuses on the development of emerging enterprises, including emerging enterprises located in local communities, and on procuring from black enterprises and enterprises owned by black women.
- Procurement:
 - Local content - requires compliance with local content designations under South African procurement law, and that a certain percentage of the total value of the Project be spent on South African goods and services. Bid Window 5 required at least 40% of local content during construction, in addition to the use of designated components as determined by the Department of Trade, Industry and Competition. For the first time, local content commitments were also required during operation (Mantashe, 2021); and
 - Enterprise and Supplier Development - which focuses on the development of emerging enterprises, including emerging enterprises located in local communities; and on procuring from black enterprises and enterprises owned by black women.
- Community and social investment:
 - Ownership - requires minimum 49% ownership by South African entities and 2.5% ownership by local communities in the Project Company, and 30% ownership by black people including, for the first time, 5% ownership by black women in the Project Company and in the contractors responsible for construction and operations (Mantashe, 2021);
 - Enterprise and Supplier Development - focuses on the development of emerging enterprises, including emerging enterprises located in local communities, and on procuring from black enterprises and enterprises owned by black women; and
 - Socio-economic development - aims to address socio-economic needs including those of local communities.

As of mid-2021 IPPs can also sell independently-generated electricity to private end-users; such agreements are not subject to the REIPPPP socio-economic requirements.

4 Socio-economic Baseline

4.1 Regional Socio-Economic Environment

4.1.1 Regional Context

The project lies in the DKKDM, which comprises the JB Marks, City of Matlosana and Maquassi Hills LMs. The DKKDM is situated in the south-eastern part of the North West Province and borders the Free State and Gauteng Provinces. The DKKDM is the smallest district in the North West Province, covering 14 759 km² (14%) of the provincial area, with a population of 742 822 in 2016, or 20% of the provincial population (Wazimap, 2022a) (DKKDM, 2017a). The area has a number of decommissioned gold mines (Batho Earth & SED, 2020). The district is strategically located along the national transport corridor between Johannesburg and Cape Town, with the N12 corridor forming the main regional development axis and a potential focal point for future development (Municipalities of South Africa, 2022a).

4.1.2 Demographics

The DKKDM population increased by 12% from 2011 to 2016, at a similar rate as the North West Province population (Wazimap, 2022a). Annualised population growth of the DKKDM averaged at 1.8% between 2009 and 2019, which is close to the provincial average of 2% (Figure 4-1) (DKKDM, 2020a).

The City of Matlosana is the most populous LM in the District, with approximately 417 000 residents in 2016, followed by JB Marks (243 500) and Maquassi Hills LMs (82 000) (Wazimap, 2022b). The DKKDM population is comprised of 82% Black Africans, 4% Coloureds, 14% Whites and less than 1% Indians. More than 57% of the District’s residents live in the City of Matlosana LM (DKKDM, 2017a).

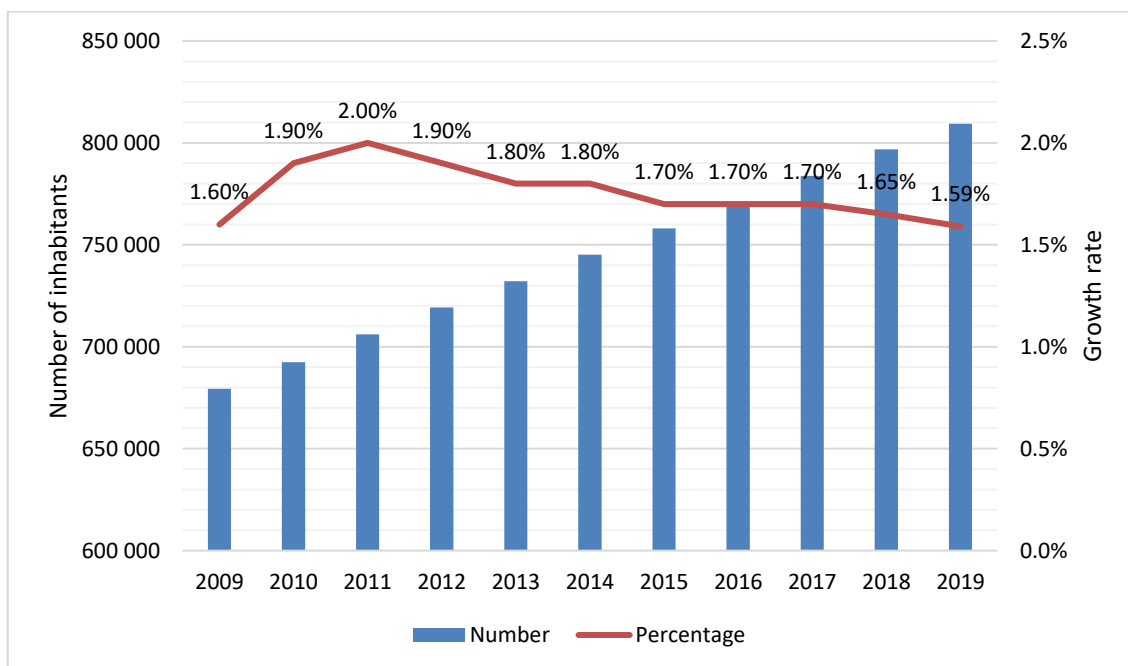


Figure 4-1: NW Dr Kenneth Kaunda population growth 2009-2019

Source: (DKKDM, 2020a)

4.1.3 Economy

The DKKDM economy is dominated by the services (tertiary) sector, which accounts for 77.1% of DKKDM Regional Gross Domestic Product (GDP), followed by mining (primary sector) (8%) and manufacturing (secondary sector) (5%) (NWDC, 2021a).

The tertiary sector provides 73% of jobs in DKKDM, followed by the secondary sector (15%) and the primary sector (13%) – the latter two are thus more labour intensive relative to their GDP contribution. The three main economic sectors in the District, all within the tertiary sector, are community services (27%), trade (20%) and finance (14%) (Municipalities of South Africa, 2022b) (DKKDM, 2021a).

In 2018, job opportunities within DKKDM were approximately evenly distributed across the three LMs: City of Matlosana LM provided more than 34% of jobs, followed by JB Marks LM (~34%) and Maquassi Hills LM (30%) (DKKDM, 2020a) (DKKDM, 2021a).

South Africa's year-on-year GDP growth rate has decreased over time, and this is mirrored in declining GDP growth of the North West Province. Average annual GDP growth rate in the North West Province since 2008 was half that achieved in the Western Cape and Gauteng (1.4% versus 3.1%) and quite volatile, which is attributed to the North West's historically high dependence on the mining sector (DKKDM, 2021b). Population growth has outstripped GDP growth, meaning that income per capita has reduced (Table 4-1) (NWDC, 2021a).

Table 4-1: National and provincial population and GDP growth rate 2014-2021

	2014	2015	2016	2017	2018	2019	2020	2021
South Africa % population growth	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.
North West Province % population growth	1.7	1.6	1.6	1.6	1.7	1.7	1.6	1.2
South Africa % GDP growth	1.6	1.3	0.6	1.4	0.8	0.2	-6.4	5.0
North West Province % GDP growth	-3.0	5.4	-3.0	2.1	0.5	-1.0	-8.0	6.0

Source: (NWDC, 2021a)

In 2020, the COVID-19 pandemic and associated domestic lockdowns placed the already contracting national economy under severe economic strain, and the national economy contracted by an unprecedented 51% in the second quarter of 2020 (Western Cape Provincial Treasury, 2020b). Ultimately the national economy (GDP) contracted 6.4% in 2020, with the North West Province experiencing a larger contraction at 8%. Economic growth remained subdued nationally in 2021 with the persistence of the COVID-19 pandemic and outbreak of widespread rioting and looting of industries in parts of the country in July 2021.

4.1.4 Social Characteristics

Employment opportunities in the DKKDM are limited. In rural areas, employment is primarily in the mining sector, which provides opportunities for primarily semi-skilled and unskilled workers and does not pay high wages. Towns have a slightly more diverse employment profile. Generally, the District is characterised by high levels of poverty and low levels of education.

The unemployment rate in the DKKDM was 23.5% in 2019, and unemployed people in DKKDM made up 22% of all unemployed people in the North West Province (slightly higher than its provincial share of the population) (DKKDM, 2020a). The number of unemployed people increased annually by 2.7% on average between 2009 and 2019, roughly in line with the 2.8% annual average increase in the North West Province (DKKDM, 2020a).

The Human Development Index (HDI)² scores in the DKKDM are similar to national HDI scores at an average of 0.56 and 0.58 respectively in 2010 (Figure 4-2), and are slightly higher than the provincial average of 0.53, indicating that the DKKDM is relatively better off than other district municipalities in

² The HDI quantifies the extent of human development of a community and is a "measure of people's ability to live long and healthy lives, to communicate, to participate in the life of the community and to have sufficient resources to make a decent living" (NWP, 2013, p. 34).

the North West Province. Poverty and inequality are entrenched throughout the province (NWP, 2013) and rising, affecting nearly one third of provincial residents. DKKDM poverty levels are slightly lower than the provincial average: the DKKDM Poverty Gap Index³ increased from 27.8% to 30.2% between 2013 and 2019, whereas it increased from 27.9% to 31.4% across the North West (NWDC, 2021b) (NWDC, 2016). The number of people living in poverty increased by 12.3% in the DKKDM between 2013 and 2019 and by 15% in the North West (NWDC, 2021a) (NWDC, 2016) – which does not yet take the economic effects of the COVID-19 pandemic into account.

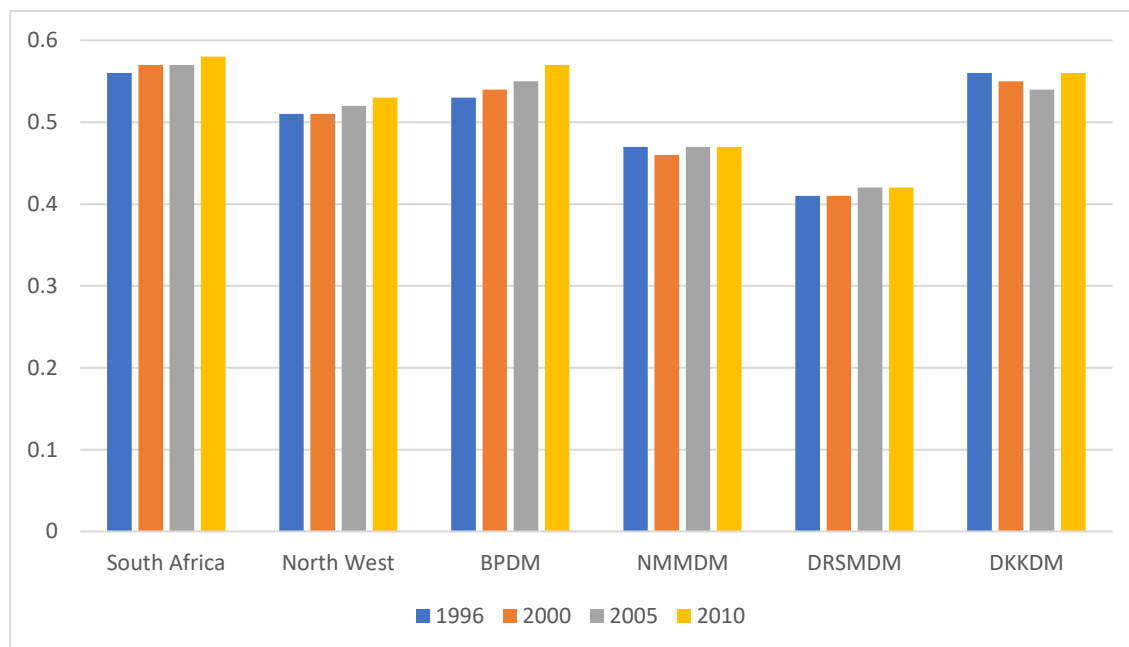


Figure 4-2: North West Province and District Municipalities’ Human Development Index scores

Source: Adapted from (NWP, 2013)

The DKKDM is serviced by four hospitals and 35 permanent Community Health Care and Clinic facilities (DKKDM, 2020a). Approximately 13% (104 000 people) of the DKKDM population have tested positive for Human Immunodeficiency Virus (HIV) in 2019. Between 1996 and 2010, the number of people living with HIV in the North West Province increased by 79%, while the number of people living with AIDS had increased by 96% (NWP, 2013). An increase in the average annual rate (2%) of HIV infection in the DKKDM was observed between 2009 to 2019; lower than the provincial average of 3% (DKKDM, 2020a). While tuberculosis was responsible for 14% of deaths in the district in 2011 (DKKDM, 2015), this decreased to 9% in 2015 (DKKDM, 2020b). In 2020, the DKKDM had seven quarantine sites for COVID-19 positive patients. By February 2022, 52 008 COVID-19 cases had been confirmed in the DKKDM, 27% of confirmed cases in the North West Province, and 1 951 COVID-19 deaths had been recorded (41% of provincial COVID-19 deaths) (Table 4-2) (North West Department of Health, 2022).

Approximately 83% of all households in the District had access to formal housing in 2016 (Wazimap, 2022a). The only notable other type of housing is informal housing (~13% of households in JB Marks

³ The Poverty Gap Index estimates the depth of poverty by considering how far, on the average, the poor are from that poverty line. The Poverty Gap Index is a percentage between 0% and 100%. Individuals whose income is above the poverty line have a gap of zero while individuals whose income is below the poverty line would have a gap ranging from 1% to 100% (with a theoretical value of 100% implying that the individual earns zero income). An overall value of zero implies that no one in the population is below the poverty line, while an overall value of 100% implies that everyone in the population earns zero income. A higher poverty gap index thus means that poverty is more severe.

LM) and traditional housing (765 households in JB Marks, 169 in Maquassi Hills and 4 024 in the City of Matlosana LM) (Wazimap, 2022a) (Wazimap, 2022b) (Wazimap, 2022c).

Table 4-2: North West Province District Municipalities COVID-19 statistics, February 2022

District Municipality	Cases	New Cases	Active Cases	Recoveries	Deaths
Bojanala	86 504	34	463	84 627	1 414
Dr Kenneth Kaunda	52 008	23	465	49 592	1 951
Ngaka Modiri Molema	38 759	21	498	37 470	791
Dr Ruth Segomotsi Mompati	13 455	5	54	12 858	543
Unallocated	208	1	208	0	0
Total	190 934	84	1 688	184 547	4 699

Source: (North West Department of Health, 2022)

4.1.5 Regional Role of the Renewable Energy Sector

The South African REIPPPP has been very successful in attracting investment, including investment in local component manufacturing and construction (PERO, 2018) (WCG, 2020). It also contributes to energy security and possibly lower electricity costs, with resulting socio-economic benefits, and reduces carbon emissions compared to coal-generated electricity (TIPS, 2020).

A notable feature of South Africa's REIPPPP is the heavy weighting given to socio-economic factors in bid assessments, including job creation, local content, black and community ownership, black management control, preferential procurement, enterprise development and spending on socio-economic development. By some estimates, existing community ownership trusts are slated to receive more than R27 billion in cash from their investments in IPPs over the lifetime of the projects. This may provide mechanisms to manage communities stranded as coal mining and thermal power plants are decommissioned and replaced with renewable energy sources (Intellidex, 2021)⁴.

The North West Province has a lower potential for renewable energy projects than other areas of South Africa, due to lower solar (see Figure 4-3) and wind energy (see Figure 4-4) resources. As such, it has not received as much interest from renewable energy companies as some other provinces (see Figure 4-5). However, the area may become increasingly attractive as it has spare grid capacity to evacuate renewable energy, while none is currently available in some other areas, e.g. Northern Cape.

⁴ As of mid-2021 IPPs can also sell limited quantities of independently-generated electricity to private end-users; such agreements are not subject to the REIPPPP socio-economic requirements. It is likely that certain socio-economic benefits that may be achieved under the REIPPPP, such as community ownership in the project, would not materialize, or be lower, if a private end-user agreement is pursued for the project.

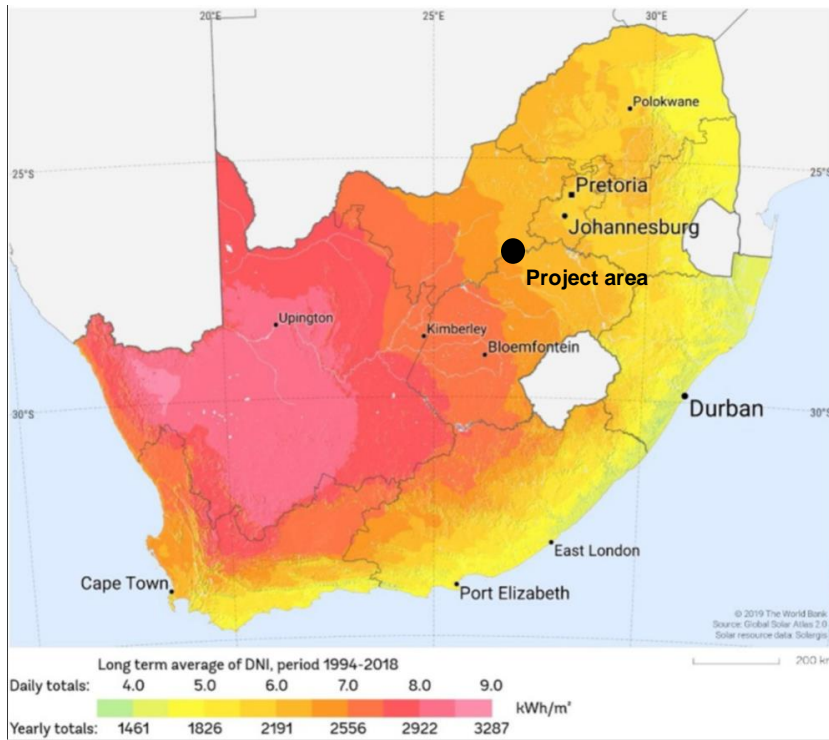


Figure 4-3: Solar resource map for South Africa

Source: (Akinbami, Oke, & Bodunrin, 2021)

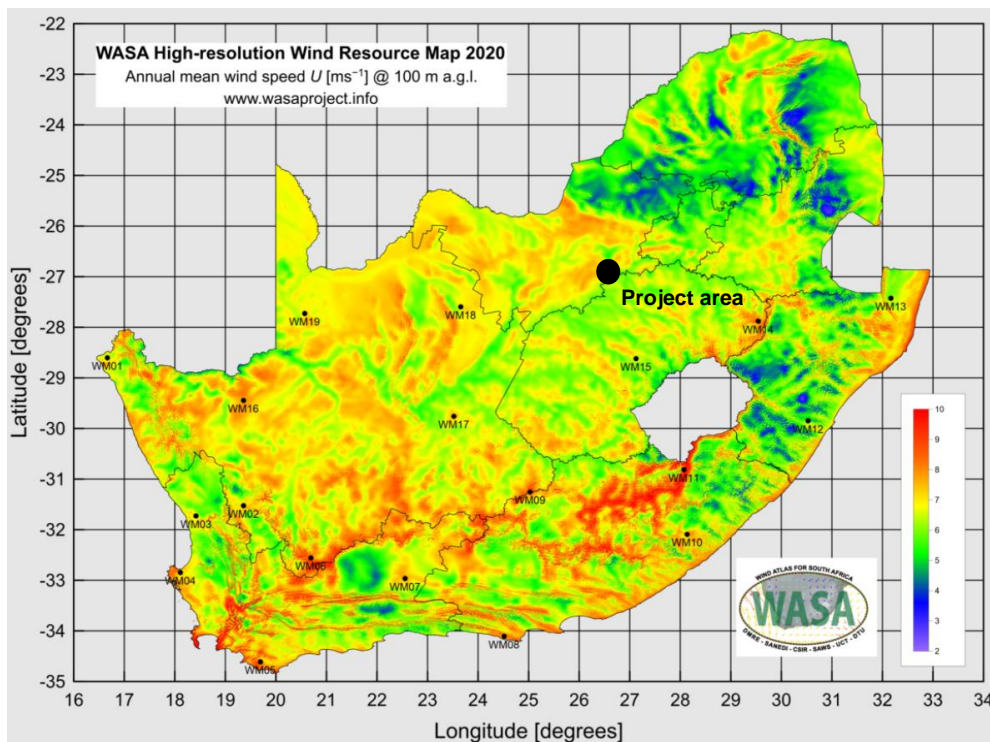


Figure 4-4: Diab’s wind atlas (left) and Hagemann’s wind atlas (right)

Source: (WASA, 2020)

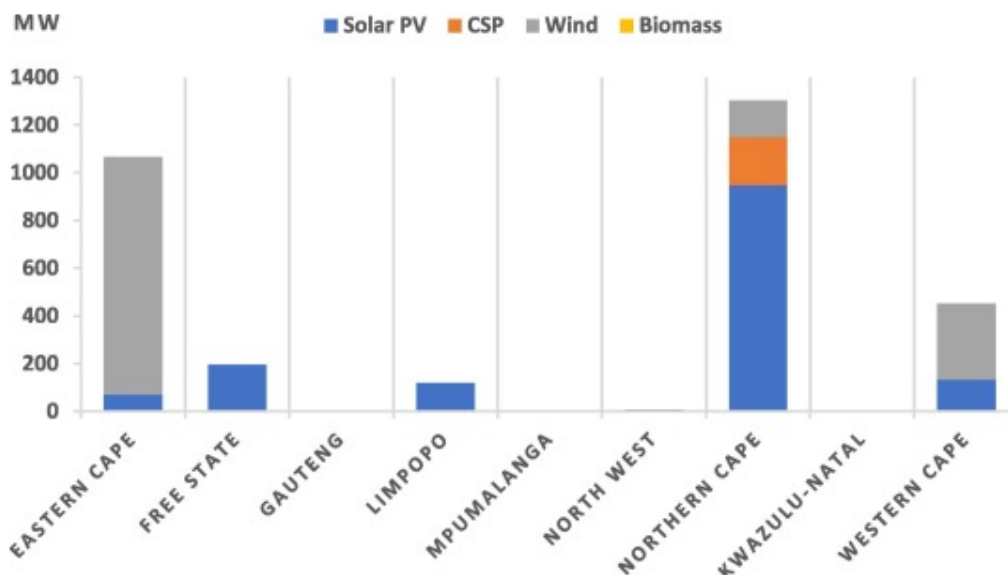


Figure 4-5: Distribution of renewable energy production in South African (2020)

Source: (Akinbami, Oke, & Bodunrin, 2021)

Four renewable energy projects were awarded in the North West Province during the 2018 REIPPPP Bid Window 4: Waterloo (75 MW) near Vryburg, Zeerust (75 MW) near Zeerust, Bokomaso (68 MW) near Rustenburg and De Wildt (50 MW) near Brits, all of which were operational as of early 2021 (DMRE, n.d.). These projects contribute(d) to local employment (mostly during construction) and development of communities within a 50 km radius through investment in SED projects and Enterprise Development (ED) (Waterloo Solar, n.d.), (De Wildt Solar, n.d.). None of these are located in the DKKDM.

Although several solar farms in the Klerksdorp REDZ received EA in the past (see Table 4-3 and Figure 4-6), none have established, and the project area has not yet benefitted from renewable energy projects. The Klerksdorp REDZ was declared in 2020 during the second REDZ designation round, in a specific attempt to generate a renewables industry near coal and gold mining towns to begin the process of just transition, i.e. where the poor and working class are not left behind in an energy transition process (Creamer T. , 2020).

Table 4-3: Renewable energy projects in the project region

Project	DFFE Reference	Capacity	EA Status
Kabi Vaalkop PV Facility	12/12/20/2513/4/AM1	n/a	Approved
Kabi Vaalkop PV Facility	12/12/20/2513/4	75 MW	Approved
Buffels Solar PV 1	14/12/16/3/3/2/777	75 MW	Approved
Buffels Solar PV 2	14/12/16/3/3/2/778	100 MW	Approved
YMS Mineral Resources PV Plant	12/12/20/2629/AM1	20 MW	Approved
Witkop Solar PV II	12/12/20/2507/2	61 MW	In process

Source: (DFFE, 2022)

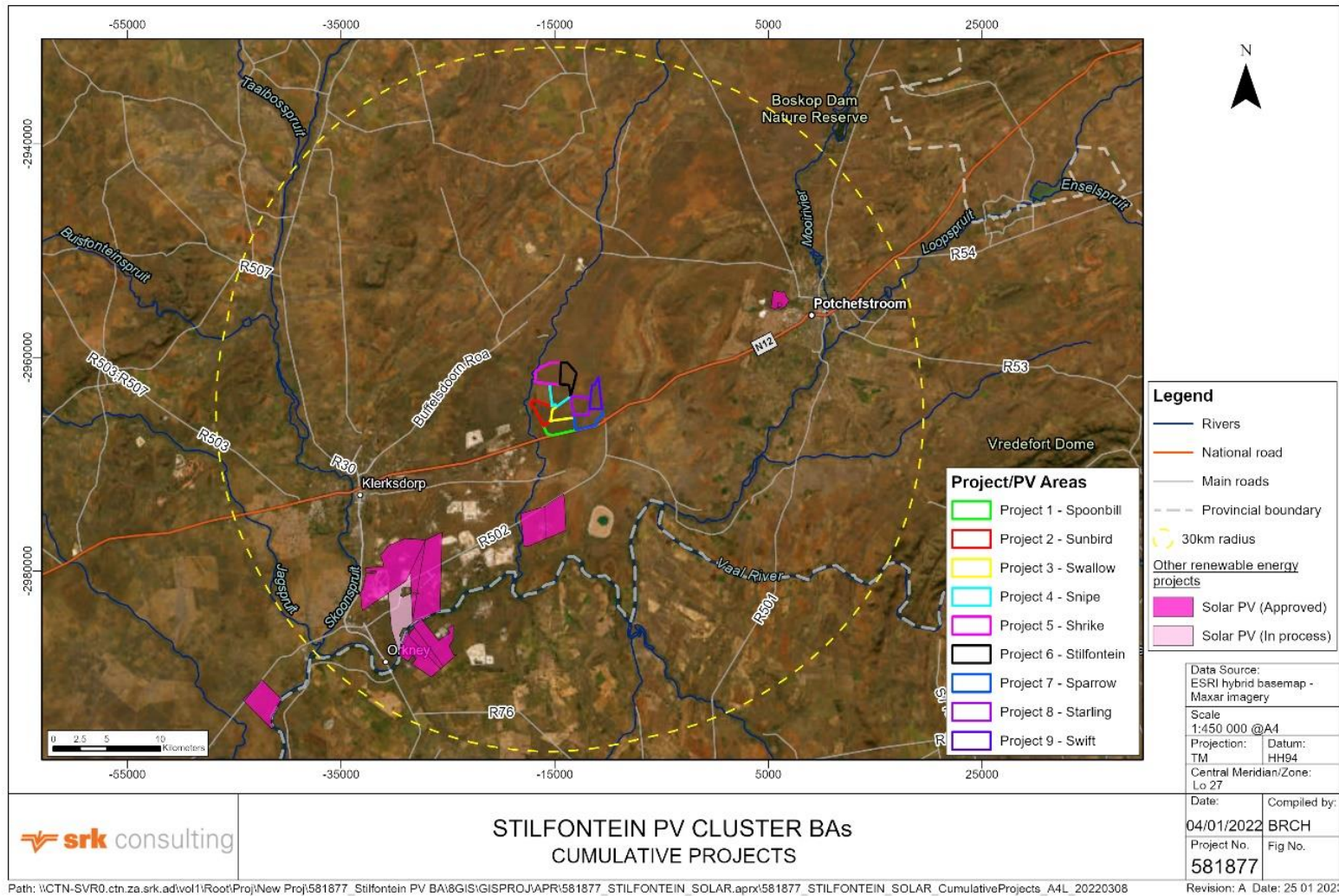


Figure 4-6: Renewable energy projects in the project region

Source: (DFFE, 2022)

4.2 Local Socio-Economic Environment

The proposed Stilfontein PV Cluster is located in the JB Marks LM, with only the south-western portion falling within the City of Matlosana LM (see Figure 1-1 and Figure 4-7). These are described in the sections below. See Section 3.1 for a description of activities in adjacent areas.

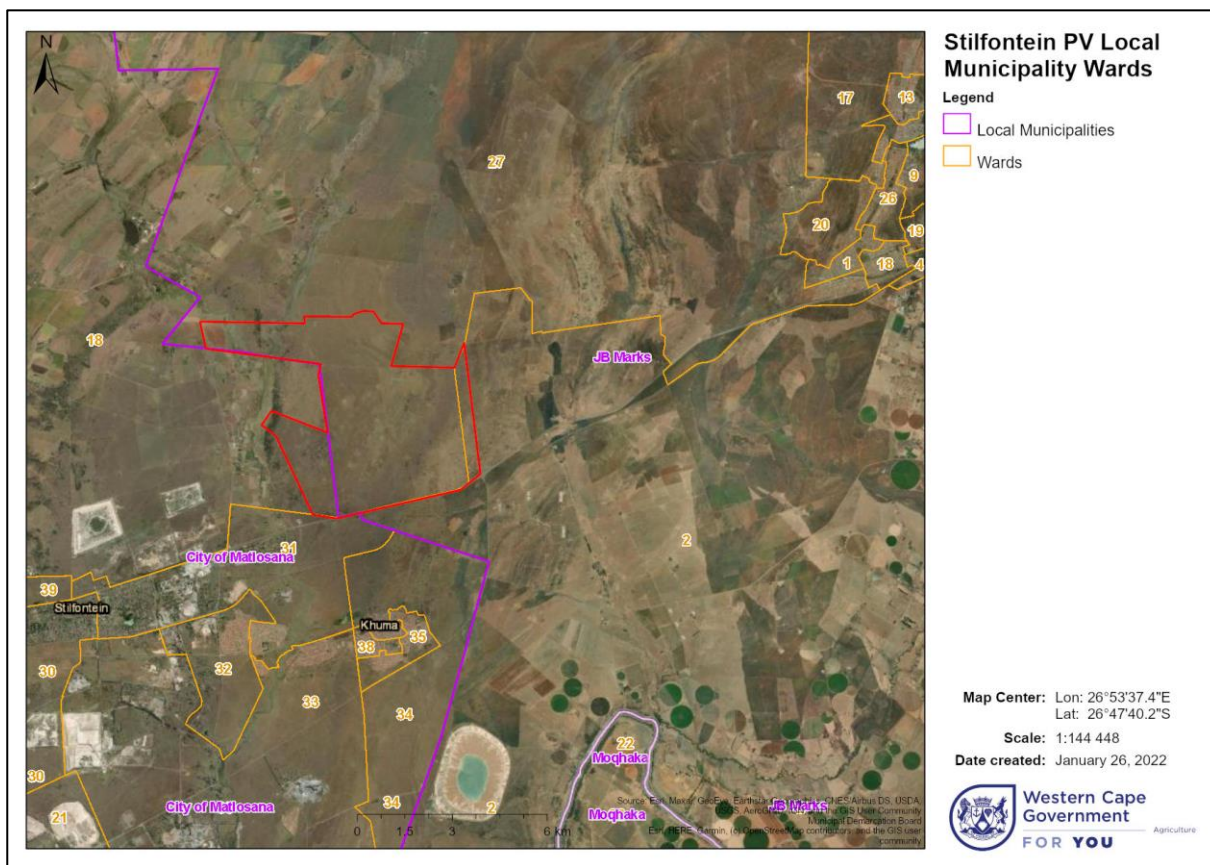


Figure 4-7: Location of the Stilfontein Cluster (in red) relative to LMs and Wards

4.2.1 JB Marks LM

In August 2016, the former Ventersdorp and Tlokwe City LMs were amalgamated to form the JB Marks LM. The JB Marks LM is the largest of the three LMs in the District, with an area of 6 410 km², ~50% of the District’s geographical area (Municipalities of South Africa, 2022b). JB Marks LM is divided into 34 wards, of which Wards 2, 3, 27, 28, 31, 33, 34 are large rural wards, while the remainder are smaller and associated with the urban settlements of Potchefstroom and Ventersdorp. The majority of the Stilfontein PV Cluster lies on the south-western boundary of Ward 27, while a small eastern portion of the Cluster falls within Ward 2.

4.2.1.1 Demographics

The population size of the JB Marks LM increased by 17% between 2011 and 2016 to 243 528, and the LM population thus increased faster than the DKKDM population, which grew by 12%. Approximately 33% of the DKKDM population resides in the JB Marks LM (Wazimap, 2022c), of which the majority live in Potchefstroom and Ventersdorp (Batho Earth & SED, 2020). The population density in the JB Marks LM was estimated at 38 people / km² in 2016, significantly lower than the district average and reflecting the predominantly rural nature of the region (Wazimap, 2022c). The municipality has a relatively young population, with 35% of residents (~85 200) younger than 18 years, 60% (~146 500) between 18 – 64 years and 5% (~11 900) older than 65 years (see Figure 4-8). The population in the JB Marks LM is comprised of 77% Black Africans, 5% Coloureds and 17% Whites (see Table 4-6), while the proportion of the Black African population in Ward 2 is slightly lower at 65%

(Wazimap, 2022d). An equal number of men and women live in the LM. Average household size remained relatively constant between 2011 and 2016 at 3 individuals per household (Municipalities of South Africa, 2022b).

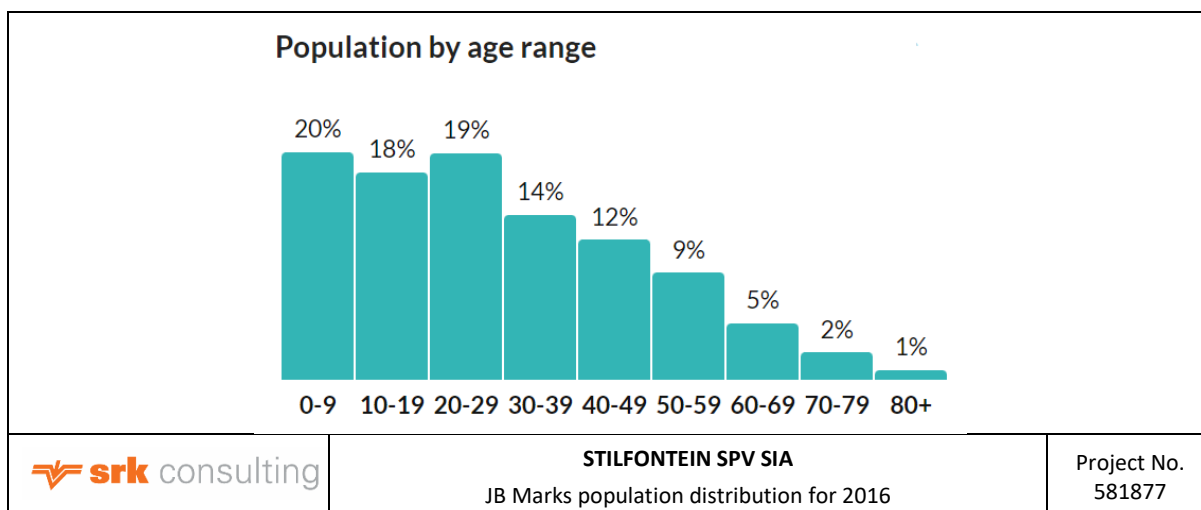


Figure 4-8: JB Marks population distribution for 2016

Source: (Wazimap, 2022c)

Table 4-4: Population distribution (number and percentage) across the JB Marks LM, DKKDM and Province

Population Group	LM		DKKDM		North West Province	
	Number	Percentage	Number	Percentage	Number	Percentage
Black African	187 656	77%	606 652	82%	3 432 379	92%
Coloured	12 987	5%	27 185	4%	61 010	2%
Indian/ Asian	1 620	1%	5 066	1%	16 686	1%
White	41 264	17%	103 919	14%	238 360	6%

Source: (Wazimap, 2022c)

4.2.1.2 Education

Education levels in the JB Marks LM are similar to those in the City of Matlosana LM, but higher than in the Maquassi Hills LM. Nearly 32% of the JB Marks population had completed secondary education (matric) in 2016, while another 30% obtained at least some secondary education. Approximately 9% of the population had received no schooling, and 11% had only (some) primary education. Some 11% of the population has a form of tertiary education, above the national average of ~8% and reflective of the presence of tertiary education facilities in Potchefstroom. Between 2011 and 2016 the number of people without schooling decreased by 0.3% (from 9.2% to 8.9%) and the number of people who completed matric increased by 3% (from 29.4% to 32.4%) (Wazimap, 2022c) (Wazimap, 2022e), indicating that education levels are improving slightly, but very slowly.

Only 22% of households had access to the internet in 2011, of those, 74% used the internet via their cell phone. Although internet access is likely to have improved in the interim, it nevertheless suggests that the local population has limited opportunities to participate in today's increasingly online world and associated educational and employment opportunities (Wazimap, 2022f).

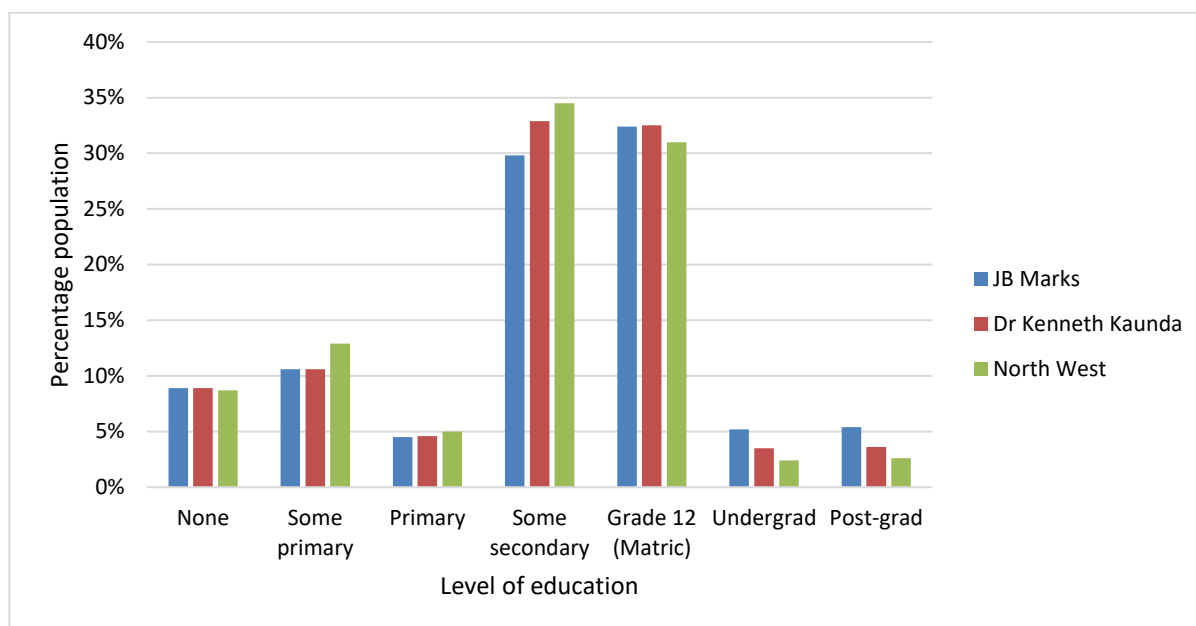


Figure 4-9: JB Marks LM, district and provincial education for 2016⁵

Source: (Wazimap, 2022c)

4.2.1.3 Social Characteristics and Economy

The average annual income of households in the JB Marks LM was R30 000 in 2011 (Wazimap, 2022e), with 39% of households earning less than R20 000 per annum. Household income distribution is comparable across the JB Marks LM, DKKDM and North West Province, although a slightly higher percentage of households has higher incomes in the JB Marks LM (Table 4-5). The average annual income in Ward 27 in 2011 was half that of the LM and the province, at R15 000 (Wazimap, 2022f), indicating that incomes in Ward 27, and likely other rural wards, are significantly lower than in urban areas of the LM. Even though no data is available on the Gini coefficient for the JB Marks LM, it is likely that it broadly aligns with the Gini coefficient of the province (0.61 in 2006 and 2017) (Batho Earth & SED, 2020).

Table 4-5: Annual household income in JB Marks LM, DKKDM and North West Province

Income band	JB Marks LM		DKKDM		North West Province	
	No. of hh	% of hh	No. of hh	% of hh	No. of hh	% of hh
Under R20 000	25 393	39%	74 155	40%	327 385	39%
R20 000 - R40 000	11 854	19%	32 418	18%	157 273	19%
R40 000 - R75 000	8 341	13%	29 187	16%	150 385	18%
R75 000 - R150 000	7 401	12%	21 562	12%	95 774	11%
R150 000 - R300 000	4 830	8%	13 760	7%	54 668	7%
R300 000 - R600 000	1 711	3%	4 127	2%	17 238	2%
Over R600 000	953	2%	2 034	1%	8 152	1%

Source: (Wazimap, 2022e)

The economy of the JB Marks LM is dominated by agriculture in the northern parts and services and manufacturing in the southern parts (Batho Earth & SED, 2020). The services sector is the largest

⁵ Data reflects education levels of individuals 20 years and older.

contributor to the JB Marks LM, primarily due to the presence of the North West University in Potchefstroom as well as other governmental and private services (Figure 4-10).

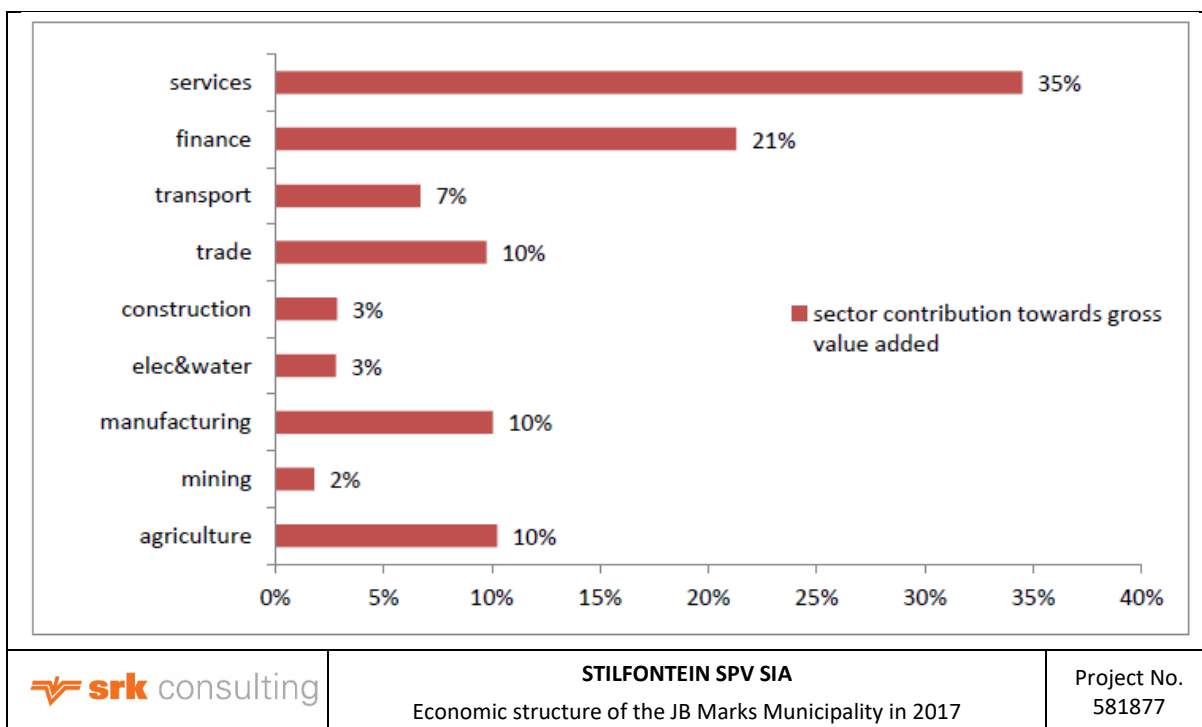


Figure 4-10: Economic structure of the JB Marks Municipality in 2017

Source: (Batho Earth & SED, 2020)

Some 13% of the municipal population was unemployed in 2011, a further 4% were discouraged work seekers and 40% of people were not economically active (Wazimap, 2022e). Of the 43% of the working-age population that were employed, 74% worked in the formal sector (Wazimap, 2022e), while 24% had more precarious employment in the informal sector and private households (see Figure 4-11).

Employment status in Ward 27 is similar to that in the LM, but employment in the informal and private household sectors is nearly double the proportion of JB Marks LM (see Figure 4-12), indicating less secure and likely lower-income work opportunities in Ward 27, which aligns with the lower household income reported above.

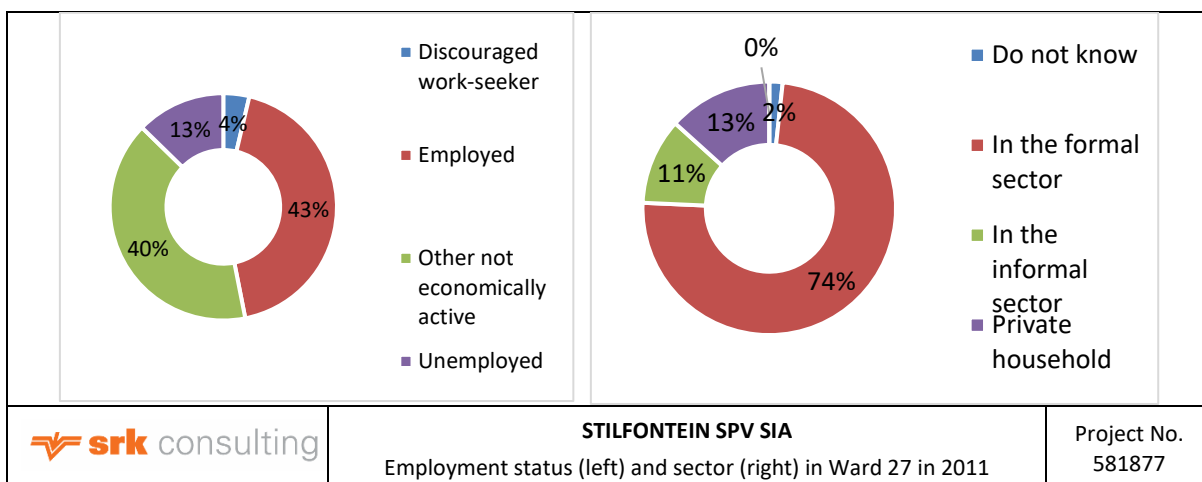


Figure 4-11: Employment status (left) and sectors (right) in the JB Marks LM in 2011

Source: (Wazimap, 2022e)

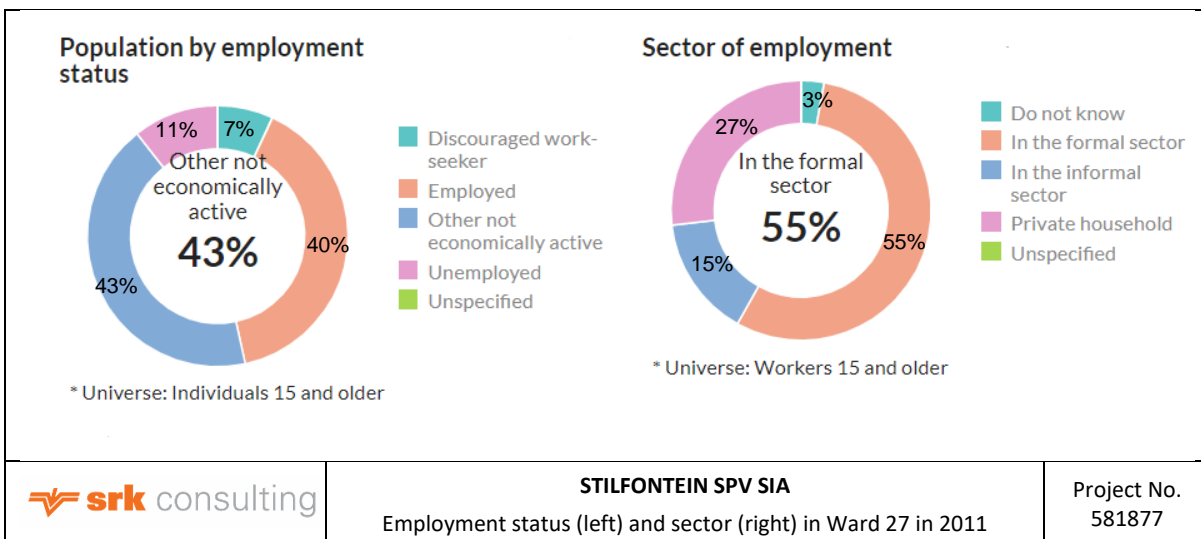


Figure 4-12: Employment status (left) and sectors (right) in Ward 27 in 2011

Source: (Wazimap, 2022f)

4.2.1.4 Housing and Services

Only 71% of households in the JB Marks LM reside in formal dwellings (houses and apartments), while the remainder live in informal dwellings (shacks – 16% and backyard flats – 8%) (see Figure 4-13) (Wazimap, 2022c). In Ward 27 only 40% of households live in a formal house or apartment, and the majority of households (51%) lives in shacks, with an additional 7% in backyard dwellings.

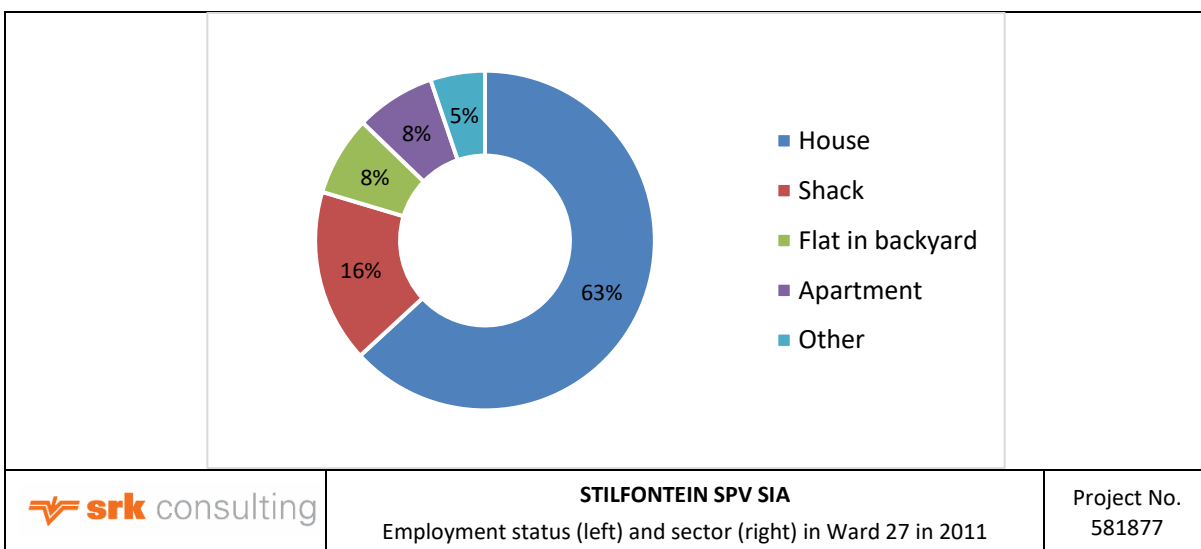


Figure 4-13: Dwelling types in JB Marks LM in 2016

Source: (Wazimap, 2022c)

Access to services is variable across the JB Marks LM, but generally poorer in the rural areas. Most households in Ward 27 have access to municipal water supply (85%), while access to flush toilets (55%) and refuse removal (31%) is considerably lower, and significantly lower than the LM average (Wazimap, 2022c).

Overall it is evident that Ward 27 has many socio-economic challenges and needs, expressed in lower education levels, more precarious employment, much lower income levels, a dominance of informal housing and poor access to basic services.

4.2.2 City of Matlosana LM

The City of Matlosana LM, located in the southern part of the DKKDM, is the smallest municipality in the District with an area of 3 625 km² (City of Matlosana, 2017). The City of Matlosana LM has 35 wards, of which Ward 8 (north-eastern municipal area), Ward 1 (north-western municipal area) and Ward 4 (south of Ward 1) are the largest wards. A portion of the proposed Stilfontein PV Cluster is located in the south-eastern boundary of Ward 18.

4.2.2.1 Demographics

The City of Matlosana LM population increased by 10% between 2011 and 2016 to 417 282, and thus slower than the DKKDM population, which grew by 12%. More than 57% of the District’s population resides in the City of Matlosana LM (Wazimap, 2022b), of which 31% lived in the town of Jouberton in 2011 (SA Cities Network, 2014). A further 20% and 14% lived in Kanana and Klerksdorp, respectively.

Population density in the City of Matlosana LM was 115.6 people / km² in 2016, significantly higher than the district average, reflecting the more urban nature of the region (Wazimap, 2022c). Population density in Ward 18 was lower at 9.7 people / km² in 2011, which reflects the rural nature of the ward (Wazimap, 2022d).

The municipality has a relatively young population, with 37% of residents (~149 400) younger than 18 years, 59% (~247 500) between 18 – 64 years and 5% (~20 300) older than 65 years (see Figure 4-14). The population in the City of Matlosana LM is comprised of 83% Black Africans, 3% Coloureds and 14% Whites (see Table 4-6), while the proportion of the Black African population in Ward 18 is slightly lower at 81% (Wazimap, 2022d). Almost 56% of the Ward’s population is male. Similar to the JB Marks LM, average household size remained relatively constant between 2011 and 2016 at three individuals per household in the LM (Municipalities of South Africa, 2022a).

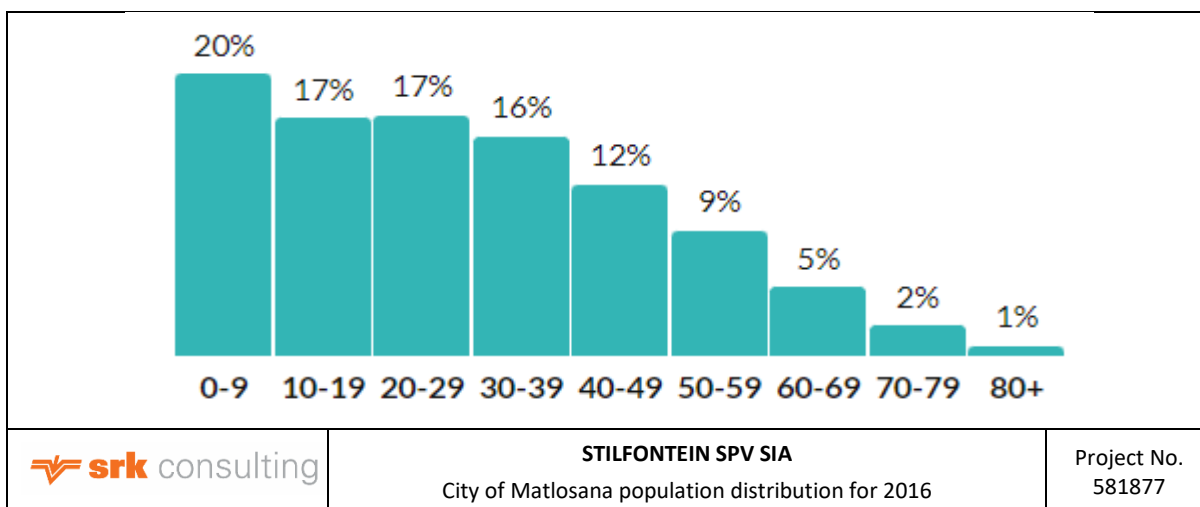


Figure 4-14: City of Matlosana population distribution by age (2016)

Source: (Wazimap, 2022b)

Table 4-6: Population distribution (number and percentage) across the City of Matlosana, DKKDM and Province

Population Group	Ward 18		LM		DKKDM	
Black African	12 124	81%	344 527	83%	606 652	82%
Coloured	269	2%	13 360	3%	27 185	4%
Indian/ Asian	16	0.1%	2 878	0.7%	5 066	0.7%
White	2 619	17%	56 517	14%	103 919	14%

Source: (Wazimap, 2022f)

4.2.2.2 Education

Education levels in the City of Matlosana are similar to those in JB Marks LM. Approximately 34% of the City of Matlosana population had completed secondary education (matric) in 2016, while another 35% obtained at least some secondary education (Figure 4-15). Approximately 8% of the population had received no schooling, and 9% had some primary education. Some 6% of the population had some tertiary education. Between 2011 and 2016 the proportion of people without schooling increased from 7.7% to 7.9%, and the proportion of people who completed matric increased from 31% to 34.2% (Wazimap, 2022g) (Wazimap, 2022b), indicating that education levels are increasing slightly, but very slowly. Education levels in Ward 18 are lower than those of the LM, as only 22% of the population in Ward 18 had completed matric in 2011, compared to 34.2% in the LM (Wazimap, 2022f).

Only 18% of households in Ward 18 had access to the internet in 2011. Although internet access is likely to have improved in the interim, it nevertheless suggests that the local population has limited opportunities to participate in today’s increasingly online world and associated educational and employment opportunities (Wazimap, 2022f).

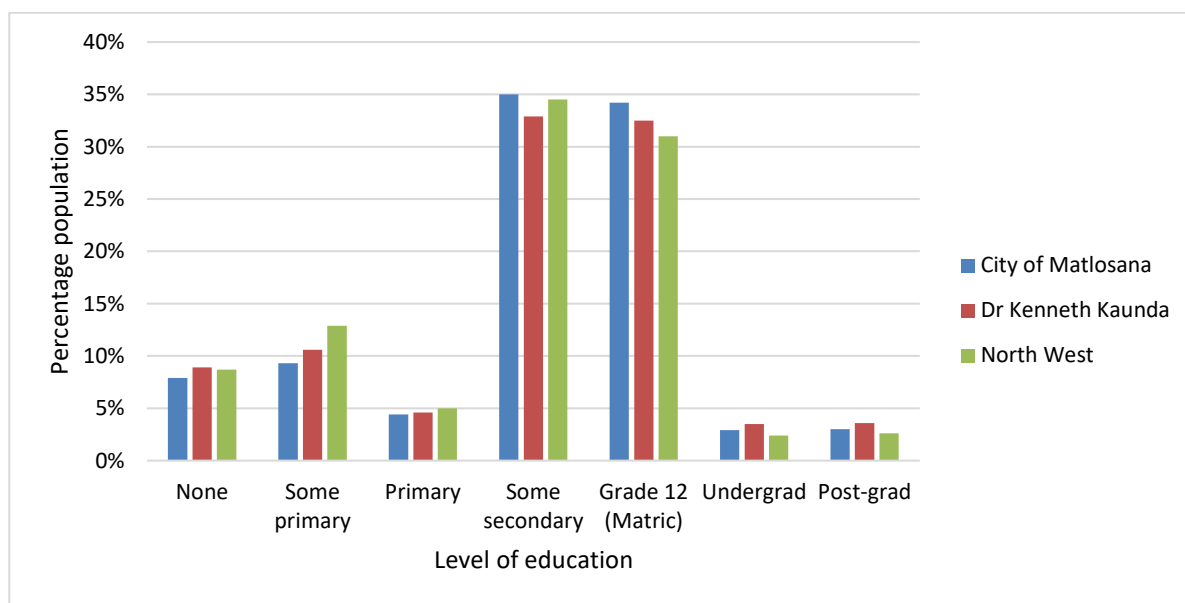


Figure 4-15: City of Matlosana LM, district and provincial education for 2016⁶

Source: (Wazimap, 2022f)

4.2.2.3 Social Characteristics and Economy

Similar to JB Marks LM, the average annual income of households in the City of Matlosana LM was R 30 000 in 2011 (Wazimap, 2022g), though 37% of households earned less than R 20 000 per annum. Household income distribution is comparable with the LM and DKKDM (Table 4-7). However, the majority of the population in Ward 18 earned less than R 20 000 annually (Wazimap, 2022f). The average annual household income in Ward 18 was R 15 000, and thus half that of the LM and similar to that of Ward 27 of JB Marks LM (Wazimap, 2022f) (Batho Earth & SED, 2020). This indicates that income in rural areas, such as Ward 18, are significantly lower than in urban areas of the LM.

⁶ Data reflects education levels of individuals 20 years and older.

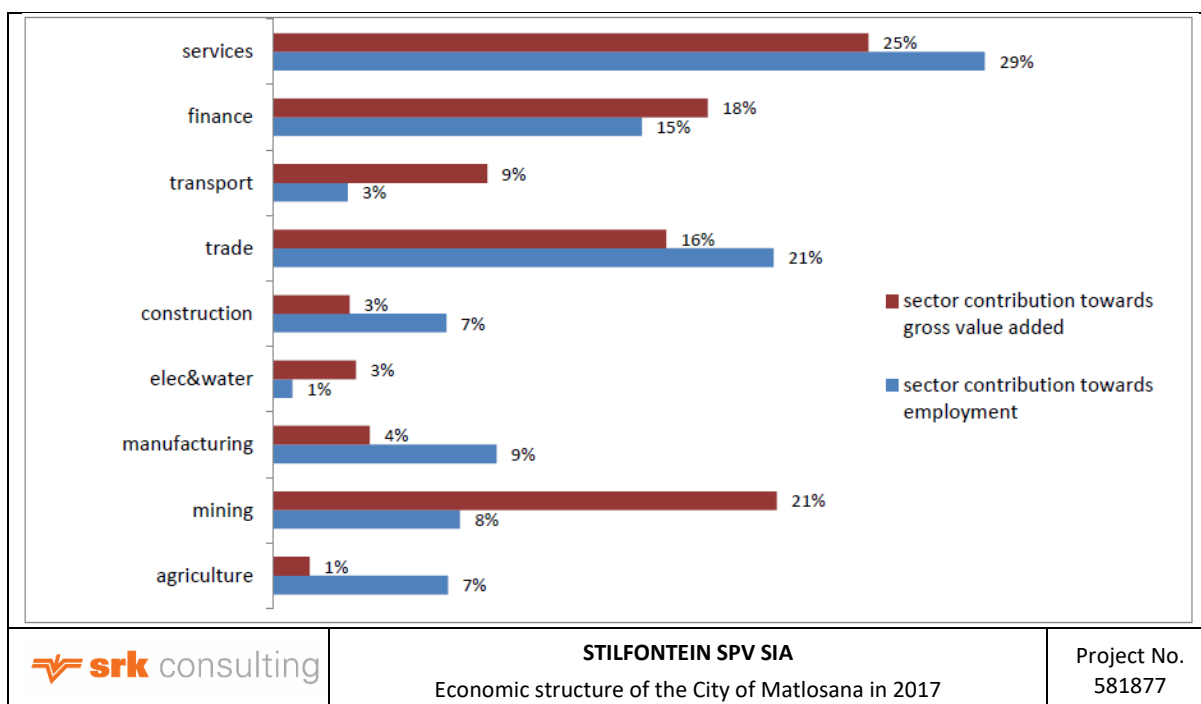
Table 4-7: Annual household income in Ward 18, City of Matlosana LM and DKKDM

Income band	Ward 18		City of Matlosana LM		DKKDM	
	No. of hh	% of hh	No. of hh	% of hh	No. of hh	% of hh
Under R20 000	3 206	66%	25 393	39%	74 155	40%
R20 000 - R40 000	498	10%	11 854	19%	32 418	18%
R40 000 - R75 000	331	7%	8 341	13%	29 187	16%
R75 000 - R150 000	266	6%	7 401	12%	21 562	12%
R150 000 - R300 000	178	4%	4 830	8%	13 760	7%
R300 000 - R600 000	66	1%	1 711	3%	4 127	2%
Over R600 000	49	1%	953	2%	2 034	1%

Source: (Wazimap, 2022f) (Wazimap, 2022g)

The City of Matlosana LM economy contributed ~44% to the DKKDM GDP in 2011 and 28% to the North West Province (SA Cities Network, 2014). The average annual GDP growth rate decreased by 0.1% between 2006 and 2016, compared to a 0.4% decrease of the District (DKKDM, 2020b).

The economy of the City of Matlosana LM is dominated by the services (tertiary) and mining (primary) sectors, followed by the trade (secondary) sector (Figure 4-16) (Batho Earth & SED, 2020). However, the employment contribution by the mining sector decreased by 22% between 2010 and 2017 (Batho Earth & SED, 2020), due to mine closures, indicative of the need to identify alternative income opportunities and sectors.

**Figure 4-16: Economic structure of the City of Matlosana in 2017**

Source: (Batho Earth & SED, 2020)

Only 5% of the population in Ward 18 was unemployed in 2011, compared to 20% of the LM's population. However, a slightly higher proportion of the Ward's population (4%) was discouraged work seekers compared to the LM (3%). Both the LM and Ward 18 had similar percentages of individuals not economically active: 36% and 39% respectively. This implies that a higher percentage of people in Ward 18 worked compared to the LM, but possibly in low-income agricultural activities (given low household incomes).

Of the 50% of the working-age population that were employed in the LM, 43% worked in the formal sector (Wazimap, 2022f), while 25% and 30% had more precarious employment in the informal sector and private households, respectively. Employment status in Ward 18 is similar to that in the LM, but employment in the informal and private household sectors are nearly double the proportion of City of Matlosana LM (see Figure 4-17), indicating less secure and likely lower income work opportunities in Ward 18, which aligns with the lower household income reported above.

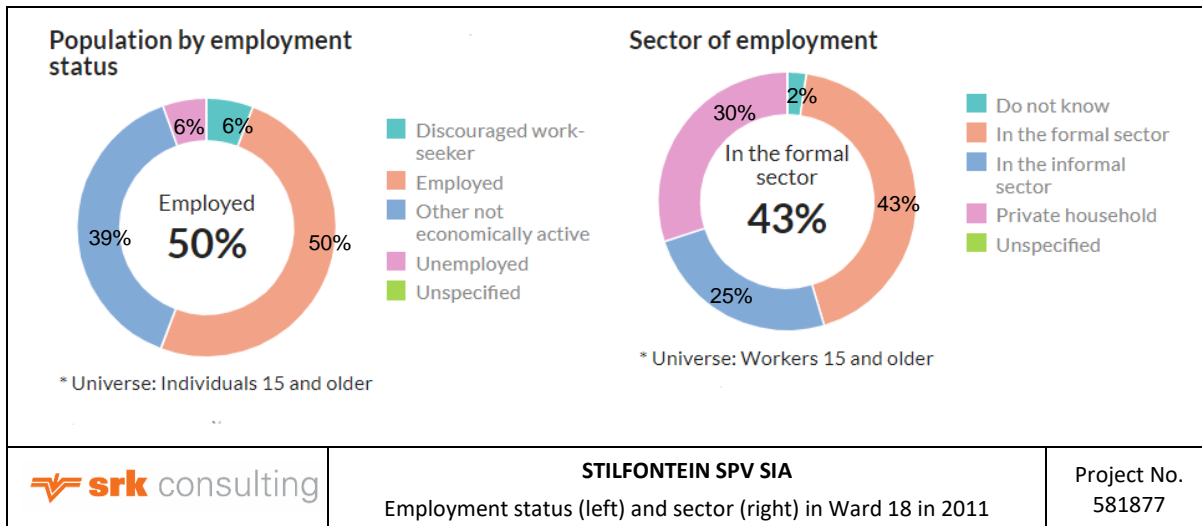


Figure 4-17: Employment status (left) and sectors (right) in Ward 18 in 2011

Source: (Wazimap, 2022g) (Wazimap, 2022f)

4.2.2.4 Housing and Services

Approximately 83% of households in the City of Matlosana LM reside in formal dwellings (houses and apartments), while the remainder live in informal dwellings (shacks – 9% and backyard flats – 3%) (Wazimap, 2022b). The situation is worse in Ward 18, where 69% of households live in a formal house or apartment, while a larger proportion of 17% and 6% live in shacks and traditional dwellings, respectively (Wazimap, 2022f).

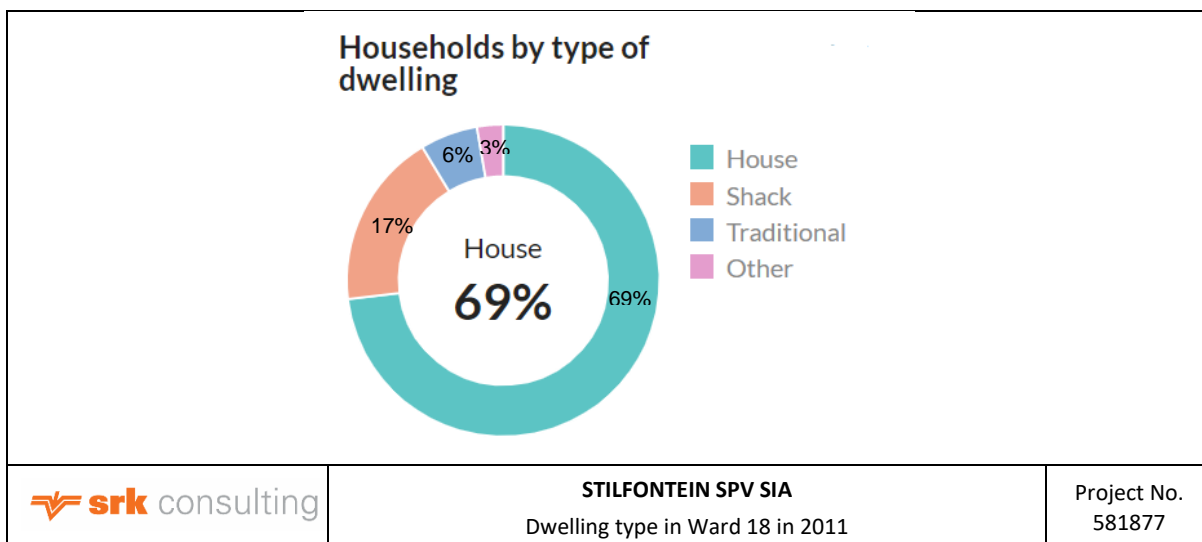


Figure 4-18: Dwelling type in Ward 18 in 2011

Source: (Wazimap, 2022f)

Access to services is variable across the City of Matlosana LM, but generally poorer in the rural areas, such as Ward 18. Households in Ward 18 have limited access to municipal water supply (10%), flush

toilets (35%) and refuse removal (6%), and access to services is significantly lower than the LM average.

Similar to Ward 27 of the JB Marks LM, Ward 18 has many socio-economic challenges and needs, expressed in lower education levels, more precarious employment, much lower income levels, a dominance of informal housing and poor access to basic services.

4.2.3 Areas Adjacent to the Project Site

The project area is surrounded by farmland suitable for grazing, and some irrigated plots lie in the strip between the Koekemoerspruit and Vermaasdrift Road west of the project. Several residences and businesses are located within 0.75 km and 2 km of the Stilfontein Cluster boundary (see **Error! Reference source not found.**), including farmsteads and Frontier Metal Processing and Shooting Range.

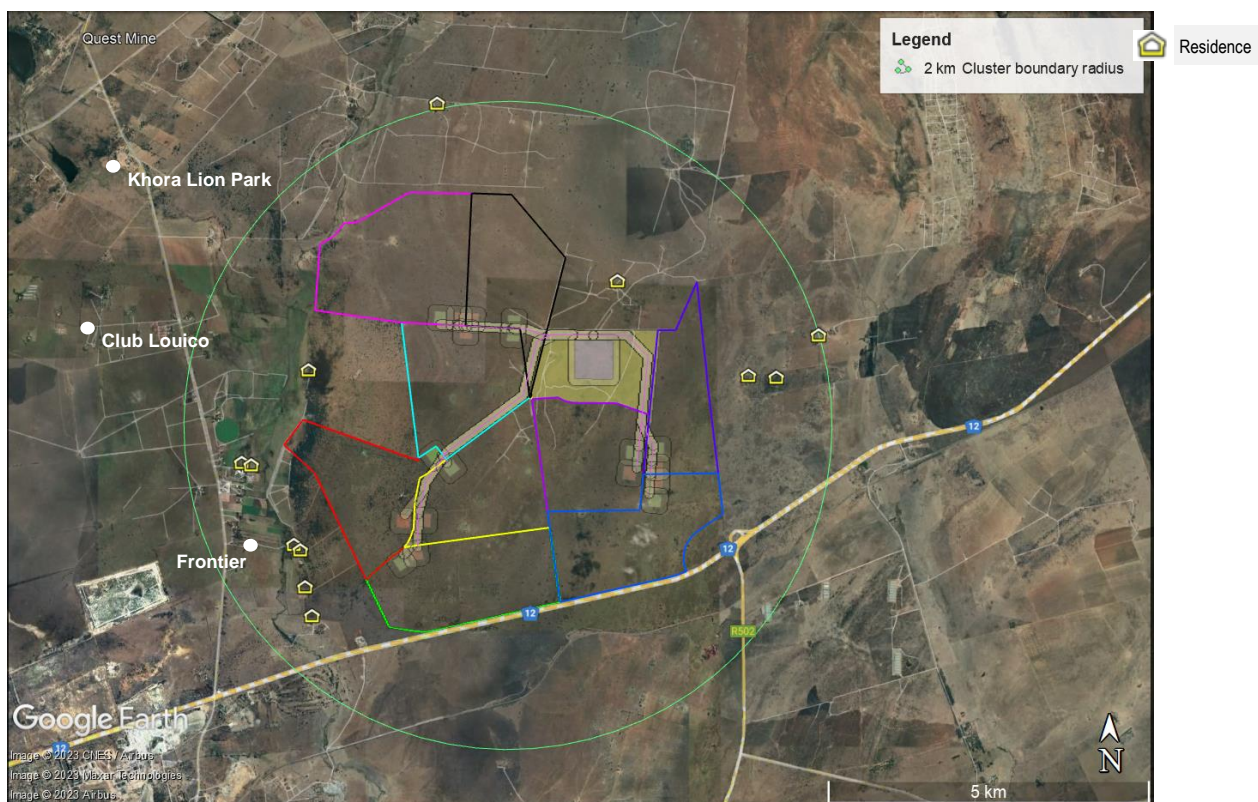


Figure 4-19: Residences located within ~2 km of the outer Stilfontein Cluster boundary
 Businesses located within 4 km west of the project boundary and Koekemoerspruit include MMO Motors, Club Louico and Khora Lion Park.

The high-density low-income township of Khuma lies 3 km south of the project boundary. Matlwang village lies 4 km north-east of the project boundary,

4.3 Socio-Economic Sensitivities

No socio-economic sensitivities were identified on the project sites. A small number of residences located in the project area belong to the landowners who are beneficiaries of the project and have entered into contractual agreements with Mainstream that will also regulate any constraints identified by the landowner, such as homesteads (see Section 2.3).

The only socio-economic sensitivities adjacent to the project area are a number of residences, shown in Figure 4-19; these are not directly affected by the project.

5 Key Stakeholder Perceptions and Concerns

This section summarises the perceptions and concerns of Stilfontein project stakeholders, obtained via telephonic interviews and email correspondence between 11 April and 2 May 2022 to inform the SIA. The section is not intended to be representative of all stakeholder comments.

Landowners reported the following views associated with the proposed project:

- The project will negatively affect some current farming activities, which include game and cattle farming. Other activities, such as the operation of the Doringplaat farm lodge, are expected to continue;
- On balance, the project is expected to have a positive impact on farmers as it provides an alternative income in the light of declining farming income and productivity;
- The project will not negatively affect existing residents / tenants / workers in the project area. No third parties reside in the project area; and
- Neighbours have not raised any concerns about the project to landowners of the project area.

The municipality / organisations representing local residents reported the following views associated with the proposed project:

- Several mining operations in the area have reached the end of Life of Mine and have been shut down, leading to great demand for new work opportunities. Unemployment and poverty are major challenges in the region, and renewable energy projects are considered a good initiative for the area;
- However, employment at renewable energy projects is much lower than in mining, and renewable energy projects are unlikely to compensate for previous mining sector jobs. Population growth in the area as significantly outpaced economic growth;
- It is hoped that renewable energy projects will benefit the local community, and South Africa at large by providing affordable, sustainable and less polluting energy compared to electricity generated from fossil fuels;
- The project site is not highly productive agricultural land, and thus likely suitable. Other suitable areas in the region may include e.g. old tailings facilities further west, from which tailings were removed but which remain unsuitable for e.g. agricultural activities due to historic land contamination;
- Community violence during consultation on mining-sector projects in recent years, culminating in demands for jobs and project involvement, indicates the significant need for opportunities within communities; and
- The area experiences minor mine-induced seismic activity. The most notable include the Stilfontein tremor in March 2005, with a magnitude of ~5 on the Richter Scale, with its epicentre ~4 km south-west of the project site, and which caused some damage to buildings and infrastructure. The Orkney tremor ~20 km south-west of the site occurred in August 2014 and measured 5.3 on the Richter Scale.

Stakeholders located near the project area reported the following views associated with the proposed project:

- Renewable energy generation is beneficial and seemingly appropriate for the area, which is not otherwise utilised;

- Neighbours would like to directly benefit from more reliable access to cheaper energy, and/or other assistance or cooperation in this regard⁷;
- The development of a solar farm(s) in the project area is not expected to affect neighbouring businesses;
- Potential deterioration of safety in the area, due to uncontrolled influx of people, is a key concern of neighbouring stakeholders. Cattle theft and similar crimes are regularly recorded in the area;
- Water is scarce, and sustainable project water use is another important consideration for neighbours; and
- Surrounding businesses and landowners are generally supportive of the project if it has no negative impacts on their activities.

⁷ Under the current model IPPs enter into energy purchase agreements with Eskom, and all power generated by the project is fed into the national grid.

6 Impact Assessment

The significance of the socio-economic impacts was assessed using the prescribed SRK impact rating methodology described in Appendix C. The socio-economic impacts of the project and the no-go alternative are assessed in the sections below. Technology alternatives do not affect the magnitude of socio-economic impacts, as noted in Table 6-1, and are therefore not discussed further in the impact assessment.

Table 6-1: Technology alternatives

Alternative type	Alternatives considered	Relevance to SIA
11-33/132 kV Substation location	Technically preferred location	The choice of substation location does not affect the significance of socio-economic impacts of the project.
	Alternative substation location	
Cell technology	Monocrystalline Modules	The choice of cell technology does not affect the significance of socio-economic impacts of the project, assuming that the project will be constructed to the designated capacity within the designated footprint.
	Polycrystalline Modules	
	Thin Film Modules	
Panel technology	Monofacial panels	The choice of panel technology does not affect the significance of socio-economic impacts of the project, assuming that the project will be constructed to the designated capacity within the designated footprint.
	Bifacial panels	

6.1 Potential Impacts: Construction Phase

6.1.1 Capital Investment Contributing to the National, Regional and Local Economy

The estimated CapEx of the project is ~R1.1 billion. While this would be a highly significant amount if directly invested in the local economy, much of the investment is expected to accrue to other geographic areas from where materials (notably the solar panels) and specialised labour are sourced.

The extent to which the economic benefit of the capital investment accrues in South Africa and locally depends on the expertise and resources of national and local suppliers. While the REIPPPP presents a localisation opportunity, domestic capacity built during the REIPPPP Bid Windows 1-4 from 2010 to 2015 has been downscaled or lost due to the protracted hiatus in new procurement between 2015 and 2021 (Creamer T. , 2020). This will initially reduce opportunities for domestic procurement and the national economic impact of new renewable energy projects. In recent years the REIPPPP has procured renewable energy at more predictable intervals and quantities. If this trend continues, leading to continuity of demand, the industry has signalled confidence that national supply sectors will recover, including domestic steel and aluminium production, local component production and assembly, project management, civil works, specialised logistical services and transport, environmental and legal services (Creamer T. , 2020). Certain components may continue to be produced by highly specialised (international) manufacturers, but South Africa has a fairly sophisticated industrial sector, including the steel and automotive industries, which – under the right circumstances – could manufacture more components in South Africa (IRENA, 2014).

Mainstream estimates that 45% of CapEx, e.g. ~R500 million, will be expended in South Africa. This is in line with current REIPPPP local content requirements, which required at least 40% local content during construction in 2021, in addition to the use of designated components (see Section 3.2)⁸.

Specialised suppliers are likely located outside the project region, as renewable energy has played a limited role in the North West Province. However, the nearby towns of Potchefstroom, Klerkdorp and Stilfontein have a history of providing services to the mining industry and will be able to provide many of the required services, such as civil works. Other local businesses that typically benefit, at least temporarily, from the construction of a renewable energy project include the hospitality sector (restaurants, entertainment businesses and accommodation), services and transport and retail (hardware) businesses, particularly if services meet the quality requirements of multinational clients (WWF, 2015).

It has been noted that the relatively high investment costs of renewable energy projects may cause a slightly contractionary effect on the economy by diverting local investment funds away from other more profitable sectors (Caetano & Thurlow). However, many South African renewable energy projects are funded through Foreign Direct Investment (FDI), accounting for 85% of South African FDI in 2015 (SAWEA, 2019). Companies investing in renewable energy projects exclusively target this sector and would not make investments in other sectors of the South African economy, thereby limiting the crowding out effect.

In relation to the national economy the investment is relevant, but small. At the local scale, it is expected that a considerable proportion of required project services (total value of ~R500 million) can be sourced locally and regionally, and that construction of the solar project will thus generate opportunities for local and regional businesses and service providers, including:

- Potential opportunities for businesses and entrepreneurs to partner with the developer or selected contractor(s) to provide services related to the manufacture of a small proportion of plant components, transport of components to site, site preparation, installation of project facilities, construction of associated infrastructure and transportation of workers;
- Opportunities to provide services to construction workers employed by the project, including catering; and
- Commercial opportunities due to increased demand for goods in the local area as people earn an income (wages) during construction.

Renewable energy is deemed one of the economic sectors with the most promise to add value to the GDP, while having the potential to change the composition and character of towns (CKDM, 2017). This could equally apply to the Klerksdorp REDZ and is especially important in the light of several economic contractions in the past decade (see Section 4.1.3), ascribed to mine closures, difficult farming conditions and the impacts of COVID-19.

It is expected that the project construction will temporarily (for ~2 years) but significantly increase business activity in the region and have a direct positive regional impact that is enhanced by the presence of a functional local services sector. The project will have a smaller effect at national level.

Large-scale investment in renewable energy is considered an opportunity to stimulate economic recovery and create sustainable employment in the wake of the COVID-19 pandemic (Meridian Economics, 2020).

⁸ REIPPPP requirements would not apply to agreements with private end-users, but it is assumed that local content would be maximized in either case.

Given the scale of investment during the construction phase relative to the local and regional economy, the impact is expected to be of high intensity, albeit over the short-term. The benefit is assessed to be of **medium** (positive) significance with and without the implementation of optimisation⁹ (Table 6-2).

Table 6-2: Significance of capital investment contributing to the national, regional and local economy

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	High 3	Short-term 1	Medium 6	Definite	MEDIUM	+ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> • Source as many goods and services as possible from the local and regional economy (e.g. use local contractors and accommodation and equipment suppliers as far as possible and purchase perishable goods locally). • Provide suitable training to service providers, where possible and practicable. • Develop and implement a fair and transparent procurement policy. • Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends. • Consult with existing IPP projects that successfully procure from local SMMEs to share learnings, where possible. 								
With mitigation	Regional 2	High 3	Short-term 1	Medium 6	Definite	MEDIUM	+ve	Medium

The benefit of the investment, once made, is irreversible, though the flow of investment is temporary.

6.1.2 Generation of Employment, Income and Skills

The project is expected to create various types of employment during the manufacturing and construction phase:

- Direct employment includes staff and contractors directly associated with the project;
- Indirect employment includes other sub-contractors and suppliers; and
- Induced employment includes employment generated by increased spending at businesses and on services by households earning an income from the project (the multiplier effect).

The International Renewable Energy Agency (IRENA) estimates that a 50 MW PV project requires a total of 229 000 person days, of which 22% are associated with manufacturing (much of which is outside of South Africa) and 17% with construction and installation (supplied locally) (IRENA, 2019) (see Figure 6-1). For the up to 150 MW Starling projects this would be equivalent to 116 800 person-days for construction and installation, equivalent to ~234 full time direct jobs over two years¹⁰.

⁹ Goods and services have to be sourced from where they are available in sufficient quantity and quality, and it is assumed that the project will aim to procure locally and nationally as much as possible from the outset. As such, it is expected that there is limited scope for optimisation measures during the construction phase.

¹⁰ 229 000 person days for a 50 MW PV is equivalent to ~687 000 person days for a 150 MW PV x 17% during construction = 116 790 person days / 2 years / 250 working days = ~234 full-time jobs over 2 years.

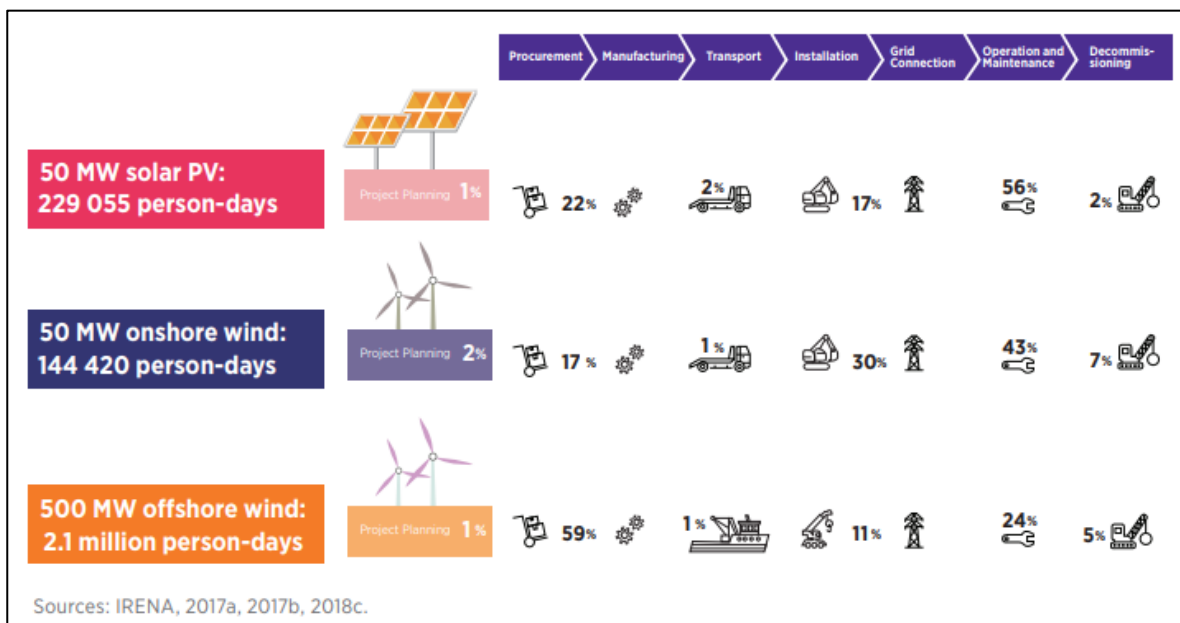


Figure 6-1: Person-days required for the development of solar and wind energy projects

Source: (IRENA, 2019)

Mainstream anticipates that the project will generate approximately 220 **direct construction** jobs during the 18 – 24-month construction phase (see Section 3.2). This is well aligned with the above estimate. Some 45% of planned jobs are skilled and semi-skilled (~100 jobs), and 55% are unskilled (120 jobs) (see Section 3.2). Based on typical REIPPPP requirements, which include targets for national and local job creation (WWF, 2015) (and Section 3.2)¹¹, it is assumed that virtually all semi-skilled and unskilled positions (assumed ~85% of jobs, or ~180 jobs) will be filled by local labour. Skilled personnel may be sourced from further afield.

Renewable energy projects often create employment in areas with little opportunity (van der Walt, 2019), and primarily during the first two years of a renewable energy project’s life (WWF, 2015). Generally, the District is characterised by high levels of poverty and low levels of education. The project ward has an even higher proportion of precarious employment and much lower income levels than surrounding areas. Employment opportunities in the mining sector, which previously provided local semi-skilled and unskilled jobs, have reduced as mines have closed. The (temporary) generation of ~180 direct local semi-skilled and unskilled positions during the construction phase in this poverty-stricken area is thus important.

Unskilled workers will be paid no less than the South African minimum wage, which is R23.19 per hour in 2022 (DEL, 2022). Based on coarse assumptions made for this specialist study, the local wage bill will amount to more than R16.5 million during the construction phase¹².

To determine indirect and induced jobs, it is assumed that the solar project installation can be broadly compared to a construction project. Construction is one of the most labour-intensive sectors in the economy (Tregenna, 2010) and creates and sustains indirect jobs mainly in upstream sectors, e.g. the building materials sector, as well as sustaining services provided by contractors, e.g. architects, planners, consultants and security services. National Treasury (2016) estimates an employment

¹¹ REIPPPP requirements would not apply to agreements with private end-users, but it is assumed that local employment would be maximized in either case.

¹² 50 working weeks per year x 40 working hours per week = 2 000 working hours per year per worker x 180 local semi-skilled and unskilled workers x 2 years of construction = 720 000 million person-hours x R23.19 / hour minimum wage = R16.7 million.

multiplier of 4.9 for the South African construction sector, implying that for every R1 million of extra construction spend, 4.9 additional jobs are created. As the construction phase in this case is mainly an installation exercise, the assumed multiplier has been halved for this study to 2.5.

The reduced construction multiplier implies that CapEx of ~R1.1 billion (see Section 3.2) generates up to 2 500 **indirect and induced** (temporary) jobs. It is noted that many or most of those jobs will be jobs retained as contractors finish one project and start another, rather than additional jobs created.

Employment provides many socio-economic benefits to employees and their dependants, including:

- Improved material wealth and standard of living;
- Enhanced potential to invest and improved access to social services such as education and health services;
- Enhanced skills transferred to previously unskilled workers, facilitating employment prospects of such workers; and
- Contribution to a sense of independence, freedom and pride, which may improve quality of life.

The REIPPPP requirements typically include skill development requirements for employees and suppliers (see Section 3.2), which will be of particular value in this area where education levels are low.

Workers will also support a number of dependants. Based on data from the National Income Dynamics Survey (NIDS, Wave 3), Finn (2015) estimates that the average dependency ratio for earners in South Africa is 1.55 (i.e. each income earner on average supports an additional 1.55 people). The average ratio varies significantly between 1.0 for wealthier earners and 2.65 for earners in poor households. Assuming a ratio of 2, the estimated 180 locally and directly employed workers would support ~360 dependants.

An increase in regional employment has the potential to improve the financial security of employees and their dependants. While those positions will be limited to ~2 years, workers have the opportunity to improve their economic prospects in the longer term if they take full advantage of the income, experience and skills transferred to them through the projects. Transparent communication with local communities before and during the hiring process is thus important.

Local employment and income are likely higher than estimated above, as skilled workers may be available locally in nearby towns and the average wage will exceed the minimum wage. The extent of the impact is deemed regional (mostly restricted to the DKKDM) and the intensity of the impact is low, owing to the limited, albeit noteworthy number of jobs relative to the number of unemployed people. The impact is restricted to the medium-term construction phase.

The benefit is assessed to be of **low** (positive) significance and with the implementation of mitigation increases to **medium** (Table 6-3).

Table 6-3: Significance of generation of employment, income and skills

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Low 1	Medium 2	Low 5	Probable	LOW	+ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> • Maximise use of local skills and resources through preferential employment of locals where practicable. • Develop, communicate and implement a fair and transparent labour and recruitment policy. • Ensure diversity and gender equality in recruitment, as far as possible. • Provide training to staff and service providers before and/or during the construction phase. • Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends. 								
With mitigation	Regional 2	Medium 2	Medium 2	Medium 6	Definite	MEDIUM	+ve	Medium

The benefit of employment is irreversible, though the employment itself is temporary.

6.1.3 Social Disruption and Change in Social Dynamics

The establishment of the solar project may attract different groups of people to the area:

- *Non-local workers / professionals hired for the construction phase of the project:* Where expertise is not available in the local area, skilled professionals will be hired from outside areas for the construction phase. These professionals are typically awarded short term contracts, find their own accommodation in formal housing in nearby towns and are likely to leave the area at the end of their contract / the construction period. It is also possible that local semi-skilled and unskilled workers will be accommodated by the EPC contractor in nearby towns; and
- *People moving opportunistically into the area in the hope of finding employment or exploiting other commercial opportunities:* Due to high unemployment and poverty levels in many areas of South Africa, including the project area, it is possible that the project, or more likely the anticipated proliferation of renewable energy projects in the region, may attract people to the area in search of opportunities. The movement of such people is generally uncontrolled, and it is expected they will be predominantly unskilled and likely to settle for longer periods in the poorer sections of settlements in the area, where facilities are already inadequate.

The temporary influx of people during construction, leading to short-term growth in population size, may lead to changes in social dynamics (WWF, 2015). These can include:

- *Conflict in the community / increased competition* – Migrant jobseekers are likely to compete directly with local people for the same unskilled jobs and/or not find employment, which may create conflict in the community. The presence of (skilled) contract workers is not expected to have a significant negative impact on the (unskilled) local communities' job prospects, as they do not compete directly with local people for jobs;
- *Stress on existing physical infrastructure and services* – Access to formal housing and basic services is reasonably in the LMs but below LM average in the Wards adjacent to the project area. Should a significant number of people move into the area, service provision to existing and future households may suffer if there is not sufficient capacity (financial and personnel) at the municipal level to expand and maintain services and infrastructure as well as facilities such as schools and clinics;
- *Increased incidence of anti-social behaviour* – Increased incidences of e.g. prostitution, alcohol and drug abuse may be experienced if a substantial portion of the workforce with a higher disposable income from the project settles (at least temporarily) in local urban centres without their families; and

- *Increased incidence of communicable disease* – Communicable diseases, particularly TB, HIV and, more recently, COVID-19, are a major problem in South Africa, with poor rural areas often particularly hard-hit. A significant influx of new people into the area may aggravate the problem, and/or put increased pressure on health services in the area.

This indirect impact of the project is common to most medium to large scale projects in South Africa and much of the world. It cannot be addressed by the developers alone and will require management of resources by the municipality as well.

The impact intensity and likelihood are considered comparatively low as:

- It is expected that none or very few workers need to be hired from outside of the region, as sufficient workers should be available from the three towns located within 35 km of the project area. As such, most workers could operate from their home base;
- The presence of several towns and a considerable population within 35 km of the project area will dilute the effect of migrants moving into the area; and
- The region, though located within the Klerksdorp REDZ, has not yet seen any renewable energy development. As such, it is not (yet) a focus area for in-migration.

The rollout of renewable energy may also cause socio-political disruption/protest (Wlokas et al (2017), Marais et al (2017), Nkoana (2018), cited in Meridian Economics (2020)). Though social resistance to renewable energy projects is not yet widespread in South Africa, it has occurred based on perceived environmental or social project impacts (including potential redundancies at thermal power plants) and/or if communities do not share in the benefits provided by renewable energy development, e.g. employment, ownership and service delivery (Meridian Economics, 2020).

The project does not appear to overlay ecologically sensitive areas (as identified by SANBI GIS), is located on private land and not directly linked to potential job losses at existing local (e.g. power generation) facilities or agricultural ventures. Stakeholders contacted during the SIA did not voice concerns regarding the project (see Section 5). Disruptions due to social or environmental concerns are thus considered unlikely prior to or during the construction phase. Certain forms of benefit-sharing with local communities are prescribed in the REIPPPP (see Sections 3.2) and discussed in Section 6.2.3, as they occur primarily during the operational phase.

The impact is assessed to be of **very low** significance and with the implementation of mitigation reduces to **insignificant** (Table 6-4).

Table 6-4: Significance of social disruption and change in social dynamics

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Medium 2	VERY LOW 4	Probable	VERY LOW	-ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> • Clearly publicise and implement a local recruitment policy. • Work together with impartial local representatives to identify local people during the recruitment process. • Consult with the municipality regarding the capacity of existing services and infrastructure (e.g. provision of water, electricity, waste removal, sanitation and housing) to cope if significant numbers of additional workers are brought into the area during the construction period. • Consider supporting projects that improve local services and infrastructure and/or deal with social problems or conflicts through the social upliftment programme, if the need arises. 								
With mitigation	Local 1	Low 1	Medium 2	VERY LOW 4	Possible	INSIGNIFICANT	-ve	Medium

6.1.4 Reduced Quality of Life and Increased Risks due to Construction near Residences

Several residences are located within 0.75 km and 2 km of the Stilfontein Cluster boundary (see Figure 4-19). Construction can reduce quality of life of residents and/or increase risks through:

- Noise and dust from construction activities;
- Crime due to increased activity in the area, possibly attracting opportunists; and
- Littering by construction crews.

The most common effect of noise¹³ is annoyance. Noise and the way it is experienced is very subjective, and some individuals will be much more sensitive to / annoyed by noise than others. Construction noise is mostly associated with the use of heavy equipment, drilling and delivery vehicles. Construction noise will be confined primarily to daylight hours and weekdays and is attenuated by the distance between the project site and (offsite) residences (>750 m).

Stakeholders were concerned that security in adjacent areas may deteriorate during project construction (see Section 5). Risks may include trespassing, damage to infrastructure, stock theft and reduction in safety. The project area is large, rural and within walking distance of surrounding settlements and cannot be effectively secured against trespassing. Some factors will mitigate security risks. No workers will be accommodated on site during the construction phase, and it is in the proponent's interest to secure the site and access to it to prevent theft or other illegal activity. The community residing around the project area is small, and nominated representatives can act as liaison between residents and contractors to address grievances. The project is not expected to trigger a significant influx of people (see Section 6.1.3).

Other construction-related nuisances and risks, such as littering and disruption of any service infrastructure, can be managed through standard contractor procedures.

The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 6-5).

Table 6-5: Significance of reduced quality of life and increased risks due to construction near residences

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	High 3	Short-term 1	Low 5	Possible	VERY LOW	- ve	High
Key essential mitigation measures:								
<ul style="list-style-type: none"> • Liaise with nearby residents (up to ~2 km from the project boundary) before and during construction to inform them of construction status and discuss safety management measures to reduce security risks. • Maintain a visible security presence on site. • Implement a grievance mechanism during the construction phase. • Communicate and implement a compensation procedure in the event of damages directly linked to the construction. • Control site access. • Provide transportation to site for workers. • Declare areas outside of the construction site as no-go areas for construction staff. • Erect and regularly inspect a boundary fence. • Regularly inspect the project area and surrounding area for signs of illegal activity. • Regularly clean any litter from the project area and surrounding area. 								
With mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Improbable	INSIGNIFICANT	- ve	High

¹³ This discussion relates specifically to the social impacts of noise.

The impact can be reversed, as no or very few security risks are associated with the operation phase, when on-site activities significantly scale back.

6.2 Potential Impacts: Operational Phase

6.2.1 Operational Investment Contributing to the National, Regional and Local Economy

The estimated OpEx is ~R600 million, or ~R32 million per year over 20 years (2022 prices), and mostly relates to servicing solar panels and project infrastructure, administering the project and land rental. This represents a significant and reliable long-term contribution to the local and regional economy.

Far fewer support services will be required during operations and fewer workers will be employed. As such, opportunities for other businesses arising from the project will be much reduced compared to the construction phase. However, contrary to the intense but short-term construction phase, operations provide long-term opportunities related to operation and maintenance activities such as regular plant monitoring, equipment inspections and repair services.

Whether the benefits will accrue at a local, regional or national level depends to a large extent on the level of development of renewable energy support services in the area (IRENA, 2014). As Potchefstroom, Klerksdorp and Stilfontein are located nearby, it is expected that many of the services required during operation will be available at a local and regional level. This would be compliant with current REIPPPP local content requirements, which were stipulated for the operational phase for the first time in 2021 (see Section 3.2)¹⁴.

Local economic activity has reduced considerably in the wake of mine closures, and the need for alternative economic opportunities is significant.

The benefit is assessed to be of **medium** (positive) significance with and without the implementation of optimisation¹⁵ (Table 6-6).

Table 6-6: Significance of operational investment contributing to the national, regional and local economy

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Low 1	Long-term 3	Medium 6	Probable	MEDIUM	+ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> • Source as many goods and services as possible from the local and regional economy (e.g. use local contractors and equipment suppliers as far as possible). • Provide suitable training to service providers, where possible and practicable. • Develop and implement a fair and transparent procurement policy. 								
With mitigation	Regional 2	Low 1	Long-term 3	Medium 6	Probable	MEDIUM	+ve	Medium

6.2.2 Generation of Employment, Income and Skills

As noted in Section 6.2.1, activities and therefore employment opportunities during the operational phase are much reduced but extend over a much longer period and are hence more sustainable.

¹⁴ REIPPPP requirements would not apply to agreements with private end-users, but it is assumed that local content would be maximized in either case.

¹⁵ Goods and services have to be sourced from where they are available in sufficient quantity and quality, and it is assumed that the project will aim to procure within South Africa as much as possible from the outset. As such, it is expected that there is limited scope for optimisation measures during the operation phase.

IRENA (2019) estimates that a 50 MW PV project requires a total of 229 000 person days, of which 56% are associated with operation and maintenance (over the project life time) (see Figure 6-1). For the up to 150 MW Starling project this would be equivalent to 385 000 person-days (~77 full time direct jobs for 20 years)¹⁶.

Mainstream anticipates that the project generates approximately 20 **direct jobs** during the 20-year project life (see 3.2). This is below the IRENA (2019) estimate, but the gap may exclude additional jobs generated or sustained at contractors who service the project and/or who manufacture replacement parts. Based on typical REIPPPP requirements, operational practicalities and the fact that the region is expected to hold a pool of suitable labour, it is assumed that all positions will be filled by local/regional labour¹⁷. Though the total number of positions is limited, the generation of sustainable long-term employment in the region is important.

The project also provides a sustainable alternative income for some farmers (whose activities have seen productivity declines), from lease payments for land on which the project is established. This will supplement or substitute current farming activities, some of which may not be able to continue (see Section 5) (van der Walt, 2019).

The extent of the impact is deemed local, as far fewer positions need to be filled and only landowners of the sites occupied by the project benefit from payments. The benefit is assessed to be of **low** (positive) significance with and without the implementation of optimisation (Table 6-7).

Table 6-7: Significance of generation of employment, income and skills

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term 3	Low 5	Definite	LOW	+ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> • Maximise use of local skills and resources through preferential employment of locals where practicable. • Develop and implement a fair and transparent labour and recruitment policy. • Ensure diversity and gender equality in recruitment, as far as possible. • Provide suitable training. • Provide ancillary training to workers on maximising the use of income and training to further future economic prospects, potentially through projects initiated as part of the social upliftment programme. 								
With mitigation	Local 1	Low 1	Long-term 3	Low 5	Definite	LOW	+ve	Medium

6.2.3 Increased Community Prosperity through Contributions and Income from the Project

While specific requirements applicable to the project were not available at the time of writing, the REIPPPP requires successful bidders to comply with requirements aimed at sharing benefits of the project with communities of Previously Disadvantaged Individuals (PDIs) within a 50 km radius and contribute towards the growth and transformation of the South African economy. Requirements typically include (WWF, 2015) (Section 3.2):

- Annual Socio-economic Development (SED) contributions, as a percentage of project revenue¹⁸;

¹⁶ 229 000 person days for a 50 MW PV is equivalent to ~687 000 person days for a 150 MW PV x 56% during operation = 384 720 person days / 20 years / 250 working days = ~77 full-time jobs over 20 years.

¹⁷ REIPPPP requirements would not apply to agreements with private end-users, but it is assumed that local employment would be maximized in either case.

¹⁸ The 25 Preferred Bidders of Bid Window 5 committed a total of R 2.7 billion towards Socio-Economic Development and Enterprise and skills development initiatives over the 20-year lifetime of the projects (Mantashe, 2021).

- Annual Enterprise Development (ED) contributions, as a percentage of project revenue; and
- Community ownership (shareholding) in the project, which pays dividends¹⁹.

The actual contribution to SED and ED varies from project to project. A typical project is likely to contribute between 1.5% and 2.5% of project revenue to community upliftment projects; these investments tend to start shortly after project initiation. Between 5% and 15% of the project equity is assigned to communities and typically acquired through a loan by a Community Trust set up for this purpose; during the initial project years dividends from these investments are typically used to pay off loans used to purchase the equity.

As of mid-2021 IPPs can also sell limited quantities of independently generated electricity to private end-users; such agreements are not subject to the REIPPPP socio-economic requirements.

The following analysis applies if the project is procured via the REIPPPP and if past REIPPPP requirements in relation to community ownership and investment continue to apply in future bidding windows: While contributions by the project are not currently known, they are highly likely to be millions of Rand per year. The magnitude of the benefit to communities will depend on the value of contributions, their temporal and spatial distribution and the effectiveness with which they are expended on projects within the communities. A community upliftment (investment) strategy for this project has not yet been developed, but it is likely that, over the lifetime of the project, initiatives contributing to an improvement in education, healthcare and job creation in the area will be supported.

If managed and implemented effectively, sustained funding of social upliftment projects over many years is expected to have many potential benefits for the local communities, such as enhanced educational opportunities, improved skills, improved access to healthcare and development of an economic base and economic independence of the community. Community ownership of and SED / ED contributions by the project may provide mechanisms to manage communities stranded as coal [or in this case gold] mining and thermal power production is decommissioned and replaced with renewable energy sources (Intellidex, 2021).

However, the prospect and eventual flow of significant payments also creates risks related to unrealistic expectations in the community, disagreement about appropriate fund allocation, rivalry for fund allocation, misallocation or ineffective allocation of funds and corruption. These risks are significant because the intended beneficiaries are poor and often with few if no alternative prospects and income, and few community members who are capacitated to manage public trusts.

These challenges can lead to social disruptions and conflict, disillusionment and apathy and empowerment of some sections of the community at the expense of others. Stakeholder testimony on the perceived effect of renewable energy projects on communities includes (SRK, 2022):

- Poor management of funds;
- Poor visibility of SED / ED initiative benefits;
- Unachievable expectations;
- Rivalry between beneficiary communities located within the 50 km project radius;
- Protests over fund allocations;
- Lack of cooperation and strategy; and

¹⁹ Local communities own an average of 11% of active IPP projects (CSIR, IASS, IET, 2019). By some estimates, community trusts are due to receive over R27 billion in cash from their investments in IPPs that had been selected by 2021 (Intellidex, 2021).

- Politicisation of the communities and contractors.

Intellidex (2021) noted common concerns with the management of trusts holding community equity in IPPs:

1. Trusts are often set up for compliance purposes rather than a desire to meaningfully contribute to community development;
2. Participatory processes are often truncated and not extensive enough;
3. Trustees frequently lack skills and knowledge of their role, or are not regarded by the communities as their true representatives;
4. Collaboration with other trusts, IPPs and local governments is very limited;
5. During the first seven to eight years, dividends are spent on servicing loans acquired to purchase the Community Trusts' equity in the energy facility, during which time very little, if any, social upliftment work is done;
6. Trusts are not required to report on expenditures and social impacts to anyone except the IPP Office. This impedes accountability to both communities and local governments; and
7. Practices such as outsourcing of labour, hiring external consultants and insufficient community engagement have resulted in ill-will within communities.

The considerable socio-economic needs of communities in the Stilfontein Cluster project area identified in Section 1.1, partly a result of mine closures and a dearth of other economic opportunities, indicate that several local communities would qualify as beneficiaries of IPP contributions and income. However, reported violence during consultation processes on projects in the recent past (see Section 5) also indicates the potential for social disruptions and challenges listed above.

Intellidex (2021) makes broad recommendations to improve trusts and fund management – many aimed at funders and the Government:

1. Funders should provide more structured support to IPPs and the trusts they establish, including strategies and formats for community engagement, managing expectations, trustee elections and appointments and trust management;
2. Trustees should meet stringent selection criteria that are made standard across the REIPPPP. Factors could include e.g. having a tertiary qualification or having experience of managing large sums of money for the public benefit;
3. Trustees must, as far as possible, be from the local area;
4. An intermediary, capacity-building NGO could be established by the IPP Office to work with the trusts and build trustees' skills as well as systems of governance;
5. Trust should report on plans and expenditures to local authorities and community structures on a semi-annual basis;
6. The IPP Office should encourage multilateral collaboration between different trusts and between different IPPs, especially where there are multiple IPPs (and hence trusts) operating in the same geographic areas to improve integration and scaling of efforts and reduce duplication;
7. The Department of Mineral Resources and Energy (DMRE) should allocate sufficient time for adequate trust preparation, including meaningful consultation with communities during this period;
8. IPPs should dedicate full-time resources to managing community work and relationships with various stakeholders;

9. IPPs and trusts should maintain open channels of communication with their communities to manage expectations and separate the companies from the trusts;
10. Funders should get income into trusts sooner by adjusting loan terms; and
11. IPPs should investigate options to be part of local energy security in communities where the widespread expectation is that IPPs will solve longstanding energy woes, possibly through municipal IPP procurement, if possible.

While few of the above recommendations are within the remit or control of IPPs, it is important that IPPs engage with each other and communities through experienced staff or consultants to ensure community buy-in to the project, gain insight into the communities' needs and devise an effective structure for the management and disbursement of funds to address challenges in the project area, such as low education levels and high poverty. Socio-economic development goals and projects should be selected in close cooperation with community members.

As contributions must benefit qualifying communities up to 50 km from the project area, the impact is regional. As many qualifying communities reside within 50 km of the project area, any given sum contributed by the project will be diluted to some effect. However, because of the current relatively poor socio-economic conditions of the area, improvements in facilities and opportunities as part of a well-executed upliftment programme over the (long term) project duration will be significant.

The benefit is assessed to be of **medium** (positive) significance and with the implementation of mitigation increases to **high** if the project is procured via the REIPPPP (and past REIPPPP requirements apply) (Table 6-8).

Table 6-8: Significance of increased community prosperity through contributions and income from the project if procured via the REIPPPP

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Medium 2	Long-term 3	High 7	Possible	MEDIUM	+ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> • Regularly engage with community stakeholders to develop meaningful strategies for community development. • Define a vision for economic development in consultation with communities. • Develop a Governance Plan with clear governance rules for the Community Trust, including administration and trustee and beneficiary selection. • Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. • Set clear goals for each project and phase out funding once these goals are achieved. • Ensure regular external auditing of the Community Trust as well as supported projects. • Consider auditing projects for several years after funding has ceased to ensure their benefits are sustained. 								
With mitigation	Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	+ve	Medium

Ensuring that the Community Trust is consistently funded and that projects are carefully selected and well administered would increase the likelihood of successful outcomes and long-term benefits accruing to the community. Conversely, **poor fund management can have a significant negative impact on community wellbeing and cohesion.**

The following analysis applies if the project sells generated electricity via agreements with private end-users, or if the REIPPPP programme excludes or reduces requirements in relation to community ownership and investment in future: If community ownership in the project and specified SED and ED funding are not contractual requirements, it is likely that they will not be implemented to the same degree as in previous REIPPPP bidding rounds, although some Corporate Social Investment (CSI) is likely. As such, the project would result in some, but lower, socio-economic benefits from SED and ED funding.

The benefit is assessed to be of **low** (positive) significance and with the implementation of mitigation remains **low** if a private end-user agreement is pursued or past REIPPPP requirements do not apply (Table 6-9).

Table 6-9: Significance of increased community prosperity through contributions and income from the project if a private end-user agreement is pursued

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term 3	Low 5	Probable	LOW	+ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> Regularly engage with community stakeholders to develop meaningful strategies for community development. Define a vision for economic development in consultation with communities. Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. Set clear goals for each project and phase out funding once these goals are achieved. 								
With mitigation	Local 1	Low 1	Long-term 3	Low 5	Probable	LOW	+ve	Medium

6.3 Potential Impacts: Decommissioning Phase

6.3.1 Reduced Employment and Community Income

The decommissioning phase is primarily associated with the demolition, salvage and removal of the solar facilities and the rehabilitation of the site. This generates some opportunities for demolition, recycling and disposal services (IRENA, 2014). No detail on such opportunities is currently available.

Decommissioning is also associated with a reduction and, ultimately, cessation of employment at the project, and discontinued support of upliftment initiatives and dividend payouts to shareholders. Employment during the operational phase is relatively low and the end of life of the project is predictable, so that the impact of termination of employment is limited. Similarly, contributions to initiatives are predictable over the lifetime of the project and the cessation of such contributions is known from the outset.

The impact is assessed to be of **very low** significance and with the implementation of mitigation remains **very low** (Table 6-10).

Table 6-10: Significance of reduced employment and funding

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Low 1	Short-term 1	Very Low 4	Definite	VERY LOW	-ve	Medium
Essential mitigation measures:								
<ul style="list-style-type: none"> Clearly communicate project duration to staff and communities. Prolong the operational life of the project as much as possible. Assist with recommendations and referrals where possible. Assist with the sustainable administration of funds throughout the project lifetime. 								
With mitigation	Regional 2	Low 1	Short-term 1	Very Low 4	Definite	VERY LOW	-ve	Medium

6.4 Cumulative Impacts

6.4.1 Introduction

For the purposes of this report, cumulative impacts are defined as 'direct and indirect impacts that act together with existing or future potential impacts of other activities or proposed activities in the area / region that affect the same resources and / or receptors'.

For the most part, cumulative effects or aspects thereof are too uncertain to be quantifiable, due mainly to a lack of data availability and accuracy. This is particularly true of cumulative effects arising from potential or future projects, the design or details of which may not be finalised or available and the direct and indirect impacts of which have not yet been assessed.

For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognised as important on the basis of scientific concerns and/or concerns of affected communities.

6.4.2 Cumulative Impacts Analysis

In addition to the project, other past, present and future activities that might have caused or may cause impacts and may interact with impacts caused by the project are briefly discussed below:

- **Cumulative impacts of past and existing activities:**

The project is located within a region that has been heavily affected by past and (to a lesser extent) present mining. Agricultural activities, mostly grazing, are also conducted in the area, which have led to cumulative socio-economic effects, notably a reduction in economic opportunities due to mine closures. Past and present activities are largely taken into account in the baseline.

- **Potential cumulative impacts of planned and foreseen activities:**

The Starling project is part of the larger proposed Stilfontein Cluster that comprises up to nine up to 150 MW PV facilities and ancillary infrastructure on neighbouring properties (see Section 3.2 and Figure 1-1). The project is also located within the Klerksdorp REDZ, which may attract additional renewable energy projects while grid capacity remains available. Although several solar farms in the Klerksdorp REDZ received EAs in the past (see Table 4-3 and Figure 4-6), none have established (see Section 4.1.5).

6.4.3 Stimulation of Economic and Employment Growth

Total CapEx for the nine Stilfontein Cluster PV projects would be ~R9.9 billion, and total OpEx over the 20-year project life would amount to ~5.4 billion (not discounted)²⁰.

Investment figures and installed capacity for other projects proposed in the area are not yet available. However, considering the high investment for a single PV project and the likely increasing interest by other IPPs to establish in the area, it is expected that multiple billions of Rand will be spent in the national, regional and local economies. For comparison, during the first four bidding rounds, REIPPPP attracted R209.4 billion in committed private sector investment (South African Government News Agency, 2019), 24% of which is FDI (Nomjana, 2020).

A spike of investment and employment will be experienced during the construction phases of individual projects. If the construction phases for several projects in the same region coincide, the cumulative investment could have a distorting effect in the local and regional economy through significantly increased (short-term) demand for certain goods and services and labour. In the worst case, this could

²⁰ CapEx: R1.1 billion per project x 9 projects, OpEx: R600 million per project x 9 projects

lead to inflationary pressures on wages, goods and services and make them less affordable for other businesses or individuals. This could crowd out such businesses or reduce the living standard of people who do not benefit from the renewable energy boom and cannot afford goods at higher prices. However, the presence of several town and past and present mining activity ensures a relatively large business network and workforce in the area, and the likelihood of this impact is expected to be low.

Cumulative operational phase spending by the different projects will be lower and longer-term and thus carries less distortion risk. Operational phase spending of even a few projects will be highly significant for sustained long-term increase in employment and local economic activity, and also provide some indirect and induced stimulation for other sectors.

The nine Stilfontein Cluster PV plants together will have an installed capacity of up to 1 350 MW and are projected to generate ~3 000 GWh/annum²¹. This would represent 22% to 33% of the shortfall in installed capacity²², though renewable energy projects have a lower efficiency as they cannot produce continuously. Nevertheless, that is a significant contribution towards reducing the shortfall in South African electricity generation and the highly costly incidence of loadshedding.

The cumulative benefit of renewable energy IPPs on the local, regional and national economy is assessed to be of **very high** significance with and without the implementation of mitigation.

Table 6-11: Significance of potential cumulative stimulation of economic and employment growth

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Regional	High	Long-term	Very High	Probable	VERY HIGH	+ ve	High
	2	3	3	8				

Recommended mitigation measures to be implemented on the project to manage cumulative impacts:

- Coordinate local recruitment and procurement with other nearby developments / projects where possible to streamline the application process and/or transition of workers between projects.
- Consider pooling resources to provide training to appointed staff and appointed service providers on how to position themselves for other employment opportunities once construction ends.
- Consider undertake a joint skills survey in the area to inform a coordinated recruitment and procurement approach.

With mitigation	Regional	High	Long-term	Very High	Probable	VERY HIGH	+ ve	High
	2	3	3	8				

The significance of this cumulative impact could be reduced further if the relevant authorities implement the following mitigation measures in the Aol:

²¹ Anticipated power output was not provided, and depends on various factors, such as the panel technology and solar irradiation. Productions rates vary across PV plants:

- In 2017, total PV installed capacity in South Africa was 2 186 MW, producing 3 095 GWh, or ~1 416 MWh per installed MW (Wikipedia, 2022);
- The 96 MW Jasper Solar Power Project, operational in the Northern Cape since 2014, produces 180 GWh per year, or ~1 875 MWh per installed MW (Unwin, 2019);
- The more recent 75MW Kalkbult solar power plant, operational in the Northern Cape since 2019, produces 150 GWh of energy a year, or ~2 000 MWh per installed MW (Unwin, 2019); and
- Amazon’s 10 MW solar project in the Northern Cape, using single-axis tracking bifacial solar modules, is expected to supply 28 GWh of renewable energy per year, or 2 800 MWh per installed MW (BusinessTech, 2021a).

It is evident that energy generation efficiency is increasing in solar plants. However, considering the less intense solar irradiation in North West Province, where the Stilfontein Cluster is located, generation capacity of ~2 200 MWh per installed MW is assumed for this project. Output is thus calculated as 1 350 MW x 2 200 MWh = 2 970 GWh.

²² South Africa’s immediate power gap has been reported as 4 000 MW to 6 000 MW (Business Day, 2022)

Offer training in relevant skills to potential future workers and contractors prior to the initiation of projects.

6.4.4 Increased Community Prosperity through Contributions and Income from IPPs

Projects selected through the REIPPPP must comply with requirements aimed at sharing project benefits with PDI communities within a 50 km radius and contributing towards the growth and transformation of the South African economy.

Amounts committed to communities proposed by other projects is not yet available, but community investment is highly significant, especially in the context of largely impoverished rural communities. For comparison, WWF (2015) estimates that the 64 projects approved during the first three REIPPPP bidding rounds have committed to R441 million in SED, R130 million in ED and R600 million in dividends via community shareholding, amounting to community investment of R1.17 billion over the 20-year project lifetimes. The South African government assumes much higher values based on the first four bidding rounds, including R27.1 billion net community income through the dividends from their shareholding over the 20-year life of these projects (Nomjana, 2020).

The funds disbursed by REIPPPP to communities are highly significant, which may lead to governance challenges. Communication between IPPs operating in the same region and IPPs and communities, as well as the implementation of good governance procedures, will be critical to ensuring that the funds deliver equitable benefits, and to avoid corruption and community discord over use of funds.

As of mid-2021 IPPs can also sell independently generated electricity to private end-users; such agreements are not subject to the REIPPPP socio-economic requirements.

The cumulative benefit is assessed to be of **very high** significance with and without the implementation of mitigation if the project is procured via the REIPPPP (and past REIPPPP requirements apply).

Table 6-12: Significance of potential cumulative increase in community prosperity if REIPPPP requirements apply

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Regional	High	Long-term	Very High	Probable	VERY HIGH	+ ve	High
	2	3	3	8				
Recommended mitigation measures to be implemented on the project to manage cumulative impacts:								
<ul style="list-style-type: none"> Coordinate selection and implementation of SED and ED initiatives with adjacent development / project proponents as far as possible maximise the effectiveness of initiatives. Consider pooling resources of several projects to fund dedicated full-time resources to jointly manage community work and relationships with stakeholders on behalf of several adjacent IPPs. Consider pooling resources of several projects to build skills of trustees and/or other community representatives as well as systems of governance. 								
With mitigation	Regional	High	Long-term	Very High	Probable	VERY HIGH	+ ve	High
	2	3	3	8				

The cumulative benefit is assessed to be of **low** significance and with the implementation of mitigation increases to **medium** if a private end-user agreement is pursued (or past REIPPPP requirements do not apply).

Table 6-13: Significance of potential cumulative increase in community prosperity if REIPPPP requirements do not apply

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local	Low	Long-term	Low	Probable	LOW	+ ve	High
	1	1	3	5				

Recommended mitigation measures to be implemented on the project to manage cumulative impacts:								
<ul style="list-style-type: none"> • Coordinate selection and implementation of SED and ED initiatives with adjacent development / project proponents as far as possible maximise the effectiveness of initiatives. • Consider pooling resources of several projects to fund dedicated full-time resources to jointly manage community work and relationships with stakeholders on behalf of several adjacent IPPs. • Consider pooling resources of several projects to build skills of community representatives as well as systems of governance. 								
With mitigation	Local	Medium	Long-term	Medium	Probable	MEDIUM	+ ve	High
	1	2	3	6				

The significance of this cumulative benefit could be increased further if the relevant authorities implement the following optimisation measures in the Aol:

- Encourage multilateral collaboration between different trusts and different IPPs, especially where there are multiple IPPs (and hence trusts) operating in the same geographic areas to improve integration and scaling of efforts and reduce duplication;
- Provide structured support to IPPs and any trusts they establish, including strategies and formats for community engagement, managing expectations, trustee elections and appointments and trust management; and
- Investigate options to improve local energy security in communities where the widespread expectation is that IPPs will solve longstanding energy woes, possibly through municipal IPP procurement, if possible.

6.5 No-Go Alternative

If the project is not authorised, then the impacts or benefits discussed above will not materialise.

The project has significant socio-economic benefits at the local and regional scale which outweigh the potential negative socio-economic impacts. The No-Go alternative is thus considered less desirable than proceeding with the project.

7 Findings and Conclusion

This chapter presents the principal findings and conclusions with regards to the socio-economic impacts of the proposed Starling project.

7.1 Findings

The following findings are pertinent:

- Mainstream proposes to construct up to the nine Photovoltaic (PV) facilities and associated infrastructure for the Stilfontein PV Cluster, including the Starling PV. The Stilfontein Cluster is located ~20 km south-west of Potchefstroom and ~6 km north-east of Stilfontein, in North West Province and within the Klerksdorp REDZ;
- The Starling PV facility comprises PV arrays with a total maximum export capacity of up to 150 MW, a Lithium-Ion BESS, 11-33kV overhead powerline(s) between the PV facility and Starling on-site substation, IPP-side of the 11-33/132 kV Starling on-site substation and internal infrastructure and structures, including gravel roads, fencing, lighting, stormwater, water supply, septic / conservancy tank supply and water storage infrastructure, laydown areas and offices;
- The project lies within an area that has many socio-economic challenges, expressed in low education levels, precarious employment, low income levels, a dominance of informal housing and poor access to basic services. Closure of local mines has significantly reduced economic opportunities in the area;
- The local authority and adjacent businesses and landowners are generally supportive of the project;
- Potential socio-economic benefits associated with the proposed project include investment contributing to the economy and generation of employment, income and skills during construction and operation, and increased community prosperity due to SED / ED initiatives and partial project ownership if previous REIPPPP requirements are applied. Potential socio-economic impacts relate to reduced quality of life for nearby residents and (unlikely) social disruptions during construction and reduced employment and funding during decommissioning;
- The motivation underlying the project, namely to produce additional electricity to reduce the risk of loadshedding and associated impacts on economic activity and quality of life, is also a fundamental socio-economic motivation;
- The project has acceptable socio-economic impacts and desirable benefits, though careful management of benefits (particularly governance of Community Trusts if community takes partial ownership of the project) is critical. Anticipated benefits outweigh the potential impacts, which can be mitigated; and
- The potential cumulative socio-economic impacts of the nine projects of the Stilfontein Cluster and/or any other renewable projects that may establish in the Klerksdorp REDZ are highly significant and positive. Some distorting effects and social pressures may arise if several projects are implemented simultaneously, although the presence of several town and past and present mining activity ensures a relatively large business network and workforce in the area, and the likelihood of this impact is expected to be low.

Table 7-1 summarises the potentially significant socio-economic impacts and their significance ratings before and after application of mitigation and/or optimisation measures.

Table 7-1: Summary of impacts and mitigation / optimisation measures

Impact	Significance rating		Mitigation / optimisation measures
	Before mitigation/optimisation	After mitigation/optimisation	
Construction Phase			
Capital investment contributing to the national, regional and local economy	Medium	Medium	<ul style="list-style-type: none"> Source as many goods and services as possible from the local and regional economy (e.g. use local contractors and accommodation and equipment suppliers as far as possible and purchase perishable goods locally). Provide suitable training to service providers, where possible and practicable. Develop and implement a fair and transparent procurement policy. Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends. Consult with existing IPP projects that successfully procure from local SMMEs to share learnings, where possible.
Generation of employment, income and skills	Low	Medium	<ul style="list-style-type: none"> Maximise use of local skills and resources through preferential employment of locals where practicable. Develop, communicate and implement a fair and transparent labour and recruitment policy. Ensure diversity and gender equality in recruitment, as far as possible. Provide training to staff and service providers before and/or during the construction phase. Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends.
Social disruption and change in social dynamics	Very low	Insignificant	<ul style="list-style-type: none"> Clearly publicise and implement a local recruitment policy. Work together with impartial local representatives to identify local people during the recruitment process. Consult with the municipality regarding the capacity of existing services and infrastructure (e.g. provision of water, electricity, waste removal, sanitation and housing) to cope if significant numbers of additional workers are brought into the area during the construction period. Consider supporting projects that improve local services and infrastructure and/or deal with social problems or conflicts through the social upliftment programme, if the need arises.
Reduced quality of life and increased risks due to construction near residences	Very low	Insignificant	<ul style="list-style-type: none"> Liaise with nearby residents (up to ~2 km from the project boundary) before and during construction to inform them of construction status and discuss safety management measures to reduce security risks. Maintain a visible security presence on site. Implement a grievance mechanism during the construction phase. Communicate and implement a compensation procedure in the event of damages directly linked to the construction. Control site access. Provide transportation to site for workers. Declare areas outside of the construction site as no-go areas for construction staff. Erect and regularly inspect a boundary fence. Regularly inspect the project area and surrounding area for signs of illegal activity.

Impact	Significance rating		Mitigation / optimisation measures
	Before mitigation/optimisation	After mitigation/optimisation	
			<ul style="list-style-type: none"> Regularly clean any litter from the project area and surrounding area.
Operation Phase			
Operational investment contributing to the national, regional and local economy	Medium	Medium	<ul style="list-style-type: none"> Source as many goods and services as possible from the local and regional economy (e.g. use local contractors and equipment suppliers as far as possible). Provide suitable training to service providers, where possible and practicable. Develop and implement a fair and transparent procurement policy.
Generation of employment, income and skills	Low	Low	<ul style="list-style-type: none"> Maximise use of local skills and resources through preferential employment of locals where practicable. Develop and implement a fair and transparent labour and recruitment policy. Ensure diversity and gender equality in recruitment, as far as possible. Provide suitable training. Provide ancillary training to workers on maximising the use of income and training to further future economic prospects, potentially through projects initiated as part of the social upliftment programme.
Increased community prosperity through contributions and income from the project	If procured via the REIPPPP		<ul style="list-style-type: none"> Regularly engage with community stakeholders to develop meaningful strategies for community development. Define a vision for economic development in consultation with communities. Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. Set clear goals for each project and phase out funding once these goals are achieved. Consider auditing projects for several years after funding has ceased to ensure their benefits are sustained. If the community takes partial ownership in the project: <ul style="list-style-type: none"> Develop a Governance Plan with clear governance rules for the Community Trust, including administration and trustee and beneficiary selection. Ensure regular external auditing of the Community Trust as well as supported projects.
	Medium	High	
	If a private end-user agreement is pursued		
	Low	Low	
Decommissioning Phase			
Reduced employment and funding	Very low	Very low	<ul style="list-style-type: none"> Clearly communicate project duration to staff and communities. Prolong the operational life of the project as much as possible. Assist with recommendations and referrals where possible. Assist with the sustainable administration of funds throughout the project lifetime.

7.2 Statement and Reasoned Opinion

The proposed construction of the project provides significant socio-economic benefits, related to economic growth and employment and financial contributions to and upliftment of PDIs in rural local communities.

More secure power generation (reducing the probability of loadshedding and the many socio-economic costs of such outages) and generation of renewable power (contributing to the reduction of social and economic risks from climate change) are the fundamental motivations underpinning the project.

Negative impacts associated with the project relate to possible change in social dynamics during the construction phase (when activity on the site increases) and possible social conflict in the event of poor governance of community funding, such as SED and ED contributions and upliftment initiatives. Mitigation of these impacts is critical, whereupon they are more than countervailed by the socio-economic benefits of the project.

Cumulative impacts are highly likely, as the Stilfontein Cluster comprises nine PV projects and other IPPs are also expected to establish in the Klerksdorp REDZ. The projects cumulatively magnify the benefits and some impacts of the Starling project, and the risk of distorting effects is considered low as the area has a considerable business network and workforce.

The project has acceptable socio-economic impacts and desirable benefits, though careful management of benefits (governance of Community Trusts) is critical. From a socio-economic perspective the project should be authorised and is preferred to the No-Go alternative.

Technology alternatives or changes do not impact the socio-economic impacts and benefits identified in this study. Both 11-33/132 kV substation location alternatives and tie-in of powerlines anywhere along the substation within the powerline corridor and associated substation buffers (on-site & MTS buffers) are deemed acceptable.

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Appendices

Appendix A: Specialist Declaration



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed development the Stilfontein Cluster, North West Province, with separate EA applications for:

- Nine Photovoltaic (PV) facilities and associated infrastructure: Spoonbill, Sunbird, Swallow, Snipe, Shrike, Stilfontein, Sparrow, Starling and Swift;
- Three collector substations and associated infrastructure: Voelnessie A, Voelnessie B, Voelnessie C; and
- One Main Transmission Substation and associated infrastructure.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
 Department of Environmental Affairs
 Attention: Chief Director: Integrated Environmental Authorisations
 Private Bag X447
 Pretoria
 0001

Physical address:
 Department of Environmental Affairs
 Attention: Chief Director: Integrated Environmental Authorisations
 Environment House
 473 Steve Biko Road
 Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
 Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	SRK Consulting		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition
			135%
Specialist name:	Sue Reuther		
Specialist Qualifications:	BSc (Hons) Economics, MPhil (Env Mgmt)		
Professional affiliation/registration:	Reg. EAP (EAPASA) Member of IA/Asa		
Physical address:	Albion Spring, 183 Main Road, Rondebosch, 7700		
Postal address:	Postnet Suite #206, P Bag X18, Rondebosch, 7701		
Postal code:	7700	Cell:	084 424 5197
Telephone:	021 659 3060	Fax:	086 530 7003
E-mail:	sreuther@srk.co.za		

2. DECLARATION BY THE SPECIALIST

I, Sue Reuther, declare that –

- 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

SRK Consulting

 Name of Company:

14 June 2022

 Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Sue Reuther, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

SRK Consulting

Name of Company

14 Jun 2022

Date



Signature of the Commissioner of Oaths

2022 -06 -14

Date



Appendix B: CV

Sue Reuther

Principal Consultant and Partner



Profession Environmental Consultant

Education MPhil (Environmental Management), University of Cape Town, 2004
BSc (Hons), (Economics), University College London, 2001

**Registrations/
Affiliations** Registered Environmental Assessment Practitioner (EAP): Number 2020/425
Member, IAIAAsa

Specialisation

Environmental impact assessments, economic and resource economic impact assessment, environmental control officer, state of the environment reporting (including environmental management frameworks), visual impact assessment.

Expertise

Sue Reuther has been involved in environmental assessment sector in Africa, Latin America, Asia and the Middle East for the past 19 years. Her core expertise includes:

Environmental impact assessment and management projects, including IFC / PS compliant processes, strategic assessments and spatial planning for projects in the mining, infrastructure, oil and gas and coastal and marine sectors in South Africa, Africa and South America;

Environmental and Social Due Diligence (ESDD) reviews against Good International Industry Practice (GIIP) in Africa and the Middle East;

Economic and socio-economic specialist studies for projects in the infrastructure, mining and energy sectors in Africa, South America and Asia; and

Visual impact assessments for mining projects and energy infrastructure.

She has 2 years of previous experience in strategy and financial research and assessment (London).

Employment

2005 - present	SRK Consulting (Pty) Ltd, Associate Partner and Principal Environmental Consultant
2003 - 2004	
2001 - 2002	University of Cape Town (UCT), MPhil Environmental Management
2000 (Jul - Oct)	JPMorgan Chase, Equity Research Analyst, London
1998 - 2001	Chase Manhattan Bank, Financial Institutions Analyst, London University College London (UCL), BSc (Honours) Economics, London

Publications

A number of publications, in *Development Southern Africa* and for JPMorgan.

I have been interviewed and quoted in numerous environmental and sustainability articles published in the press and sector specific journals since 2011, *inter alia*: *Urban Green File*, *Mining World*, and *Environmental Management and Civil Engineering*.

I hold guest lectures to UCT 4th year / post-graduate students on EIA/EMF since 2014.

Languages

English – read, write, speak (Excellent)
 German – read, write, speak (Excellent)
 French – read, write, speak (Good)
 Spanish – read, write, speak (Good)
 Portuguese – read (Good)
 Dutch – read, speak (Good)
 Afrikaans – read, understand (Good)

Economic and Social Assessments

- Mainstream Renewable Power, Social impact assessments for nine Hanover Cluster Wind Energy Facilities (WEFs) and Photovoltaic (PV) Facilities and associated infrastructure, South Africa, 2022, Specialist – ongoing, R154,000
- African Rainbow Minerals, Social, environmental, local economic, human rights and climate change assessment as per the requirements of the Global Industry Standard on Tailings Management (GISTM) for the Modikwa Platinum, Nkomati Nickel, Two Rivers Platinum and Bokoni Platinum operations, South Africa, 2022-2023, Specialist – ongoing, R117 000
- ABO Wind / CSIR, Social impact assessment for six Ingwe Wind Energy Facilities (WEFs) and Photovoltaic (PV) Facilities, Eastern Cape, South Africa, 2022, Specialist, R207 000
- Mainstream Renewable Power, Social impact assessment for 18 Stilfontein Cluster Solar Photovoltaic projects and associated infrastructure, South Africa, 2022, Specialist – ongoing, R7.8 million
- Vale, Development of socio-economic closure strategy for Confidential Mine, Specialist, 2020-2021
- RSK, Modelling of economic and population dynamics to inform town master plans for sections of Basra, Zubair and Nashwa, Iraq, 2020-2021, Specialist, \$15,000
- ABO Wind / CSIR, Social impact assessment for three Kwagga Wind Energy Facilities, Western Cape, South Africa, 2020-2021, Specialist, R100 000
- Department of Environmental Affairs and Development Planning (DEA&DP), Ecosystem Services Assessment and Valuation of Papenkuils Wetland, Western Cape, South Africa, 2020-2021, Project Manager, R500,000
- Eskom, Socio-economic screening and baseline compilation to inform the selection of the preferred Eskom Kappa – Sterrekus transmission line corridor, Western Cape, South Africa, 2020, Specialist, R120,000
- Aecom, Socio-economic impact assessment for a bulk water pipeline through an informal settlement, Stellenbosch Municipality, South Africa, 2020, Specialist, R80,000
- Centerra Gold, Input into and review of economic impact assessment for the Kumtor Gold Mine Conceptual Closure Plan Update, Kyrgyzstan, 2019, Specialist, \$23,000
- KSEMS (on behalf of SANRAL), Social Impact Assessment for the Upgrade of National Road 3 Section 3 Pietermaritzburg, South Africa, 2019, Specialist, R86,000
- Allied Gold Corp, Economic specialist study for the Dish Mountain Gold Project, Ethiopia, 2018 – suspended in Dec 2019, Specialist, \$11,000
- Sierra Rutile Limited, Economic input into the SRL Area 1 Mine Environmental, Social and Health Impact Assessment, Sierra Leone, 2018, Specialist, R35 000
- Serina Kaolin, Update of socio-economic impact assessment for proposed Chapman's Peak Estate, Cape Town, 2017, Specialist, R45,000
- RSK, Economic specialist component of three socio-economic impact assessments for the East African Crude Oil Pipeline (EACOP), Uganda and Tanzania, 2016 – 2017, Specialist, \$40,000

- Eskom, Economic input into socio-economic study for Eskom Generation Fleet Renewal Project, South Africa, 2016 – 2017, Specialist, R25,000
- Tronox Mineral Sands, Socio-economic impact assessment for the Doringbaai Abalone Farm, West Coast, South Africa, 2016, Specialist, R85,000
- Provincial Government Western Cape, Socio-economic impact assessment for the Hermanus CBD Bypass Project, Hermanus, Western Cape, 2016, Specialist, R85,000
- River Club, Socio-economic impact assessment for the redevelopment of the River Club, Cape Town, January 2016 – 2017, Specialist, R77,000
- Airports Company South Africa (ACSA), Socio-economic baseline study and Spatial Analysis study for proposed runway realignment at Cape Town International Airport, Cape Town, 2014 – 2016, Specialist, R200,000
- PPC Cement, Update of the socio-economic assessment in the ESIA and ESMP for the PPC Barnet Songololo cement plant and quarry in Bas Congo Province to ensure compliance of the documents with IFC standards and other lender requirements, Bas Congo Province, Democratic Republic of Congo, 2013 – 2014, Specialist
- Nyumba Ya Akiba Sprl, Update of the socio-economic assessment in the ESIA and EMP for the Nyumba Ya Akiba cement plant in Bas Congo Province to ensure compliance of the documents with IFC standards and other lender requirements, Bas Congo Province, Democratic Republic of Congo, 2013, Specialist, R94,000
- Sasol, Socio-economic specialist study for proposed mine development, Limpopo, South Africa, 2013, Specialist, R90,000
- FCX / PDG, Socio-economic specialist study for proposed copper mine, Democratic Republic of Congo, 2012, Specialist, R50,000
- AF-ROM Energy, Socio-economic specialist study for proposed 75 MW solar farm, Victoria West, Northern Cape, South Africa, 2012, Specialist, R50,000
- AF-ROM Energy, Socio-economic specialist study for proposed 75 MW solar farm, Craddock, Eastern Cape, South Africa, 2012, Specialist, R50,000
- Staatsolie Maatschappij Suriname, CRP for communities potentially affected by the refinery expansion, Suriname, 2012, Specialist, US\$20,000
- SRK Cardiff, Input into review of Economic Impact Assessment, Pakistan, 2010, Specialist, R50,000
- Courtrai Developments, Social Impact Assessment of proposed new retirement village and resettlement, Paarl, Western Cape, 2009 – 2010, Specialist, R40,500
- Staatsolie, Social Impact Assessment of proposed oil refinery expansion, Wanica Province, Suriname, South America, 2009, Specialist, US\$10,000
- BHP Billiton / SRK Consulting, Economic Impact Assessment of proposed dredging operations, Suriname, South America, 2008, Specialist, US\$10,000
- BHP Billiton / SRK Consulting, Economic Impact Assessment of proposed bauxite transport activities, Suriname, South America, 2006 – 2007, Specialist, US\$20,000
- BHP Billiton / SRK Consulting, Economic Impact Assessment of proposed bauxite mining activities at Bakhuis, Bakhuis, Apoera district, Suriname, South America, 2005 – 2007, Specialist, US\$27,000

Environmental (and Social) Impact Assessments (EIA or ESIA)

- Staatsolie Maatschappij Suriname, Environmental Management and Monitoring Plan (EMMP), including impact assessment, for Staatsolie's Produced Water Re-injection (PWRI) project in the Tambaredjo, Tambaredjo North West and Calcutta oilfields, Suriname, 2022, Project Manager, \$65,000
- Mainstream Renewable Power, 18 EIAs for the proposed 1 350 MW Stilfontein Cluster Solar Photovoltaic Project and associated infrastructure, South Africa, 2022, Project Manager, – ongoing, R2.1 million
- Mineral Sand Resources, ESIA for the proposed inland extension of Tormin Mine, South Africa, 2021-ongoing, Project Manager, R2.4 million
- Mineral Sand Resources, Baseline for the potential future inland extension of Tormin Mine, South Africa, 2021 - ongoing, Project Manager, R850,000
- Tronox Mineral Sands, Screening study to provide environmental input into the site selection process for the Sand Tailings Facility (STF) and the preferred In-Pit Residue Storage Facility (RSF) for the Namakwa Sands East Mine Orange Feldspathic Sands (East OFS) Project, South Africa, 2019– 2020, Project Consultant, R300,000
- Tronox Mineral Sands, EIA for proposed construction and operation of an In-Pit Residue Storage Facility (RSF 6) and Sand Tailings Facility (STF) for the Namakwa Sands East Mine Orange Feldspathic Sands (East OFS) Project, South Africa, 2019 – 2020, Project Consultant, R1,900,000
- Staatsolie Maatschappij Suriname, Environmental Management and Monitoring Plan (EMMP), including impact assessment, for Staatsolie's Cyclic Steam Stimulation (CSS) Enhanced Oil Recovery (EOR) project in the Tambaredjo oil field, Suriname, 2019 – 2020, Project Manager, \$40,500
- Staatsolie Maatschappij Suriname, Environmental Management and Monitoring Plan (EMMP), including impact assessment, for Staatsolie's Polymer Flooding Enhanced Oil Recovery (EOR) project in the Tambaredjo oil field, Suriname, 2019, Project Manager, \$64,000
- Maritime Authority Suriname, ESIA update for the Suriname River Dredging Project (SRDP), Suriname, 2019, Project Manager, US\$172,000
- Staatsolie Maatschappij Suriname, ESIA for the construction of a new 36 MW HFO-fuelled power plant in the Saramacca District, Suriname, 2018 – 2019, Project Manager, US\$125,000
- Sezigyn, EIA for Exploration Right Application, Offshore Block Orange Deep West, West Coast, South Africa, 2018, Project Consultant, R150,000
- Ricocure, EIA for Exploration Right Application, Offshore Block 3B, West Coast, South Africa, 2018, Project Consultant, R150,000
- Sezigyn, EIA for Exploration Right Application, Offshore Mid-Orange Basin, West Coast, South Africa, 2018, Project Consultant, R150,000
- Mineral Sands Resources, Section 24G Application to apply for rectification of an unlawful activity, South Africa, 2018 - 2019, Project Manager, R95,000
- Joule Africa, Initial Environmental and Social Assessment of the KPEP Hydropower Project, Cameroon, 2018, Project Consultant, \$10,800
- Impact Oil and Gas, EIA for 2D and/or 3D Seismic Survey in Orange Deep Basin, South Africa, 2017, Project Consultant, R600,000
- City of Cape Town, EIA in support of a Waste Management Licence application for the operation of the Vissershok North Landfill, Cape Town, 2017 – 2018, Project Manager, R650,000
- Sungu Sungu, EIA for proposed 3D seismic survey in the offshore Pletmos Basin, South Coast, 2016 – 2018, Project Manager, R500,000

- Mineral Sand Resources, EIA for the Tormin Coastal Mine Expansion, Western Cape, 2016 – 2017, Project Consultant, R1,500,000
- Department of Agriculture, Forestry and Fisheries (DAFF), Project Definition and EIA for a proposed Aquaculture Development Zone (ADZ) in Saldanha Bay, Western Cape, 2016 – 2018, Project Manager, R1,000,000
- Provincial Government Western Cape, Environmental Authorisation Amendment Application process for a section of the R310 upgrade at Spier, Western Cape, South Africa, 2015 – 2019, Project Manager, R100,000
- Transnet Capital Projects, EIA for the construction of additional substations, transmission infrastructures and area lighting masts near the Port of Saldanha, Western Cape, 2015 – 2016, Project Manager, R360,000
- Simo Petroleum, ESIA to IFC standards for the transportation and storage of fuel in Liberia, 2015 – 2016 (suspended), Project Manager, \$175,000
- Simo Petroleum, ESIA to IFC standards for the transportation and storage of fuel in southern Guinea, 2015 – 2016 (suspended), Project Manager, \$175,000
- Provincial Government Western Cape, EIA for the construction of a bypass in Hermanus, including EMP and Water Use Authorisation (WUA), Hermanus, Western Cape, 2014 – ongoing, Project Manager, R3,100,000
- Lucky Star, Section 24G Application and Environmental Impact Assessment to apply for rectification of an unlawful activity, St. Helena Bay, Western Cape, Project Manager, 2015 – 2016, R330,000
- Sable Mining / West Africa Explorations (WAE), Cumulative Impact Assessment for WAE's Nimba iron ore mine, Guinea, 2014 – 2015 (suspended), Project Manager, US\$90,000
- Hatch Goba, BA and WUA for the proposed upgrade of a portion of Slent Road, City of Cape Town, South Africa, 2013 – 2015, Project Manager, R200,000
- Sonangol, ESIA and EMP for terrestrial aspects of the four landing sites of SOOC, Angola, 2013, Project Consultant, US\$47,000
- Maersk Oil Angola, ESIA and EMP for a 3D seismic survey in an offshore oil concession area, Angola, 2013, Project Manager, US\$35,000
- Lucky Star (formerly: Oceana Brands), Review and Public Participation for AEL renewal for fishmeal plant in St. Helena Bay, St. Helena Bay, Western Cape, 2013, Project Manager, R40,000
- N.V. Energiebedrijven Suriname (EBS), ESIA and EMMP for construction of a new 84 MW power plant in Paramaribo, Suriname, 2013 – 2014, Project Manager, US\$130,000
- Maersk Oil Angola, ESIA and EMP for prospect drilling of 6 wells in offshore Block 16, Angola, 2012 – 2013, Project Manager, US\$35,000
- WesternGeco, ESIA and EMP for a 3D seismic survey in an offshore oil concession area, Angola, 2012, Project Manager, US\$35,000
- Rare Metals Industries, Scoping study, including applications for AEL and WML, for construction of a specialty metals production complex, Saldanha, Western Cape, 2012 – 2014, Project Manager, R230,000
- WesternGeco, ESIA and EMP for a 3D seismic survey in an offshore oil concession area, Angola, 2012, Project Consultant, US\$35,000
- Staatsolie Maatschappij Suriname, Rapid Environmental Assessment and EMP for expansion of a power plant from 14 MW to 28 MW, Suriname, 2012 – 2013, Project Manager, US\$100,000
- Transnet (TPT), Operational EMP for the Saldanha Terminal, including the Break Bulk and Bulk Terminals, Saldanha, Western Cape, 2012, Project Manager, R88,000

- AECOM (Pty) Ltd on behalf of Western Cape Department of Transport and Public Works, EIA and EMP for the proposed completion of the R45 road corridor near Malmesbury in the Western Cape, Western Cape, South Africa, 2012 – 2016, Project Manager, R600,000
- Provincial Government Western Cape, BA and EMP for proposed upgrade of Annandale Road, Stellenbosch, South Africa, 2011, Project Manager, R150,000
- Staatsolie Maatschappij Suriname, EIA and EMP for proposed construction of diesel, gasoline and LGP pipelines, Suriname, 2011 – 2012, Project Manager, US\$120,000
- Premier Fishing, EIA, incl. EMP and applications for AEL and CWDP, for proposed re-establishment of fishmeal plant in Saldanha, Saldanha Bay, South Africa, 2011 – 2015, Project Manager, R1 200,000
- WesternGeco, EIA and EMP for proposed offshore 3D seismic survey of concession Block 20, Angola, 2010, Project Consultant, US\$30,000
- WesternGeco, EIA and EMP for proposed offshore 3D seismic survey of concession Block 19, Angola, 2010, Project Consultant, US\$30,000
- Provincial Government Western Cape, EIA and EMP for upgrade of Main Road 168 through Stellenbosch Wine Route, Stellenbosch, South Africa, 2009 – 2012, Project Manager, R1 100,000
- Transnet, Basic Assessment and EMP to inform AEL application, Saldanha Bay, Western Cape, 2009 – 2010, Project Manager, R900,000
- BHP Billiton, Environmental and Social Impact Assessment of dredging operations, Suriname, South America, 2007 – 2008, Project Consultant, US\$500,000
- Transnet, EIA of proposed expansion of Transnet's Iron Ore Terminal at Port of Saldanha, Saldanha Bay, Western Cape, 2007 – 2008, Project Consultant, R22 000,000
- BHP Billiton, ESIA of bauxite transport options, Bakhuis, Sipaliwini district, Suriname, South America, 2006 – 2008, Project Consultant and Logistics Coordinator, US\$2 000,000
- Transnet, EIA and EMP of deepening of Ben Schoeman Dock, Cape Town Harbour, Cape Town, Western Cape, 2006 – 2007, Project Consultant, R1 500,000
- Provincial Government Western Cape, EIA and EMP for proposed upgrade of Main Road 108 in Gordon's Bay, Gordon's Bay, Western Cape, 2006 – 2007, Project Manager, R200,000
- Nassau IER, Initial Environmental Review of Phase 1 bauxite exploration activities in Nassau, Nassau Mountains, Suriname, South America, 2006, Project Manager, US\$12,200
- BHP Billiton, ESIA and EMP of proposed bauxite mine, Bakhuis, Sipaliwini district, Suriname, South America, 2005 – 2008, Project Consultant and Logistics Coordinator, US\$4 000,000
- Provincial Government Western Cape, EIA and EMP for proposed upgrade of Trunk Road 2 in Somerset West, Somerset West, Western Cape, 2005 – 2006, Project Manager, R200,000

Chris Dalgliesh

Principal Consultant



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Education MPhil (EnvSci), Cape Town, 1994
 BBusSc (Hons), Cape Town, 1985
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 Director SRK South Africa 2018 - 2021
 Director SRK Australia 2019 - 2023
 Director SRK Investments 2011 - 2020
 Director SRK Global 2013 - 2017
 SRK Cape Town Managing Partner 2007 – 2015

Specialisation ESG Consulting

Expertise Chris Dalgliesh has been involved in management and environmental projects for the past 36 years. His expertise includes:

- EIA and ESIA (EMPR);
- environmental and social due diligence;
- socio-economic impact assessments;
- stakeholder engagement;
- strategic environment assessments and management plans;
- state of environment reporting;
- environmental management frameworks;
- site safety reports for the nuclear industry;
- natural resource management;
- waste management.

Employment

2000 – present SRK Consulting (Pty) Ltd, Director, Partner and Principal Environmental Consultant
1999 – 2000 Arcus Gibb (Pty) Ltd, Associate, Cape Town, South Africa
1996 – 1998 African Environmental Solutions (Pty) Ltd, Senior Environmental Consultant
1994 – 1996 Environmental Evaluation Unit, Environmental Consultant, UCT
1991 – 1993 Novello Music Publishers, Marketing Manager, London, UK
1988 – 1990 JR Phillips, Product Manager, Wokingham, UK
1986 – 1988 Unilever, Trade and Assistant Brand Manager, Durban, South Africa

Publications I have been interviewed and quoted in numerous environmental and sustainability articles published in the press and sector specific journals, including *Engineering News*, *Mining News*, *Business Report* and *Cape Times*, and am a frequent guest lecturer.

Languages English – read, write, speak
 Afrikaans – read, write, speak
 Dutch - read

Environmental and Social Impact Assessment (ESIA) and Environmental Management Programmes (EMP)

- Staatsolie Maatschappij Suriname, Produced Water Re-injection (PWRI) Project EIA, Saramacca, Suriname, 2022 – ongoing, US\$65 000
- AES, Cabinda Total Waste Management Facility FS: Environmental Screening Study, Cabinda, Angola, 2022 – ongoing, US\$26 000
- Mainstream Renewable Power South Africa (Pty) Ltd, EIA for Hanover SPV and Windfarm and Associated Infrastructure, Eastern Cape Province, South Africa, 2022 – ongoing, R 2 300 000
- Mainstream Renewable Power South Africa (Pty) Ltd, EIA for Stilfontein SPV Cluster and Associated Infrastructure, North West Province, South Africa, 2021 – ongoing, R 2 100 000
- PetroSA, PetroSA Gas to Power EIA, Mossel Bay, Western Cape, South Africa, 2021 – 2023, R 750 000
- Oceana Group Limited, Basic Assessment for 10 MW SPV Facility, St Helena Bay, Western Cape, South Africa, 2021 – ongoing, R 400 000
- Samara Mining (Pty) Ltd, Offshore Diamond Prospecting EIA, Offshore, West Coast, South Africa, 2021-2022, R 1 250 000
- Blue Crane Funerals, EIA for a Crematorium, Strand, Western Cape, 2021 – ongoing, R400 000
- Mineral Sand Resources, Tormin Mine Inland EIA, Lutzville, Western Cape Province, 2021 – ongoing R2 500 000
- AES, Bengo Landfill EIA, Angola, 2021 - ongoing, US\$80,000
- Mineral Sand Resources, De Punt Prospecting Block Baseline Study, Lutzville, Western Cape Province, 2021 – ongoing R1 000 000
- Coega Development Corporation, four EIAs for Gas to Power Plants (3 000MW), Eastern Cape Province, South Africa, 2020 – ongoing, R2 800 000
- Tronox Mineral Sands, EIA for East Mine In-Pit Residue Storage Facility, Namakwa Sands Mine, Brand se Baai, South Africa, 2019 – 2021, R900 000
- N.V. Energiebedrijven Suriname, ESIA for Tout lui Faut Kanaalweg Power Plant, Wanica District, Suriname, 2019, US\$115 000
- Eskom, EIA for Kappa-Sterrekus Powerline, Western Cape Province, South Africa, 2019 - ongoing, R3 000, 000
- Staatsolie Maatschappij Suriname, ESIA for Cyclic Steam Stimulation Enhanced Oil Recovery Project, Saramacca District, Suriname, 2019, US\$50 000
- Staatsolie Maatschappij Suriname, ESIA for Polymer Flood Enhanced Oil Recovery Project, Saramacca District, Suriname, 2019, US\$85 000
- Maritieme Autoriteit Suriname, ESIA for Suriname River Dredging Project, Suriname, 2019, US\$185 000
- Staatsolie Maatschappij Suriname, ESIA for Saramacca Power Plant, Saramacca District, Suriname, 2018 - 2019, US\$125 000
- Tronox Mineral Sands, EIA for coastal setback prospecting, Namakwa Sands Mine, Brand se Baai, South Africa, 2018 – ongoing, R800 000
- Motaengil Africa, IFC compliant EIA for Patriota Hospital, Luanda, Angola, 2018 – ongoing, R640 000
- Ricocure (Pty) Ltd, EIA for Exploration Right application for Offshore Block 3B, West Coast, South Africa, 2018-2019, R150 000

- Sezignyn (Pty) Ltd, EIA for Exploration Right application for Offshore Mid-Orange Basin, West Coast, South Africa, 2018-2019, R150 000
- Rheinmetall Denel, Multi Purpose Nitration Plant EIA, Wellington, Western Cape Province, South Africa, 2018 - ongoing, R650, 000
- Impact Oil and Gas, Orange Deep Basin Seismic Survey EIA, Offshore West Coast, South Africa, 2017, R600,000
- Sungu Sungu Oil (Pty) Ltd, Pletmos Basin EIA, Offshore Southern Cape, South Africa, 2017, R525,000
- City of Cape Town, Vissershok North Landfill Waste Management Licence, Cape Town, Western Cape Province, 2016 – ongoing, R1 250,000
- Mineral Sand Resources, Tormin Mine EIA, Lutzville, Western Cape Province, 2016 – ongoing R1 250 000
- Department of Agriculture, Forestry and Fisheries, Project Definition and EIA for a proposed Aquaculture Development Zone in Saldanha Bay, Western Cape, 2016 – 2018, R1,000,000
- Easigas, EIA for LNG Plant, Mossel Bay, Western Cape Province, South Africa, 2016 – 2017, R600,000
- Gyproc St Gobain, EMPr for gypsum mine, Vanrhynsdorp, Western Cape Province, South Africa, 2016, R125,000
- Tronox Namakwa Sands, EIA for new slimes dam, Brand se Baai, Western Cape Province, South Africa, 2015 – ongoing, R900,000
- The River Club, EIA for redevelopment of the property, Cape Town, Western Cape Province, South Africa, 2015 – ongoing, R1 900,000
- SIMO Petroleum Ltd, ESIA for fuel supply project, Guinea, 2015, US\$200,000
- SIMO Petroleum Ltd, EIA for fuel supply project, Liberia, 2015, US\$200,000
- Eskom, EIA for Transient Interim Storage Facility, Western Cape, South Africa, 2015 – ongoing, R900,000
- Falcon Oil & Gas, Environment Management Programme Report (EMPr) update and engagement, Western, Northern and Eastern Cape, South Africa, 2014 – 2015, US\$90,000
- Department of Environmental Affairs (DEA), Waste Management Licence applications and Basic Assessment for 20 waste facilities, Western Cape, South Africa, 2014 – 2015, R2,600,000
- Sable Mining / West Africa Explorations (WAE), Cumulative Impact Assessment (CIA) for WAE's Nimba iron ore mine, Guinea, May 2014 – on hold, US\$90,000
- De Beers Buffalo Camp, Basic Assessment and EMPr Amendment, Kimberley, Northern Cape, 2014, R260,000
- EFG Engineers, EIA for Hermanus bypass road, Western Cape Province, South Africa, 2014 – 2017, R1,200,000
- SRK Turkey, CIA of Copley gold mine, Turkey, 2014, US\$30,000
- Sable Mining Africa Ltd, ESIA for railway line and port expansion, Liberia, 2014, US\$480,000
- Tronox Namakwa Sands, EIA for abalone farm, Brand se Baai, Western Cape Province, South Africa, 2014 – ongoing, R1,050,000
- Matzikamma Municipality, EIAs for three abalone farms, Doringbaai, Western Cape Province, South Africa, 2014 – 2017, R1,100,000
- De Beers, EMPr amendment for fine residue pond, Kimberley, South Africa, 2013, R120,000
- AES, ESIA of landfill, Soyo, Angola, 2013, US\$70,000

- PetroSA, EIA of offshore gasfield, Southern Cape, South Africa, 2013 – ongoing, R500,000
- EnergieBedrijven Suriname, ESIA for new power plant, Suriname, 2013, US\$135,000
- AES, ESIA of Thermal Desorption Unit, Soyo, Angola, 2013, US\$65,000
- Staatsolie Maatschappij Suriname, Rapid EIA of power plant expansion, Suriname, September 2012 – 2014, US\$100,000
- BP, ESIA of Blocks 18 & 31 Drilling and Seismic Survey, Angola, 2012, US\$40,000
- Frontier, EIA for desalination plant and water pipeline, Abraham Villiers Bay, Northern Cape, South Africa, August 2012 – ongoing, R1,250,000
- Tronox Namakwa Sands, EIA /EMPr for two mining application areas, Namakwaland, Western Cape Province, South Africa, 2012 – ongoing, R1,250,000
- Airports Company South Africa, EIA of realignment of runway, Cape Town International Airport, Western Cape, South Africa, R3,175,000
- Grindrod Mauritius, EIA of Matola Coal Terminal Phase 4 Expansion, Maputo, Mozambique, 2012 - 2013, US\$425,000
- Maersk, ESIA of Block 16 Seismic Survey, Angola, 2010 – 2011, US\$25,000
- Staatsolie Maatschappij Suriname, EIA for diesel, gasoline and LGP pipelines, Suriname, October 2011 – 2013, US\$120,000
- Premier Fishing, EIA for re-establishment of fishmeal plant, Saldanha Bay, South Africa, May 2011 – 2015, R1,200,000
- Eni Angola BV, ESIA of development of Block 15/06 West Hub oil fields, Angola, 2011 - 2013, US\$110,000
- Falcon Oil & Gas, EMPr, Western, Northern and Eastern Cape, South Africa, 2010 – 2011, US\$100,000
- Great Western Minerals Group, EIA and EMPr of rare earth mine, Vanrhynsdorp, Western Cape, South Africa, 2010 – 2012, R1,760,000
- Vale, ESIA of phosphate mine, Nampula Province, Mozambique, 2010 – 2013, US\$630,000
- Sonangol Lda, EIA (x6) of onshore hydrocarbon facilities, Luanda, Malange and Lubango, Angola, March – November 2010, US\$280,000
- Empresa Moçambicana de hidrocarbonetos and Buzi Hydrocarbons Pty Ltd, ESIA for seismic surveys and exploration drilling in Buzi Block, Sofala Province, Mozambique, 2009 – 2010, US\$200,000
- Staatsolie, ESIA of refinery expansion, Paramaribo, South America, 2009 – 2010, US\$400,000
- Sasol Technology, EIA for proposed new gas pipeline from Ressano Garcia to Moamba, Mozambique, Moamba, Mozambique, 2009 – 2010, R1,000,000
- Anglo American, State of Environment Report, Strategic Environment Assessment, and ESIA of Gamsberg zinc mine, Aggeneys, South Africa, 2008 – 2010, R13,000,000
- CIC Energy, Environmental screening and fatal flaw assessment of Trans Kalahari Railroad and port, Botswana and Namibia, 2008 – present, R1,300,000
- BHP Billiton, ESIA of Corantijn River dredging, Suriname, 2007 – 2008, US\$750,000
- BHP Billiton, ESIA of Bakhuis transport project, Suriname, 2006 – 2008, US\$1,600,000
- Altona Developments, EIA of mixed development, Worcester, Western Cape Province, South Africa, 2006 – 2010, R750,000
- BHP Billiton, ESIA of Bakhuis bauxite mine, Suriname, 2005 – 2008, US\$3,200,000

- Levendal Developments (Pty) Ltd, EIA of mixed development, Suider-Paarl, Western Cape Province, South Africa, 2005 – 2008, R450,000
- Bevcan, Angola, EIA of canning facility, Viana, Angola, 2005 -2010, US\$75,000
- Chevron Texaco, EIA of landfill, Cabinda, Angola, 2004 – 2005, US\$90,000
- Attpower Developments (Pty) Ltd, EIA of mixed coastal development, Mossel Bay, Western Cape Province, South Africa, 2004, R600,000
- Intels Services Luanda, EIA of landfill, Cacuaco, Angola, 2004, US\$65,000
- Kwezi V3, EIA of waste water treatment works, Gansbaai, Western Cape Province, South Africa, 2003 – 2005, R350,000
- City of Cape Town, EIA of Fisantekraal waste water treatment works, Cape Town, Western Cape Province, South Africa, 2003 – 2004, R450,000
- St Francis Bay Municipality, EIA of beach remediation, St. Francis Bay, Eastern Cape Province, South Africa, 2002 – 2003, R300,000
- City of Cape Town, Environmental Impact Control Report of Vissershok North landfill, Western Cape Province, South Africa, 2001 – 2004, R175,000
- NDC, EMP for NDC diamond mine, Vredendal district, Western Cape Province, South Africa, 2001 – 2003, R800,000
- Coega Development Corporation, EIA for rezoning, Eastern Cape Province, South Africa, 1999, R85,000
- BHP Billiton, EIA (Scoping) of Alusaf Hillside smelter, Richards Bay, KwaZulu-Natal Province, South Africa, 1999, R150,000
- Gencor, EIA of zinc refinery and phosphoric acid plant, Port Elizabeth, Eastern Cape Province, South Africa, 1995 – 1998, R800,000
- Duferco, EIA of steel rolling mini-mill, Saldanha, Western Cape Province, South Africa, 1997, R90,000
- Hoechst, EIA of polymer extension, Durban, KwaZulu-Natal Province, South Africa, 1993 – 1994, R280,000

Environmental Planning and Natural Resource Management

- AES, Angola Waste Valorisation and Greenhouse Gas Emissions Management Plan, Luanda and Soyo, Angola, 2022 – ongoing, US\$18 000
- Mineral Sand Resources, West Matzikama Strategic Environmental Assessment Terms of Reference, Lutzville, Western Cape Province, 2021 R180 000
- Tronox Mineral Sands (Pty) Ltd, renewal of the Atmospheric Emission Licence for the Namakwa Sands UMM Plant, Brand-se-Baai, Western Cape, 2018-ongoing, R320 000
- Tronox Mineral Sands (Pty) Ltd, renewal of the Atmospheric Emission Licence for the Namakwa Sands Mineral Separation Plant, Koekenaap, Western Cape, 2018-ongoing, R290 000
- Tronox Mineral Sands (Pty) Ltd, renewal and variation of the Atmospheric Emission Licence for the Namakwa Sands Smelter Plant, Saldanha, Western Cape, 2018-ongoing, R300 000
- Kudumane Manganese Resources, EMP Amendment for KMR Manganese Mine, Hotazel, Northern Cape, 2017 – ongoing, R170 000
- Eskom, Ecological Reports, Duynefontyn and Thyspunt, Nuclear Site Safety Reports Update, South Africa, 2017 – present, R800,000
- DEA&DP, Western Cape State of Environmental Report, 2017, R1,700,000

- Tronox Namakwa Sands, Development of Closure Commitments and Rehabilitation Monitoring Plan Namakwaland, Western Cape Province, South Africa, 2015 – ongoing, R600,000
- West Coast District Municipality, Integrated Coastal Management Plan, West Coast, South Africa, 2012 – 2013, R700,000
- City of Cape Town, Environmental Management Framework and control zones, Cape Town, Western Cape Province, South Africa, 2008 – 2009, R600,000
- Eskom, Ecological Reports, Koeberg, Bantamsklip and Thyspunt, South Africa, 2008 – 2013, R900,000
- City of Cape Town, Environmental Management Framework and control zones, Cape Town, Western Cape Province, South Africa, 2008, R500,000
- Knysna Municipality, State of Environmental Report, Western Cape Province, South Africa, 2004 – 2005, R130,000
- DEA&DP, Western Cape State of Environmental Report, 2004 – 2005, R1,400,000

Environmental and Social Review and Due Diligence

- Vedanta - Black Mountain Mining (Pty) Ltd, BMM and Gamsberg Water Use Licence and EMPr Performance Assessment, Northern Cape Province, South Africa, 2023, R210 000
- UniCredit, Environmental and Social Action Plan and Performance Review of Caculo Cabaca Hydropower Dam, Angola, 2022 - 2023, €320 000
- HSBC, Annual Monitoring Reports for MIGA Review, Cambambe Hydropower Dam, Angola, 2019 – 2021, €110 000
- Vedanta - Black Mountain Mining (Pty) Ltd, BMM and Gamsberg Water Use Licence and EMPr Performance Assessment, Northern Cape Province, South Africa, 2021, R105,000
- HSBC, Environmental and Social Due Diligence and Annual Review of Lauca Hydropower Dam, Angola, 2014 – 2021, €410 000
- Eramet Comilog Manganese, Environmental Regulatory Due Diligence of Heavy Minerals Mine, Alexander Bay, South Africa, 2020, €11 000
- HSBC, Environmental and Social Compliance Monitoring of Fertilizer Plant and Railway Line, Ghorashal, Bangladesh, 2020 – 2032, \$670 000
- BNP Paribas, Environmental and Social Due Diligence of Elandsfontein mine Expansion, Langebaan, South Africa, 2020, R115 000
- Euler Hermes/ UniCredit / Voith, Environmental and Social Due Diligence and Action Plan of Caculo Cabaca Hydropower Dam, Angola, 2020, €30 000
- Vedanta - Black Mountain Mining (Pty) Ltd, BMM and Gamsberg EMPr Performance Assessment, Northern Cape Province, South Africa, 2019, R125,000
- Easigas, ESDD of Avedia LPG terminal, Saldanha Bay, South Africa, 2018, R90 000
- Kropz, Environmental and Social Due Diligence for Competent Persons' Report, Elandsfontein mine, Langebaan, South Africa, 2018, R130 000
- Standard Bank South Africa Limited, Environmental and Social Due Diligence and Environmental and Social Action Plan (ESAP) for Caculo Cabaca Hydropower Dam, Angola, 2017, \$23 000
- Voith Hydro, Zenzo Hydroelectric Project Gap Analysis and Environmental and Social Action Plan, Angola, 2017, €30 000
- Voith Hydro, Koysa Hydroelectric Project Gap Analysis, Ethiopia, 2017, €15 000
- AES, Cacuco Landfill Environmental Compliance Audit, Luanda, Angola, 2017, US\$17,500

- Industrial and Commercial Bank of China, Environmental and Social Due Diligence and Environmental and Social Action Plan (ESAP), and Annual Compliance Audits for Caculo Cabaca Hydropower Dam, Angola, 2016-2017, \$31 000
- Deutsche Bank, Environmental and Social Due Diligence and Annual Review of Be'er Tuvia Combined Cycle Gas Turbine Power Plant, Israel, 2016 – 2022, €150 000
- Confidential, Environmental and Social Gap Analysis of Caculo Cabaca Hydropower Dam, Angola, 2016, €20 000
- BNP Paribas, Environmental and Social Due Diligence of Elandsfontein mine, Langebaan, South Africa, 2015, R60,000
- Tronox Namakwa Sands, Water Use Licence Audit(s), Namakwaland, Western Cape Province, South Africa, 2015 and 2014, R175,000 (x2)
- Tronox Namakwa Sands, EMPr Performance Assessment, Namakwaland, Western Cape Province, South Africa, 2014, R175,000
- West Africa Exploration Ltd, Environment and social gap analysis of Nimba iron ore mine, Guinea, 2014, US\$80,000
- HSBC, Environmental and Social Due Diligence and Annual Review, Cambambe Hydropower Dam, Angola, 2013 – 2017, €255,000
- Tronox Namakwa Sands, EMPr Performance Assessment, Namakwaland, Western Cape Province, South Africa, 2012 – 2013, R150,000
- Biovac, Environmental due diligence audit of pharmaceutical plant, Cape Town, Western Cape Province, South Africa, 2012, R100,000
- SRK UK, Environmental Due Diligence of phosphate mine, Brazil, 2010, US\$15,000
- SRK Russia, Environmental Due Diligence of Rossing South uranium mine, Namibia, 2009, US\$12,000
- SonaGas, EIA external review of LNG plant EIA, Soyo, Angola, 2006, US\$50,000
- Confidential, Environmental Due Diligence, Cape Town, Western Cape Province, South Africa, 2004, R80,000
- Netherlands Commission for EIA, External EIA review of Mavoco hazardous landfill EIA, Maputo, Mozambique, 2002, R30,000

Management Plans

- Black Mountain Mining (Pty) Ltd, Gamsberg Mine IWWMP Update, Aggenys, Northern Cape Province, South Africa, 2018 – ongoing, R185 000
- West Africa Exploration Ltd, Stakeholder Engagement Plan, Guinea, 2014, US\$15,000
- West Africa Exploration Ltd, Biodiversity Action Plan, Guinea, 2014, US\$20,000
- Tronox Namakwa Sands, Integrated Water and Waste Management Plan for Namakwa Sands mine, Namakwaland, Western Cape Province, South Africa, 2013 – 2014, R125,000
- Tronox Namakwa Sands, Integrated Water and Waste Management Plan for Namakwa Sands Smelter, Saldanha Bay, Western Cape Province, South Africa, 2013, R110,000
- BHP Billiton, Conceptual Closure and Rehabilitation Plan, Suriname, 2007 – 2013, US\$210,000
- Namakwa Sands, Closure Plan, Namakwaland, Northern Cape Province, South Africa, 2003, R170,000

Socio Economic Impact Assessments

- Mineral Sand Resources, Tormin Mine Socio-Economic Benefits Assessment, Lutzville, Western Cape Province, 2021 R165 000

- Department of Environmental Affairs and Development Planning (DEA&DP), Papenkuils Wetland Valuation, South Africa, 2020 – 2021, R500 000
- Departments of Public Works and Basic Education, Helderberg School and Hospital Socio-economic impact assessment, South Africa, 2020, R80 000
- Client: RSK, Basra Master Plan: Modelling of Economic and Population Dynamics, Iraq, 2020 – 2021, \$15 000
- Aecom, Social Impact Assessment of Kayamandi Bulk Water Pipeline, South Africa, 2020 - 2021, R80 000
- Allied Gold Corp, Economic specialist study for the Dish Mountain Gold Project, Ethiopia, 2018 – ongoing, \$11 000
- Joule Africa, Initial Environmental and Social Assessment of the KPEP Hydropower Project, Cameroon, 2018 – ongoing, \$10,800
- Anglo Gold Ashanti, Economic Baseline Report for Siguiri Gold Mine, Guinea, 2018, R130 000
- Pam Golding / Pennyroyal (Gibraltar) Ltd., Economics benefits analysis of Amber Resort Development, Zanzibar, Tanzania, 2017, R300 000
- RSK, EACOP Pipeline Economic Study, Uganda and Tanzania, 2017, \$ 40,000
- Tronox, Socio-Economic Impact Assessment of Mining and Associated Operations, South Africa, 2017, R120 000
- SRK UK, Sintoukola Potash Mine Economic Impact Assessment, Republic of Congo, 2012, \$30,000
- Staatsolie Maatschappij Suriname, Refinery Expansion Community Relations Plan, Suriname, 2011, \$120,000
- SRK UK, Reko Diq Phosphate Mine Review of Economic Impact Assessment, Pakistan, 2010, \$7,500
- DEADP, Western Cape State of the Environment Report Economic Study, 2004, R40,000

Appendix C: Impact Assessment Methodology

Impacts are rated according to SRK’s prescribed impact assessment methodology presented below.

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring, including possible irreversibility of impacts and/or loss of irreplaceable resources, and the **probability** that the impact will occur.

The criteria used to determine impact consequence are presented in the table below.

Table 8-1: Criteria used to determine the consequence of the impact

Rating	Definition of Rating	Score
A. Extent – the area (distance) over which the impact will be experienced		
Local	Confined to project area (e.g. the development site and immediate surrounds)	1
Regional	The region (e.g. municipality or Quaternary catchment)	2
(Inter) national	Nationally or beyond	3
B. Intensity – the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered and/or irreplaceable resources ²³ are lost	3
C. Duration – the timeframe over which the impact will be reversed		
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years or irreversible	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 8-2: Method used to determine the consequence score

Combined Score (A+B+C)	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence was derived, the probability of the impact occurring was considered, using the probability classifications presented in the table below.

Table 8-3: Probability classification

Probability – the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall **significance** of impacts was determined by considering consequence and probability using the rating system prescribed in the table below.

²³ Defined as important cultural or biological resource which occur nowhere else, and for which there are no substitutes.

Table 8-4: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Finally the impacts were also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below.

Table 8-5: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a ‘benefit’)
	– ve (negative – a ‘cost’)
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK’s judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **INSIGNIFICANT:** the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity/development.
- **VERY LOW:** the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity/development.
- **LOW:** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.
- **MEDIUM:** the potential impact **should** influence the decision regarding the proposed activity/development.
- **HIGH:** the potential impact **will** affect the decision regarding the proposed activity/development.
- **VERY HIGH:** The proposed activity should only be approved under special circumstances.

Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of mitigation and optimisation measures. Mitigation and optimisation measures are either:

- **Essential:** measures that must be implemented and are non-negotiable; and
- **Best Practice:** recommended to comply with best practice, with adoption dependent on the proponent’s risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the applicant if not implemented.

Fields to update

Field	Stands for	BA applicability	Insert
Starling	<i>Project name</i>	<i>for PV</i>	Spoonbill Sunbird Swallow Snipe Shrike Stilfontein Sparrow Starling Swift
