

SOCIO-ECONOMIC IMPACT ASSESSMENT REPORT

The Proposed Mura Solar Energy Facilities:

Mura PV Development

Impact Assessment Report

January 2023

Prepared for:

WSP Group Africa

Prepared by:

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INDEPENDENT
ECONOMIC RESEARCHERS

APPENDIX 6 OF NEMA EIA REGULATIONS: REQUIREMENTS OF SPECIALIST REPORTS

REQUIREMENT	SECTION
(1) A specialist report prepared in terms of these Regulations must contain—	
(a) details of—	
(i) the specialist who prepared the report; and	Appendix E
(i) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Appendix E
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	See next section
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 4, 5 and 6
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Appendix A
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 5
(g) an identification of any areas to be avoided, including buffers;	Section 5
(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
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 5
(k) any mitigation measures for inclusion in the EMPr;	Section 5
(l) any conditions for inclusion in the environmental authorisation;	N/A
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 5
(n) a reasoned opinion—	
(i) whether the proposed activity, activities or portions thereof should be authorised;	Section 6
(iA) regarding the acceptability of the proposed activity or activities; and	
(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 5
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 3
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Appendix F
(q) any other information requested by the competent authority.	N/A
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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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 HOOGLAND WIND FARMS:
HOOGLAND 1 WIND FARM AND HOOGLAND 2 WIND FARM

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			100%
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DECLARATION BY SPECIALISTS

I, Dr Hugo van Zyl, 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

Independent Economic Researchers

Name of Company:

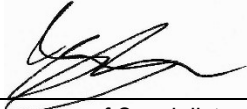
24 January 2023

Date:

I, James Kinghorn, 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 Specialist

Independent Consultant

Name of Company:

24 January 2023

Date:

EXECUTIVE SUMMARY

Red Cap Energy (Pty) Ltd is proposing to develop four solar facilities and associated grid connections, on behalf of four separate Project Applicants, collectively known as the Mura PV development between Loxton and Beaufort West in the Beaufort West Local Municipality and Ubuntu Local Municipality and the Central Karoo District Municipality and Pixley ka Sema District Municipality. Independent Economic Researchers (IER) has been appointed by WSP Group Africa, on behalf of Red Cap Energy (Pty) Ltd to undertake a socio-economic impact assessment for the proposed facilities and grid connection. The scope of this report is the Mura Solar Project 1, Mura Solar Project 2, Mura Solar Project 3, Mura Solar Project 4, as well as the associated Grid Connection.

Most of the overall area proposed for the development of solar energy facilities is within Ward 7 of the Beaufort West Local Municipality (BWLM), in the Central Karoo District Municipality (CKDM) of the Western Cape Province. Mura 3 is located in Ward 3 of the Ubuntu Local Municipality (ULM), in the Pixley ka Sema District Municipality (PkSDM) of the Northern Cape Province. The nearest major towns include Beaufort West in the Western Cape (50km) and Victoria West in the Northern Cape (65km). Smaller towns nearby include Loxton (27km) and Nelspoort (46km).

Current land uses in the wider rural area, where the solar facilities would be located, are focused on extensive agriculture with small stock primarily in the form of sheep, game farming, some tourism and conservation primarily in the form of the Karoo National Park. The farms are large and homesteads are few and far between to maintain economically viable farm units. Small communities are housed on the farms and work as farm labourers or in associated tourism ventures. Away from the towns there are few other sources of enterprise or employment.

The development has the potential to contribute to greater energy supply stability and security to the benefit of local residential electricity consumers as well as farmers and businesses. Furthermore, the development achieves a relatively high degree of compatibility with national strategic planning focused on renewable energy and associated grid infrastructure development. The local development and spatial planning documents reviewed (including Integrated Development Plans and Spatial Development Frameworks) recognise the importance of integrated and diversified economic development that makes optimal use of each area's comparative advantages and creates economic opportunities. The concept of a renewable energy project is therefore broadly supported provided environmental impacts and impacts on other land uses and potentials are acceptable.

Preliminary estimates indicate that a total of R2–2.9 billion would be spent on the entire construction phase for each solar facility. Therefore, for all four solar facilities it is expected that between R7.6 billion and R11.6 billion would be spent. The EGI would require construction expenditure of between R320–345 million. It is anticipated by the applicant that between R36.7 million and R52 million would be spent annually on operations for each solar facility (R147 million–R208 million for all four), escalating in line with inflation. Roughly 275 to 455 jobs of 18 to 24-month duration would be associated with each solar facility during construction. For each solar facility, it is anticipated that approximately 100 to 166 temporary jobs would be allocated to workers from the local municipal area. A further 51–88 temporary jobs would result from construction of the EGI, 18–36 of whom would likely be required from the local area. Based on preliminary estimates, incomes flowing to workers would be between R9.1 million and R15.1 million for each solar facility (R36.5 million–60.4 million for all four) and R1.5–3.2 million for the EGI during construction. With regard to direct employment during the operation phase, it is anticipated that between 21 and 37 direct employment opportunities would be created by each solar facility (84–148 jobs for both wind farms combined). The majority of jobs are in maintenance (33%), followed by security (29%), engineering (19%), cleaning (14%) and

site management (5%). Impacts on regional employment and household income associated with project activities and expenditure have been rated as moderate with and without mitigation during construction, moderate during operations before mitigation and high during operations after mitigation.

Based on preliminary estimates, a minimum of R6–R7 million could be spent per annum on socio-economic development contributions, local community shareholding and enterprise development combined for each 100MW SEF (R9–11 million for a 240 MW SEF). This impact is expected to be of moderate significance both with and without mitigation, applicable only during operations.

Community concerns are common, especially in smaller communities, regarding the negative impacts associated with an influx of outside workers particularly during the construction of large projects. These concerns include those associated with negative impacts on social structures and increased ‘social ills’ such as increased crime levels, increased alcohol and drug use, increased teenage and unwanted pregnancies, increased prostitution and increases in sexually transmitted diseases (STDs such as HIV). It is likely that a significant proportion of workers would be sourced locally especially low and medium skilled workers. These workers would already be part of the local community and its social structures thereby reducing the risk posed by influx. Impacts associated primarily with the influx of people have been rated as moderate before mitigation and low after mitigation, with the same ratings applicable during construction and operations.

Tourism is a key sector and has the potential to play an increasingly prominent role as a driver of economic development. Project activity during construction would essentially reduce the appeal of the local area as a tourist destination, particularly in a place ordinarily characterised by tranquillity. Tourism facilities and attractions in the areas surrounding the project site are very limited and sparsely distributed. Of the tourism establishments identified, only one is closer than 5km from any of the solar farm boundaries: Booiskraal Farm Stay (3.4km from Mura 4 and 5km from Mura 3). However, the VIA notes that Booiskraal will have a low visibility of the solar facilities as this tourism establishment is located in a view shadow (Lawson and Oberholzer, 2022). In addition to the above establishments, the Aardwolf Loop, the Meerkat Loop and the Porcupine Loop are scenic drives which would be more directly impacted by one part of the development, specifically the EGI corridor. The positive impacts resulting from an increase in business-related tourism for contractors and employees visiting the project site have also been considered. Overall, impacts on tourism have been rated as low negative with and without mitigation during construction, moderate before mitigation and low with mitigation during operations.

An influx of people associated with the projects, including workers as well as job-seekers, is seen as a risk factor for trespassing, theft, damages to farm infrastructure and equipment, littering along with veld fires. Some of these potential impacts can also lead to changes in the sense of place. The increased volume of project-related traffic in the area is likely to affect surrounding communities. Increased road incidents, road degradation, dust and intersection safety. These impacts are relevant for both the construction and operation phases. Impacts on surrounding landowners and communities have been rated as moderate before mitigation and low after mitigation, with the same ratings applicable during construction and operations.

Assessment of cumulative impacts considered Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taibos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors. It is considered unlikely that all of these developments would go ahead at the same time, though some overlap can potentially be expected. Drawing on the socio-economic impact assessments for these projects where available, and using industry averages for those without estimates, cumulative expenditure has been estimated. Preliminary estimates suggest that cumulatively the developments would generate R38–46 billion in construction expenditure, of which R157–239 million would accrue to construction workers. During the operations phase, the WEFs and SEFs would collectively spend R1.2–1.4 billion per year

on operational costs, as well as a further R48–53 million on socio-economic development. Cumulatively, the projects would generate 2,886–4,431 temporary jobs during construction (most of these being 18–24 months in duration). During the operations phase, between 378–573 full-time jobs would be generated, of which 244–370 jobs would accrue to residents of the local area. Cumulatively, the combined minimum investment associated with socio-economic development, enterprise development and shareholding would be in the region of between R30.7 million – R34.0 million in the average year during operation. Cumulative impacts on regional employment and household incomes, as well as with the funding of local socio-economic development, enterprise development and shareholding, have both been rated as high positive both with and without mitigation considering the substantial levels of economic activity anticipated.

In terms of negative aspects, the cumulative impact over the following several years would be an increase in the likelihood of a larger influx of people to the area whether they have jobs secured or are job seekers. This would result in a higher risk of social problems associated with influx particularly during construction. Furthermore, implementation of all the developments would result in an increase in tourism risk but also tourism opportunities from business tourism, particularly during construction. Cumulative impacts on surrounding landowners and communities would also intensify relative to the implementation of the Mura developments alone. Cumulative impacts have been rated as moderate negative for all three of these negative impact categories, both with and without mitigation.

It is considered most likely that the combined positive impacts of the project would exceed its negative impacts resulting in an overall net benefit with mitigation. The projects are therefore deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.

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LIST OF ABBREVIATIONS

Acronym	Description
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
BBBEE	Broad Based Black Economic Empowerment
BESS	Battery Energy Storage System
BWLM	Beaufort West Local Municipality
CA	Competent Authority
CDC	Community Day Centre
CEQ	Council on Environmental Quality
CKDM	Central Karoo District Municipality
CSI	Corporate Social Investment
DCGHSTA	Department of Cooperative Governance, Human Settlements and Traditional Affairs
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
DoE	Department of Energy (now incorporated into the DMRE)
DMRE	Department of Mineral Resources and Energy
DRDLR	Department of Rural Development and Land Reform
EAP	Environmental Assessment Practitioner
EGI	Electrical Grid Infrastructure
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GN	Guide Number
HIV	Human Immunodeficiency Virus
IDC	Industrial Development Corporation
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
KHLM	Karoo Hoogland Local Municipality
kV	Kilovolt
LED	Local Economic Development
MW	Megawatt
NDM	Namakwa District Municipality
NDP	National Development Plan
NEMA	National Environmental Management Act
NPV	Net Present Value
PHC	Primary Healthcare Centre
PkSDM	Pixley ka Seme District Municipality
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REFIT	Renewable Energy Feed-In Tariff
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S&EIA	Social and Environmental Impact Assessment
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEF	Solar Energy Facility
SMME	Small, Medium and Micro-sized Enterprises
STD	Sexually Transmitted Disease
TB	Tuberculosis
ToR	Terms of Reference
ULM	Ubuntu Local Municipality
WEF	Wind Energy Facility

1. INTRODUCTION

Red Cap Energy (Pty) Ltd is proposing to develop four solar facilities and associated grid connections, on behalf of four separate Project Applicants, collectively known as the Mura PV development between Loxton and Beaufort West in the Beaufort West Local Municipality and Ubuntu Local Municipality and the Central Karoo District Municipality and Pixley ka Sema District Municipality (refer to Figure 1.1). The proposed Mura PV projects are located in close proximity to the approved Nuweveld Wind Farm Development.

The sites will be accessed via the R381, DR02317 and existing access roads. Each solar facility will connect to the Eskom grid via new 132 kV overhead lines connecting the two on-site solar substations via adjacent Eskom switching stations to the approved Nuweveld Collector substation.

In terms of the EIA Regulations various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. Specialist studies have been commissioned to verify the sensitivity and assess the impacts of the wind farms under the Gazetted specialist protocols (GN R 320 and GN R 1150 of 2020). Independent Economic Researchers (IER) has been appointed by WSP Group Africa, on behalf of Red Cap Energy (Pty) Ltd to undertake a socio-economic impact assessment for the proposed facilities and grid connection.

The scope of this report is the Mura Solar Project 1, Mura Solar Project 2, Mura Solar Project 3, Mura Solar Project 4, as well as the associated Grid Connection.

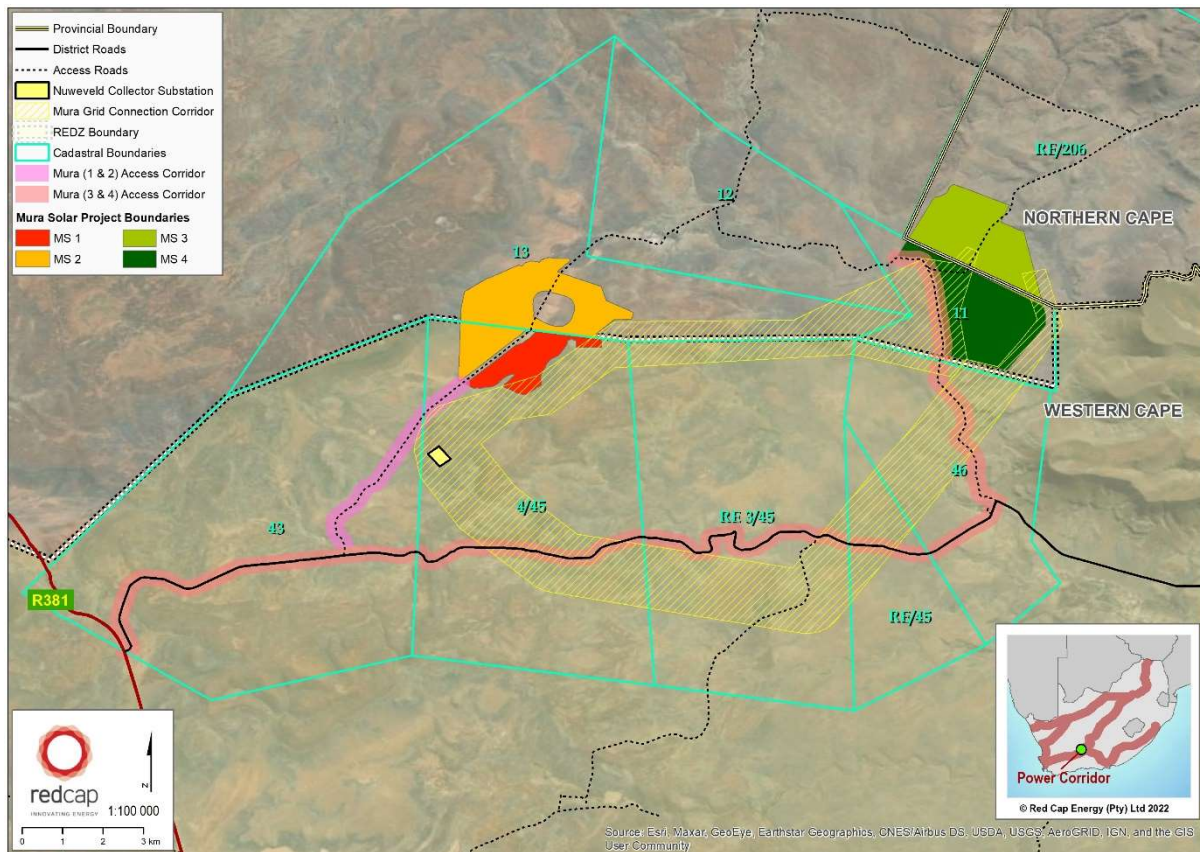


Figure 1.1 Locality map

1.1. Terms of reference

The term of reference (ToR) was to undertake all necessary data collection and fieldwork to assess the project and produce an impact assessment report. The reports must fulfil the requirements of Appendix 6 of the EIA Regulations (as amended) and provide:

- Project specific description to be assessed,
- A detailed baseline description of the receiving environment in and surrounding the site, including a description of key no go areas or features or other sensitive areas to be avoided, presented as a sensitivity maps for the pre-determined infrastructure classes.
- A description of all methodology and processes used to source information, collect baseline data, generate models and the age or season when the data was collected. A description of any assumptions made and any uncertainties or gaps in knowledge.
- A description of relevant legal matters, policies, standards and guidelines.
- A list of potentially significant environmental impacts that may arise in the construction, operation and decommissioning phases of the project, including possible cumulative impacts
- A detailed impact assessment of each impact including:
 - A pre-mitigation and post-mitigation impact assessment description; and
 - A list of essential mitigation measures and management interventions.
- A cumulative impact assessment. The cumulative impact of all three wind farms and gridline should be assessed (and any other wind farms or similar developments in 30km – of which there are presently none).
- An assessment of the “No go” alternative.

- An overview and summary of the assessed impacts.
- A discussion on the overall impact of the project and a reasoned opinion as to whether the proposed activity, or portions of the activity can be authorised. Provide any additional recommendations regarding avoidance, management, or mitigation measures for consideration in a layout revision or inclusion into the Environmental Management Programme (EMPr). Any other information the specialist believes to be important, including recommendations that should be included as conditions in the Environmental Authorisation.

2. APPROACH AND METHODOLOGY

The approach adopted involved the following steps in line with accepted EIA practice:

1. Investigate the existing context within which the project would be established.
2. Identify impacts.
3. Assess impacts without mitigation measures.
4. Recommend mitigation measures.
5. Re-assess impacts assuming mitigation measures are implemented.
6. Provide a reasoned opinion regarding the impacts and acceptability of the project.

Guidance on the approach was taken primarily from the Department of Environmental Affairs and Development Planning (Western Cape) guidelines on economic specialist input to EIA processes (van Zyl *et al.*, 2005) augmented by the guidelines on social specialist input to EIA processes (Barbour, 2007). This included guidance on the appropriate level of detail required for the assessment in order that it be adequate for informing decision-making without going into superfluous detail (i.e. superfluous detail in this report as well as superfluous detail when the briefs of other specialist studies forming part of the EIA are taken into account).

WSP Group Africa provided the impact assessment methodology employed in this assessment and a copy of the methodology can be found in Appendix A. Section 5. provides a brief site sensitivity verification report (SSVR) or statement for the project based on the assessment.

2.1. Assumptions and Limitations

The following assumptions and limitations apply to the study:

- All information provided by the EAP, the applicant, the applicant's project team, other official sources and other specialists involved in the EIA is assumed to be correct unless there is a clear reason to suspect incorrect information.
- The quantification of economic impacts in order to inform the assessment of the significance of impacts was not possible, nor considered necessary, for all impacts. Where possible, quantification focused on impacts considered to be most important in the overall assessment. Assessments of impact significance made without quantification (and based on a consideration of the likely magnitudes of impacts and/or expert judgements) are, however, considered adequate unless otherwise specified.
- All impacts are assessed individually and then as a whole to the degree possible and appropriate. An overall assessment and discussion of net impacts (i.e. whether overall benefits exceed costs) was undertaken to the degree thought appropriate and justifiable combining quantifiable and unquantifiable impacts. Given uncertainties and the potentially subjective nature of comparisons between impact categories, the emphasis in the report is on presenting assessments of impact categories with less emphasis on trying to reconcile them in an overall assessment of net effects. To a large degree this role of comparing and

weighing up different (and hard to reconcile) impacts is the ambit of the relevant decision-making authorities.

- The findings of the assessment reflect the best professional assessment of the author drawing on relevant and available information within the constraints of time and resources thought appropriate and made available for the assessment. See Appendix B for the disclaimer associated with this report.
- The assessment only considers the impacts of the proposed projects and the no-go alternative. It does not make comparisons with other wind energy projects which may or may not be more desirable. The Department of Mineral Resources and Energy (DMRE) is primarily responsible for making the necessary comparisons between projects as part of the process of awarding contracts to aspirant competing renewable energy developers, should these projects be bid in a Renewable Energy Independent Procurement Producer Programme (REIPPPP) bidding round.

2.2. Sources of Information

Key information sources used in the assessment include:

- Census data and other socio-economic baseline data.
- Policy document focused on renewable energy, economic development planning, spatial planning.
- Local and international literature on the impacts of other existing project of a similar nature.
- The requirements of the REIPPPP and available information from operational wind farms.
- Inputs from the other specialists making contributions to the EIA (visual, terrestrial ecology, traffic, heritage and agricultural impact assessments).
- Comments received during the public participation process.
- Interviews with stakeholders and informants (see next section).

2.3. Stakeholder inputs

Interviews were conducted with the stakeholders listed in the table below (consultation notes are provided in Appendix E).

Table 2.1 List of interviewed stakeholders and informants

Person/s	Affiliation
Andrew Jack	Landowner and owner of Boiskraal Farm Stay (primarily affected by grid)
Josias Reynolds	BWLM Councillor for neighbouring Ward 2
Sascha Klemm	Beaufort West Tourism Organisation
Barbara Koopman	Strategic Support Services Manager, Central Karoo District Municipality
Rick Haw	Neighbouring Landowner
Johan Moolman	Landowner, Quagga Fontein

The following key socio-economic issues and impacts were raised by stakeholders and were used to inform the scope and content of this impact assessment:

- Impacts on sense of place with implications for impacts on surrounding landowners, communities and tourism.

- Potential for ecological impacts, especially on iconic species, to change unique natural heritage with resulting risks for tourism that relies on this heritage.
- Increased crime including livestock theft.
- Increased traffic both during construction and operations with implications for safety on the road for other road-users including cyclists.
- Social impacts anticipated from the influx of workers, especially during construction and for lower-income communities in Beaufort West and Loxton. Specific concerns raised in this regard include the risk of increased alcohol and drug consumption, sexual exploitation, adolescent pregnancy, increased prevalence of Sexually Transmitted Disease (STDs), all of which could exacerbate existing poverty in affected communities.
- Increased chances of gates being left open on farms with implications for the movement of livestock and agricultural productivity.
- Several stakeholders are supportive of the EIA process and the potential for mitigation measures to address their concerns regarding negative impacts (more detail on specific impacts and mitigation suggested by respondents is provided in Appendix E). Respondents tended to stress the need for communication and collaboration between a range of stakeholders (including the developer and eventual operator of the facilities, local communities, local government and civil society groups in the surrounding towns) to ensure that effective mitigation is implemented.

3. PROJECT DESCRIPTION

3.1. Project components and specifications

The following are proposed as part of each project. It should be noted that the areas under consideration for each solar project site should be assumed to be wholly transformed and will contain the following (see Section 3.2 below for project specific information):

A. Solar Field, comprising Solar Arrays:

- Maximum height of 6 m;
- PV Modules that are located on either single axis tracking structures or fixed tilt mounting structures or similar

B. Solar Farm Substation:

- Maximum height of 12m;
- Two up to 150 m x 75 m substation yards that will include:
 - Substation building; and
 - High voltage gantry.

C. Building Infrastructure:

- Maximum height of 8m;
- Offices;
- Operational and maintenance (O&M)/ control centre;
- Warehouse/workshop;

- Ablution facilities; and
- Converter/inverter stations.

D. Li-ion or similar solid state Battery Energy Storage System (BESS):

- Each solar farm will have up to a 4 ha area for a 240 MWac BESS;
- BESS substation (same specifications as the solar farm substations)
- Connected to the solar farm sub/switching stations via an underground high voltage cable.

E. Other Infrastructure located within the solar area footprint:

- Internal underground cables of up to 132 kV;
- Internal gravel roads;
- Fencing (between 2 – 3 m high) around the PV Facility;
- Panel maintenance and cleaning area;
- Storm water management system; and
- Site camps.

F. Associated Infrastructure (outside the solar area footprint but part of each solar project's application):

- Internal access gravel roads will have a 2-4 m wide driving surface and may require side drains on one or both sides. During construction the roads may be up to 12m wide but this will be a temporary impact and rehabilitated following the construction phase; and
- Site camp within the access road corridor.

Electrical Grid Infrastructure (EGI) Corridor Components. This will be covered in separate applications to the Solar PV facilities.

- Eight Eskom Switching stations:
 - Located adjacent to the solar farm substations within the solar area footprint;
 - Maximum height of 12m;
 - Footprint of up to 150 m x 75 m.
- Four additional up to 150 m x 75 m switching stations located within the corridor;
- ~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m); and
- Access tracks.

3.2. Project specific information and reporting structure

Table 3.1 Project specific information for Solar Projects

Project Name	Project Extent (full area to be transformed)	Road Access Area (existing roads to be upgraded)	Generation capacity	Affected Farm portions
Mura Solar Project 1	160 ha	18 ha	Up to 150 MW	<ul style="list-style-type: none"> • Leeuwkloof Farm 43 • Portion 4 of Duiker Kranse Farm 45
Mura Solar Project 2	430 ha	20 ha	Up to 400 MW	<ul style="list-style-type: none"> • Leeuwkloof Farm 43 • Portion 4 of Duiker Kranse Farm 45 • Bultfontein 13
Mura Solar Project 3	370 ha	37 ha	Up to 320 MW	<ul style="list-style-type: none"> • Leeuwkloof Farm 43 • RE of Abrams Kraal Farm 206 • Portion 4 of Duiker Kranse Farm 45 • RE of Portion 3 of Duiker Kranse Farm 45 • RE of Duiker Kranse Farm 45 • Sneeuwkraal Farm 46 • Aangrensend Abramskraal Farm 11
Mura Solar Project 4	420 ha	40 ha	Up to 360 MW	<ul style="list-style-type: none"> • Leeuwkloof Farm 43 • Aangrensend Abramskraal Farm 11 • Portion 4 of Duiker Kranse Farm 45 • RE of Portion 3 of Duiker Kranse Farm 45 • RE of Duiker Kranse Farm 45 • Sneeuwkraal Farm 46

Table 3.2 Project specific information for the EGI

Project Components	Description	Disturbance footprint
Switching stations	There will be up to two Eskom switching stations on each solar farm with a footprint of approximately 150 x 75 m (11,250 m ²). The switching station area will include all the standard switching station electrical equipment/components, such as bus bars, metering equipment, switchgear, and will also house control, operational, workshop and storage	13

	buildings/areas. Additional switching stations are also proposed outside of the solar farm footprint.	
Overhead lines and pylons	~70 km of overhead 132 kV lines (~40 km will be single overhead 132 kV lines and ~30 km will be up to two overhead 132 kV lines running in parallel running between the switching stations supported by monopole pylons with a max height 38m. The spans (distance between pylons) on the monopole pylons (without stays) are on average 260 m.	2,5
Access roads and tracks	Existing access roads and tracks (upgraded to ± 2-4 m wide where needed) will be used as far as possible and new access tracks would be created where needed (±2-4 m wide). These are required for all project phases.	32
Temporary areas	Temporary laydown areas will be identified along the alignment, with the main equipment and construction yards being located along the alignment or based in one of the surrounding towns or at the solar site camp. It is anticipated that the total area required for the temporary laydown areas is up to 5 ha and two will be required.	10
Total disturbance footprint: Temporary		10
Total disturbance footprint: Permanent		48
TOTAL		58

Table 3.3 Affected farm portions for the EGI

Project Name	Affected Farm portions
Mura EGI Corridor	<ul style="list-style-type: none"> • Leeuwkloof Farm 43 • Bultfontein Farm 13 • Portion 4 of Duiker Kranse Farm 45 • RE of Portion 3 of Duiker Kranse Farm 45 • Portion 12 of Bultfontein Farm 387 • Aangrensend Abramskraal Farm 11 • RE of Abrams Kraal Farm 206 • Sneeuwkraal Farm 46 • RE of Duiker Kranse Farm 45

	<ul style="list-style-type: none"> • Portion 2 of Paardeberg Farm 49
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The likely phasing of construction is outlined in Table 3.4. Mura Solar Project 1 and the EGI will be constructed over the first two years, while Mura Solar Projects 2, 3 and 4 will be constructed in years three and four.

Table 3.4 Likely phasing of solar facilities and EGI

Year	1	2	3	4
Mura Solar Project 1	50%	50%		
Mura Solar Project 2			50%	50%
Mura Solar Project 3			50%	50%
Mura Solar Project 4			50%	50%
Electronic Grid Infrastructure (EGI)	50%	50%		

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The significance of impacts is often highly dependent on the socio-economic environment or context within which they occur. For example, job creation or losses in a small local community with a stagnating economy and high unemployment will be more significant than it would be in a larger community with a healthy economy. In order to offer such baseline information to the impact assessment this section describes the socio-economic environment.

The main information sources used were municipal socio-economic profiles generated by the provincial government, the latest Municipal Economic Review and Outlook, as well as Census 2011 and Community Survey 2016 data. Given that the Community Survey was not carried out at smaller spatial scales and considering that the Census 2011 is ten years old, these two sources of data were relied upon to a lesser extent.

Most of the overall area proposed for the development of solar energy facilities is within Ward 7 of the Beaufort West Local Municipality (BWLM), in the Central Karoo District Municipality (CKDM) of the Western Cape Province. Note however that Ward 7 covers a particularly large area of 8,175 square kilometres and extends as far as the town of Merweville which is over 100km from the proposed Solar Facilities. Mura 3 is located in Ward 3 of the Ubuntu Local Municipality (ULM), in the Pixley ka Seme District Municipality (PkSDM) of the Northern Cape Province. The nearest major towns include Beaufort West in the Western Cape (50km) and Victoria West in the Northern Cape (65km). Smaller towns nearby include Loxton (27km) and Nelspoort (46km). Towns and settlements in the wider area include Carnarvon, Hutchinson, Fraserberg, Leeu-Gamka, Merweville, Murraysburg and Riebtou, all located between 60–130km from the project site. Some of these towns are relatively less accessible given the condition of minor provincial roads.

With this locational context in mind, socio-economic context data is focused on the Central Karoo, Pixley ka Seme and Namakwa District Municipalities, as well as the Beaufort West, Ubuntu and Karoo Hoogland Local Municipalities, along with towns of Loxton, Beaufort West, Fraserburg and Nelspoort within these local municipalities. Note that due to a greater availability of data, more detail is provided on the Central Karoo District Municipality and the Beaufort West Local Municipality relative to the municipalities located in the Northern Cape.

4.1. Current land uses

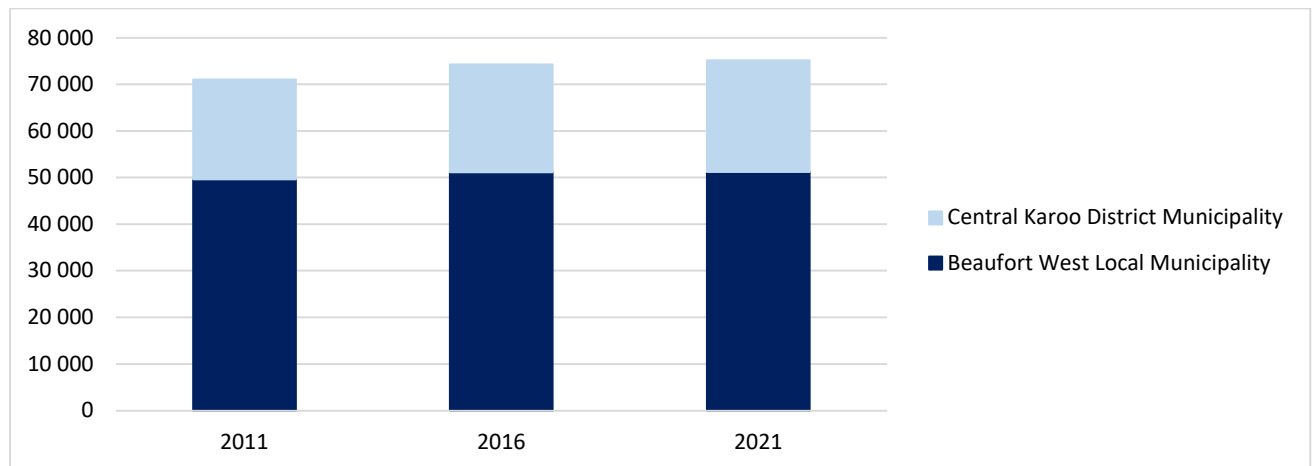
Current land uses in the wider rural area, where the solar facilities would be located, are focused on extensive agriculture with small stock primarily in the form of sheep, game farming, some tourism and conservation primarily in the form of the Karoo National Park. The farms are large and homesteads are few and far between to maintain economically viable farm units. Small communities are housed on the farms and work as farm labourers or in associated tourism ventures. Away from the towns there are few other sources of enterprise or employment. For more details on agricultural land uses, see the Agricultural Specialist Study.

Drought has been experienced to varying degrees in different parts of the study area, with many of the farms surrounding Loxton and Beaufort West are currently in the initial stages of recovery from a severe drought. During the drought, farming became unviable for those without access to a permanent source of groundwater. Consequently, many farmers sold their livestock or moved them to other parts of the region or country. This reduction in agricultural activity resulted in retrenchments which have been particularly disruptive to affected communities given that farm labourers typically reside on-farm in this area. This resulted in an influx of job seeker, particularly in Beaufort West. In

2021, many farmers experienced their first rainfall in several years. This has resulted in increased agricultural activity and renewed demand for farm labour in the area.

4.2. Demographics

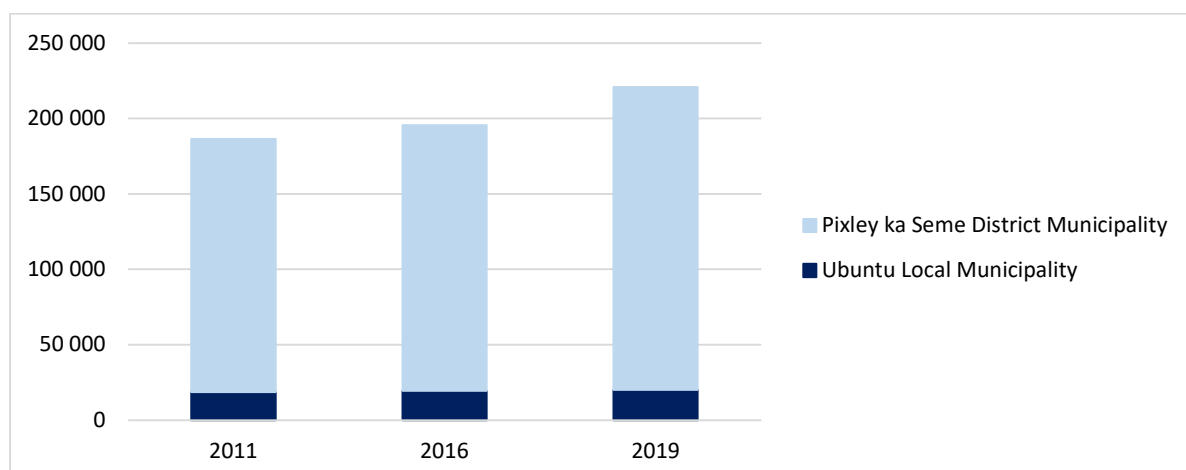
BWLM had a population of 51 177 in 2021, up from 49 586 in 2011, which translates to a population growth rate of around 0.3% per annum over the ten-year period (see Figure 4.1). This is lower than the annual growth rate for the Central Karoo District Municipality (CKDM), which was 0.6% over the same period. BWLM had an average household size of 3.9 in 2021.



Source: WCPG, 2018a; 2018b; 2020a; 2020b; 2021a; 2021b

Figure 4.1 Population trends in the CKDM and the BWLM

Up-to-date statistics are not available for Ubuntu Local Municipality (ULM). But based on the population growth rate between 2011 and 2016 (average of 0.92% per annum), the 2019 population was estimated to be 20,007 (see figure below). The average growth rate for Pixley ka Seme District Municipality (PkSDM) was estimated to be 0.98% per year over the 2011–2019 period, based on available statistics for these years, which indicate that the PkSDM had a population size of 200,835 in 2019.



Source: StatsSA, 2011; 2016; NCPG, 2021

Figure 4.2 Population trends in the PkSDM and the ULM

Around 53.1% of BWLM’s population are female. According to statistics published by the Western Cape Government, this proportion is similar to that of the Central Karoo District Municipality’s (CKDM)

population – 52.8%. In the case of the ULM, around 50.4% of the population are female (based on 2016 figures), which is also roughly in line with the PkSDM’s 50.6% (also 2016 figures).

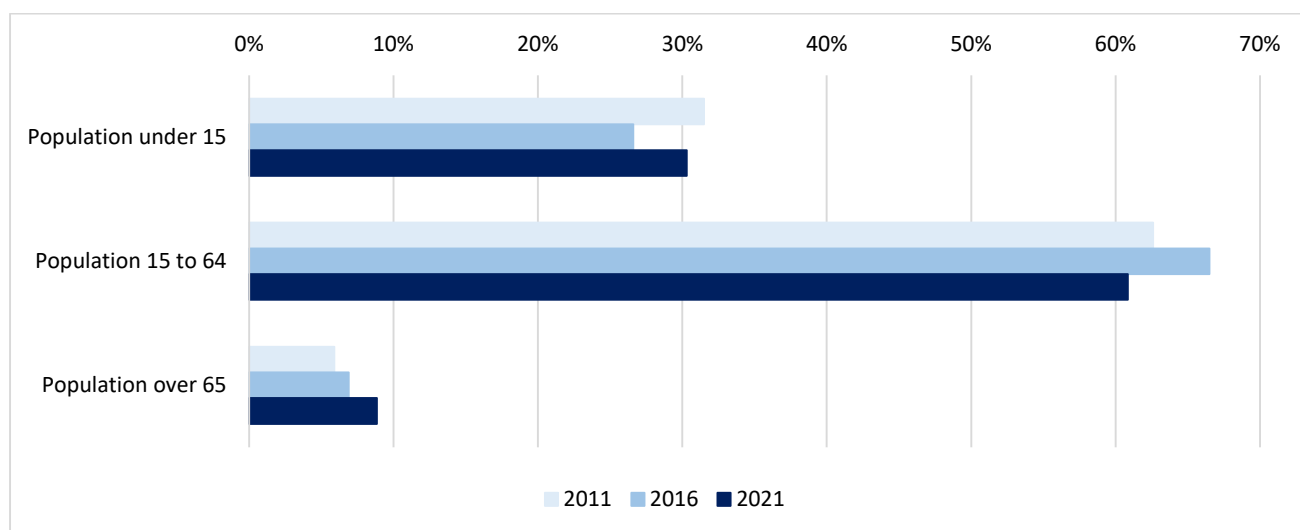
Recent population estimates are not available at the settlement level, but the 2011 census gives some indication of the towns nearby the study site, as outlined in Table 4.1. Beaufort West had a population of 20,053 in 2011, while Loxton had a population of 1,044, Fraserburg 3,029 and Nelspoort 1,696.

Table 4.1 Population groups in the towns surrounding the study site, 2011

Population Group	Beaufort West	Loxton	Fraserburg	Nelspoort
Black African	1 452	28	145	288
Coloured	15 624	895	2 569	1 375
Indian or Asian	107	3	18	14
White	2 741	113	288	13
Other	129	5	9	6
Total	20 053	1 044	3 029	1 696

Source: StatsSA, 2012

Between 2011 and 2016, BWLM’s dependency ratio¹ showed a decreasing trend over time as an ever-larger proportion of the population was falling into the working age group (see figure below). The dependency ratio decreased from 59.7 in 2011 to 56.7 in 2019. The Western Cape Provincial Government had previously projected that it would continue to reduce to 55.1 by 2024. However, more recent information suggests that this trend reversed between 2016 and 2019, with an increase in the dependency ratio to a high of 64.4% in 2021. Interviews with municipal representatives indicate that this could be due to higher than anticipated rates of in-migration over the period. As the net change in population has been negligible in recent years this would imply out-migration as well.

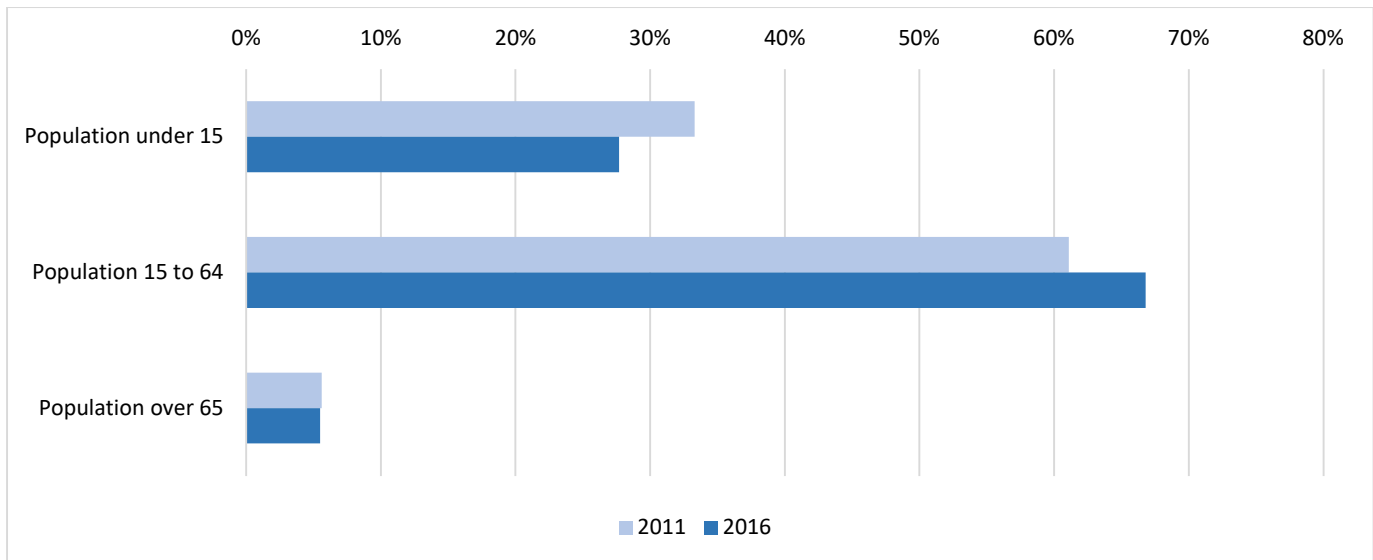


Source: WCPG, 2018a; 2018b; 2020a

Figure 4.3 Age cohorts over time in the Beaufort West Local Municipality

Between 2011 and 2016, the population of the ULM appeared to be following a similar trajectory to that of the BWLM. Post-2016 data are not available to confirm whether this trend has continued or, as in the case of BWLM, reversed. As in BWLM, the dependency ratio in the ULM fell from 64 in 2011 to 50 in 2016, with an increasingly large portion of the younger population falling into the working age category.

¹ The dependency ratio expresses the ratio of those typically not in the labour force (being lower than the age of 15 and higher than the age of 64) to those typically in the labour force (people of ages 15 to 64).

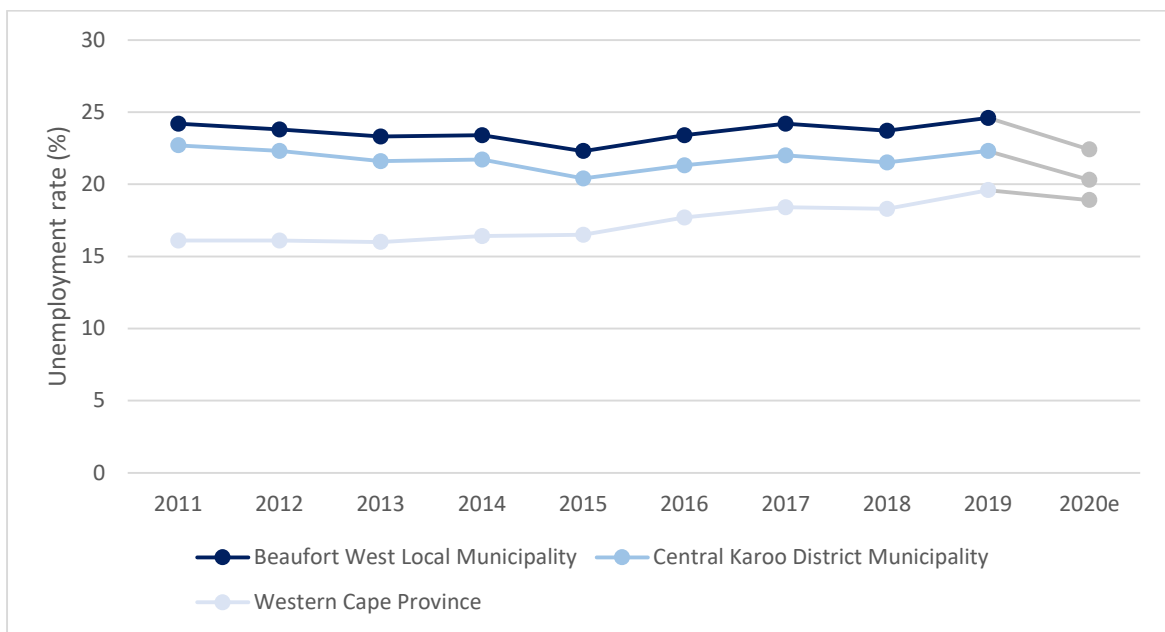


Source: StatsSA, 2011; 2016

Figure 4.4 Age cohorts over time in the Ubuntu Local Municipality

4.3. Employment and sectors

BWLM’s unemployment rate was around 24.2% in 2019, which is the highest unemployment rate in the CKD. The local municipality’s trend has for the most part been consistent with that of the district municipality as well as that of the province at least since 2008 (see Figure 4.5). Western Cape Treasury estimates that unemployment will fall to 22.4% in 2020 (WCPG, 2021a). Reducing unemployment in a year like 2020 seems challenging however, given that Quantec Research estimates that 725 jobs were lost in BWLM in 2020 (1,066 in the wider CKDM) (WCPG, 2021b).



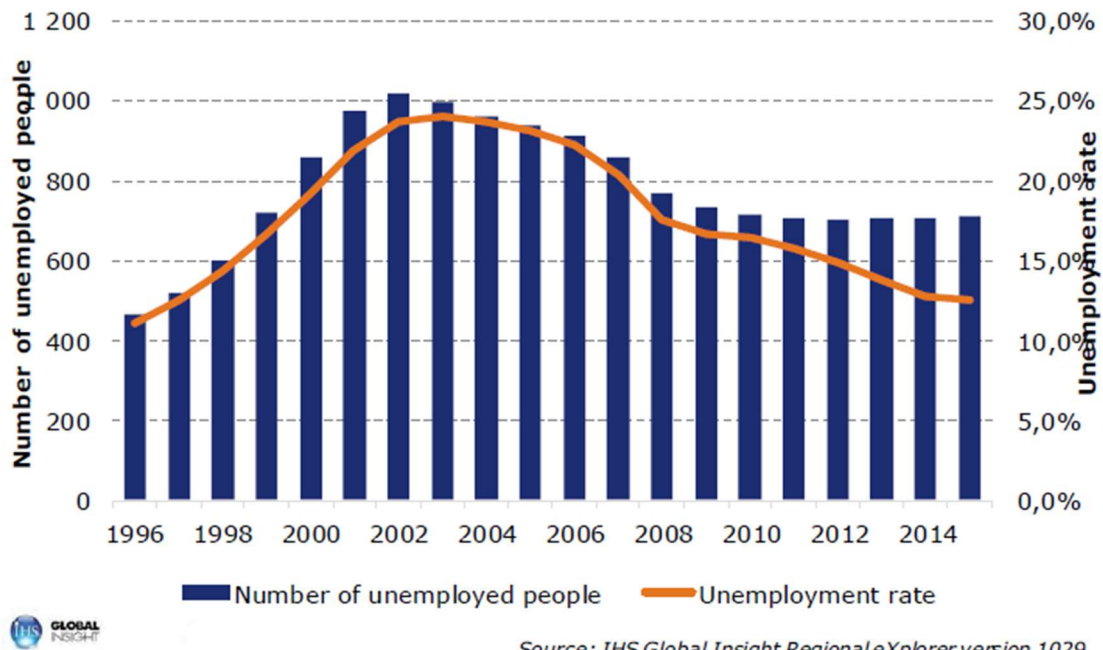
e denotes estimate

Source: WCPG, 2019; 2020a; 2021a

Figure 4.5 The unemployment rate in BWLM and CKDM over time

Recent employment data are not available for ULM, PkSDM or KHLM. The 2011 census revealed that in that year the unemployment rate in ULM was 29.1% and in PkSDM, 28.3%. The youth

unemployment rate in 2011 was 34.8% in ULM and 35.4% in PKSDM. For the KHLM, unemployment data is outlined in Figure 4.6, which shows that the unemployment rate peaked around 2003 and has been falling since. However, recent data is not available and there is reason to suspect that this trend may not have continued following the impact of the COVID-19 pandemic and lockdown restrictions, which have tended to increase unemployment in other places where the impact has been measured.



Source: KHLM, 2017

Figure 4.6 The unemployment rate in KHLM over time

The sector which contributes most to employment in BWLM is wholesale and retail trade, catering and accommodation. This sector contributed 3,165 of the total of the area’s 12,552 jobs in 2019, and 31 more jobs than in 2018. The second highest number of jobs was in agriculture, forestry and fisheries which employed 2,421 people in that year (the same number estimated in 2018). Table 4.2 outlines each sector’s employment numbers in 2019 and shows the change in job numbers between 2014 and 2018.

Table 4.2 Sectoral contribution to employment and net employment growth per sector in Beaufort West Local Municipality

	GDPR			Employment		
	R Million value 2019	Trend 2015 – 2019	Real GDPR growth 2020e	Number of jobs 2019	Ave ann. change 2015 - 2019	Net change 2020e
Primary Sector	225.3	-2.8	10.7	2 423	77	-73
Agriculture, forestry & fishing	223.7	-2.9	10.8	2 421	77	-73
Mining & quarrying	1.6	0.5	-17.6	2	0	0
Secondary sector	278.6	-0.3	-12.8	787	-11	-94
Manufacturing	67.4	0.4	-10.3	249	-2	-16
Electricity, gas & water	120.3	0.2	-6.2	65	0	-3
Construction	90.9	-1.3	-22.0	473	-9	-75
Tertiary sector	1 727.3	0.5	-6.3	9 342	70	-558
Wholesale & retail trade, catering & accommodation	346.4	-0.2	-11.3	3 165	41	-280
Transport, storage & communication	382.2	-1.2	-16.9	649	-1	-38
Finance, insurance, real estate & business services	287.9	2.2	-3.6	1 277	2	-86
General government	500.3	1.0	1.0	2 319	7	26
Community, social & personal services	210.5	0.7	-2.9	1 932	21	-180
Beaufort West	2 231.2	-0.1	-4.8	12 552	136	-725

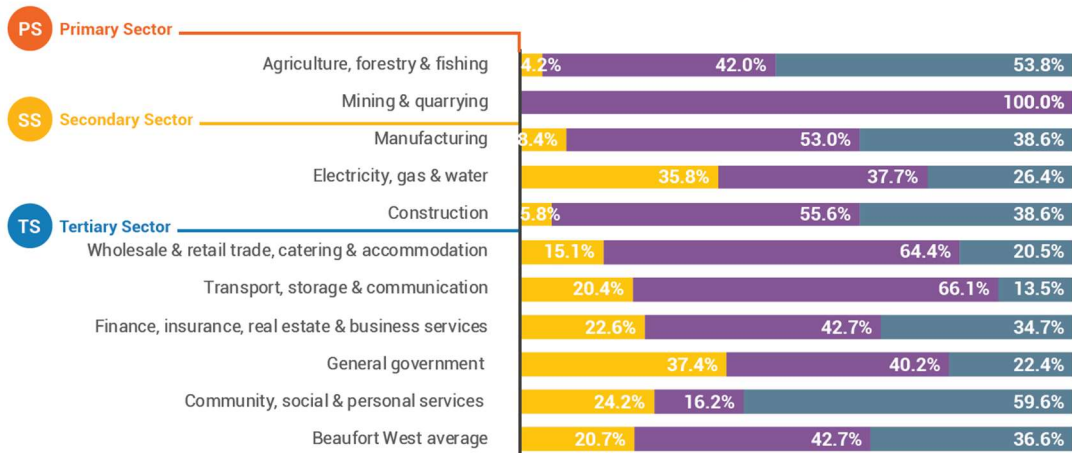
Source: WCPG, 2021a

Most jobs in BWLM fall into the semi-skilled (42.7%) and low-skilled (36.6%) categories with skilled jobs making up only 20.7% of jobs in the area (see Figure 4.7) Higher-skill positions are concentrated in the electricity, gas and water sector, as well as in general government, finance and community services-related sectors.

SKILL LEVELS PER SECTOR, Beaufort West, 2019 (%)



● Skilled
● Semi-skilled
● Low-skilled



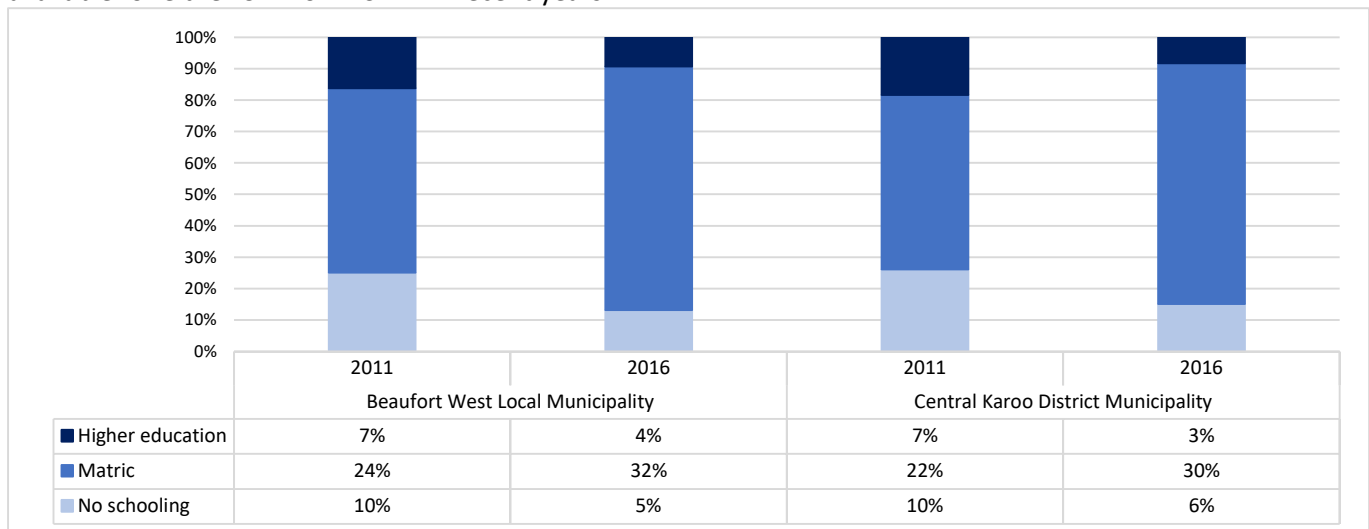
Source: Quantec Research, 2021

Source: WCPG, 2021b

Figure 4.7 Sectoral contribution to employment and net employment growth per sector in Beaufort West Local Municipality

4.4. Education levels

The proportion of people over the age of 20 years who have obtained a matric certificate increased in the 2011 to 2016 period at both the local and district municipality scales (See Figure 4.8). This indicates that basic education levels have improved in the study area during this time. The proportion of people who have obtained some form of higher education has however decreased over the same period, at both the local and district municipality scales. This metric, previously published by StatsSA, is not available for either ULM or PkSDM in recent years.



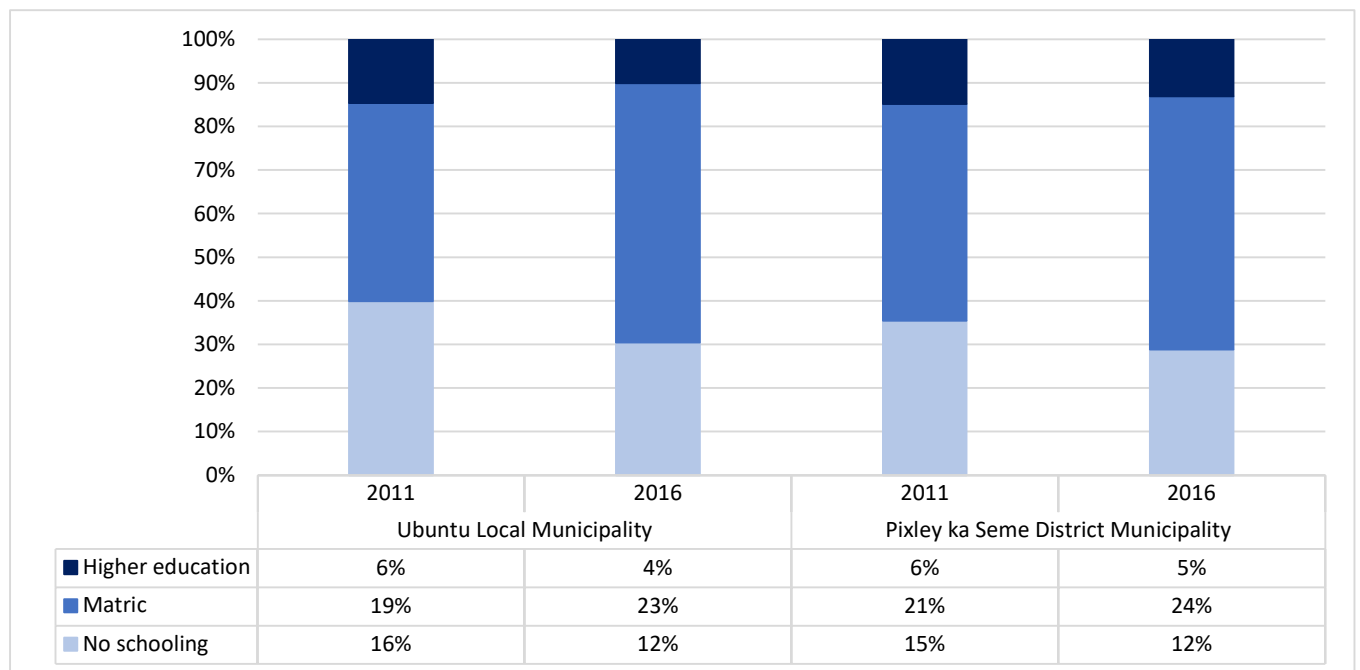
Source: Stats SA, 2012; Stats SA, 2017

Figure 4.8 Education levels in those over 20 years old in BWLM and CKDM, 2011 and 2016

Statistics published by the Western Cape Government indicate that both learner enrolment and learner retention have been increasing gradually in recent years (WCPG, 2021a). This is a promising trend. However, while the demand for education has risen, supply has decreased according to the measure of the number of public ordinary schools, which decreased by one per year over the 2018–2019 period. This combination of trends has resulted in higher learner-teacher ratios in the

municipality, at 1:33.2 in 2019 (higher than the provincial average of 1:30.5 and the national average of 29.3). In 2020 the ratio reduced slightly to 1:31.

According to StatsSA the proportion of people in ULM over the age of 20 years with no schooling fell from 16% to 12% over the 2011–2016 period. For the PkSDM this figure decreased similarly from 15% to 12%. At the same time, the proportion of people who have attained a matric certificate had increased for both ULM and PkSDM during these years. The proportion of people who had attained some form of higher education had meanwhile fallen (See Figure 4.9). More recent data has not been published on the above-reported metrics at either the district or local municipality-level in the Northern Cape.



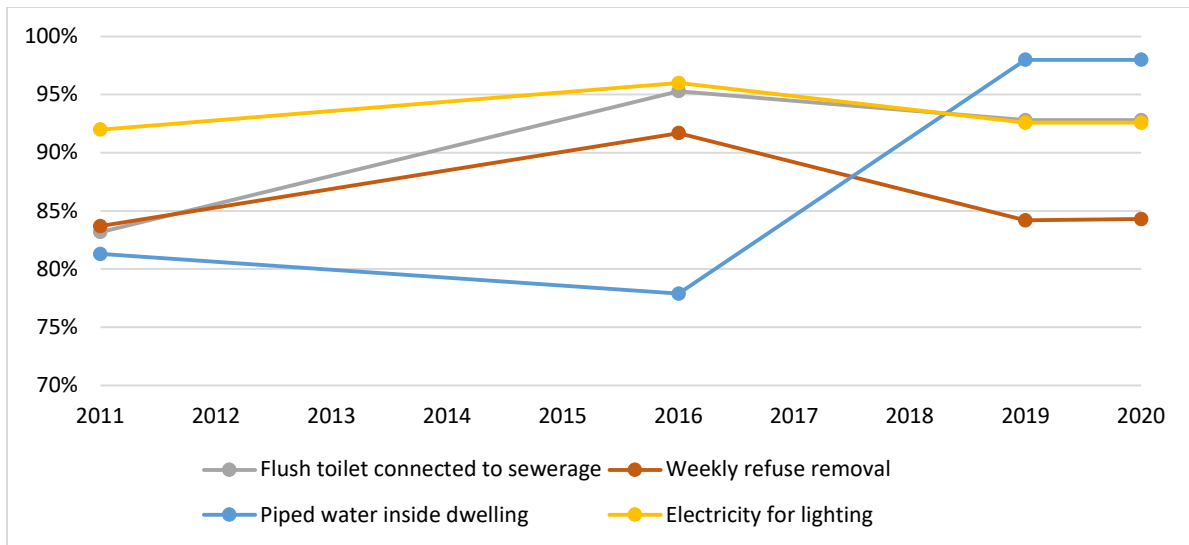
Source: Stats SA, 2012; Stats SA, 2017

Figure 4.9 Education levels in those over 20 years old in ULM and PkSDM, 2011 and 2016

4.5. Availability of municipal services

Access to basic services has fluctuated over time both at the local and district municipality levels, except in the case of water. The data in Figure 4.10 was assembled based on statistics generated by StatsSA for 2011 and 2016, as well as 2019–2020 statistics generated by Quantec and reported in the Western Cape Treasury’s 2020 and 2021 socio-economic profiles for Beaufort West. According to this data, a greater proportion of households had access to a flush toilet connected to sewerage, weekly refuse removal and electricity and lighting in 2016 as compared to 2011 throughout the local and district municipalities. This improvement was somewhat reversed in the 2016–2019 period, with relatively more households not having access to electricity for lighting, flush toilets and weekly refuse removal in recent years.

The proportion of households with piped water inside their dwelling fell from 81% to 78% in BWLM and from 77% to 74% in CKDM between 2011 and 2016, but then saw an increased to 98% in 2019 for both BWLM and CKDM. Interviews with municipal representatives suggest that in-migration of poor families has led to the expansion of informal settlements where the provision of service delivery remains relatively low.

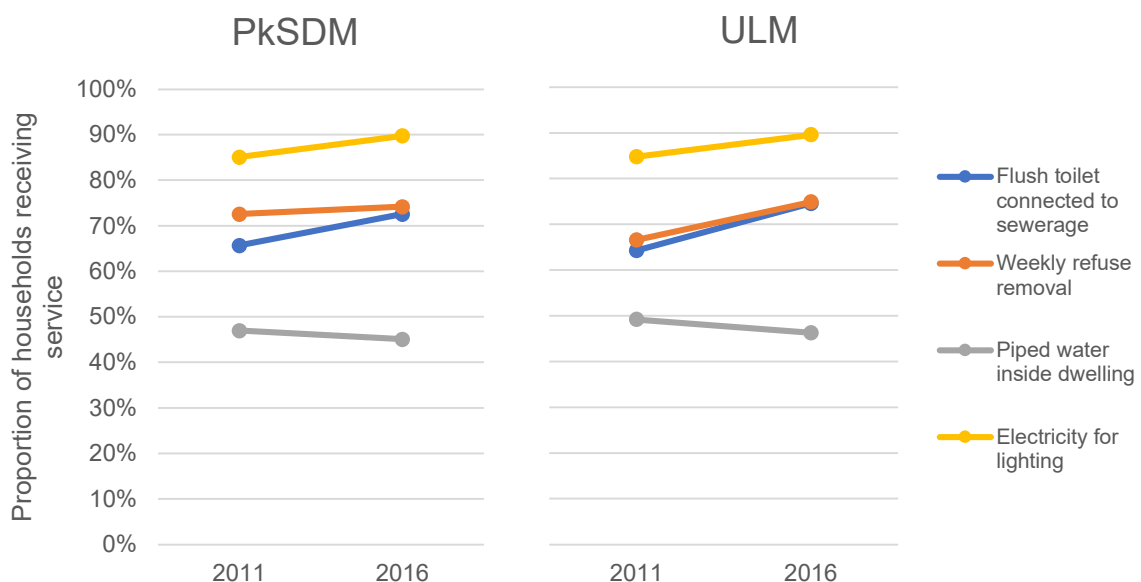


Source: Stats SA, 2012; Stats SA, 2017; WCPG, 2020a

Figure 4.10 Access to key municipal services in BWLM and CKDM, 2011, 2016 and 2019

According to the Western Cape Government, there are relatively few informal houses in either the BWLM or in the CKDM. In the BWLM, 97.9% of households live in formal dwellings, which is a slightly higher proportion of households than the CKDM with 97.0% (WCPG, 2021a).

Data for the Northern Cape are comparatively limited. For the 2011–2016 period, Figure 4.11 shows that service delivery in ULM and PkSDM had improved in all areas except in terms of the number of households who have access to piped water inside their dwellings. This was likely the result of water provision not keeping pace with the growing number of households in the local as well as the district municipality. More recent figures are not available.



Source: Stats SA, 2012; Stats SA, 2017

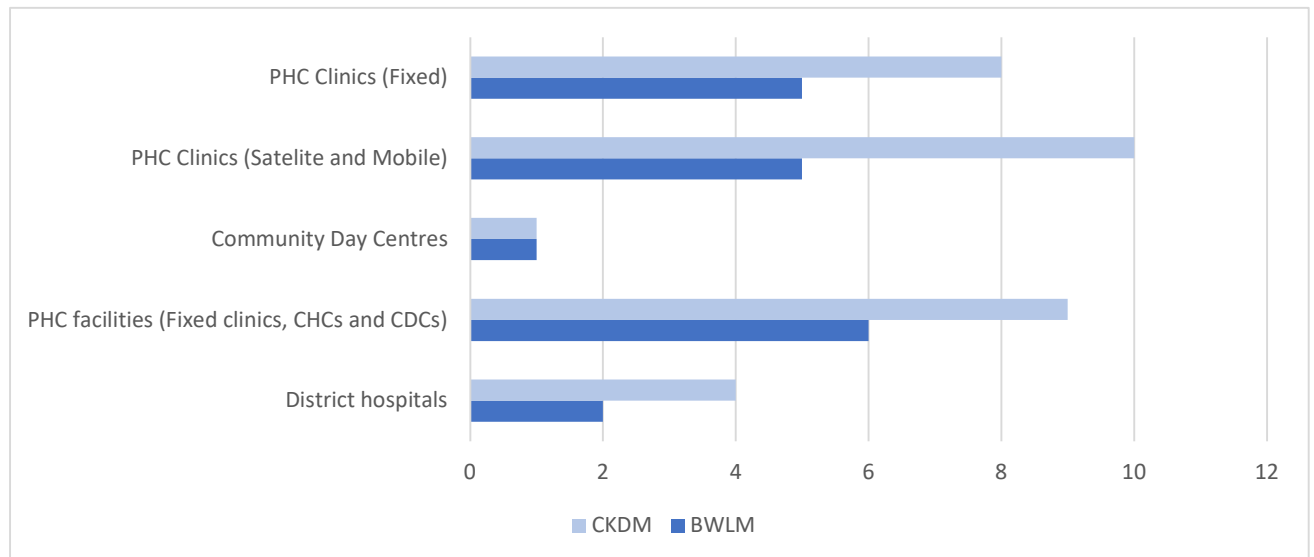
Figure 4.11 Access to key municipal services in ULM and PkSDM, 2011 and 2016

4.6. Health

Assessing access to health services is key to understanding well-being and poverty. Chronic lower respiratory disease is the leading cause of death in the Central Karoo District (9.5% of deaths in 2018),

followed by Tuberculosis (TB) (8.8%), Cerebrovascular disease (6.9%), Hyperintensive diseases (5.5%) and Diabetes melitus (5.5%) (WCPG, 2021b).

According to StatsSA, 75% of South Africans rely on public health services, while the remaining 25% make use of private facilities. The number and types of public healthcare facilities available in BWLM and CKDM are outlined in Figure 4.12.



Source: WCPG, 2021a

Figure 4.12 Public healthcare facilities in the study area

BWLM’s latest IDP revision notes the importance of providing preventative care for HIV/AIDS and Tuberculosis (TB) to vulnerable communities. This preventative care is provided by government and consists primarily of condom distributions and campaigns to encourage the practice of safe sex. In terms of providing treatment, government provides antiretroviral therapy (ART) to people living with HIV. There were a total of 1,558 people receiving ART in BWLM in 2020/21, up from 1,524 in 2019/20. The total number in the CKDM was 2,037 in 2020/21, down from 2,050 in 2019/20. The CKDM socio-economic profile, published by the Western Cape Treasury, notes that the number of newly registered ART patients remained relatively stable at 142 in 2019/20 and 147 in 2020/21.

Direct provision of public health services is complemented by service provision more broadly. This is noted in the PKSDM Health Profile, with inadequate provision of basic services such as water and wastewater treatment highlighted as factors that contribute to heightened incidences of illness.

The following healthcare facilities provide treatment in the BWLM:

- Murraysburg Primary Healthcare Centre (PHC)
- Nelspoort PHC
- Nieuvelddpark PHC
- Kwa Mandlenkosi PHC
- Hillside Clinic PHC (constructed in 2016/17)
- Merweville Satellite Clinic
- Beaufort West CDC
- Murraysburg Mobile Clinic
- Nelspoort Mobile Clinic

- Beaufort West Mobile Clinic
- Merweville Mobile Clinic
- Beaufort West District Hospital
- Murraysburg District Hospital
- Nelspoort Specialised Hospital

Similar to the BWLM, communities living in the ULM also face challenges with respect to HIV/AIDS and TB. According to the latest available information, the ULM currently has 3 clinics and 2 Community Health Centres, no district hospital (for Pikley ka Seme District these are located in the Emthanjeni, Siyancuma and Siyathemba Local Municipalities), no Mobile Clinics and no Satellite Clinics (HST, no date). The ULM IDP identifies the following issues in the local health sector:

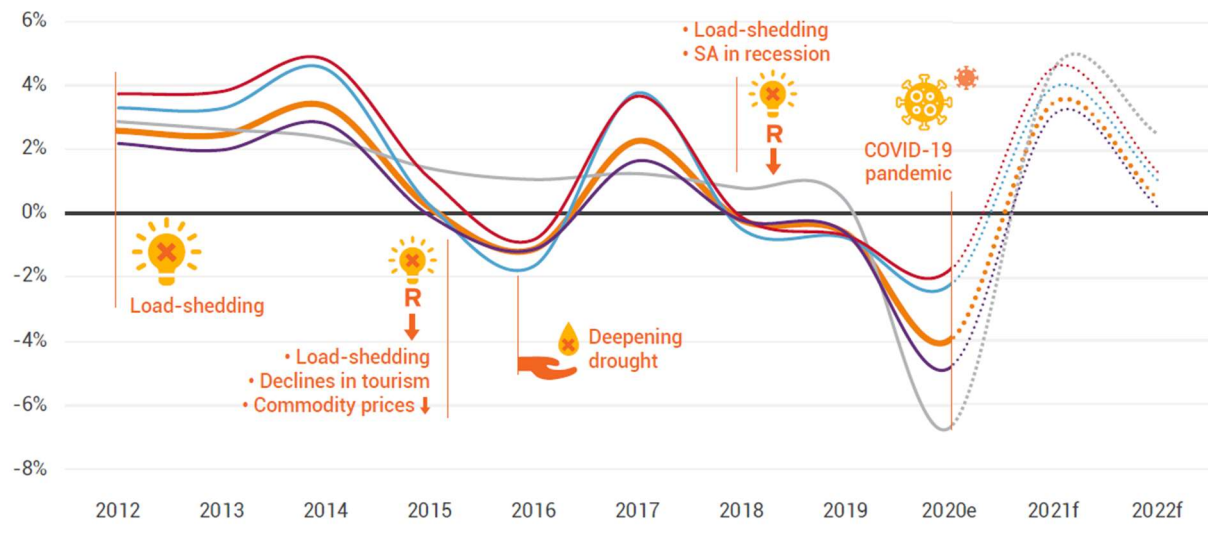
- “Inadequate health facilities
- Limited medical staff (Doctors & Nurses)
- Limited equipment’s
- Underutilized facility
- Shortage of ambulances” (ULM, 2021)

The latest available information indicates that the KHM has 3 PHC clinics and 2 Mobile Clinics.

Municipalities continue to address health issues facing communities through the provision of health services and through the continued training of Community Health Workers. In addition to treating HIV/AIDS, facilities provide immunisation for children (CKDM’s immunisation rate was 74.9% in 2016). Other challenges faced by communities include a higher than anticipated neo-natal mortality rate – 13.4 neonatal deaths per 1000 live births for CKDM in 2019, up from 14 in 2016 (the target had been set at 6 or less). The neonatal death rate for BWLM is lower, at 8.4 deaths per live birth.

4.7. Local and regional socio-economic growth and development plans/priorities

The Central Karoo District has experienced low levels of economic growth in recent years, with fluctuating GDP growth patterns seen since 2014 in the district economy and all local economies within. Quantec Research estimates that the BWLM experienced 4.8% decline in 2020, in line with the 4% decline in CKDM’s GDP growth rate and a 6.7% decline in that of the Western Cape. Several reasons for this low and erratic growth are outlined in Figure 4.13. They include the COVID-19 pandemic, drought and load shedding.



	2012	2013	2014	2015	2016	2017	2018	2019	2020e	2021f	2022f
Western Cape	2.9%	2.6%	2.4%	1.4%	1.1%	1.2%	0.8%	0.4%	-6.7%	4.6%	2.5%
Central Karoo District	2.6%	2.4%	3.3%	0.2%	-1.1%	2.3%	-0.2%	-0.6%	-4.0%	3.5%	0.5%
Laingsburg	3.3%	3.3%	4.5%	0.3%	-1.6%	3.8%	-0.5%	-0.7%	-2.2%	4.0%	1.0%
Prince Albert	3.7%	3.8%	4.8%	1.1%	-0.8%	3.7%	-0.1%	-0.7%	-1.8%	4.6%	1.3%
Beaufort West	2.2%	2.0%	2.8%	-0.1%	-1.1%	1.7%	-0.2%	-0.6%	-4.8%	3.2%	0.2%

Source: Quantec Research, 2021; Urban-Econ based on Quantec, SARB, Stats SA and BFAP, 2021 (e denotes estimate, f denotes forecast)

Figure 4.13 GDP growth in the local economies of the Central Karoo District

In terms of future economic development goals, the 2021-2022 review of the 2017-2022 Integrated Development Plan (IDP) of the BWLM is most instructive. According to this plan, the Municipal Strategic Programme is aligned to 5 Key Performance Areas:

- “KPA 1: Basic service delivery and infrastructure development
- KPA 2: Economic development
- KPA 3: Institutional development and municipal transformation
- KPA 4: Financial viability and management
- KPA 5: Good governance and community participation”

KPA 2 above (economic development) is linked to the following strategies:

- “To use municipal and government funded projects as means to create jobs and reduce poverty
- To facilitate development and growth of SMME's
- To establish and strengthen LED Structures
- To facilitate Education and Skills Development for Cooperatives & SMME's
- To provide SMME Support and Capacity building
- To manage and enhance the performance of the municipality”

At the district level, the Central Karoo District Municipality IDP 2017-2022, 2nd Review 2021–2022, highlights the following projects, identified in the District LED Strategy:

- “Infrastructure development to increase access for businesses and households;
- Business support programmes to retain existing businesses and encourage start-up or relocating businesses to enter the area;

- Spatial planning to promote land acquisition and property development for businesses and households;
- Skills programmes to respond to business and government for greater productivity and efficiency; and
- Social development programmes to increase participation in the local economy and build better lifestyles for the community.”

The CKDM IDP goes on to mention the importance of establishing an LED unit to coordinate activities, as well as the Economic Recovery Plan being drafted to respond to the economic impact of the COVID-19 pandemic.

The Ubuntu Local Municipality 2017-2022 & 2020/21 Draft IDP outlines the following strategic objectives associated with National Key Performance Area 2: Local Economic Development:

- a. Private Sector Investment Upliftment & Acceleration
- b. Public Sector Investment Upliftment & Acceleration
- c. Tourism Upliftment & Acceleration
- d. Agriculture & Agri-processing Upliftment & Acceleration
- e. Industry Upliftment & Acceleration
- f. Commerce Upliftment & Acceleration
- g. SMME Upliftment & Acceleration
- h. Industrial & Commercial Economic Zone Establishment” (ULM, 2021: 44)

The Key Performance Areas put forward in the 2017–2022 KHLM IDP, 2021–2022 Review are as follows:

- “KPA 1: Basic service delivery
- KPA 2: Local Economic development
- KPA 3: Financial viability
- KPA 4: Institutional development and municipal transformation
- KPA 5: Good governance and community participation”

In the area of KPA 2: Local Economic Development, the following strategic objectives are listed:

- “Transform Urban areas to vibrant economic centres that are safe and secure
- Promote growth and diversification of the local economy
- Promote BBBEE development
- Promote healthy living and working environments
- Promote social cohesion through economic and social development”

5. SITE SENSITIVITY VERIFICATION REPORT

In accordance with GN 320 and GN 1150 of the NEMA EIA Regulations of 2014, prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

No preliminary socio-economic sensitivities or sensitivity rating was identified or provided based on the DFFE Screening Tool (i.e. a preliminary sensitivity rating was not provided that could then be confirmed or altered based on further assessment). Nevertheless, this assessment report contains a detailed assessment of the socio-economic impacts of the proposed project. As such, it provides all the necessary information and assessment data to provide an opinion on the sensitivity rating of the site.

It was therefore found that the site would have a low to medium sensitivity rating based on the following:

- The planning documents relevant to the site do not identify significant or inherent constraints to appropriate development. Considered as a whole, the planning documents reviewed recognise the importance of integrated and diversified economic development that makes optimal use of the area's comparative advantages and creates economic opportunities. The concept of a renewable energy project is therefore broadly supported provided environmental impacts and impacts on other land uses and potentials are acceptable.
- Tourism facilities and attractions in the areas are very limited and sparsely distributed reducing tourism sensitivities. However, it should be recognised that the area is relatively isolated with wilderness quality and limited signs of civilisation which contributes to its tourism potential. It has a remote sense of place which makes it more sensitive to potential impacts on tourism and also on surrounding landowners and communities.
- Given its remote and relatively isolated location, the site would be relatively sensitive to the influx of people, including job seekers, that may be associated with the project. The influx of large numbers of people are not thought likely and these risks should be manageable and are common to most larger projects.
- The area is sensitive, in a positive sense, to increased economic opportunities as they are much needed as reflected in low employment and income levels. Projects that can provide such opportunities are therefore to be encouraged where possible.

6. IDENTIFICATION AND DESCRIPTION OF IMPACTS

Aside from a review of the compatibility of the project with local, regional and national socio-economic development plans and the financial viability/risks associated with it (broad level review), the following impacts have been identified as relevant for assessment based on the guidelines for socio-economic specialist inputs, the nature of the project, stakeholder inputs and the receiving environment:

Construction phase impacts:

1. Impacts from expenditure on the construction and operation of the project.
2. Impacts associated primarily with the influx of people including job seekers.
3. Impacts on surrounding landowners and communities.
4. Impacts on tourism.

Operations phase impacts:

1. Impacts from expenditure on the construction and operation of the project.
2. Impacts on local socio-economic development, enterprise development and shareholding.
3. Impacts associated primarily with the influx of people including job seekers.
4. Impacts on surrounding landowners and communities.
5. Impacts on tourism.

Decommissioning phase impacts

1. Impacts from expenditure on the construction and operation of the project.

2. Impacts associated primarily with the influx of people including job seekers.
3. Impacts on surrounding landowners and communities.
4. Impacts on tourism.

Cumulative impacts

1. Impacts from expenditure on the construction and operation of the project.
2. Impacts on local socio-economic development, enterprise development and shareholding.
3. Impacts associated primarily with the influx of people including job seekers.
4. Impacts on surrounding landowners and communities.
5. Impacts on tourism.

Note that the above choice of impact categories aims to limit overlap with other specialist studies and is therefore partially informed by the nature and scope of the work conducted by other specialists contributing to the EIA. In particular, impacts on agriculture and those associated with traffic are not a focus of this report as they are dealt with by other relevant specialists in their studies.

6.1. Compatibility with policy and planning guidance

The proposed project's key strategic objectives can be summarised as providing additional electricity generation capacity whilst meeting national renewable energy and climate change targets. This section contextualises the project with respect to these objectives along with a wider consideration of the project's fit or compatibility with socio-economic and associated spatial development planning objectives and guidance.

6.1.1. Energy policy imperatives and the environment

Historically, South Africa has relied heavily on non-renewable fossil fuels (primarily coal) for energy generation purposes. This reliance remains a key feature of the current energy mix with about 87% of our electricity generation needs met by non-renewables. Given our abundance of coal reserves relative to most other countries, it is not particularly surprising that our energy mix favours coal, and it is to be expected that coal will remain dominant at least in the short and medium term. However, substantial improvements in cost-effectiveness, imperatives with regard to global warming, other environmental impacts associated with fossil fuels and energy security have elevated renewable energy solutions.

In recent years the cost of energy generated through renewable technologies has fallen. Figure 6.1 shows that between bid windows 4 and 5, the average price of electricity purchased through REIPPPP fell by 54% (Magoro, 2021). The result is that the levelized cost of renewables is now lower than any other form of electricity generation. For the first time in history, the argument in favour of renewables can now be made on purely on grounds of financial feasibility.

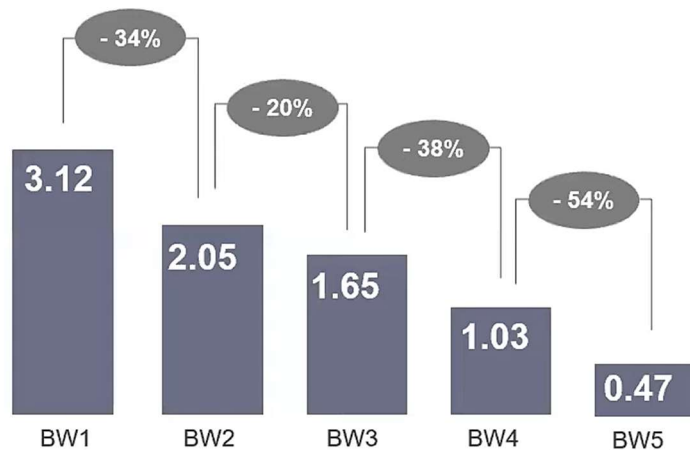


Figure 6.1 REIPPPP average bid prices in April 2021 terms

In addition to the financial argument, most governments in the global community now recognise that the roll-out of renewable energy will be needed among a number of other actions to curb global warming. Furthermore, the South African renewable energy industry is now a major economic sector contributing to socio-economic development goals in a sustainable manner.

With the above in mind, South African longer-term energy policy has rapidly changed from one that did very little to encourage renewable energy to one that actively encourages it. The first draft version of the national Integrated Resource Plan (IRP) released in 2010 set a target for 30% of new generation to come from renewables by 2030. This was subsequently increased to a target of 42% from renewables in the final IRP approved by cabinet in 2011. The 2019 IRP proposes that renewable energy will play an increasingly significant role in South Africa's energy mix. By 2030, wind energy should contribute 17.8% of total energy (from an installed capacity of 17,742 MW), solar should contribute 7% while coal contributes 59%. Reaching these targets will require substantial investment in new renewable projects.

In order to facilitate the roll-out of renewable energy and meet ambitious targets, the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) was launched in 2011 to replace the previously mooted Renewable Energy Feed-In Tariff (REFIT) programme. Through the REIPPPP, aspirant renewable energy developers bid for contracts in terms of which government commits to purchase power from them in keeping with national targets. The REIPPPP has the following key features:

1. A two-phase tender system in which bidders must first meet qualification criteria (including legal, environmental and financial requirements) and will then be evaluated on bid price and economic-development objectives.
2. The programme's evaluation criteria currently scores 90% on price and 10% on a range of socio-economic development requirements (previously 70% price and 30% socio-economic development).

The sixth round of the REIPPPP was launched in April 2022.

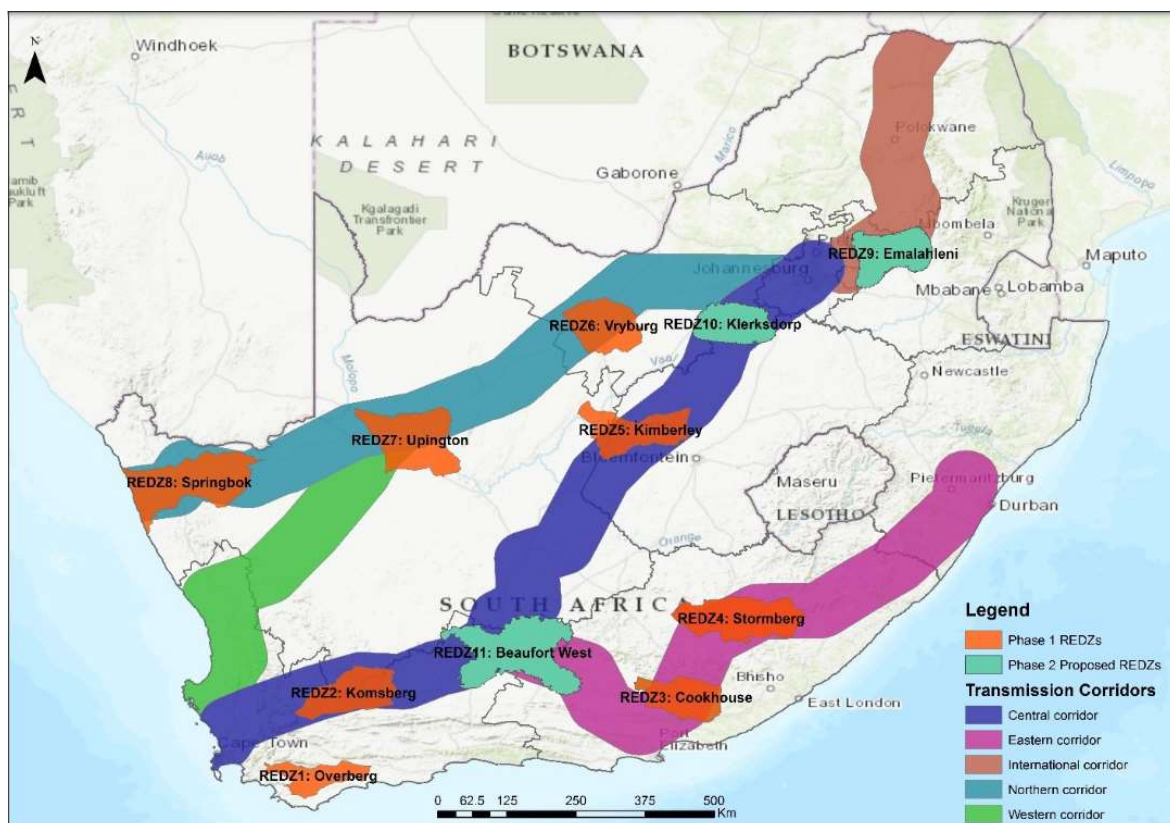
In summary, the policy case for the roll-out of renewable energy in South Africa has been made at a national and provincial government level using arguments that are in line with international policy trends, the National Development Plan 2030 and IRP. Targets that include solar energy have been set through the REIPPPP in order to encourage such projects. Aside from impacts on the achievement of national goals and policy imperatives, the project also has the potential to contribute to greater energy supply stability and security to the benefit of local residential electricity consumers as well as farmers and businesses due to it contributing to the improvement of the national electricity grid and supply.

6.1.2. Strategic spatial planning for solar areas and transmission lines in South Africa

The project achieves a relatively high degree of compatibility with national strategic planning focused on renewable energy and associated grid infrastructure development.

Phase 1 of a Strategic Environmental Assessment (SEA) commissioned by the then Department of Environmental Affairs (DEA) identified Renewable Energy Development Zones (REDZs) for the roll-out of wind and solar energy in South Africa. The identification of these zones is aimed at enabling the development of large-scale wind and solar energy facilities in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and maximizing socio-economic benefit to the country. Phase 2 of the SEA includes additional REDZs which have recently been gazetted (see Figure 6.2).

Mura Solar Project 1 falls entirely within “REDZ11” which is one of the REDZs in the Phase 2 REDZ (see the following Figure). Mura Solar Project 2 falls partially within REDZ11 and partially to its immediate north. Mura Solar Projects 3 and 4 are also immediately north of REDZ11. The EGI corridor also falls just north of the Central Transmission Corridor identified as part of the National Electricity Grid Infrastructure Strategic Environmental Assessment (DEA, 2016) and subsequently gazetted, as well as mostly within the REDZ11. Overall, each of the projects therefore achieves relatively close alignment with national renewable energy spatial planning. This is further reflected in the existence of approved wind energy facilities and EGI in the immediate vicinity of the proposed projects.



Source: DEA 2019

Note: Phase 2 Proposed REDZs in map were subsequently accepted and gazetted without alterations

Figure 6.2 Renewable Energy Development Zones identified in the Strategic Environmental Assessment for the wind and solar energy Phase 2 and Transmission Corridors

6.1.3. Socio-economic development and spatial planning

Socio-economic development imperatives inform spatial planning imperatives. A critical aspect of socio-economic desirability is thus whether the proposed development complements economic planning as reflected in spatial development planning. Integrated Development Plans (IDPs) and their accompanying Spatial Development Frameworks (SDFs) are particularly important in this regard. SDFs are central to economic development planning and serve to guide overall development in a direction that local and provincial authorities see as desirable. Indeed, the basic purpose of an SDF is to specify the spatial implications of IDPs, with a focus on optimising economic opportunities and other strategic objectives.

Alignment with SDFs, structure plans and other planning documents is a robust way of ensuring economic and social feasibility. Projects that do achieve close alignment are more likely to ensure that positive impacts are optimised, reducing the likelihood of externalities on other stakeholders and productive sectors. Where projects do not achieve alignment with existing planning, there should be clear and compelling reasons why a deviation from planning should be considered.

The following provincial and regional planning documents were found to be of relevance and were consequently reviewed:

- Western Cape SDF 2014
- Northern Cape SDF 2012, updated in 2018
- Central Karoo District Municipality IDP 2021/22
- Central Karoo District Municipality SDF 2014 and draft SDF 2019
- Namakwa District Municipality IDP 2021/22
- Namakwa District Municipality Rural Development Plan 2017
- Beaufort West Local Municipality IDP 2021/22
- Beaufort West Local Municipality SDF 2013
- Ubuntu Local Municipality IDP 2020/21
- Karoo Hoogland Local Municipality IDP 2021/22
- Karoo Hoogland Local Municipality SDF 2019

Provincial planning

The Western Cape SDF recognises the importance of the province's cultural and scenic landscapes as assets that underpin the tourism economy. As part of the SDF, a spatial mapping exercise was carried out to identify landscapes and routes of particular importance, considering their rural, archaeological, agricultural and natural significance. Figure 6.3 shows the project site, ~60km north of Beaufort West, falls completely within the white area, which was not identified by the provincial SDF as particularly important as a cultural landscape. It should be noted, however, that wilderness / natural landscapes (represented by the colour green) do occur south of the project site (DEAD&P, 2014).

In terms of scenic routes, the R381 between Beaufort West and Loxton was identified in the Provincial SDF as a 'Primary scenic route'. It is therefore represented by the red line in Figure 6.3. At its closest point, the EGI corridor would be about ~7.5km from this route and the closest solar facilities, Mura Solar Project 1 and Mura Solar Project 2, would be about ~9.5km away at their closest boundary. Nevertheless, the project's proximity to this route raises the potential for some impact on sense of place and tourism. This issue is discussed further in Section 6.6.

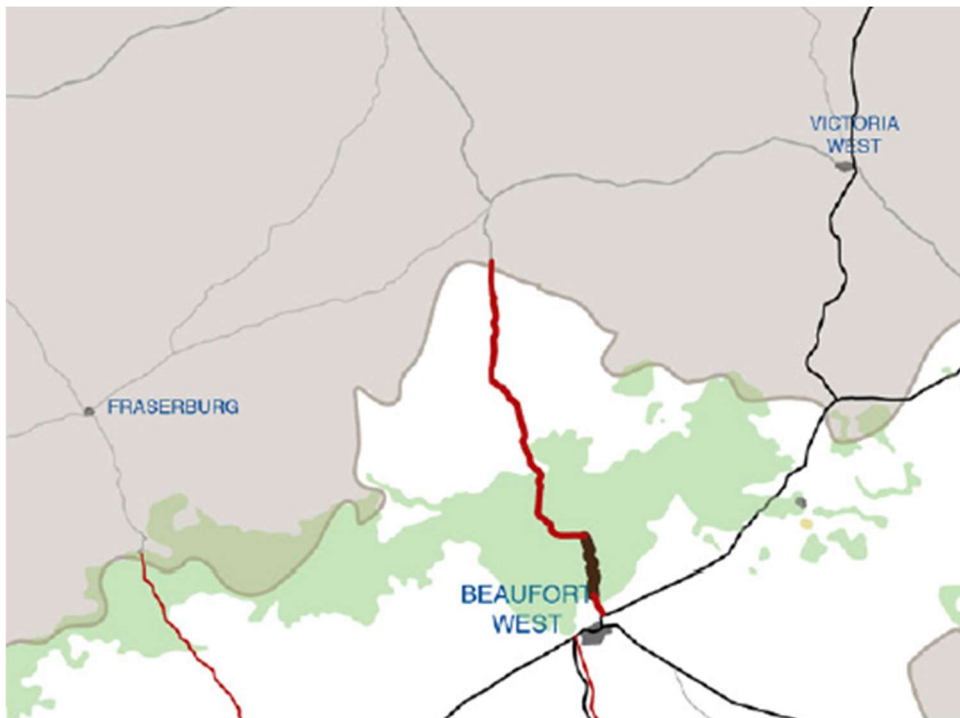


Figure 6.3 Scenic landscapes and routes identified in the Western Cape SDF, 2014

The Northern Cape SDF was based on a comprehensive analysis of the province and its regions. It recognises the importance of the province’s diverse human, natural and built capital and develops a spatial vision to guide development at a high level. The SDF was first drafted at the beginning of the development of renewable energy projects in South Africa. It recognises the potential for renewables development in large parts of the province balanced with conservation and tourism.

District planning

The Central Karoo District SDF of 2014 echoes the provincial SDF in highlighting the importance of the R381 between Beaufort West and Loxton as having significance as a scenic route (AECOM, 2014). However, the most recent draft SDF, which was published for public input in 2019, does not make mention of this route, except insofar as it is identified as a priority for improving rural accessibility and mobility for people and goods in support of a resilient economy (CKDM, 2019).

The 2019 draft SDF further acknowledges that “there are several on-shore wind and solar energy projects which are currently being planned for the District” (pg. 53), and further states that “opportunities exist for expanding renewable energy projects related to solar and wind power in the Central Karoo.” (pg. 55)

The Namakwa District has a Rural Development Framework which balances various development priorities including agriculture, tourism and mining. It lists renewable energy generation as one of six development priorities within the area (DRDLR, 2017).

The Karoo Readiness Action Plan for Large-scale Development (DEA&DP, 2021) does not provide spatial planning guidance useful for assessing the project’s fit with policy. It is, however, useful in terms of impact mitigation measures for municipalities. It evaluates government’s readiness to respond to the foreseen increase in service delivery associated with large-scale, or regional, development proposals such as shale gas development (SGD), uranium-molybdenum mining and renewable energy developments in the Central Karoo. It then aims to identify interventions/actions to be implemented within the short to medium term (i.e. the next 5 to 10 years), as well as the roles and responsibilities of

municipalities, provincial and national government in readiness for these potential large-scale developments.

Local planning

The Beaufort West Municipality Spatial Development Framework (SDF) was found to be most relevant with respect to planning at the local level. It was completed in 2013 and builds on the 2011 Urban Restructuring Framework. The SDF acknowledges the need for the development of renewable energy. However, two closely related constraining factors were identified in the Municipal SDF. The first is the high level of biological diversity and ecological connectivity present in the Northern part of the Municipality, where the project site is located. This factor is partly a function of the topographical character of the area and is therefore closely related to its sense of place, which is considered scenic and therefore of relevance for tourism (CNdV Africa, 2013).

From an ecological perspective, the area's importance is recognised in the 2013 SDF and refined in the Western Cape Biodiversity Spatial Plan of 2017 as outlined in the Terrestrial Ecology Assessment Reports. The Report shows that the wider project area includes Critical Biodiversity Areas and Ecological Support Areas. Given the close links between tourism, sense of place, and ecological conditions, the iterations of solar facility layouts and power line alignments that respond to ecological constraints taking into account the recommendations of the Terrestrial Ecology Specialist, are critical.

According to the Beaufort West Municipal SDF, the Nuweveld Highlands contain "romantic landscapes with rolling hills and mountains" (Pg. 77). The area is therefore identified as a biodiversity and eco-tourism sub-region. The SDF encourages "the extension of the Karoo National Park and the existing conservancies including accommodation opportunities focusing on Critical Biodiversity Areas" (Pg. 209). Furthermore, as with the Provincial SDF and the older District SDF, the Municipal SDF identifies the R381 between Beaufort West and Loxton as a "Scenic Gravel Route" (CNdV Africa, 2013: 218)

On the topic of how best to manage development in future, the SDF states that "[t]he Department of Environmental Affairs and Development (DEA&DP) should ensure the protection of these cultural and scenic landscapes through the preparation of design guidelines for new development" (CNdV, 2013: 217).

The SDF provides guidance on major infrastructure projects as follows: "Promote domestic and large wind and solar energy projects subject to appropriate guidelines and siting principles", which reflects support for the kind of project proposed and emphasises the need to develop in a way that minimises trade-offs for biodiversity and cultural heritage. This guidance is largely in keeping with the visual and ecological sensitivity mapping being undertaken for this Environmental Authorisation process.

The 2020/21 Ubuntu Municipality IDP Review provides some context around socio-economic development in this local municipality that borders the project site to the north and includes the towns of Loxton and Victoria West. According to this document, the following strategic objectives have been set for the municipality in the area of local economic development:

- a. Private Sector Investment Upliftment & Acceleration
- b. Public Sector Investment Upliftment & Acceleration
- c. Tourism Upliftment & Acceleration
- d. Agriculture & Agri-processing Upliftment & Acceleration
- e. Industry Upliftment & Acceleration
- f. Commerce Upliftment & Acceleration
- g. SMME Upliftment & Acceleration
- h. Industrial & Commercial Economic Zone Establishment"

The Ubuntu Municipality has therefore prioritised upliftment and acceleration in the tourism and agriculture sectors, but also in SMME upliftment, industry and commerce more broadly.

Discussion

Considered as a whole, the planning documents reviewed recognise the importance of integrated and diversified economic development that makes optimal use of each area's comparative advantages and creates economic opportunities. The concept of a renewable energy project is therefore broadly supported provided environmental impacts and impacts on other land uses and potentials are acceptable. However, some potentially constraining spatial factors were identified in the documents, including some tension over the kind of development considered appropriate for the Nuweveld Highlands. These findings have been used to guide the remainder of this assessment of socio-economic impacts and in particular those on sense of place and associated tourism.

6.2. Financial viability and risks

Long-term positive economic impacts can only flow from a project that is financially sustainable (i.e. financially viable in the long term with enough income to cover costs). The REIPPPP essentially ensures that once a renewable project is operational there is relatively low levels of financial risks in order to encourage these types of projects. The Project is thus highly likely to prove financially viable assuming it is able to secure a long-term contract through the REIPPPP and then proceed to control its costs and meet revenue and other expectations.

As mentioned previously, under the REIPPPP competitive bidding process, the relevant authorities will only be offering limited producers long term power purchase contracts. The Mura solar projects will therefore have to compete with other projects. At this stage it is not possible to determine whether the projects will be one of those chosen - the adjudication process will determine this. The existence of a number of alternative wind and solar energy developers and sites, from around the country, looking to access REIPPPP contracts means that the state can be selective in allocating contracts to those projects and project alternatives that meet stringent qualification criteria and offer the cheapest electricity and highest socio-economic development commitments.

The balance between financial benefits and costs are thus likely to be positive for the applicant and landowner partners barring unforeseen risks. The remainder of this report focuses on the economic impacts (including costs and benefits) that would accrue to wider society in order to provide information on the overall economic desirability of the project.

6.3. Impacts on regional employment and household income associated with project activities and expenditure

The construction and operational phases of the projects would both result in positive spending injections into the area that would lead to increased economic activity best measured in terms of impacts on employment and associated incomes. Bear in mind that at this stage of project planning estimates of expenditure and employee needs are generally tentative and not detailed resulting in a broad level of assessment but underpinned by experience obtained from work done on other solar farms and powerline developments.

All new expenditures will lead to linked direct, indirect and induced impacts. Taking employment as an example, impacts would be direct where people are employed directly on the project in question (e.g. jobs such as construction workers), indirect - where the direct expenditure associated with a project can lead to jobs and incomes in other sectors (e.g. purchasing building materials maintains

jobs in that sector) and induced where jobs are created due to the expenditure of employees and other consumers that gained from the project. Direct impacts are the most important of these three categories as they are the largest and most likely create change in the local area. Their estimation also involves the lowest level of uncertainty. The quantification of indirect and induced impacts is a far less certain exercise due to uncertainty surrounding accurate multipliers particularly at a local and regional level (as each area and community has its own nuances). This uncertainty makes it inadvisable to quantify indirect employment unless an in-depth analysis is required. Potential direct employment impacts are consequently quantified here, and likely indirect impacts are considered in a qualitative sense when providing overall impact ratings.

6.3.1. Construction phase impacts

Construction expenditure would not displace other investment and would constitute a positive injection of new investment. During the construction phase the civil and other construction, specialised industrial machinery and building construction sectors would benefit substantially. The development would provide a major injection for contractors and workers in the area that would in all likelihood purchase goods and services in the local area and the wider region.

Preliminary estimates indicate that a total of R2–2.9 billion would be spent on the entire construction phase for each solar facility, including infrastructure and building construction as well as other specialised machinery installation for each solar facility (see Table 6.1). Therefore, for all four solar facilities it is expected that between R7.6 billion and R11.6 billion would be spent. The EGI would require construction expenditure of between R320-345 million. Around half of this amount would be spent on overhead lines and pylons.

Table 6.1: Construction expenditure estimate for each solar facility

Per 100–240MW Solar Facility	Spend in 2022 rands spread over construction phase		Duration of construction phase
	Solar field, comprising Solar Arrays	R 1 575 000 000	- R 2 300 000 000
Solar Farm Substation	R 94 500 000	- R 150 000 000	
Building Infrastructure	R 210 000 000	- R 300 000 000	
Other infrastructure specific to Solar Project	R 105 000 000	- R 160 000 000	
Total	R 1 984 500 000	- R 2 910 000 000	

Table 6.2 Construction expenditure estimate for the EGI

Electronic Grid Infrastructure	Spend in 2022 rands spread over construction phase		Duration of construction phase
	Switching stations	R 70 000 000	- R 75 000 000
Overhead lines and pylons	R 150 000 000	- R 160 000 000	
Access roads and tracks	R 70 000 000	- R 75 000 000	
Temporary areas	R 30 000 000	- R 35 000 000	
Total	R 320 000 000	- R 345 000 000	

The local area would benefit primarily from expenditure on civils, roads and buildings. The majority of the more technical components of the facility would need to be imported as these items are not currently available in South Arica. During the sixth round of the REIPPPP bidding process, the DMRE

set a minimum threshold for the proportion of South African content spend during construction and operation of Solar PV at 45%. However, development of domestic industry around inputs to renewable energy projects has been slow, largely due to policy uncertainty. Notwithstanding the need for imports, the construction of the project represents a significant investment spread over roughly 18 to 24 months (see the two tables below). Note that estimates are only meant to give an approximate indication of potential expenditure and are subject to revision.

Table 6.3 Likely geographical allocation of solar facility-related expenditure during construction

	On local suppliers within 50km	On suppliers in the rest of the Western Cape	On suppliers in the rest of South Africa	On imports
Per 100–240MW Solar Facility				
Solar field, comprising Solar Arrays	0%	0%	25%	75%
Solar Farm Substation	0%	0%	60%	40%
Building Infrastructure	5%	15%	80%	0%
Other infrastructure specific to Solar Project	5%	15%	80%	0%

Table 6.4 Likely geographical allocation of EGI-related expenditure during construction

	On local suppliers within 50km	On suppliers in the rest of the Western Cape	On suppliers in the rest of South Africa	On imports
Electronic Grid Infrastructure				
Switching stations	0%	5%	70%	25%
Overhead lines and pylons	0%	5%	75%	20%
Access roads and tracks	10%	20%	70%	0%
Temporary areas	10%	20%	70%	0%

Standard construction industry estimates for labour required were used to estimate direct temporary employment during construction. Table 6.5 outlines employment that would be associated with the main components of the construction phase over 18 to 24 months for each solar facility. Roughly 275 to 455 jobs of 18 to 24-month duration would be associated with the entire construction period. Table 6.6 shows the employment associated with the EGI – 51–88 jobs over an 18–24 month period.

As with expenditure, the estimates are not to be regarded as highly accurate and are meant to give an indication of potential impacts. Once the final tenders are received, construction plans will be finalised and the exact figures will become clearer.

Table 6.5: Estimated direct temporary employment during construction of each solar facility

Employment categories	Number of workers				Duration of employment
	Highly skilled	Medium skilled	Low skilled	Total	
Per 100–240MW Solar Facility					
Solar field, comprising Solar Arrays	16 - 27	32 - 54	32 - 54	80 - 135	18 - 24 months
Solar Farm Substation	7 - 12	14 - 24	14 - 24	35 - 60	
Building Infrastructure	18 - 30	36 - 60	36 - 60	90 - 150	
Other infrastructure specific to Solar Project	14 - 22	28 - 44	28 - 44	70 - 110	
Total	55 - 91	110 - 182	110 - 182	275 - 455	

Table 6.6 Estimated direct temporary employment during construction of the EGI

Employment categories	Number of workers				Duration of employment
	Highly skilled	Medium	Low skilled	Total	
Electronic Grid Infrastructure					
Site support staff	2 - 3	2 - 4	2 - 3	6 - 10	18 - 24 months
Civils and foundations	2 - 3	6 - 9	7 - 14	15 - 26	
Towers and electrical equipment	2 - 3	6 - 9	7 - 14	15 - 26	
Conductor and hardware	2 - 3	6 - 9	7 - 14	15 - 26	
Total	8 - 12	20 - 31	23 - 45	51 - 88	

In keeping with the goal set out in the DMRE scorecard for potential REIPPPP bidders, the applicant intends sourcing as high a possible portion of construction employees from the local area followed by the region and then the province, with the aim of ensuring local communities derive the greatest benefit. The two tables below present estimates of how much employment is likely to go to workers from different areas in the construction of each solar facility and the EGI respectively. For each solar facility, it is anticipated that approximately 100 to 166 temporary jobs would be allocated to workers from the local municipal area and a further 101 to 167 jobs to workers from the rest of the province given the project's skills profile. For the EGI, 18-36 workers would likely be required from the local area, and a further 19-31 workers from elsewhere in the province.

Table 6.7: Employment per area during construction of each solar facility

	Construction workers			
	Highly skilled	Medium skilled	Low skilled	Total
Per 100–240MW Solar Facility				
Anticipated % of workers from the local municipal area	2%	30%	60%	
Number from the local municipal area	1 - 2	33 - 54.6	66 - 109	100 - 166
Anticipated % of workers from the rest of the province	23%	40%	40%	
Number from the rest of the province	13 - 21	44 - 72.8	44 - 72.8	101 - 167
Anticipated % of workers from the rest of South Africa	65%	30%	0%	
Number from rest of SA	36 - 59	33 - 54.6	0 - 0	69 - 114
Anticipated % of workers from overseas	10%	0%	0%	
Number from overseas	6 - 9	0 - 0	0 - 0	6 - 9
Total	55 - 91	110 - 182	110 - 182	275 - 455

Table 6.8: Employment per area during construction of EGI

	Construction workers			
	Highly skilled	Medium skilled	Low skilled	Total
EGI				
Anticipated % of workers from the local municipal area	0%	0%	80%	
Number from the local municipal area	0 - 0	0 - 0	18 - 36	18 - 36
Anticipated % of workers from the rest of the province	50%	50%	20%	
Number from the rest of the province	4 - 6	10 - 16	5 - 9	19 - 31
Anticipated % of workers from the rest of South Africa	40%	50%	0%	
Number from rest of SA	3 - 5	10 - 16	0 - 0	13 - 20
Anticipated % of workers from overseas	10%	0%	0%	
Number from overseas	1 - 1	0 - 0	0 - 0	1 - 1
Total	8 - 12	20 - 31	23 - 45	51 - 88

Direct household income impacts would flow from all wages paid during construction. These were estimated by multiplying the projected number of direct jobs associated with the project above by assumed average monthly salaries for each skill category (i.e. R8,000 for low skilled, R35,000 for medium skilled and R80,000 for highly skilled employees). Again, these estimates are to be treated as indicators. The results of this exercise in the tables below indicate that incomes flowing to workers would be between R9.1 million and R15.1 million for each solar facility (R36.5 million–60.4 million for all four) and R1.5-3.2 million for the EGI.

Table 6.9: Monthly household incomes during construction of each solar facility

	Direct incomes during construction (R'000)				% of total
	Highly skilled	Medium skilled	Low skilled	Total	
Per 100–240MW Solar Facility					
Workers from local municipality area	R 88 - R 146	R 1 155 - R 1 911	R 528 - R 874	R 1 771 - R 2 930	19%
Workers from the rest of the province	R 1 012 - R 1 674	R 1 540 - R 2 548	R 352 - R 582	R 2 904 - R 4 805	32%
Workers from the rest of SA	R 2 860 - R 4 732	R 1 155 - R 1 911	R 0 - R 0	R 4 015 - R 6 643	44%
Workers from overseas	R 440 - R 728	R 0 - R 0	R 0 - R 0	R 440 - R 728	5%
Total	R 4 400 - R 7 280	R 3 850 - R 6 370	R 880 - R 1 456	R 9 130 - R 15 106	100%

Table 6.10: Monthly household incomes during construction of the EGI

	Direct incomes during construction (R'000)				% of total
	Highly skilled	Medium skilled	Low skilled	Total	
132kV gridline					
Workers from local municipality area	R 0 - R 0	R 0 - R 0	R 147 - R 288	R 147 - R 288	9%
Worker from the rest of the province	R 320 - R 480	R 350 - R 543	R 37 - R 72	R 707 - R 1 095	34%
Workers from the rest of SA	R 256 - R 384	R 350 - R 543	R 0 - R 0	R 606 - R 927	29%
Workers from overseas	R 64 - R 864	R 0 - R 0	R 0 - R 0	R 64 - R 864	27%
Total	R 640 - R 96	R 700 - R 1 085	R 184 - R 360	R 1 524 - R 3 173	100%

In addition to the above direct employment and associated income opportunities, a significant number of temporary indirect opportunities would also likely arise from the projects. These would stem primarily from expenditure by the project in the local area and region as well as expenditure by workers hired for the construction phase.

6.3.2. Operational phase impacts

Once established, the operation of the solar facilities would result in direct and indirect economic opportunities over a 20-year period. These are quantified in this section. Note that while the operational expenditure and employment associated with the EGI would also provide some stimulation of the economy, these effects have been estimated to be relatively small and have not been quantified.

Positive benefits would stem from expenditure on the operation of the solar facilities including expenditure on employees that would not otherwise have occurred, particularly in the local area. It is anticipated by the applicant that between R36.7 million and R52 million would be spent annually on operations for each solar facility (R147 million–R208 million for all four), escalating in line with inflation (see Table 6.11).

Table 6.11: Preliminary estimate of annual operational expenditure

Operational cost categories	Annual costs once plant is fully operational in 2022 Rands	
Per 100–240MW Solar Facility		
Salaries and wages	R 10 500 000	- R 12 000 000
Municipal services	R 8 400 000	- R 10 000 000
Outsourced engineering services	R 3 150 000	- R 14 000 000
Sundry supplies	R 3 675 000	- R 4 000 000
Insurance	R 3 675 000	- R 4 000 000
Other	R 7 350 000	R 8 000 000
Total costs once fully operational	R 36 750 000	- R 52 000 000

The local area would benefit primarily from payments towards municipal services (20%), salaries and wages (5%), and other costs which are yet to be defined in more detail by the eventual operator of the facilities. Most of the total expenditure is anticipated to occur within the Western Cape. The direct provincial economic impact from expenditure includes 70% of all salaries and wages, 80% of municipal services, 60% of outsourced engineering services and 69% of sundry supplies (see Table 6.12).

Table 6.12: Likely location of expenditure during operations

Operational cost categories	% of total costs that would go to local suppliers within 50km	% of total costs that would go to suppliers in the rest of the Western Cape	% of total costs that would go to suppliers in the rest of South Africa	% of total costs for imports
Per 100–240MW Solar Facility				
Salaries and wages	5%	70%	20%	5%
Municipal services	20%	80%	0%	0%
Outsourced engineering services	0%	60%	40%	0%
Sundry supplies	2%	69%	29%	0%
Insurance	0%	0%	100%	0%
Other	25%	25%	25%	25%

With regard to direct employment during the operation phase, Table 6.13 outlines what should be expected. It is anticipated that between 21 and 37 direct employment opportunities would be created

by each solar facility (84–148 jobs² for the solar facilities), with the spread across skill levels shown in the table.

Table 6.13: Employment associated with operations

Employment categories	Number of employees				Likely annual salary per
	Highly	Medium	Low skilled	Total	
Site manager	1 - 1	0 - 0	0 - 0	1 - 1	R 1 000 000
Maintenance engineers	3 - 5	1 - 3	0 - 0	4 - 8	R 540 000
Maintenance workers	1 - 2	4 - 8	2 - 4	7 - 14	R 300 000
Security	0 - 0	1 - 1	5 - 8	6 - 9	R 80 000
Cleaning	0 - 0	0 - 0	3 - 5	3 - 5	R 65 000
Total	5 - 8	6 - 12	10 - 17	21 - 37	

The majority of jobs are in maintenance (33%), followed by security (29%), engineering (19%), cleaning (14%) and site management (5%) (shown in Figure 6.4)

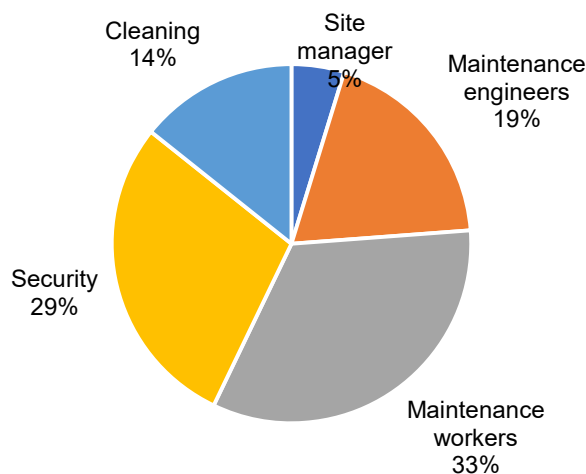


Figure 6.4 Proportion of total employees in each employment category

It is anticipated by the applicant that for each solar facility, between 15 and 27 jobs (roughly 70% of available opportunities) would go to residents of the local community (see Table 6.145.14). Bidders in the REIPPPP are required to allocate a minimum of 20% and a target of 50% to citizens residing in local communities. Available skills dictate that the majority of the high skill positions will initially be filled by people from outside the local area and province in some cases. It should be possible and desirable to give preference to locals in the majority of medium skill and all low skill positions, but it should be noted that this could prove challenging due to skills shortages and other socio-economic challenges faced by communities in the area as outlined in Section 4.

² Given economies of scale and the potential for certain jobs to cover multiple solar facilities, the lower end of this range is probably more likely when considering only direct jobs)

Table 6.14: Operational employment per area

	Operational workers			
	Highly skilled	Medium skilled	Low skilled	Total
Wind farm				
Anticipated % of workers from the local municipal area	5%	80%	100%	
Number from the local municipal area	0 - 0	4.8 - 9.6	10 - 17	15 - 27
Anticipated % of workers from the rest of the province	40%	15%	0%	
Number from the rest of the province	2 - 3	0.9 - 1.8	0 - 0	3 - 5
Anticipated % of workers from the rest of South Africa	54%	5%	0%	
Number from rest of SA	3 - 4	0.3 - 0.6	0 - 0	3 - 5
Anticipated % of workers from overseas	1%	0%	0%	
Number from overseas	0 - 0	0 - 0	0 - 0	0 - 0
Total	5 - 8	6 - 12	10 - 17	21 - 37

Aside from these direct employment opportunities, the operational expenditure on the project (detailed above) and the spending of those employed directly would result in positive indirect impacts on the local and regional economy. Essentially those that secure jobs on the project would spend some portion of their increased income on local goods and services generally purchased by households. This would benefit those businesses where the money is spent.

In terms of agricultural incomes on the site, previously conducted interviews suggest that the negative impact of the project on agricultural productivity should be negligible. While a small area of grazing land would be lost, this area is relatively inconsequential in terms of productivity, given the extensive nature of farming in the area, with each small livestock unit requiring in the region of 10 ha grazing land. Farmers would also gain significant additional income from the project particularly when compared to the quantum and reliability of income from farming. This would assist in diversifying their income and they may use the additional income for re-investment in agricultural operations.

In line with the above findings, the Agricultural Specialist Studies for the Solar Facilities and for the associated EGI both conclude that the development poses a very low threat to agricultural production potential (Lanz, 2022a; Lanz, 2022b). The study focused on the solar facilities goes so far as to conclude that the site has no crop production potential (Lanz, 2022b).

The potential for the project and other future solar energy projects to result in greater impacts on local economies and the South African economy as a whole is primarily dependent on economies of scale. Currently, import content is necessarily high. However, as the solar energy programme grows in size (aided by the projects) it should provide opportunities for manufacturing and servicing at scale and the additional benefit that would flow from it. The intention of the DMRE is also clearly in this direction and it has gradually increased local content targets with this in mind.

6.3.3. Decommissioning phase impacts

Activities associated with the decommissioning of the project at the end of its design life would create somewhat less, but essentially similar, opportunities as the construction phase in terms of temporary local employment and other income opportunities. Note that operational phase impacts were assessed under the assumption that they would cease after 20 years and that the impacts of decommissioning consequently do not include a consideration of the withdrawal of the project's operational phase benefits from the economy.

6.3.4. Cumulative impacts

Assessment of cumulative impacts considered Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taaibos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors. Drawing on the socio-economic impact assessments for these projects where available, and using industry averages for those without estimates, cumulative expenditure has been estimated and is shown in Table 6.15. Cumulatively the projects would generate R38–46 billion in construction expenditure, of which R157–239 million would accrue to construction workers. During the operations phase, the WEFs and SEFs would collectively spend R1.2–1.4 billion per year on operational costs, as well as a further R48–53 million on socio-economic development. The cumulative annual operational spend would be equivalent to 53% of BWLM’s Regional Gross Domestic Product (RGDP) and 37% of CKDM’s RGDP. Note however that only a portion of operational expenditure would occur within the local and regional areas in accordance with REIPPPP requirements, with most of the impact likely to be experienced at the provincial level in the case of the Mura Development. References to local RGDP therefore serve as an indicator of the potential for the project to be highly significant at the local level should efforts to promote localised expenditure, for example those mentioned in the mitigation section, prove successful.

Table 6.15 Cumulative expenditure estimates

Category	Expenditure (R million)	
	Minimum	Maximum
Construction and decommissioning phases (once-off each)		
Total expenditure	R 38 102	- R 46 522
Total incomes	R 157	- R 239
Operational phase (annual)		
Operational expenditure	R 1 176	- R 1 350
Socio-economic development	R 48	- R 53
Total	R 1 224	- R 1 404
Region	RGDP	Cum. annual op spend as % of RGDP
BWLM	R 2 231	53%
CKDM	R 3 173	37%
Western Cape	R 648 830	0.2%

Cumulatively, the projects would generate 2,886–4,431 temporary jobs during construction (most of these being 18–24 months in duration). During the operations phase, between 378–573 full-time jobs would be generated, of which 244–370 jobs would accrue to residents of the local area. For reference, the number of jobs which would accrue to locals represents about 2–3% of the total jobs in BWLM as of 2019.

Table 6.16 Cumulative employment estimates

Employment category	Jobs	
	Minimum	Maximum
Temporary jobs during construction	2 886 -	4 431
Permanent, full-time operational jobs	378 -	573
Of which go to locals	244 -	370
Total jobs in BWLM (2019)	12 552	
New local jobs as proportion of total	2% -	3%

Positive cumulative impacts are also likely to stem from the fact that the project should set a positive precedent for further investment in the area. By committing to investment in large developments, the applicants would be casting a strong ‘vote of confidence’ in the local economy. This has the potential to influence other investors (including locals) to also act with similar confidence thereby resulting in cumulative impacts on overall investment levels.

6.4. Impacts associated with the funding of local socio-economic development, enterprise development and shareholding

6.4.1. Operational phase impacts

The applicant intends ensuring that as large a portion of the proceeds as feasible from the project contributes to local socio-economic development. This is in keeping with the requirements of the REIPPPP bidding process in which significant contributions to economic development are mandatory for all bidders, and the evaluation of bids is weighted towards a 90% emphasis on competitiveness in terms of price and 10% emphasis on socio-economic development criteria. The sixth bidding round documentation was released in 2022. Bidding criteria involve projects needing to specify key socio-economic ‘thresholds’ (i.e. minimum requirements that must be met) and ‘targets’ (i.e. amounts that should be aimed for in order to increase the chances of a successful bid). These are outlined in the Economic Development Scorecard associated with the REIPPPP bidding process of 2022 (see Appendix C). They included the following categories of contribution:

1. A minimum/threshold of 1.1% and a target of 1.5% of annual revenue to be committed to Socio-economic Development Contributions in the local community.
2. A minimum/threshold of 0.6% and a target of 1.0% of annual revenue should be earmarked for Enterprise Development.
3. A minimum/threshold of 2.5% and a target of 5% of the shares in the project to be reserved for the local community.

The bidding process of 2021 turned out to be highly competitive, with some projects opting to invest amounts greater than the targets outlined above in order to have their project selected (Magoro, 2021). These systems and practices help ensure that project benefits are distributed to the impacted communities.

To estimate the amount that is likely to be spent by the applicant on the three categories outlined above, annual revenue and profit was estimated (based on highly preliminary calculations). Contributions were then estimated based on the 2022 thresholds, with the results outlined in Table 6.17. These figures suggest that a minimum of R6–R7 million could be spent per annum on socio-economic development contributions, local community shareholding and enterprise development combined for a 100MW SEF (R9–11 million for a 240 MW SEF).

The previous regulations, while specifying requirements for the amounts that needed to be spent over the full duration of contracts, did not specify timeframes for this spending within project life cycles. The decision not to specify requirements in this regard has resulted in an incentive for operators to concentrate their spending in the later stages of project life cycles. It is not yet clear whether the future rounds after round six of the REIPPPP process will specify requirements for the timing of local development spending or what the threshold requirements will be.

Assuming a linear pattern of spending on socio-economic development, the total amounts that are likely to be spent over the 20-year project timeframe are expressed in Table 6.17. These net present values (NPVs) were estimated by discounting future annual contributions using a range of discount rates from 0% (i.e. no discounting) to 3.5%. The results of discounting at 2.5% are recommended as the most realistic base case and reflect the recent real (i.e. after inflation) returns on 10-year government savings bonds³. They indicate that if all future fund flows are evenly spread over the operations period, they would have a present value of R94–115 million for a 100MW facility and R140–173 million for a 240 MW facility (i.e. one would need to have this magnitude of funds available for investment today in order to be able to receive, as an annuity, the annual amounts of fund flows). This is a substantial flow of funds and, assuming good fund management and project selection, it has the potential to result in the creation of significant economic opportunities in the local area.

Table 6.17: Potential funding flows to socio-economic and enterprise development initiatives

Contribution category	Minimum/threshold amounts to accrue to the local community per annum smoothed over lifetime of project*			
	100 MW		240 MW	
Socio-economic Development Contribution	R 3 300 000	- R 4 400 000	R 4 950 000	- R 6 600 000
Local Community Shareholding	R 900 000	- R 1 200 000	R 1 350 000	- R 1 800 000
Enterprise Development Contribution	R 1 800 000	- R 1 800 000	R 2 700 000	- R 2 700 000
Total	R 6 000 000	- R 7 400 000	R 9 000 000	- R 11 100 000

Discount rate	Net Present Value of all minimum/threshold annual funds accruing to the local community discounted over 20 years			
	100 MW		240 MW	
0%	R 120 000 000	- R 148 000 000	R 180 000 000	- R 222 000 000
1.5%	R 103 011 833	- R 127 047 927	R 154 517 749	- R 190 571 891
2.5%	R 93 534 974	- R 115 359 801	R 140 302 461	- R 173 039 701
3.5%	R 85 274 420	- R 105 171 784	R 127 911 630	- R 157 757 677

**This amount is purely indicative and there will not necessarily be spending in every year. Timing of spending will be dependent on REIPPPP requirements at the time of bidding.*

6.4.2. Cumulative impacts

Similar to the case of project expenditure, the total cumulative funding of local socio-economic and enterprise development associated with all four Hoogland projects as well as all three Nuweveld projects would generate a substantial amount of economic activity. Combined minimum investment would be in the region of between R30.7 million – R34.0 million in the average year during operation.

³ Discounting is necessary as money received one year from now is worth less in today's terms due to positive real interest rates – e.g., one would need to invest less than R1000 today in order to have the equivalent of R1000 one year from now assuming positive real interest rates or investment returns (i.e. returns that exceed inflation).

6.5. Impacts associated primarily with the influx of people

Potential impacts of the influx of people have been assessed in detail as part of the social specialist studies for other renewable energy projects in small communities the findings of which are drawn on here (see Barbour and van der Merwe, 2012 and van Zyl and Barbour, 2014 in particular). Barbour and van der Merwe note that while the presence of construction and other workers does not in itself constitute an impact, the manner in which workers conduct themselves can affect the local community and lead to increased social ills. They also make the observation that likely impacts are related to the number of employment opportunities that would go to non-locals and how the recruitment process is managed. This view was echoed by some of the surrounding landowners who were interviewed.

Note that there is some potential for overlap between this section and Section 6.7 which deals with impacts on landowners and communities. In order to limit overlap, this section focuses on impacts associated with increased risk of social ills in the wider community and potential strain on services (municipal and accommodation) stemming from 'new' people coming to the area including those who have already secured employment as well as job-seekers hoping to find work at the project or in other businesses which may grow as a result of it.

6.5.1. Construction phase impacts

Community concerns are common, especially in smaller communities, regarding the negative impacts associated with an influx of outside workers particularly during the construction of large projects. These concerns include those associated with negative impacts on social structures and increased 'social ills' such as increased crime levels, increased alcohol and drug use, increased teenage and unwanted pregnancies, increased prostitution and increases in sexually transmitted diseases (STDs such as HIV). These types of impacts are more commonly associated with the influx of people looking for work without success but can also be associated with workers that do find work. As previously mentioned, the applicant has indicated that they are committed to implementing a 'locals first' employment policy where possible as per REIPPPP requirements. It is likely that a significant proportion of workers would be sourced locally especially low and medium skilled workers. These workers would already be part of the local community and its social structures thereby reducing the risk posed by influx.

Another potential issue raised is that the influx of workers from outside the area during construction may overwhelm towns in the area in terms of available accommodation. As outlined in Section 6.3, the construction phase will create between 275 and 455 jobs for an 18-24-month period for a SEF of between 100 and 240 MW in size. Of these jobs, the applicant estimates that between 175 to 389 will be filled by people from outside of the local municipality and who are likely to require accommodation for each SEF. According to the estimated phasing of projects, a maximum of three SEFs would be constructed simultaneously, requiring a maximum of between 525 and 1,167 construction workers in years three and four of the combined development. As part of the assessment of tourism impacts for the wind farms and gridlines it was estimated that Beaufort West and surrounds probably has at least 800 to 1200 beds available and there is additional accommodation in Fraserberg, Loxton and Victoria West. It therefore stands to reason that the area will be able to accommodate construction workers, but that demand from construction would likely be strong with implications for the pricing of tourism establishments.

The potential for strain on municipal services is also relevant for the construction phase but is a relatively greater risk during operations and is therefore discussed in the following section.

6.5.2. Operational phase impacts

One of the ways in which an influx of people can impact a municipality is through the additional strain they place on the provision of municipal services. This is especially true of job seekers who do not end up finding work, as they will be less likely to contribute to municipal finances through payments for services. Those who do find work, or who relocate to the area because they have been offered a job, are more likely to have a net positive impact on municipal finances, thus allowing the municipality to scale-up services provision as demand increases. In this case there does not seem to be a high likelihood of significant strain on municipal services resulting from the project. Solar Facilities are not commonly known to provide large numbers of operational-phase employment, and the nature of the jobs tend towards more skilled profiles. Therefore, the likelihood of people relocating to the area in great numbers, when it is understood that there are relatively few positions available which will mostly need to be filled by qualified individuals, is considered low.

6.5.3. Decommissioning phase impacts

Decommissioning would be very similar to construction phase impacts, although it may use slightly less labour and be of a shorter timeframe. Impacts resulting from workers who are employed as part of the decommissioning phase would thus be largely similar to those experienced during construction. Note that it stands to reason that the two phases would differ in terms of the number of job seekers who would likely be attracted to the area on the prospect of finding work. Newly proposed projects attract people seeking to benefit from them in terms of finding employment in either the construction or operations phases. Since the decommissioning phase would signal no further longer-term opportunities, the appeal of perceived opportunities would be lower than for the construction phase.

6.5.4. Cumulative impacts

The cumulative impact associated with Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taabos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors going ahead over a period of several years would be an increase in the likelihood of a larger influx of people to the area whether they have jobs secured or are job seekers. This would result in a higher risk of social problems associated with influx particularly during construction.

In terms of adequate accommodation, as indicated in Section 6.3, between 175 and 289 construction employment opportunities are likely to be filled by people from outside of the local municipality per solar facility. As per indicative phasing, up to three solar facilities could be built at a time, resulting in a housing demand for 525–867 workers⁴. In addition, for the EGI grid connection, between 33 and 52 construction jobs are likely to be filled by people from outside of the local municipality who are thus likely to require accommodation⁵. As Beaufort West probably has at least 800 to 1200 beds available for accommodation and there is additional accommodation in Carnarvon, Loxton and Victoria West, it is expected that adequate accommodation will be available. With adequate forewarning, it is also likely that businesses will respond to the opportunity and add accommodation stock if needed.

⁴ If the jobs filled by outsiders associated with the Nuweveld projects and the Hoogland Projects are added to this, the maximum cumulative figure is 1,253–1,770 new people in the area. However, this is considered unlikely given that the Nuweveld and Hoogland projects are further along in the project planning phase, with Nuweveld more advanced than Hoogland.

⁵ Adding the EGI for the Nuweveld and Hoogland Developments to the equation, the cumulative number of outsider construction positions associated with the gridlines of these projects is 69–105 people, but again this is unlikely as construction is more likely to take place in a staggered approach, thereby reducing the amount of simultaneous logistics support required at any point in time.

In terms of the social impacts resulting from multiple, simultaneous developments, some of the stakeholders interviewed expressed concern that smaller towns in the area would experience a substantive change in their sense of place if there were multiple projects being developed in their vicinities. These views were often related to stakeholders' experience thus far with oil, gas and uranium exploration in the area, as well as with the construction of the Square Kilometre Array (SKA) telescope project in the wider region. These experiences were validated to some degree by interviews with municipal representatives, who confirmed that communication between project managers and other stakeholders in the area had been historically poor, with the result that local government, civil society and communities had been inadequately positioned to respond to either the negative or positive impacts of these projects.

6.6. Impacts on tourism

Tourism is a key sector and has the potential to play an increasingly prominent role as a driver of economic development. It is thus important to consider the potential impacts of the project on this sector. The assessment of impacts on tourism was based on the following:

- Information on current tourism use and potential focusing on the area surrounding the site.
- A review of the literature on the impact of wind farms on tourism.
- Pertinent information from other specialist studies - the Visual Impact Assessment (VIA) and Heritage Impact Assessment (HIA) were most relevant in this regard.
- Comments from Interested and Affected Parties received during the PPP.
- Own observations, experience in assessing other similar projects and inputs from stakeholders including the local tourism organisation.

The focus of assessment was on gauging overall tourism impacts. This overall assessment was, however, partially informed by a consideration of risks to selected known and more prominent individual tourism establishments or facilities (this does not imply that there are absolutely no other tourism establishments in the area nearby the site). Although the primary focus was on tourism risks, the project's potential to result in positive impacts on tourism was also assessed.

6.6.1. The tourism context

Information on current tourism use and potential was gathered using planning documents for the district and local municipalities, interviews with the local tourism organisation and other stakeholders, own observation and accommodation search websites including SafariNow, AirBnB, Lekkeslaap and Google. The primary overall tourism appeal of the area lies in its isolated nature. Views are characterised by open landscapes with few signs of civilisation, reflective of the Karoo's reputation as a very sparsely populated, quiet place. The Karoo is sometimes referred to as "Die Niks" – an Afrikaans phrase meaning "The Nothing", which is suggestive of the level of isolation that one experiences when travelling through parts of the Karoo such as the area concerned.

The project site includes only one tourism establishment called Boiskraal Farm Stay. Boiskraal is owned by Andrew Jack and will primarily be affected by the EGI corridor, given that this land was removed as a potential solar facility site during screening. The Figure below shows the site in relation to selected known surrounding tourism establishments and facilities. Table 6.18 provides a brief profile of these establishments which tend to be smaller and offer activities such as hiking, birdwatching, mountain biking and hunting. Compared to Boiskraal, the other tourism establishments listed are relatively far from the project site.



Source: Project team; Google Earth

Figure 6.5 Map showing the study site and identified prominent tourism establishments

Table 6.18 Tourism facilities profile and distance from project components

Name of tourism facility	Number of units / rooms	Number of beds	Distance from				
			Mura 1	Mura 2	Mura 3	Mura 4	EGI
Accommodation							
Booskraal Farm Stay	1 farm house	7	9	9	5	3.5	1
Riverine Rabbit Retreat	1 farm house	10	14.5	14.5	24	23	12
Other							
De Putten Jag	N/A	N/A	23	23	14	14	14
Wagenaarskraal Heritage Museum	N/A	N/A	28	28	19	19	19

In addition to specific tourist facilities, correspondence with a representative of the Beaufort West Tourism Organisation (BWTO) has revealed that there has been sustained demand for self-drive tourism since the COVID-19 pandemic, with domestic tourists spending time exploring rural areas. There has also been continued demand for off-road motorbike tourism. In response, the BWTO has published a map called “Roads less travelled in the Karoo”, which outlines five scenic routes in the Beaufort West area, highlighting attractions and accommodation options. An excerpt from this map is shown in Figure 6.6. This excerpt shows that there are three routes that use the R381 between Beaufort West and Loxton. These include the Aardwolf Loop, the Meerkat Loop and the Porcupine Loop. While these routes are relatively undeveloped at present, BWTO will continue promoting them and there is some potential that the area could see some growth in tourism relative to the baseline which is modest but important to some landowners who rely on the sector for much needed income, especially in times when agricultural incomes are low due to drought. BWTO has been in the process of developing a website in 2022 to further promote local tourism (S. Klemm, pers com).



Source: BWTO, 2021

Figure 6.6 Excerpt from the Roads less travelled in the Karoo tourism map, focus on R381

A photograph taken from the meerkat/porcupine loop is shown below. The closest part of the route runs in an east-west direction roughly 3–4km south of both the SEF facilities. The EGI corridor would cross this route twice, the eastern-most crossing being in the vicinity of where the photograph below was taken.



Figure 6.7 Photograph taken from a scenic route on the south-western corner of the project area between the R381 and Booiskraal

Booiskraal Farm Stay would likely be the only accommodation facility where infrastructure would potentially be visible. However, this visibility would largely be determined by the specific siting, particularly of the EGI corridor which is planned for 1km away at its closest boundary. The figure below shows that the accommodation is surrounded by trees and in a lower part of the valley than the area outlined for development of the EGI.



Figure 6.8 Photographs taken from Booiskraal Farm Stay facing north-west (image on left is wide-angle)

Booiskraal is a relatively small accommodation facility, catering to guests who are attracted by the quiet area with its natural charm. Guest activities include birdwatching, hiking and scenic drives. The farm used to be used for hunting, and while game numbers are not currently high enough to sustain hunting, the owners hope that recent rainfall, if sustained, will result in higher populations that can support hunting once more. The owner estimates that Booiskraal currently accounts for less than 10% of overall income, the remainder coming from sheep farming. The capacity for the guesthouse to generate revenue was not seen to be at risk from the development and the owner indicated that the

net impact on accommodation demand could potentially be positive, given increased demand for accommodation by contractors for the project or for other renewable energy projects in the area.

Guests staying at the Riverine Rabbit Retreat would not likely see the project site from the accommodation site. However, the project could potentially be visible from other scenic points. For example, one respondent noted that while his tourism establishment, the Riverine Rabbit Retreat would be sufficiently shielded from the SEFs and EGI, there would still be areas on Quaggafontein (where RRR is located) where the facilities and infrastructure could be visible, particularly from a viewpoint located south-east of the RRR. The figure below shows that Quaggafontein is located south-west of the project site, approximately ~3.3km from the powerline corridor using the nearest boundaries (but further from the above-noted sensitive view-point, which is approximately ~10km away). Views of the project site would therefore be confined to specific points in the surrounding landscape and the project would not likely be a prominent feature, given the distances concerned).



Figure 6.9 Quaggafontein and the Riverine Rabbit Retreat in relation to the project site

6.6.2. Specialist findings and key considerations

The Visual Impact Assessment (VIA) sums up the sense of place of the area as follows: “The flat-topped hills and dolerite ridges are a characteristic feature of the Great Karoo in an otherwise fairly featureless, parched landscape, an area noted mainly for its empty, uncluttered landscapes, stillness, red sunsets, dark nights and starry skies.

“The most scenic areas tend to be the dolerite koppies and the river courses, particularly in the vicinity of Leeukloof and Booiskraal...” (Lawson and Oberholzer, 2022)

The VIA describes the project's potential visual intrusion on scenic resources and sensitive receptors, noting that this impact will occur in the context of a rural landscape with a pastoral character. The impact is rated as moderate both with and without mitigation during the operational phase. During construction and decommissioning, this impact is rated as moderate without mitigation and low with mitigation. The VIA provides a separate rating for the impact of new access roads and construction camps, which are rated as having a low impact both with and without mitigation. The VIA does not assess visual impacts related to the EGI.

In terms of sensitive receptors, the VIA mentions scenic routes as well as Booskraal Farm Stay, which is noted as having low visibility of the proposed project, due to its being located in a view shadow. Bultfontein is the only farmstead identified as having moderate visibility, but this is not a tourism establishment. The VIA concludes that the current design and layout of the proposed development reflects an iterative process in which the mapping of scenic resources allowed for the avoidance of highly sensitive receptors. It concludes that the project may be authorised from a visual impact standpoint.

The Heritage Impact Assessment lists items identified in a heritage survey conducted in the project area, including stone-walled farmsteads, houses, and ruins as well as agricultural implements and scattered archaeological artefacts. "The most significant concern is a large, ruined farm complex located midway along the Mura 3 and Mura 4 access road at a point where there is a fairly sharp bend in the road. The most important features are all on the outside of the bend, however, and will thus not be affected if the bend needs to be changed." (Orton, 2022: 35). The VIA concludes that the project should be approved but that it should be subject to mitigation, including the avoidance of particular buffer areas and further approvals by archaeologists at key points in the construction phase (Orton, 2022)

6.6.3. Construction phase impacts

Aside from impacts driven primarily by visual and heritage changes, construction phase impacts would be driven by temporary changes and disruptions. These include the following which are discussed in Section 6.7 given their greater relevance to impact on surrounding landowners:

- Deterioration of local roads
- Increased traffic on roads that are ordinarily quiet
- Greater risk of increased dust levels
- Increased risk of crime such as stock theft and poaching
- Increased littering
- Increased potential for veld fires

These would essentially reduce the appeal of the local area as a tourist destination, particularly in a place ordinarily characterised by tranquillity. These impacts would be experienced to a varying degree over the 18-24-month construction period.

6.6.4. Operational phase impacts

Experience from other SEF and related EGI assessments indicate that instances where solar farms are most likely to result in negative impacts on tourism are those where they are situated in areas with a clear wilderness quality with little or no signs of development in the form of infrastructure such as power lines and major roads. The conclusions of the VIA and HIA confirm that the project site and

surrounds have this quality and that impacts would be significant on the cultural landscape which will have consequences for the sense of place and attraction associated with the area. The VIA rates impacts to the cultural landscape as moderate negative, both during construction and operations. However, the VIA and HIA reports also note that these impacts will be localised and isolated from major routes, owing to the iterative design process which has already accounted for some sensitive receptors.

Tourism facilities and attractions in the areas surrounding the project site are very limited and sparsely distributed. Of the tourism establishments identified, only one is closer than 5km from any of the solar farm boundaries: Booiskraal Farm Stay (3.4km from Mura 4 and 5km from Mura 3). However, the VIA notes that Booiskraal will have a low visibility of the solar facilities as this tourism establishment is located in a view shadow (Lawson and Oberholzer, 2022). The other tourism establishments identified were not found to have high exposure to the SEFs or to the EGI corridor, given that they are all 10km from the nearest boundary.

In addition to the above establishments, the Aardwolf Loop, the Meerkat Loop and the Porcupine Loop are scenic drives which would be more directly impacted by one part of the development, specifically the EGI corridor, which would cross these routes at two points. Some places along these scenic drives, as well as along hiking trails in the area, would experience a change in the view and in the sense of place (refer to the VIA for details – Lawson and Oberholzer, 2022).

In addition to visual impacts, other notable changes from a tourism perspective would include more traffic on the roads and more people working in the area. These would all contribute to a change in the area's sense of place and tourist appeal.

The positive impacts resulting from an increase in business-related tourism will mostly have been covered in Section 6.3, as they will have been included in the estimates of the expenditure which will result from the proposed project, some of which will go towards accommodation and other expenses incurred by the company for contractors and employees visiting the project site. Other positive impacts would be more indirect as trips for work purposes can lead to an extended stay or lead to return visits for leisure when project personnel are exposed to the attractions of the area and the wider country. Personnel may also recommend the area to others as a tourist destination.

6.6.5. Decommissioning phase impacts

Decommissioning would be similar to construction phase impacts, although it may use slightly less labour and be of a shorter timeframe and relative intensity. Impacts of the phase would thus be similar but less than those experienced during construction from disruption and other nuisance factors such as increase dust levels etc.

6.6.6. Cumulative impacts

The VIA notes that in terms of cumulative impacts, “[o]nly parts of the Nuweveld WEF would potentially be seen in combination with the proposed Mura solar projects, although the nature of the topography would largely screen these projects from each other”. Given this limited inter-visibility between projects, the VIA rates the cumulative visual impact significance of the solar facilities as moderate negative. The VIA further rates the cumulative impact of access roads as neutral given that they would form part of the existing road network (Lawson and Oberholzer, 2022).

The Heritage Impact Assessment found that “Cumulative impacts to the landscape are likely to be moderate negative both before and after mitigation for both the construction and decommissioning

phases. The operation phase impact significance could potentially be high negative before mitigation but with a slight reduction in intensity after mitigation this drops to moderate negative” (Orton 2022).

The cumulative impact associated with Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taaibos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors going ahead at the same time would be an increase in tourism risk but also tourism opportunities from business tourism, particularly during construction. However, it is highly unlikely that all of these developments would go ahead at the same time, as the applicant responsible for all of these projects except for Taaibos and Soutrivier has indicated that construction would more likely occur in a staggered way so as to spread the effort over the distinct 18–24 months construction period planned for these projects.

6.7. Impacts on surrounding landowners and communities

As is often the case with large projects, concerns are usually raised by surrounding landowners and communities that relate to potential negative impacts associated mainly with greater activity nearby and the presence of workers on the site particularly during construction.

6.7.1. Construction phase impacts

During the construction phase, impacts on surrounding landowners and communities would largely result from:

- Increased risk of crime such as stock theft and poaching
- Damage to farm infrastructure such as fences
- Increased littering
- Increased potential for veld fires
- Greater risk of increased dust and noise levels
- Safety concerns associated mostly with presence of large trucks and machinery
- Deterioration of local roads

Experiences with the presence of construction workers associated with the Eskom sub-stations and transmission lines in the area, as well as with other large projects, have made landowners particularly wary of the risks that come with the introduction of a significant labour force into the area. More people in farming areas are seen as a risk factor for trespassing, theft, damages to farm infrastructure and equipment, littering along with veld fires. Some of these potential impacts can also lead to changes in the sense of place, which is discussed in Section 6.6 and elaborated on below under operational phase impacts.

The increased volume of project-related traffic in the area is likely to affect surrounding communities. The Traffic Impact Assessment (TIA) notes that most of the traffic delivering equipment and material to the proposed developments is anticipated via the town of Loxton. While routes further to the south could potentially be used in the transport of personnel, the TIA warns of the risks associated with the use of Molteno Pass and De Jagers Pass in their current form, given that they have very few barriers, steep drop-offs, very tight corners, negative banking and loose gravel. The TIA recommends that the developer addresses these risks in conjunction with the local road authority, which would serve to mitigate potential impacts both on construction personnel and members of the local community. During construction, the TIA identifies impacts related to increased road incidents, road degradation, dust and intersection safety, all of which are rated as moderate negative both with and without mitigation, except for dust which has been rated low with mitigation.

6.7.2. Operational phase impacts

The operations phase would also be associated with relatively similar issues to those assessed for the construction phase albeit over a longer time-period and of a lower intensity.

One of the most substantial changes will be to the sense of place. One neighbouring landowner previously commented that the area is characterised by clusters of houses most of which are not visible to one another, creating a sense of solitude and isolation. There are very few trees in the landscape and little movement can be seen. The proposed development would lead to a change in the sense of place experienced throughout the study site as well as the surrounding landscape. This would occur through changes in the visual character of the area, as well as through a marked increase in activity in the area, which would result in visual and heritage impacts such as those discussed in Section 6.6 on tourism.

The presence of more people in the local area during the operations phase was raised as a concern by some landowners in the area as for the construction phase. These included increased risk of crime such as stock theft and poaching, damage to farm infrastructure such as fences, increased littering, increased potential for veld fires, greater risk of increased dust and noise levels, safety concerns and deterioration of local roads. Impacts associated with these concerns are likely to be of a similar but less intense in nature than for construction.

6.7.3. Decommissioning phase impacts

Decommissioning would be similar to construction phase impacts, although it may use slightly less labour and be of a shorter timeframe and relative intensity. Impacts of the phase would thus be similar to those experienced during construction from disruption and other nuisance factors such as increase dust levels, increased risk of crime, etc.

6.7.4. Cumulative Impacts

Assessment of cumulative impacts considered Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taaibos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors. The assessment partially draws on the findings of other specialist studies including the TIA which found that cumulative impacts in terms of increased road incidents, road degradation and intersection safety would be moderate negative with mitigation during construction. During operations, the TIA found that impacts in terms of increased road incidents would be moderate both with and without mitigation (Schwarz, 2022). The VIA rated the cumulative visual impact on scenic resources and sensitive receptors as moderate given that only parts of the development would be seen in conjunction with the Nuweveld WEFs.

7. ASSESSMENT OF IMPACTS

This section provides an assessment of the identified impacts. The impact assessment considers all infrastructure associated with the development, including the EGI, as presented in Section 3. The summary impact rating tables provided based on the methodology for assessment of impact significance provided by the EAP outlined in Appendix A.

The purpose of this study is to identify potential impacts that may occur during the construction, operational and decommissioning phases of development. The decommissioning phase of the project at the end of its design life would be of similar duration to the construction phase. Note that operational phase impacts were assessed under the assumption that they would cease after 20 years and that the assessment of decommissioning consequently does not include a consideration of impacts associated with the cessation of operations.

7.1. Construction phase

Construction phase impacts range from moderate positive for impacts on regional employment and household incomes to low negative with mitigation for each of the other three impacts listed in the table below. Effective mitigation would serve to reduce the significance of impacts associated primarily with the influx of people, as well as impacts on surrounding landowners and communities, from moderate to low. While mitigation would also reduce the magnitude of impacts related to tourism, the overall significance would remain low both with and without mitigation.

Table 7.1 Construction phase impacts associated with each solar facility and associated EGI

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+)	E+	R+	D)x	P=	S	Rating	(M+)	E+	R+	D)x	P=	S	Rating
Impact 1:	Socio-economic	Impacts on regional employment and household income associated with project activities and expenditure	Construction	Positive	moderate	3	3	3	2	5	55	P3	4	3	3	2	5	60	P3
Significance						P3 - Moderate							P3 - Moderate						
Impact 2:	Socio-economic	Impacts associated primarily with the influx of people	Construction	Negative		4	2	3	2	3	33	N3	2	2	3	2	3	27	N2
Significance						N3 - Moderate							N2 - Low						
Impact 3:	Socio-economic	Impacts on tourism	Construction	Negative		3	2	3	2	3	30	N2	2	2	3	2	3	27	N2
Significance						N2 - Low							N2 - Low						
Impact 4:	Socio-economic	Impacts on surrounding landowners and communities	Construction	Negative		4	2	3	2	4	44	N3	3	2	3	2	3	30	N2
Significance						N3 - Moderate							N2 - Low						

7.2. Operational phase

During the operational phase the project would have moderate positive impacts on regional employment and household income, but with mitigation this would increase to high positive impacts, particularly if the developer is able to source labour, materials and supplies from the local region. Impacts associated with the funding of local socio-economic development, enterprise development and shareholding are rated as moderate positive, both with and without mitigation. Impacts associated primarily with the influx of people, impacts on tourism and impacts on surrounding communities and landowners are all rated as moderate negative without mitigation and low negative with mitigation (see table below)

Table 7.2 Operational phase impacts associated with each solar facility and associated EGI

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+)	E+	R+	D)x	P=	S		(M+)	E+	R+	D)x	P=	S	
Impact 1:	Socio-economic	Impacts on regional employment and household income associated with project activities and expenditure	Operational	Positive		2	3	3	4	5	60	P3	3	3	3	4	5	65	P4
Significance						P3 - Moderate							P4 - High						
Impact 2:	Socio-economic	Impacts associated with the funding of local socio-economic development, enterprise development and shareholding	Operational	Positive		1	3	3	4	5	55	P3	2	3	3	4	5	60	P3
Significance						P3 - Moderate							P3 - Moderate						
Impact 3:	Socio-economic	Impacts associated primarily with the influx of people	Operational	Negative		2	2	3	4	3	33	N3	1	2	3	4	3	30	N2
Significance						N3 - Moderate							N2 - Low						
Impact 4:	Socio-economic	Impacts on tourism	Operational	Negative		2	2	3	4	3	33	N3	1	2	3	4	3	30	N2
Significance						N3 - Moderate							N2 - Low						
Impact 5:	Socio-economic	Impacts on surrounding landowners and communities	Operational	Negative		3	2	3	4	3	36	N3	2	2	3	4	2	22	N2
Significance						N3 - Moderate							N2 - Low						

7.3. Decommissioning phase

The ratings provided below are the same as those provided for the construction phase of the project. This is because our assessment assumes that decommissioning will involve a similar process. Under this assumption, the impact ratings shown in the table below will apply. However, it should be noted that decommissioning may not necessarily occur after the 20-year minimum life cycle of the project. Instead, the facility may undergo a regeneration/refurbishment in which Solar Arrays other project elements are upgraded or replaced. This would result in temporary positive impacts including those from additional expenditure and temporary employment, as well as risks. Following the regeneration, operational impacts similar to those experienced during the first 20 years of operations would continue to occur. Aside from this discussion, assessing the impacts from a potential regeneration phase are beyond the scope of this assessment and the probability of regeneration occurring is unknown.

Table 7.3 Decommissioning phase impacts associated with each solar facility and associated EGI

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+)	E+	R+	D)x	P=	S		(M+)	E+	R+	D)x	P=	S	
Impact 1:	Socio-economic	Impacts on regional employment and household income associated with project activities and expenditure	Decommissioning	Positive		3	3	3	2	5	55	P3	4	3	3	2	5	60	P3
Significance						P3 - Moderate						P3 - Moderate							
Impact 2:	Socio-economic	Impacts associated primarily with the influx of people	Decommissioning	Negative		4	2	3	2	3	33	N3	2	2	3	2	3	27	N2
Significance						N3 - Moderate						N2 - Low							
Impact 3:	Socio-economic	Impacts on tourism	Decommissioning	Negative		3	2	3	2	3	30	N2	2	2	3	2	3	27	N2
Significance						N2 - Low						N2 - Low							
Impact 4:	Socio-economic	Impacts on surrounding landowners and communities	Decommissioning	Negative		4	2	3	2	4	44	N3	3	2	3	2	3	30	N2
Significance						N3 - Moderate						N2 - Low							

7.4. Cumulative impacts

The cumulative impacts associated with implementation of Mura 1, 2, 3 and 4 SEFs; Hoogland 1, 2, 3 and 4 WEFs; Nuweveld North, East and West WEFs, Taaibos WEFs, Soutrivier WEFs, as well as the Mura, Hoogland, Nuweveld and Gamma Grid Corridors are outlined in the table below. The impacts are generally of the same nature as they would be if experienced from Mura alone, but with higher magnitudes and consequentially with higher significance ratings as well.

Table 7.4 Cumulative impacts associated with each solar facility and associated EGI

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+)	E+	R+	D)x	P=	S		(M+)	E+	R+	D)x	P=	S	
Impact 1:	Socio-economic	Impacts on regional employment and household income associated with project activities and expenditure	Cumulative	Positive		4	3	3	4	5	70	P4	5	3	3	5	5	80	P4
Significance						P4 - High						P4 - High							
Impact 2:	Socio-economic	Impacts associated with the funding of local socio-economic development, enterprise development and shareholding	Cumulative	Positive		3	3	3	4	5	65	P4	4	3	3	5	5	75	P4
Significance						P4 - High						P4 - High							
Impact 3:	Socio-economic	Impacts associated primarily with the influx of people	Cumulative	Negative		4	2	3	4	4	52	N3	3	2	3	4	4	48	N3
Significance						N3 - Moderate						N3 - Moderate							
Impact 4:	Socio-economic	Impacts on tourism	Cumulative	Negative		4	2	3	4	3	39	N3	3	2	3	4	3	36	N3
Significance						N3 - Moderate						N3 - Moderate							
Impact 5:	Socio-economic	Impacts on surrounding landowners and communities	Cumulative	Negative		5	2	3	2	4	48	N3	4	2	3	2	3	33	N3
Significance						N3 - Moderate						N3 - Moderate							

8. MITIGATION AND EMPR REQUIREMENTS

This section suggests suitable management and mitigation actions aimed to avoid or reduce negative impacts or to enhance positive benefits. Each sub-section presents the mitigation and EMPR requirements for each of the respective impacts identified.

8.1. Impacts on regional employment and incomes associated with project activities and expenditure

The Mura PV development is intended for participation in the REIPPPP. As discussed in Section 6.4, this will require substantial commitments in terms of corporate social responsibility. Appendix C contains the DMRE scorecard (applicable to projects in the current round of bidding) with regard to its economic development sub-criteria covering aspects such as job creation, local content, ownership, management control, preferential procurement, enterprise development and socio-economic development. Among other things, the scorecard should ensure that project developers pay attention to:

- Setting targets for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized, including those from adjacent farms who have indicated that they would like to benefit from the proposed project and its related opportunities.
- Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment.
- Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement.

There is no reason to believe the yet-to-be-published DMRE requirements for future round local benefit enhancement that would guide the project would be different in any negative way and thus they should adequately ensure a suitable base level of local benefit enhancement. Their fair and transparent application will, however, require extensive interactions and collaborative engagement with the local community and its representatives. The applicant should therefore ensure that adequate time and resources are devoted to these activities. Particular attention should be paid to the following objectives:

- Setting up a skills and services database in partnership with the local municipality and civil society for the local area before any hiring or contracting decisions are made. This can help to ensure fairness and limit potential interference in hiring processes.
- An effective employee induction programme is essential to ensuring that new employees, some of whom will be unfamiliar with the responsibilities of maintaining employment, are adequately prepared and motivated to adjust to the lifestyle required of them. This programme should incorporate life skills training as well as basic financial literacy training.
- Counselling services should be made available to employees to ensure that they have adequate guidance.
- Assisting smaller enterprises where possible in tendering for contracts and in accessing finance which are common constraints to their participation in projects.
- Avoiding potential service provider decisions that may lead to abuse or local dissatisfaction. For example, only appointing one accommodating rental agent or one catering supplier may lead to local dissatisfaction regarding the spreading of project benefits.

- As far as possible, avoid significant variation in salaries between various contractors for the same types of jobs. When variations are too high, the likelihood of dissatisfaction increases.

It is also important to anticipate that there are likely to be people whose (potentially unrealistic) expectations will not be met leading to dissatisfaction. This is difficult to avoid and can affect community relations. However, its impacts can be lessened by ensuring that all local benefits are carefully monitored and also communicated to local communities. Interviews with the Central Karoo District Municipality representatives revealed that the district is available and willing to assist with local communications and stakeholder engagement.

Impact Management Outcome: Economic on regional employment and incomes during the construction and operation phases of the project are maximised				
Impact Management Actions	Time period for implementation of the impact management actions	Monitoring		
		Method	Frequency	Responsible person
Set targets for use of local labour, based on REIPPP thresholds and targets outlined in DMRE, 2022 (e.g., RSA-based employees who are citizens and from local communities should make up at least 20% of the workforce).	CONSTRUCTION PHASE OPERATION PHASE	<ul style="list-style-type: none"> • Employee profiles should be compiled by project owner and assessed by the IPP office as per the REI4P requirements to determine whether local labour sourcing targets have been met. • Where targets have not been met, the IPP office penalties and rectification actions must be complied with. 	Auditing of these REI4P requirements as per the REI4P auditing schedule	Holder of the EA
Maximise the use of local sub-contractors where possible through tendering and procurement and ensure meeting the REI4P local content requirements	CONSTRUCTION PHASE OPERATION PHASE	<ul style="list-style-type: none"> • Records of spending on procurement should be compiled by project owner and assessed by the IPP office as per the REI4P requirements • Where targets have not been met, the IPP office penalties and rectification actions must be complied with. 	Auditing of these REI4P requirements as per the REI4P auditing schedule	Holder of the EA

Ensure that employees are adequately prepared to cope with the challenges that come with being employed through the establishment of an employee induction programme	OPERATION PHASE	<ul style="list-style-type: none"> • Programme resources to be checked by ECO or equivalent • Attendance schedules to be checked by ECO or equivalent 	Annual check of records to ensure that programming is being done for all staff brought on board.	Holder of the EA
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8.2. Impacts associated with the funding of local socio-economic development, enterprise development and shareholding

Required mitigation will be determined to a large extent by the DMRE future bidding round requirements. The DMRE monitors the compliance of IPP's with the commitments that they make to local socio-economic development as part of the bidding process. The environmental authorities should therefore liaise with the DMRE in order to gather information regarding compliance with the applicant's commitments.

Mitigation measures should include:

- The project must comply with the requirements of the REIPPPP bidding process which will have stringent requirements with regard to socio-economic development, enterprise development, BBEEE shareholding etc.
- The applicant must establish a communications committee early on in the project to ensure inclusive planning and regular feedback from stakeholders.
- Community development should be guided by a community needs analysis, drawn up by a third party and based on local socio-economic conditions, a review of planning documents such as the IDP, and discussions with local government and community representatives. Interventions should be planned in collaboration with other energy developers in the area where relevant.
- Close liaison with local municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that any projects are integrated into wider socio-economic development strategies and plans.

Impact Management Outcome: Impacts associated with project's contribution to socio-economic and enterprise development initiatives are maximised				
Impact Management Actions	Time period for implementation of the impact management actions	Monitoring		
		Method	Frequency	Responsible person
Close liaison with local municipal and other	OPERATION PHASE	<ul style="list-style-type: none"> • Consultations with municipal and other relevant 	Auditing of these REI4P requirements as	Holder of the EA

<p>stakeholders involved in socio-economic development in order to ensure that any projects are integrated into wider strategies and plans with regard to socio-economic development.</p>		<p>stakeholder representatives will reveal whether the project's socio-economic development spending is aligned with wider strategies and plans.</p> <ul style="list-style-type: none"> • Efforts should be made to ensure that socio-economic development spending is aligned with local and district municipal strategies and plans as outlined in IDPs and SDFs, as well as communicated through consultative processes. • The socio-economic development spending must be assessed by the IPP office as per the REI4P requirements • Where targets have not been met, the IPP office penalties and rectification actions must be complied with. 	<p>per the REI4P auditing schedule</p>	
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8.3. Impacts associated primarily with the influx of people

Mitigation measures should include:⁶

- A 'locals first' policy with regard to construction and operational labour needs.
- The community should be able to contact the site manager or his/her representative to report any issues which they may have. The site manager and his/her representative should

be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised.

- A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.
- The applicant and the contractors should develop a Code of Conduct for the project. The code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers. For example, access to land that is not part of the development will not be allowed.
- The applicant and the contractor should implement a Tuberculosis and HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.
- Arrangements must be made to enable workers from outside the area to return home over the weekends or at regular intervals. This would reduce the risk posed by non-local construction workers to local family structures and social networks.
- Condoms should be freely available to employees and all contractor workers.
- Introduce alcohol testing on a weekly basis for construction workers.
- The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed.
- Close coordination with the municipality is required, including regular meetings. The local community hold local government accountable for impacts resulting from the influx of people. Thus, as an existing focal point, it is important that local government plays a part in addressing these issues and efforts should be made by the applicant to involve the municipality in developing mitigation measures as needed and sharing information (including information about procedures surrounding employment and supplier involvement) with members of the public.

Impact Management Outcome: Social impacts associated with an influx of people are minimised and controlled.				
Impact Management Actions	Time period for implementation of the impact management actions	Monitoring		
		Method	Frequency	Responsible person
The Project Owner and the contractors should develop a Code of Conduct for the project. The Code of Conduct should identify what types of behaviour and activities by workers are not permitted taking account of the needs of surrounding landowners and communities residing in affected areas.	CONSTRUCTION PHASE OPERATION PHASE	<ul style="list-style-type: none"> • Establish Code of Conduct. • ECO or equivalent to review Code of Conduct. • Ensure that all staff, contractor and member of the workforce has received basic training on the Code of Conduct during their induction onsite. • Ensure that the Code of Conduct requirements are 	Auditing of these REI4P requirements as per the REI4P auditing schedule	Holder of the EA

<p>All staff, contractors and members of the workforce must be made aware of the Code of Conduct during the recruitment process.</p> <p>Awareness training must be provided during their induction onsite and prior to commencement of work duties on site. Display the Code of Conduct in the operation and maintenance buildings and construction areas.</p>		<p>well understood and respected by all staff, contractor and member of the workforce.</p> <ul style="list-style-type: none"> • Monitor the behaviour of any staff, contractor and member of the workforce onsite during the construction phase. • Record complaints and incidents in the environmental incident log. 		
<p>The Project Owner and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.</p>	<p>CONSTRUCTION PHASE</p>	<ul style="list-style-type: none"> • Record and file attendance registers and material presented during the HIV/AIDS awareness programme for all construction workers • ECO or equivalent to review and file the attendance registers and training material for the external audits • Attendance registers and copy of training material is kept on site and included in internal audit reports. • Record complaints and incidents in the environmental incident log. 	<p>Auditing of these REI4P requirements as per the REI4P auditing schedule</p>	<p>Holder of the EA</p>

8.4. Impacts on tourism

Impacts on tourism are dependent on how the site is developed and managed to minimise negative biophysical impacts. The measures recommended in other specialist reports to these impacts (primarily the minimisation of visual, heritage, traffic and ecological impacts) would thus also minimise tourism impacts.

8.5. Impacts on surrounding landowners and communities

Mitigation measures should include:

- No construction workers, with the exception of security personnel, should be allowed to stay on the site overnight.
- The community should be able to contact the site manager to report any issues which they may have. The site manager should be stationed within the area and should therefore be available on hand to deal with and address any concerns which may be raised.
- A complaints register should be available on site to any individual who may have a particular complaint with regards to the construction or operations processes.
- The applicant should develop a Code of Conduct for the project. The Code should identify what types of behaviour and activities by workers are not permitted in agreement with surrounding landowners and land managers.
- The movement of workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis.
- The applicant should implement measures to assist and, if needed, fairly compensate potentially affected surrounding landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences.
- The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.

Impact Management Outcome: Socio-Economic impacts on surrounding landowners and communities are minimised and controlled.				
Impact Management Actions	Time period for implementation of the impact management actions	Monitoring		
		Method	Frequency	Responsible person
Apply the Code of Conduct for the project. Continue with the REI4P monitoring requirements.	CONSTRUCTION PHASE OPERATION PHASE	<ul style="list-style-type: none"> • Same as those outlined above surrounding implementation of Code of Conduct 	Auditing of these REI4P requirements as per the REI4P auditing schedule	Holder of the EA
The movement of workers on and off the site should be closely managed and monitored by the	CONSTRUCTION PHASE	<ul style="list-style-type: none"> • The ECO or equivalent should conduct randomized interviews with workers of contractors to 	Auditing of these REI4P requirements as per the REI4P auditing schedule	Holder of the EA

<p>contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis.</p>		<p>monitor the provision of transport.</p> <ul style="list-style-type: none"> Where transport can be confirmed not to have been provided (through discussions with the contractors), this should be recorded in the environmental incident log. 		
<p>The Contractor/ Project Owner should implement measures to assist and, if needed, fairly compensate potentially affected landowners whereby damages to farm property, stock theft or significant disruptions to farming activities can be minimized or reduced. Measures should be agreed on before construction commences. For these to be fairly dealt with, it will be necessary to set up a Monitoring Programme in collaboration with affected landowners that is specifically designed to provide clarity on impacts and risks. Aspects or risks that should be monitored need to be agreed on with affected landowners. The Contractor/</p>	<p>CONSTRUCTION PHASE</p>	<ul style="list-style-type: none"> Affected landowners can raise any incidents of damages to farm property, stock theft and other disruptions to their operations, which can be shown to have resulted due to the presence of the project. If the incidents can be shown to be the result of the project, and where the project owners fail to resolve the matter with affected parties, the incident can be recorded in the environmental incident log and further action be considered. 	<p>Auditing of these REI4P requirements as per the REI4P auditing schedule</p>	<p>Holder of the EA</p>

<p>Project Owner should formally commit to mitigation and potential compensation actions that may arise from REI4P monitoring requirements.</p>				
<p>A fire management plan should be drawn up prior to construction in agreement with affected landowners. This plan should clearly specify what types of behaviour would not be acceptable with appropriate sanction for transgressions. The Contractor/ Project Owner should also ensure that they join the local fire protection agency. If the local fire protection agency deems it necessary then fire breaks around the site should be constructed as a first order of business before any other construction works begin.</p>	<p>CONSTRUCTION PHASE</p>	<ul style="list-style-type: none"> • Control that the fire management plan is compiled and approved by the ECO or equivalent prior to the commencement of construction activities. • Ensure that onsite Fire Control Officer is appointed prior to commencement of construction activities and that a collaboration is set up with the local fire protection agency. • Control that the staff who have specific responsibilities in case of fire are trained to implement the emergency plan for dealing with a fire situation (audit of the training session attendance registers and material used for the training). 	<p>Monthly external audits</p>	<p>Holder of the EA</p>
<p>The EMPR must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.</p>	<p>CONSTRUCTION PHASE</p>	<ul style="list-style-type: none"> • Audits of waste segregation/disposal methods on a monthly basis. • Monitor that wastes are correctly separated into recyclable and non-recyclable waste on 	<p>Monthly external audits</p> <p>Weekly inspections by Environmental Manager during construction phase and decommissioning phase.</p>	<p>Holder of the EA</p>

		<p>weekly basis during construction phase.</p> <ul style="list-style-type: none"> • Inspect that all refuse bins have a lid secured to prevent animal scavenging and scattering on weekly basis during construction phase. • Inspect condition and integrity of skips and waste collection bins, particularly after rainfall events. • Record and report non-conformance to the ECO for external audits. 	<p>Weekly inspections by Facility Manager during operation phase.</p>	
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9. CONCLUSION AND RECOMMENDATIONS

In term of positive impacts, the Mura Solar Energy Facilities would be largely supportive of local and regional socio-economic development and energy supply planning imperatives. The projects would contribute to the growth and diversification of the economy as well as increased energy generation capacity. Implementation of the projects would result in construction expenditure of R2–2.9 billion per Solar Facility (R8–11.6 billion for all four). During operations, a further R36.7–52 million would be spent by each Solar Facility (R147–208 million for all four). Roughly 275 to 455 jobs of 18 to 24-month duration would be associated with construction of each 100–240 MW Solar Facility (1100–1820 for all four, although likely closer to the 1,100 given likely economies of scale). Each facility would create 21–37 permanent jobs during operations. Positive mitigation of this impact includes the timely communication of skills profiles needed, particularly during operations, so that local skills development priorities can be expanded or adapted accordingly to enable members of the local community to benefit from positions in the solar industry. Assuming that spending on socio-economic development, local community shareholding and enterprise development is spread evenly over the 20-year project period, each facility is projected to result in an annual contribution of R6–7.4 million (R24–29.6 million for all four facilities) to these objectives collectively. As these figures are based on the minimum requirements, they represent conservative estimates.

Negative impacts would occur primarily at the local and regional scale, concentrated at the project sites as well as in communities residing on neighbouring farms and in surrounding towns. These include impacts associated with the influx of people which are not anticipated to be pronounced should the suggested mitigation be implemented. To inform the rating of impacts on tourism, the area's remote location and unique sense of place has been considered, along with the findings of the VIA and HIA outlining expected changes to the area's cultural landscape. A review of local tourism establishments suggests that negative impacts on tourism are manageable, while slight benefits from business tourism are expected to compensate, at least in part, for any reduction in demand which may be experienced by tourism operators. Impacts on surrounding landowners and communities are expected to diminish with the suggested mitigation measures, and close coordination with key stakeholders is recommended to ensure that negative impacts can be limited by effective action.

It is considered most likely that the combined positive impacts of the project would exceed its negative impacts resulting in an overall net benefit with mitigation. The projects are therefore deemed acceptable in terms of socio-economic impacts and should be allowed to proceed.

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11. APPENDICES

Appendix A: Methodology

Reporting Requirements

- Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of methodology (as required)
- Update and/or confirmation of Baseline Environment – including update and / or confirmation of sensitivity mapping
- Identification and description of Impacts
- Full impact assessment (including Cumulative)
- Mitigation measures
- Impact Statement

Ensure that all reports fulfil the requirements of the relevant Protocols.

Assessment of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct⁷, indirect⁸, secondary⁹ as well as cumulative¹⁰ impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria¹¹ presented in **Table 1**.

Table 1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographic extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries

⁷ Impacts that arise directly from activities that form an integral part of the Project.

⁸ Impacts that arise indirectly from activities not explicitly forming part of the Project.

⁹ Secondary or induced impacts caused by a change in the Project environment.

¹⁰ Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

¹¹ The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
Environmental Significance Rating (Negative (-))	Very low	Low	Moderate	High	Very High
Environmental Significance Rating (Positive (+))	Very low	Low	Moderate	High	Very High

Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 1** below.

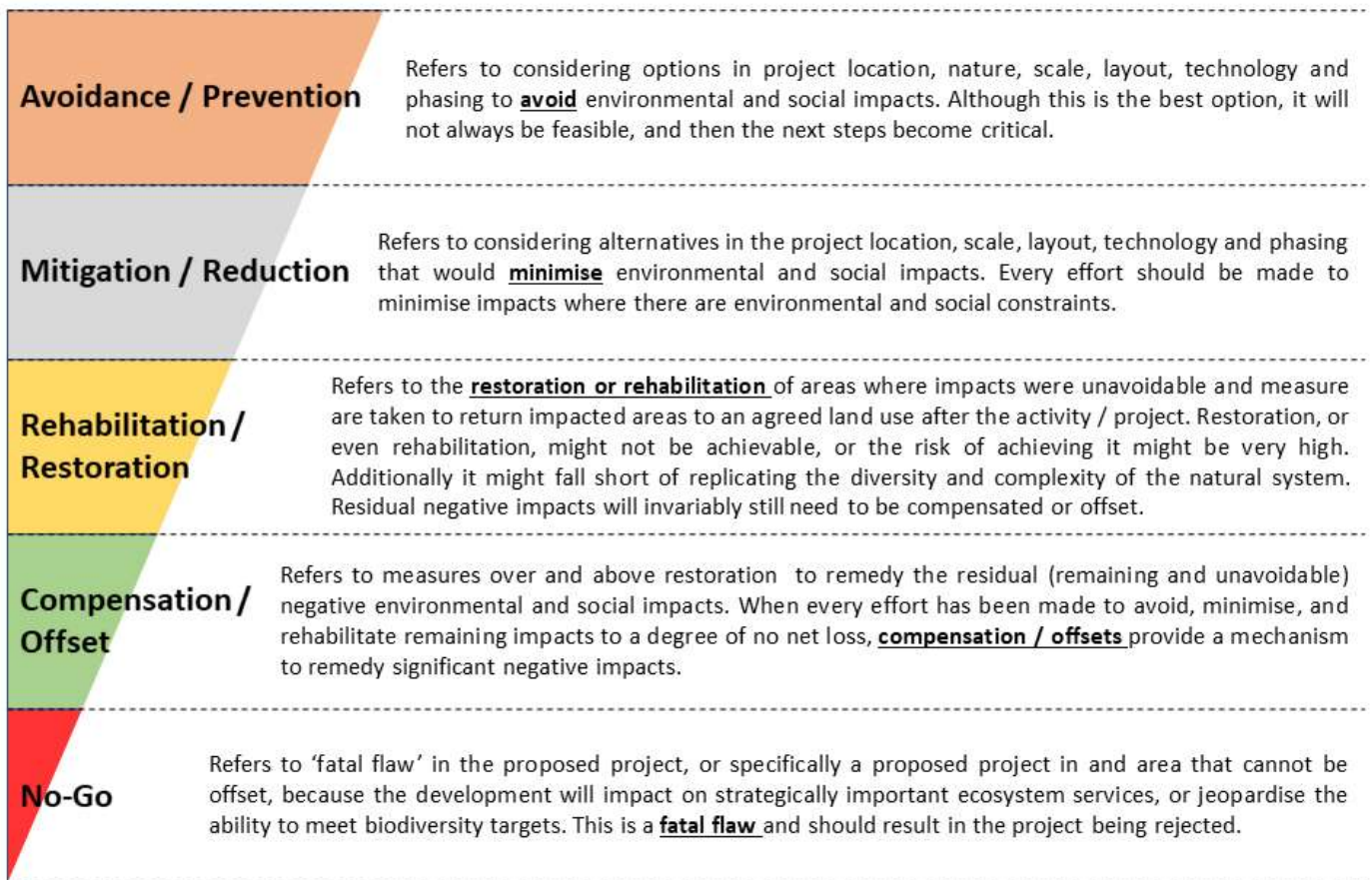


Figure 1: Mitigation Sequence/Hierarchy

Appendix B: Disclaimer

The primary role of this study is to inform the decision-making processes being undertaken by the relevant environmental authorities with regards to the proposed project. Due care and diligence has been applied in the production of the study. However, ultimate responsibility for approving, denying or requiring changes to the proposed project application rests with the relevant environmental authorities (and other government bodies where relevant) who also bear responsibility for interrogating and determining how assessment information from this economic specialist study along with other information is to be used to reach their decisions. Independent Economic Researchers and Dr Hugo van Zyl can therefore not be held responsibility or liable for any consequences of the decisions made by the relevant environmental authorities with regard to the proposed project. This includes any financial, reputational or other consequences that such decisions may have for the applicant, the Environmental Assessment Practitioner responsible for conducting the Environmental Impact Assessment process or for the environmental authorities themselves.

Appendix C: REIPPPP Economic Development Scorecard for evaluation of wind energy project bids – subject to revision for future bidding windows

Bidders in the REIPPPP are required to meet specified minimum thresholds in respect of criteria including Job Creation; Local Content; Ownership; Management Control; Skills Development; Preferential Procurement; Enterprise and Supplier Development; and Socio-Economic Development. *Table 11.1* shows selected thresholds for REIPPPP bidders wishing to participate in Bid Window 6 in 2022. Bidders tend to win bids when they exceed some or all these thresholds relative to other bidders whilst keeping their prices low.

Table 11.1: REIPPPP socio-economic development criteria and minimum thresholds for Bid Window 6

Criteria	Minimum acceptable threshold
Job creation	
RSA Based Employees who are Citizens	65%
RSA Based Employees who are Black People	40%
RSA Based Skilled Employees who are Black People	20%
RSA Based Skilled Employees who are Black People with specialised skills (eg engineering)	10%
RSA Based Employees who are Citizens from Local Communities (within 50km of project)	20%
RSA Based Employees who are Black Youth	30%
RSA Based Employees who are Black Women	10%
Local content	
Local Content Spend during Construction and Operation for On-shore Wind	40%
Local Content Spend during Construction and Operation for Solar PV	45%
Designated Local Content for project components also in National Treasury Sector Circulars	
Ownership in Seller	
Shareholding by Citizens	49%
Shareholding by Black People	30%
Shareholding by Local Communities	2.5%
Shareholding by Black Women	5%
Ownership in Material Contractors	
Shareholding by Black People in the Construction Contractor	25%
Shareholding by Black People in the Operations Contractor	25%
Shareholding by Black Women in the Construction Contractor	5%
Shareholding by Black Women in the Operations Contractor	5%
Management Control	
Black Board Directors	25%
Black Executive Management	30%
Black Senior Management	30%
Black Women Board Directors	8%
Black Women in Executive Management	8%
Black Women in Senior Management	8%
Skills Development	
Skills Development Contributions Spend (as % of revenue)	0.05%
Higher Education Bursaries for Black Students Spend (as % of revenue)	0.05%
Skills Development Contributions Spend for Black Disabled Employees (as % of revenue)	0.005%
Preferential Procurement	
B-BBEE Procurement (as % of total project spend)	30%
Black Enterprise Procurement (as % of total project spend)	10%
B-BBEE Procurement on QSEs and EMEs (as % of total project spend)	5%
B-BBEE Procurement on Black Women Owned Suppliers (as % of total project spend)	3%
Supplier Development	
Supplier Development Contributions as % of Construction Spend	0.1%
Supplier Development Contributions as % of Operations Spend	0.0%
Enterprise Development	
Enterprise Development Contributions (as % of revenue)	0.6%
Socio-economic Development	
Socio-Economic Development Contributions (as % of revenue)	1.1%

Source: IPP Office (2022)

Dr Hugo Van Zyl

Profile and Key Expertise

Economist with a PhD and 20 years' experience focusing on the analysis of projects and policies with significant environmental and development implications. Has conducted over 60 economic appraisals of infrastructure projects, industrial developments, mixed use developments, mining, energy projects, conservation projects and eco-tourism initiatives. The majority of these appraisals have involved the use of socio-economic impact assessment tools and cost-benefit analysis in order to inform decision-making. Has lead, participated in and co-ordinated research in socio-economic impact assessment, environmental resource economics (incl. ecosystem services assessment and valuation, biodiversity finance and offsets, payments for ecosystem services, policy reform), strategic assessment and conservation financing. Has provided economic inputs and guidance to national water tariff, air pollution, biodiversity conservation, biofuels, mine closure funding and climate change policy. Has had broad exposure to options for local economic development and their successful implementation. Country experience includes: South Africa, Namibia, Ethiopia, Botswana, Russia, Seychelles, Georgia, Cape Verde, Armenia, Kazakhstan and Nigeria.

Selected relevant experience:

Economic and socio-economic impact assessments forming part of Environmental Impact Assessments (EIAs)

➤ **Renewable energy:**

Wind – Nuweveld near Beaufort West (2021); Ishwati Emoyeni near Murraysburg (2015); SWE near Vleesbaai, Western Cape (2013); SAGIT Energy Ventures near Bot River and Wolesley, Western Cape (2012). Windcurrent Banna ba Pifhu near Jeffrey's Bay, Eastern Cape (2011); InnoWind near Mossel Bay, Western Cape (2011); Mainstream near Jeffrey's Bay, Eastern Cape (2010).

Solar – Mainstream Kentani near Dealesville, Free State (2014); Mainstream near Douglas and Keimoes, Northern Cape (2012); Thupela Energy near Vaalwater, Limpopo (2011).

➤ **Roads:**

N2 bypasses at Butterworth and iDutywa (2016); R44 upgrading between Stellenbosch and Somerset West (2014); Musina Ring Road, Limpopo (2011); Bloubos local road in Somerset West, Western Cape (2010); N1/N9 intersection upgrade at Colesberg, Free State (2009); tolling of the N1, N2 and R300 roads in the vicinity of Cape Town (2005); Changing road configurations on Hospital Bend in Cape Town (2001)

➤ **Infrastructure and agricultural development:**

Farm dams and production expansion for Habata Agri in the Robertson area, Western Cape (2017); Desalination plants for Umgeni Water, Kwa-zulu Natal (2015); Kleinberg Dam in the Hex River Valley, Western Cape (2014); Desalination plant for West Coast District Municipality, Western Cape (2012); Green Point World Cup Stadium, Cape Town (2008); Petroline petrol pipeline between Maputo and Gauteng (2008); Muldersvlei water treatment plant and reservoir near Klappmuts, Western Cape (2007); Iron ore terminal expansion at Saldanha port, Western Cape (2000); Wastewater treatment plan for East London, Eastern Cape (1996); Vissershok landfill expansion, Cape Town (2002); Regional landfill to service Cape Town (2006 and 2012); Helderberg waste transfer station in Somerset West, Western Cape (2008).

➤ **Industrial developments and mining:**

- Oil and gas exploration drilling in PEL 34 off Luderitz coast, Namibia (2017); Upgrade and expansion of the Tsumeb copper smelter, Namibia (2017); Kamiesberg mineral sands mine, Northern Cape (2015); Burgan Oil fuel storage and distribution facility at Cape Town Harbour, Western Cape (2015), Frankfort Kraft Paper Mill, Free State (2015); Saldanha Regional Marine Outfall Project in Danger Bay near Saldanha Bay, Western Cape (2014), AfriSam limestone mine and plant at Saldanha Bay, Western Cape (2012); Vedanta zinc mine near Aggeneys, Northern Cape (2013); Expansion of the PPC cement plant at Riebeek West, Western Cape (2009); Burnstone gold mine expansion (2009); Valencia uranium mine in Namibia (2008); Tata Steel ferrochrome smelter in Richards Bay, KZN (2003); Conversion of the Sasol Chemical Industries plant in Sasolburg from a coal based to a natural gas based plant, Free State (2002).

➤ **Mixed-use and residential developments:**

Granger Bay extension of V&A Waterfront, Cape Town (2014); Ladysmith mixed-use development, Kwa-Zulu Natal (2014); Barinor and Richmond park developments in greater Cape Town (2011); De Plaat residential estate near Velddrif, Western Cape (2009); Langezandt leisure development in Struisbaai, Western Cape (2011); Garden Route Dam mixed use development in George, Western Cape (2008); Anandale mixed use development in Cape Town (2008); Schalkenbosch Golf Estate, Le Grand Golf Estate and Ceres Golf Estates (2006); Carpe Diem Eco Estate near Port Alfred, Eastern Cape (2006); Altona mixed use development in Worcester, Western Cape (2007).

- Lead author of the Western Cape Provincial Government guidelines on economic specialist inputs into Environmental Impact Assessments. (2005)

Inputs to Strategic Environmental Assessments (SEAs)

- Lead economic specialist making inputs to the Strategic Environmental Assessment for shale gas development (fracking) in South Africa (2016).
- Economic specialist inputs to form part of the Strategic Environmental Assessment for the roll-out of electricity transmission infrastructure throughout South Africa. (2015)
- Environmental resource economic and socio-economic specialist study to form part of the Strategic Environmental Assessment and accompanying management plan for the Port of Saldanha, Western Cape. (2013)
- Lead author of a Strategic Environmental Assessment (SEA) of the potential production of biofuels based on Jatropha in the Kavango and Caprivi regions of Namibia. (2010)
- Environmental resource economics specialist study to form part of the Strategic Environmental Assessment and accompanying Environmental Management Framework for the Pixley ka Seme municipality in Mpumalanga. (2010)
- Environmental resource economics specialist study to form part of the Strategic Environmental Assessment and accompanying Environmental Management Framework for the Albert Luthuli and Msukaligwa municipalities in Mpumalanga. (2008)

James Kinghorn

Profile and Key Expertise

James conducts applied economic research to inform development, specifically where environmental aspects are important to consider in decision-making. He has six years' experience as an applied researcher, and a further three years working in humanitarian and disaster assistance programming. He has contributed economic and socio-economic specialist inputs to a total of fourteen environmental and social impact assessments; conducted economic and financial analysis in support of eight Green Climate Fund (GCF) and Global Environment Facility (GEF) funding proposals and projects; and provided strategic research and analysis to inform policy in the areas of climate change, biodiversity finance, and natural resource management.

Selected relevant experience:

Economic and socio-economic impact assessments forming part of Environmental Impact Assessments (EIAs) and Strategic Environmental Assessments (SEAs)

- **Renewable energy and powerlines:**
 - Wind – Nuweveld, Karoo Highlands, Western and Northern Cape (2021); Bann aba Pifhu, Eastern Cape (2019)
 - Solar – Paulputs PV, near Pofadder, Northern Cape (2018)
 - Powerlines – Nuweveld Grid Connection, de Jager's Pass, Western Cape (2021); Impofu Grid Connection, near Gqeberha, Eastern Cape (2019); Paulputs Grid Connection, Northern Cape (2018)
- **Roads:**
 - N2 bypasses at Butterworth and iDutywa (2016)
- **Infrastructure and agricultural development:**
 - Farm dams and production expansion in Langkloof, near Worcester, Western Cape (2019); Assessment of economic benefits for the TAHAL Integrated Agriculture Projects, Angola (2019); Farm dams and production expansion for Habata Agri in the Robertson area, Western Cape (2017);
- **Industrial developments and mining:**
 - Vedanta zinc Smelter-Refinery Complex near Aggeneys, Northern Cape (2018); Oil and gas exploration drilling in PEL 34 off Luderitz coast, Namibia (2017); Upgrade and expansion of the Tsumeb copper smelter, Namibia (2017);
 - Contributing Author to the Strategic Environmental Assessment for shale gas development in South Africa (2016)
- **Mixed-use developments:**
 - Malmesbury Shopping Mall and Private Hospital, Western Cape (2019)

Economic and financial appraisal in support of Funding Proposals

- Lead author of the economic assessment for the proposed South-Cooks Wastewater Treatment System, St. John's, Antigua and Barbuda (2020)
- Lead author in the economic and financial analysis of the following funding Green Climate Fund proposals:
 - Ecosystem-based adaptation in Botswana's communal rangelands (2021); Climate resilient development in refugee camps and host communities in Kigoma region, Tanzania (2021); Peru's Natural Legacy – Amazon Climate (2021); Heritage Colombia – Protected Areas and Climate Resilience (2021); Climate Service and Multi-hazard Early Warning for Resilience in Sudan (2020); Strengthening Climate Systems in the Greater Horn of Africa through regional cooperation (2020)

Landowners

Meeting with participating landowner (EGI only) and local ward councillor	
Date:	19 October 2021
Location:	Booiskraal
Attendees:	Andrew Jack – Landowner and owner of Booiskraal Farm Stay Josias Reynolds – Beaufort West Local Municipality Ward 2 Councillor
Notes:	
<ul style="list-style-type: none"> • Some info on farming activities provided (employment, impact of drought) • Booiskraal Farm Stay info provided, 7 beds + 1 mattress, farm stay with hiking and scenic drives. • Some hunting with potential to expand if rainfall is sustained and allows better yield • Tourism reported to be less than 10% of total income, and not seen to be at risk from development given anticipated demand for accommodation by contractors throughout construction and operations phases • Unfortunate that solar was not developed on Booiskraal and only EGI as benefits will not be shared by all landowners impacted by this development. • Solar seen as less obtrusive than wind and less likely to impact tourism and sense of place • Some uncertainty over how planning and decision-making has taken place 	

Meeting with neighbouring landowner – Johan Moolman	
Date:	27 October 2021
Location:	Dunedin
Attendees:	Johan Moolman James Kinghorn
Notes:	
<ul style="list-style-type: none"> • Info on farming activities provided (areas, livestock numbers, drought, spending and labour relations) • Some concern over SEF and EGI expressed. Especially the southern part of the EGI, given proximity. Concerns are around the following: <ul style="list-style-type: none"> ○ Change in sense of place will impact on unique tourism offering of the Riverine Rabbit Retreat. ○ If the power line is constructed too close to the northern border of the property, this could negatively affect tourism offering, given that this is the most pristine part of the land and is used for hiking, hunting, bird watching and other forms of nature-based tourism and recreation. ○ The presence of the EGI in the view from the farm will lead to a change in the sense of place and will impact their own lives. Decision to relocate to the area was in search of a more isolated existence away from people and crime. ○ Environmental and visual impacts likely to affect their own lifestyles as well as the Riverine Rabbit Retreat (local ecological processes and iconic species to impact on tourism) ○ Increase in number of people in the area due to the project could lead to an increase in crime (stock theft and other) and a decrease in road safety ○ Influx of people could also have adverse effects for communities, with potential to create social tension and reduced cohesion. ○ Will need to incur additional costs in order to mitigate increase in crime levels (better fencing, etc) ○ Layoffs from farms will lead to increase in indigent populations in local towns • Noted that the above issues are especially acute since Mr Moolman had been excluded from the project as well as related Nuweveld and Hoogland WEF developments and would therefore bear the cumulative costs associated with all of these developments combined while not receiving any of the benefits. 	

- Cumulative impact of all projects seen as getting to a stage where serious impacts expected (same intensity but longer duration – no longer short-run)
- No visual assessment had been shared with Mr Moolman for Mura or any of the previous renewable energy facilities planned adjacent to the Riverine Rabbit Retreat, despite requests having been submitted before. It is therefore difficult to imagine the cumulative impact of all the projects combined and computer simulations are requested.
- No communication received to date re Mura and opaque decision-making processes in general raised as concerns.

Email correspondence with neighbouring landowner – Rick Haw

Date: 19 October 2021

Location: Email

Attendees: Rick Haw – Owner of Klipgat Portion 9

Notes:

- Some info requested regarding the siting of the project.
- Concerns raised over potential impacts on birds and other wildlife, particularly from the EGI. Following list of birds mentioned as important:
 - Veraux Eagle
 - Martial Eagle
 - Secretary Bird
 - Black Stork
 - Ludwigs bustard
 - Blue Crane
 - Yellow bill Stork
 - Karoo Korhaan

Institutional stakeholders

Meeting with the Strategic Support Services Manager for Central Karoo District Municipality

Date: 19 October 2022

Location: CKDM Offices

Attendees: Barbara Koopman – Manager, CKDM Support Services
James Kinghorn

Notes:

- Info provided on the role of local and regional government in the process of development and need for more partnerships between public and private spheres.
- Migration trends discussed, including changing demographics as a result of influx of job-seekers.
- Experience of towns in the area with Uranium and shale gas exploration. Poor communication, public sector unable to support.
- Major social risks are anticipated during construction. Poor local population with high unemployment will be confronted with influx of paid construction workers. This will present new opportunities for locals, some which can have negative outcomes for families including childhood prostitution and pregnancy, drug abuse, domestic violence and other challenges experienced when social structures are stressed with an increased presence of construction workers.
- Info shared on impact of drought and improved situation of late with regard to numbers of laid-off farm workers since rains have picked up this year.
- Info shared on socio-economic priorities for and regional local government, which are outlined in the 2019/20 CKDM District Safety Plan
- Suggests that if project is approved, that a Project Steering Committee be formed and to include representatives of the CKDM. In addition, Action Plans can be developed to ensure that project team is prepared and issues can be dealt with as they arise. Members of CKDM will be eager to support in terms of helping to ensure that Red Cap can meet its requirements for local labour sourcing and local procurement. This can be done by

providing support to SMMEs as has been done in the past, for example with the Vuk'uphile Programme Construction Skills Workshop held in Beaufort West.

- Suggested that local municipality can be involved also to monitor and ensure fair and transparent recruitment and procurement processes are followed
- District Municipality can also support in terms of ensuring smooth communication with public to ensure that public support for the project is reflective of the extent to which local opportunities are created. All stakeholders should participate in the development from the earliest possible stage. This will ensure integrated planning between sectors.
- Trade-offs and synergies with the tourism and agriculture sectors were discussed. While renewables not without risk, seen as preferable to mineral and gas extraction-type projects, with mitigation to bring risks down substantially.

Meeting with the manager of Beaufort West Tourism Organisation (BWTO)

Date: 18 October 2022

Location: BWTO Offices

Attendees: Sascha Klemm – manager, BWTO
James Kinghorn

Notes:

- Info provided on the local tourism context. Info shared about the “Roads Less Travelled in the Karoo” Tourism Promotion Campaign, including recent website development. Shared a map that outlines scenic routes in the area and a second map focused on Beaufort West and Surrounds. Info provided on the continued popularity of self-drive tourism, hunting, birdwatching and stargazing attractions in the area.
- Mention that BWTO faces uncertainty over continued funding
- Some concerns expressed over visual impacts on sense of place (and thus Tourism), given scenic routes in the area. Three of the five scenic drive routes in the area use the R381 between Beaufort West and Loxton, including the Aardwolf Loop, the Meerkat Loop and the Porcupine Loop. These loops represent a form of tourism which has seen increased interest during recent times, with changes in the profile of tourism demand seen to result from the COVID pandemic and since sustained – with self-drive tourism being prominent. This provided landowners with much needed revenue to offset losses experienced during the drought, which has just begun to subside.
- Risks to tourism seem manageable as long as siting is done well and iconic species are not disturbed.
- Some info provided into the area of the project including scenic routes, accommodation facilities and Waggenaarskraal Museum
- Concerns were expressed over impact on ecology in line with email correspondence received during the Socio-economic Assessments for the Nuweveld and Hoogland Wind Energy Facilities. The Karoo’s tourism appeal is strongly tied to its unique ecological characteristics and iconic species. This natural heritage should be preserved through careful siting and mitigation of risks during renewable energy development.