

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED SUN GARDEN SOLAR PV FACILITY AND ASSOCIATED INFRASTRUCTURE IN THE EASTERN CAPE

Socio-Economic Impact Assessment Report

Report for Sun Garden (Pty) Ltd Solar Energy Facility

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1. INTRODUCTION

Savannah Environmental was commissioned by **Sun Garden (Pty) Ltd** to undertake a Basic Assessment for the proposed 400 MW Sun Garden Solar PV Facility which is located near Cookhouse, Somerset East, and Riebeek East in the Cookhouse Renewable Energy Development Zone (Cookhouse REDZ 3) located in the Eastern Cape Province. As part of the specialist studies, it was identified that a **Socio-Economic Impact Assessment (SEIA)** was required. Savannah Environmental subsequently appointed **Urban-Econ Development Economists** to conduct the SEIA process. This report seeks to assess the potential socio-economic impacts and has included recommendations to enhance the positive impacts and reduce the potential negative impacts of the project. This is done in order to enhance the foreseeable benefits of the development.

1.1 Brief Description of the Project

Sun Garden (Pty) Ltd is proposing the development of a commercial solar PV facility and associated infrastructure on a site located approximately 36km south-east of Somerset East and 28km south-west of Cookhouse within the Blue Crane Route Local Municipality and the Sarah Baartman District Municipality in the Eastern Cape Province. The entire extent of the site falls within the Cookhouse Renewable Energy Development Zone (REDZ) and within the Eastern Corridor of the Strategic Transmission Corridors. The facility is known as the Sun Garden PV Facility.

A preferred project site with an extent of ~4037ha has been identified by Sun Garden (Pty) Ltd as a technically suitable area for the development of the Sun Garden PV Facility. The project site consists of four affected properties:

- Portion 9 of the farm Britzkraal No 253, Division of Somerset East
- Portion 8 (a Portion of Portion 7) of the farm Britzkraal No 253, Division of Somerset East
- Portion 7 of the farm Britzkraal No 253, Division of Somerset East
- Portion 1 of farm Bothas Hoop 358

A development envelope for the placement of the solar facility infrastructure (i.e., development footprint) has been identified within the project site and assessed as part of the BA process. The development envelope is ~500ha in extent and the much smaller development footprint of ~350ha will be placed and sited within the development envelope. The development footprint will contain the following infrastructure to enable the solar facility to generate up to 400 MW:

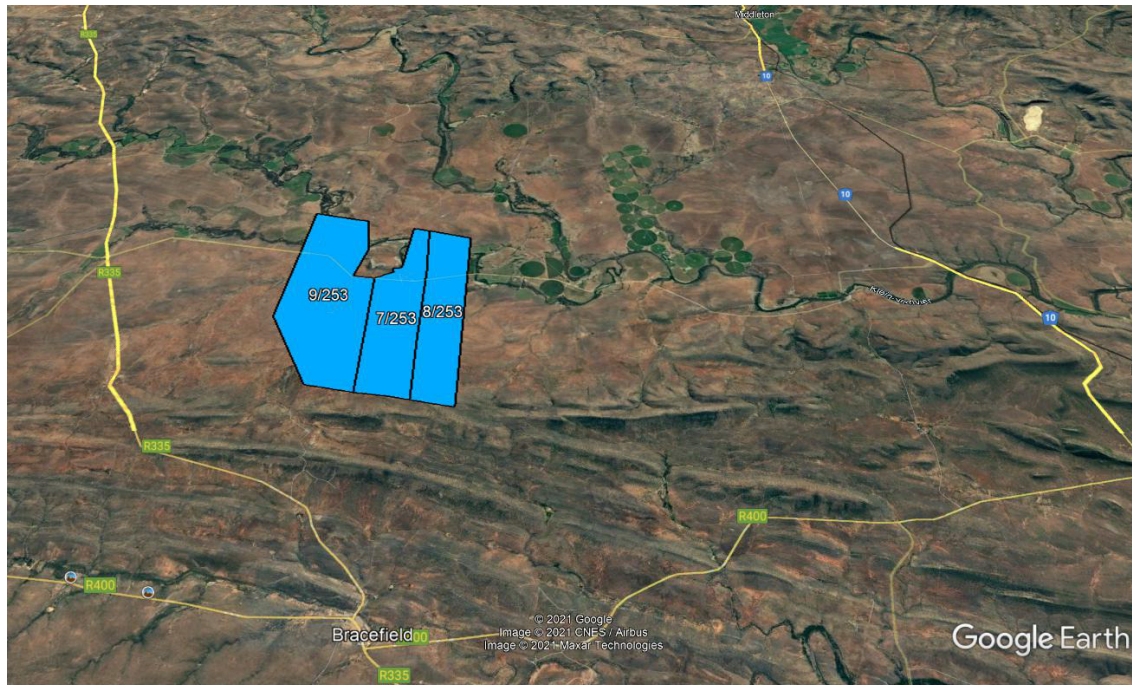
- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the project components, laid underground where practical.
- A 132/33kV on-site collector substation to be connected to a proposed 400kV Main Transmission Substation (MTS) located to the north-east of the site via a new

132kV overhead power line (twin turn dual circuit line). The development of the proposed 400kV Main Transmission Substation will be assessed as part of the separate BA process in order to obtain Environmental Authorisation.

- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Water supply pipelines from onsite boreholes.
- Temporary laydown areas.
- Access roads to the site and between project components with a width of approximately 4,5m. The main access points will be 8m wide.
- A temporary concrete batching plant.
- Staff accommodation (temporary).
- Operation and Maintenance buildings including a gate house, security building, control centre, offices, warehouses, a workshop, and visitor's centre.

The new 132kV overhead power line to connect the wind farm to the proposed 400kV Main Transmission Substation will follow a route north-east of the project site to complete the connection. The power line will therefore cross properties located to the north-east of the project site. The majority of these properties form part of the project sites of the adjacent proposed wind farms which forms part of the cluster of renewable energy facilities proposed. The power line follows that proposed for the Redding Wind Farm and the Solaris Fields PV facility and is being assessed within a 300m grid connection corridor which will provide for the avoidance of sensitive environment areas and features and allow for the micro-siting of the power line within the corridor. The development envelope is indicated below on Map 1.1.

Map 1.1: Site locality



Source: (Google Earth Pro, 2021)

1.2 Scope and Purpose of the Project

The purpose of the SEIA is to determine and assess the potential socio-economic impacts of the proposed project activities as described in the previous section. The SEIA report addresses the regulations as set out in the Environmental Impact Assessment Regulations of 2014, as amended (Chapter 4, Part 2: Basic Assessment; Appendix 6, Specialist Reports) (The Republic of South Africa, 1998; 2014).

Considering that the project will be developed in Cookhouse REDZ, the requirement for the assessment of the socio-economic impacts associated with these developments are reduced to a basic assessment level, objectives of which are as follows:

- Provision of a baseline description of the study area, specifically focusing on the socio-economic environment of the locality where the proposed development is to be implemented
- Identify and analyse positive and negative socio-economic impacts (direct, indirect, and cumulative) associated with each of the project components during the development and operational phases
- Quantify the positive and negative impacts where possible
- Develop mitigation measures to address possible negative effects and enhancement measures to increase the benefits derived from the project

1.3 Delineation of the Study Area

Study area delineation depends on the type of economic activity that is analysed and the perceived spread of economic impacts that are expected to be generated from the project during both the construction and operational phases. The municipal area where the site is located (Blue Crane Route LM) is likely to experience some direct, indirect, and induced impacts resulting from the activities on the site; however, it is unlikely that a local economy can be sufficiently diversified to supply all materials and services and support construction and operational activities from start to finish. Economic impacts, therefore, tend to extend far beyond municipal boundaries and spread throughout the entire national economy.

1.3.1 Primary, secondary, and tertiary study area

As indicated earlier, the footprint of the proposed Sun Garden Solar PV Facility will stretch across four farm portions. The potential zone of influence of the proposed project, will not be limited to these farm portions but, will extend beyond the boundaries of the project site due to the potential socio-economic impacts. As such, the following zones of influences are delineated for the purpose of the analysis:

- Primary zone of influence: For the purpose of the analysis of the impact on property values and the tourism industry, as well as the assessment of potential local economic impacts that could ensue from the project, the primary zone of influence is determined to be Blue Crane Route Municipality. In some instances, the immediate zone of influence will also be referred to when describing economic activity immediately surrounding the proposed development site. Note Section 1.3.2 below.
- Secondary and tertiary zones of influence: Economic benefits and impacts will not be limited to the site or the nearby towns and settlements only. Most of the goods and services that will be purchased for the construction and will be required for the operation of the solar PV facility will be secured from outside the primary zone of influence and specifically from areas such a Nelson Mandela Bay and the broader Eastern Cape. Therefore, the Eastern Cape and the rest of South Africa are defined as the secondary and tertiary zones of influence of the proposed project from an economic perspective.

1.3.2 Visually affected study area

The visual effects that will be experienced during the construction and operation of the solar farm are intrinsically linked to some of the socio-economic impacts that are considered in this report (such as sense of place etc.).

The visual impact assessment study undertaken by (LOGIS, 2021b) envisioned that there would be minimal potential visual exposure due to the relatively constrained dimensions of the PV facility. The study comprised a geographical area of 213 km² and a buffer zone (area of potential visual influence) of approximately 6 km from the development footprint of the facility. This implies that the visual exposure would mainly be experienced within a 6 km radius of the proposed development site, with the predominant exposure to the north. This is due to the parallel ridges to the south of the proposed PV facility, which will shield the facility from observers to the south. Whereby, the areas of exposure will be generally located on higher ground, and noticeable as indicated in Map 1.2, and the lower-lying land (e.g., along the water courses within the study area) would not be exposed to the project infrastructure (LOGIS, 2021b). The following was identified from the viewshed analysis:

- **0 – 1 km**

The facility will be highly visible within a 1 km radius of the development. There are no homesteads or public roads within this zone (LOGIS, 2021b).

- **1 – 3 km**

The zone consists of the Britskraal (2) homestead¹ and sections of the Beenleegte secondary road. Apart from these potential receptor sites, the rest of the visually exposed areas are located within the vacant farmland (LOGIS, 2021b).

- **3 – 6 km**

Visual exposure within this zone will significantly be experienced towards the north and west of the project. The homesteads within this zone which are projected to be exposed to the PV facility include:

- Sarahdale
- Karee Krans
- Draai van Visrivier
- Alwingate

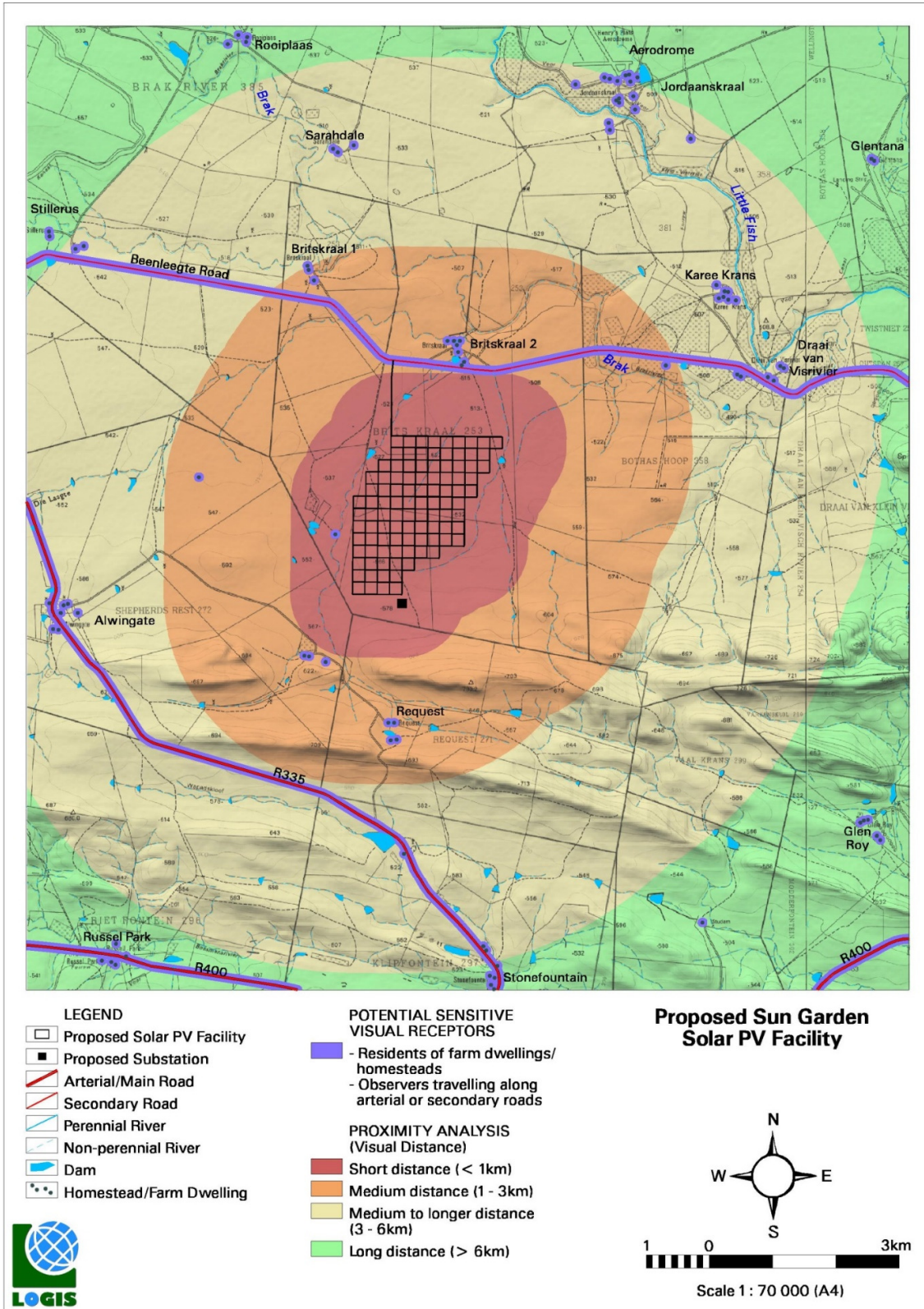
It should be noted that all of the receptor sites identified above (with the exception of Sarahdale) are located on farms earmarked for the proposed Redding Wind Farm (LOGIS, 2021b).

- **>6 km**

The visual exposure intensity of the PV facilities is anticipated to be minimal at distances exceeding 6 km and highly unlikely due to the distance between the object (development) and the observer. The only homestead which is expected to be exposed within this zone is Rooiplaas, located approximately 6.6 km north-west of the site. Also, a noticeably short section of the R335 arteria road falls under this zone, but in transit observations of the PV facility from this road are highly unlikely at this distance (LOGIS, 2021b).

¹ The names listed below are of the homestead or farm dwelling as indicated on the SA 1: 50 000 topographical maps and do not refer to the registered farm name.

Map 1.2: Viewshed analysis of the proposed Sun Garden PV Facility.



Source: (LOGIS, 2021b).

1.4 Methodological Approach

1.4.1 Economic impact assessment method

Socio-Economic Impact Assessment studies are undertaken to determine, evaluate, and where possible, quantify the effects of an intervention. This intervention could be the expansion to an existing activity within the economy or the development of a new activity (i.e., the development of the Sun Garden PV Facility).

Socio-economic impacts generated by an intervention can be disaggregated in terms of the initial or direct impacts that occur when the intervention begins. Such impacts in turn trigger secondary and further flow-on rounds of impacts thereby creating a multiplier effect. This multiplier effect can be either positive or negative. In purely economic terms these impacts are expressed as indirect and induced effects, where:

Indirect effects relate to the changes in economic indicators that are triggered along with the upstream industries that supply goods and services to the intervention.

- Induced effects refer to the changes in economic indicators that are stimulated by changes in consumption expenditure of households that were directly or indirectly affected by the intervention.

In addition to the above, two additional types of socio-economic impacts can be distinguished. These include:

- Secondary impacts that are caused by the intervention, but that are further removed in distance or take a greater amount of time to materialise but, are still reasonably foreseeable. Secondary impacts generally relate to changes in land-use patterns, economic performance, changes to the character of a community and property values in the vicinity of the location of the intervention.
- Cumulative effects are the results of incremental consequences of the intervention when added with other past, present, and anticipated future interventions. Cumulative effects consider the manner in which the impacts of a project may affect or be affected by other projects. Such effects are generally difficult to identify as they require complete knowledge of local conditions and development plans, and accordingly are sometimes even more difficult to quantify.

Projection of the initial impacts and multiplier effects are usually done by employing an input-output model or a General Equilibrium Model. The use of these models in socio-economic impact assessments allows for the quantification of potential impacts in terms of a number of economic indicators such as production, Gross Value Added (GVA), employment and income. The scale of these impacts is dependent on the size and diversification of the economy under analysis which in turn determines the leakage. Secondary and cumulative effects can be identified through an expert opinion technique, consultations, development matrices and interviews. Such impacts can be difficult to

quantify. Overall, a socio-economic impact analysis that includes the assessment of primary impacts, multiplier effects, secondary impacts and cumulative effects provides a comprehensive assessment of potential impacts. It furthermore assists in ranking the intervention using a methodology prescribed by the Department of Environment, Forestry and Fisheries (DEFF) (Chapter 4, Part 2: Basic Assessment; Appendix 6, Specialist Reports) (The Republic of South Africa, 1998; 2014).

The socio-economic impact assessment made use of the economic models based on the Eastern Cape Social Accounting Matrix (SAM) developed in 2006 and forecast to represent 2021 figures. The SAM is a comprehensive, economy-wide database that contains information about the flow of resources that takes place between the different economic agents, in this case, the Eastern Cape economy. The selection of this model in the assessment is attributed to the expected spatial distribution of procurement during both the construction and operational phases of the project.

1.4.2 Impact assessment model

All impacts identified were assessed in terms of the extent, duration, magnitude, probability and significance. The following approach was used to assess each of these aspects of the impact:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The duration, wherein it will be indicated whether:
 - the lifetime of the impact will be of very short duration (0–1 years) – assigned a score of 1;
 - the lifetime of the impact will be of short duration (2–5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5;
- » The magnitude, quantified on a scale from 0-10, where a score is assigned:
 - 0 is small and will not affect the environment
 - 2 is minor and will not result in an impact on processes
 - 4 is low and will cause a slight impact on processes
 - 6 is moderate and will result in processes continuing but in a modified way
 - 8 is high (processes are altered to the extent that they temporarily cease)
 - 10 is very high and results in the complete destruction of patterns and permanent cessation of processes
- The probability of occurrence, which shall describe the likelihood of the impact occurring. The probability will be estimated on a scale of 1–5, where 1 is very

improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (a distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

- the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium, or high; and
- the status, which will be described as either positive, negative, or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

- $S=(E+D+M)P$ where:
- S = Significance weighting
- E = Extent
- D = Duration
- M = Magnitude
- P = Probability

The significance weightings for each potential impact are as follows:

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

1.5 Data Collection

As part of the data collection process for the socio-economic impact assessment of the Sun Garden Solar PV Facility the following activities were undertaken:

1.5.1 Review of planning documents

In order to document the socio-economic context of the study area within the Blue Crane Route Municipality, a number of important documents or sources of information were reviewed, referenced, and used to inform the SEIA. These documents include but are not limited to:

- Sarah Baartman District Integrated Development Plan (IDP) 2019
- Sarah Baartman District Local Economic Development (LED) Strategy 2019
- Sarah Baartman District Spatial Development Framework (SDF) 2013
- Blue Crane Route Local Municipality IDP 2020
- Blue Crane Route Local Municipality LED Strategy 2008

1.5.2 Literature review

In order to substantiate the findings of the socio-economic impact assessment, a number of secondary research documents have been considered as they relate to the proposed solar energy facility.

These documents include academic journals and studies available through online publication or print media. It is intended that these documents substantiate the baseline profile, provide for benchmarking in the industry, while at the same time providing context to the project.

Specific reference is made here to a literature review in Section 6.1.2 and presented general views pertaining to solar energy facility developments.

1.5.3 Interviews with stakeholders

Targeted and structured one-on-one interviews and/or surveys were undertaken as part of the SEIA to collect information from owners of property in the immediate vicinity of the proposed solar PV facility. Given the notion that the direct and indirect impacts will only be felt on the property of the project site and potentially by adjacent landowners in the immediate surroundings, interviews were undertaken with these property owners using contact details obtained from Savannah Environmental.

In addition, the reader is also referred to the Redding WEF SEIA Study, where broader consultations were conducted. These consultations took place with a wider group of landowners in a broader study area between May 2020 and August 2021. Although these owners are not anticipated to be impacted by the proposed solar development, their responses have assisted in presenting a broader economic profile of the area that the said project is to be developed. The results of both sets of interviews are provided in Section 3.3.2 of the report and a list of individuals contacted and interviewed can be found in Appendix A.

2. POLICY AND PLANNING ENVIRONMENT & NEEDS AND DESIRABILITY

This chapter examines the key legislation and policies relevant to the proposed development and includes a review of pertinent national, provincial, and local policies that have a direct bearing on the development. Following this, the chapter outlines the needs and desirability of such a development accordingly.

2.1 Policy and Planning Environment

The overall aim of this review process is to provide insight into the government's priorities and plans in terms of renewable energies. This assists in determining the relevance of the project with regard to the development objectives of the various spheres of government as well as in identifying potential developmental conflicts that the project might create. A brief review of the most relevant documents is provided in Table 2.1.

Table 2.1: Brief Overview of relevant policies

Policy	Key Policy Objectives	Source
National Policy: South Africa		
National Development Plan 2030	<ul style="list-style-type: none"> • Creating jobs and livelihoods • Expanding infrastructure • Transitioning to a low-carbon economy • Transforming urban and rural spaces • Improving education and training • Providing quality health care • Building a capable state • Transforming society and uniting the nation • Fighting corruption and enhancing accountability 	(NPC, 2011)
New Growth Path Framework 2011	<ul style="list-style-type: none"> • Infrastructure investment • Main economic sectors as employment sectors • Seizing the potential of new economies • Investing in social capital and public services • Fostering rural development and regional integration 	(Department of Economic Development, 2011)
Renewable Energy Vision 2030 South Africa	<ul style="list-style-type: none"> • Renewable energy as an exceptional source of flexible supply within the context of uncertain energy demand • A comprehensive renewable energy base will support a resilient South African future • A sustainable energy mix that excludes undue risks for the environment of society 	(World Wildlife Fund, 2014)
Integrated Resource Plan 2019	<p>In addition to solar energy facilities, solar energy should continue to contribute to the generation of electricity</p> <p>Allocations to safeguard the development of solar energy projects aligned with the Integrated Resource Plan (IRP) 2010 should continue to be pursued:</p> <ul style="list-style-type: none"> • Ensure energy security and supply • Reduce environmental impacts 	(Department of Energy, 2016 and 2018)

Policy	Key Policy Objectives	Source
	<ul style="list-style-type: none"> • Endorse job creation and localisation • Lessen cost of energy • Reduce water consumption • Diversify supply sources • Promote energy efficiency • Promote energy access <p>Additionally, the IRP (2018) indicates that:</p> <ul style="list-style-type: none"> • Solar energy will be 15.1% of the energy mix compared to solar at 10.5% by 2030 	
The Constitution of South Africa 1996	<p>“Everyone has the right to an environment that is not harmful to their health or well-being” (S24)</p> <p>The environment should be protected for the benefit of present and future generations, through reasonable legislative and other measures that:</p> <ul style="list-style-type: none"> • Prevent pollution and ecological degradation • Promote conservation • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development 	(Republic of South Africa, 1996)
White Paper on Energy Policy of the Republic of South Africa 1998	<p>Seeks to ensure that an equitable level of national resources is invested in renewable technologies, given their potential, and compared to investments in other energy supply options</p> <p>Aims to create energy security by diversifying the energy supply and energy carriers</p>	(Department of Minerals and Energy, 1998)
White Paper on the Renewable Energy Policy of RSA 2003	<p>Pledges government support for the development, demonstration, and implementation of renewable energy sources for both small and large-scale applications</p>	(Department of Minerals and Energy, 2003)
Green Economy Accord (2011)	<ul style="list-style-type: none"> • The accord was signed between the government, labour and business representatives seek to shift the country’s economy towards sustainable development, green job creation, and industrial development • Committed to increasing the relay of renewable energy into the national electricity grid • Advocates the use of solar water heaters through mass installation and rebates (for consumers who switch from electric to solar geysers) <p>Promote increased investment in green industrial activities and the promotion of green skills at the technical level</p>	(SA Green Fund, 2015)
Solar Energy Technology Roadmap 2014	<ul style="list-style-type: none"> • Addresses the government's desire to integrate renewable energy technologies into the national energy mix whilst reducing the country's carbon emissions levels to help address its growing electricity generation needs, and its industrial heat needs by developing a long-term solar sector strategy to 2050 	(DST, DOE, 2014)

Policy	Key Policy Objectives	Source
	<ul style="list-style-type: none"> • Specialises in the following key areas: <ul style="list-style-type: none"> ○ Concentrated Solar Power (CSP) ○ Solar Photovoltaic (PV) ○ Solar Thermal (heating and cooling) ○ Research and Development into Hybrid Technologies and Solar Fuels • Solar energy generation is considered a non-consumptive use of natural resources as it produces zero greenhouse gas emissions during its operation <p>The advancement of renewable energy is a priority for South Africa where the government set a goal to generate 40GW of Solar Photovoltaic and Concentrated Solar Power and an additional 4GW electricity of Solar Water Heating by 2050</p>	
Provincial Policy: Eastern Cape		
The Eastern Cape Industrial Development Strategy 2011	<p>Sets out a number of strategic goals which include positive economic growth, ensuring that economic growth leads to labour absorption and ensuring that existing jobs are retained. In pursuit of these goals the Industrial Development Strategy identifies the need for:</p> <ul style="list-style-type: none"> • Research and development (R&D) and innovation • Skills development • Improving infrastructure and logistics • Providing developmental finance • Promoting investment, trade, and exports • Developing institutional structures <p>The achievement of these strategic goals is planned through the development of several key sectors including:</p> <ul style="list-style-type: none"> • Tourism • Chemicals and Petrochemicals • Agriculture and agro-processing • Capital goods • Green industries • Automotive <p>The Industrial Development Strategy also seeks to develop an industrial base for the manufacturing of components required for the production of solar cells, solar panels and certain components of wind turbines.</p>	(Department of Economic Development, Environmental Affairs and Tourism, 2011)
The Eastern Cape Sustainable Energy Strategy 2012	Seeks to layout the province's strategic direction in terms of the renewable energy industry. The focus of the strategy is to encourage sustainable, affordable, and environmentally friendly energy production by creating an enabling environment for energy production and sustainable technology, skills, and industry development.	(Department of Economic Development, Environmental Affairs and Tourism, 2012)

Policy	Key Policy Objectives	Source
	<p>This is to be achieved through several initiatives including:</p> <ul style="list-style-type: none"> • An intensive training programme among relevant decision-makers concerning renewable energy project approvals • The establishment of an implementation task team to provide potential investors with a one-stop-shop for renewable energy information in the province • Development of a provincial locational perspective of renewable energy • Lobbying Eskom to expedite and strengthen the transmission capacity of the former Transkei area • Lobbying the Department of Energy to set out a long-term programme for the procurement of renewable energy generation <p>Through the pursuit of these initiatives, the Eastern Cape Province seeks to become a leading and preferred destination for renewable energy investment in South Africa.</p>	
<p>Eastern Cape Provincial Economic Strategy (PEDS) 2016</p>	<p>The Eastern Cape PEDS seeks to create a clear, long-term vision and strategy for the growth and development of the Eastern Cape by building on the strength and opportunities of the province, while at the same time addressing its weaknesses and threats.</p> <p>In pursuit of this goal, PEDS identifies six high potential economic sectors that can catalyse growth in the province. These sectors are:</p> <ul style="list-style-type: none"> • Agri-industry • Sustainable energy • Ocean economy • Automotive • Light manufacturing • Tourism <p>With respect to sustainable energy, PEDS notes that the province must align all its energy opportunities to:</p> <ul style="list-style-type: none"> • Create the optimal institutional environment for the location of sustainable energy projects in the Eastern Cape • Harness the maximum possible value chain, localisation and industrialisation opportunities from sustainable energy projects • Ensure adequate and aligned skills development 	<p>(Department of Economic Development, Environmental Affairs and Tourism, 2016)</p>

Policy	Key Policy Objectives	Source
	<ul style="list-style-type: none"> • Link innovation, entrepreneurial and small business opportunities to sustainable energy projects • Link black industrialist opportunities to sustainable energy projects. 	
Eastern Cape Tourism Master Plan	<p>The master plan emphasises that the Eastern Cape possesses significant potential to capture large numbers of international and domestic tourists. In particular, the long and largely pristine coastline, natural and cultural and historical heritage are attractions that are in demand by all tourist groups.</p> <p>The plan states that the environmental sector often puts much emphasis on biodiversity conservation without necessarily linking it with eco-tourism. The plan states that much naivety has been observed about what ecotourism can do. The plan calls for improved implementation of policy that will see biodiversity promotion being embraced by the broader tourism industry and the need for improved awareness from players within the sector to reduce the adverse environmental impacts of tourism.</p> <p>It is recognised that the province does well to promote its game reserves and general wildlife destinations and natural attractions in the marketing of the province, but the province battles to compete with provinces such as Mpumalanga, Limpopo and KZN as a destination to fill all nature-based tourism demands.</p>	(Department of Economic Development, Environmental Affairs and Tourism, 2014)
Eastern Cape Environmental Management Bill	<p>This Bill ensures that the government of the Province of the Eastern Cape shall manage the environment in such a way that the basic right of every citizen can be realised. The Bill seeks to ensure that an adverse impact on the environment is limited and that the rights of all that live in the province with regard to the environment are protected.</p> <p>Applicable clauses within the bill in the context of this study include:</p> <ul style="list-style-type: none"> • Provides for the transfer of hunting and other rights of a holder of a certificate of the adequate enclosure. • Provides for the MEC's general powers in respect of wild animals. • Details restricted activities involving provincially protected and endangered species. 	(Department of Economic Development, Environmental Affairs and Tourism, 2019)

Policy	Key Policy Objectives	Source
	<ul style="list-style-type: none"> Stipulates obligations of holders of certificates of the adequate enclosure. <p>Details permit requirements of persons and businesses operating game parks etc.</p>	
District & Local Municipal Policy: Sarah Baartman DM & Blue Crane Route LM		
<p>Sarah Baartman District SDF 2013</p>	<p>The Sarah Baartman SDF observes that the district's economy is dependent on the natural resources of the area (tourism and production). As such, spatial planning initiatives need to support the implementation of the district's Socio-Economic and Enterprise Development Strategy (SEEDS) by:</p> <ul style="list-style-type: none"> Implementing effective spatial planning land use management Ensuring that the SDP identifies areas for renewable energy production Recognizing that game reserves and farming are playing a greater role in the economy Undertaking urban regeneration projects Identifying where infrastructure upgrading is required. Providing the spatial framework for the district's Area Based Plan (ABP) <p>The Sarah Baartman SDF further notes that the introduction of alternative energy generation infrastructure and the associated land-use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district (in the form of potential changes to the visual and cultural landscapes). This is an important consideration as part of the proposed site falls in an area identified by the SDF as the N2 development corridor which plans to link to the area to regional projects such as the Wild Coast N2 Toll Road.</p>	<p>(Sarah Baartman DM, 2013)</p>
<p>Sarah Baartman District IDP 2019</p>	<p>The Sarah Baartman IDP identifies the green economy (including, but not limited to renewable energy and ecosystem services) as a focal point of economic development in the district, noting that such investments are likely to have significant economic spinoffs for the region. To achieve this, the IDP proposes investing in natural capital so as to create a new generation of green and blue economy jobs rooted in renewable energy.</p> <p>The contribution of tourism as a key private sector-driven industry, is noted within the IDP, however, concern is drawn to the fact that from a district-wide perspective the contribution of the tourism economy to the regional economy in terms of total spending as a percentage of</p>	<p>(Sarah Baartman DM, 2019)</p>

Policy	Key Policy Objectives	Source
	GDP, has reduced from 13.8% in 2006 to 7.4% a decade later.	
Blue Crane Route Municipality IDP	<p>The Blue Crane Route Municipality identified renewable energy as a crucial aspect in securing energy for the future development of the municipality. The municipality is identified as having the potential to generate renewable energy and it also encompasses some of the largest energy-generating solar PV facilities in the country and currently supply electricity to the national grid, namely:</p> <ul style="list-style-type: none"> • Cookhouse Wind Farm • Amakhala Emoyeni Wind Farm • Nojoli Wind Farm • Golden Valley Wind Farm • Nxuba Wind Farm. 	(Blue Crane Route LM, 2020)
Blue Crane Route LED Strategy	<p>The Blue Crane Route LED notes that there is potential to generate hydroelectricity in the municipality to mitigate the electricity supply shortcomings in the area. In addition, opportunities were identified to generate green energy in the municipality, with the following projects proposed for the municipality under the pillar of alternative sources of energy:</p> <ul style="list-style-type: none"> • Identification of suitable sites and the construction of hydro-electric stations • Implement integrated electricity master plan • Energy crisis management committee • Recycling • Energy awareness campaign • Green energy e.g., solar energy. 	(Blue Crane Route LM, 2008)

The review of the policy environment suggests that utilisation, application and investment in renewable energy sources in South Africa is considered to be an integral means of reducing the carbon footprint of the country, diversifying the national economy, reducing poverty and creating much-needed additional sources of energy. Any project contributing to the above-mentioned objectives can therefore be considered strategically important to South Africa.

From a provincial and municipal policy perspective, the facilitation of renewable energy projects and interventions that are related to the broader green economy is seen as a priority. The Eastern Cape Provincial Industrial Development Strategy makes particular reference to the need to develop green industries which include renewable energies. Likewise, the Blue Crane Route Municipality has noted the importance of solar energy in its IDP and are actively seeking to promote such developments.

2.2 Needs and Desirability

South Africa is currently experiencing electricity supply challenges, which in turn is leading to periodic periods of load shedding. The impact of load shedding has had massive impacts on the economy and society at large. Furthermore, the impacts of COVID-19, reduced business confidence and national sub-investment downgrades have all had impacts on the economy of the country. This section outlines the need and desirability of such a development based on the above-mentioned aspects.

2.2.1 South African electricity supply

South Africa's energy mix is largely focused on the use of non-renewable fossil fuels. The Department of Energy (DoE) notes that 83% of electricity production in South Africa is supplied by coal followed distantly by 6% pumped storage, 5% gas, 4% nuclear, 2% hydroelectric and 0,2% wind (DoE, 2019). It is noted by the DoE that renewables are the future of energy generation in South Africa especially as the costs of generating electricity through traditional means increases (DoE, 2019).

South Africa is also considered to be the world's 14th largest emitter of greenhouse gases (McSweeney & Timperley, 2018). The CO₂ emissions are principally due to a heavy reliance on coal to produce energy. South Africa has also pledged (through the Paris Accord) to reduce emissions and cap the amount of greenhouse gasses that would be emitted. This commitment was aligned to the national planning policy which promoted the utilisation of renewable resources to generate energy (McSweeney & Timperley, 2018).

Globally, there has been an increasing shift towards the responsible utilisation of non-renewable energy sources and sustainable and non-polluting methods of energy production. The Renewables 2019 Global Status Report (GSR 2019) noted that there has been an increase of the utilisation of renewable energy around the world and there has been a steady increase in the amount of MW produced by sustainable sources (Ren21, 2019). Global renewable power capacity grew to around 2 378 GW in 2018. For the fourth year in a row, additions of renewable power generation capacity outpaced net installations of fossil fuel and nuclear power combined. Around 100 GW of solar photovoltaics (PV) was installed – accounting for 55% of renewable capacity additions – followed by wind power (28%) and hydropower (11%). Overall, renewable energy has grown to account for more than 33% of the world's total installed power generating capacity (Ren21, 2019).

South Africa is regarded as a prime candidate for increased use of renewable energy with abundant natural resources of sun and wind. The further development of renewable energy will align with the current shift in international trends and align well with the available resources of the country. The cost of renewables, notably solar and wind, has fallen significantly in South Africa. Solar PV and wind costs have fallen 80% and 60%, respectively, in just four years (McSweeney & Timperley, 2018). New renewable capacity

is now “considerably cheaper” than coal plants proposed or under construction (McSweeney & Timperley, 2018).

Additionally, the supply of electricity in South Africa is currently exceptionally constrained. Load shedding in South Africa began in 2007 as a result of insufficient electricity generating capacity by the government-owned national power utility, Eskom. The advent of load shedding has brought numerous direct economic impacts, indirect economic impacts and social impacts to South Africa. These are outlined in the table below:

Table 2.2: The consequences of power interruptions

Direct Economic Impacts	Indirect Economic Impacts	Social Impacts
Loss of business and manufacturing production	Cost of postponed income	Loss of leisure time
Restart costs	Loss of market share	Risks to health and safety
Equipment damage	Limitations to expansion and growth of production	
Raw material spoilage	Loss of competitive advantages	
Cost of backup systems	Loss of investor confidence	

Source: Goldberg, 2015

These costs are associated with losses to productivity and limitation of growth for companies and as a result limit the growth of the country (Goldberg, 2015). Load shedding thus threatens jobs, economic recovery, and the livelihood of many South Africans around the country.

Local research done through government agencies has also noted the need for change in the electricity industry. NERSA (NERSA, 2020) has examined the electricity supply industry challenges and possible solutions for those challenges and has maintained that continued price increases for electricity is unsustainable as it reduces demand. The increase in electricity prices has led to an increase in the export of unbeneficiated ore which is likely to increase as the electricity price increases (NERSA, 2020). It has also been noted that there has been a reduction in export volumes of minerals which is likely a result of the increased price of electricity and unstable electricity supply. It has also been noted that the negative trend in exports mimic the GDP growth trends, which seems to be inversely proportional to electricity prices (NERSA, 2020). NERSA has also noted that electricity price is a significant cost driver for some sectors. The increase in electricity cost has a greater impact on some sectors such as the metals, steel and mining industry and less of an impact on other industries such as the transport industry.

New energy trends have also been noted by NERSA (NERSA, 2020). Their position is that the obligation to supply the majority of domestic, commercial, and small industries energy (day load) should be removed from Eskom and be supplied by renewable energy IPP sources (NERSA, 2020).

It can thus be deduced that at a national level any additional energy production which is sustainable, and renewable would improve energy security, further South Africa's goals towards international agreements, provide employment and assist in improving investor confidence in the country.

2.2.2 Likely impact of COVID-19 on the South African economy

As stated above, the impact of COVID-19 has yet to be fully quantified as the pandemic is still ongoing at the time of drafting this report. Predictions from various sources indicate that the impact of COVID-19 on the global economy may be similar or slightly worse than the global financial crisis of 2007-2008. Indeed, at this point, the large declines in bank equity prices since mid-January 2020 suggest that investors are concerned about profitability and prospects for the banking sector (Adrian and Natalucci, 2020). For example, measures of bank capitalisation based on market prices are now worse than during the 2008 global financial crisis in many countries. The concern is that banks and other financial intermediaries may act as an amplifier should the crisis deepen further (Adrian and Natalucci, 2020).

Emerging markets risk bearing the heaviest burden in this time of distress. In fact, emerging markets have experienced the sharpest portfolio flow reversal on record—about \$100 billion or 0.4 per cent of their GDP—posing stark challenges to more vulnerable countries (Adrian and Natalucci, 2020). South Africa has not been spared this burden which, has been exacerbated as a result of the sub-investment downgrade by credit rating agencies in 2017 and 2020.

At a local level, the SARB expects the GDP of South Africa to grow by 4.2% for 2021 and by 2.3% in 2022 (SARB, 2021) with the revenue shortfall projected at R 213.2 billion for 2020/21. The consolidated budget deficit doubled between is expected to be approximately 9.3% of GDP during the 2021/22 period and then to drop to 6.3% of GDP by 2023/24 (National Treasury, 2021). Additionally, the growth South Africa currently finds itself in will likely continue at 4.2% for the rest of 2021(SARB, 2021).

Once this shock to the economic and social system has been dealt with at a national and international level, there will be a need to strengthen and develop the South African economy. One of the necessary components of a functional economy will be the provision of a stable electricity supply. The South African energy provision system is currently and has in the past decade been, notoriously unreliable which has had a major impact on investor confidence and the overall development of the country.

2.2.3 National sub-investment downgrades

On March 27th, 2020, Moody's Investor Service (Moody's) downgraded South Africa's long-term foreign-currency and local-currency issuer ratings to Ba1 from Baa3 (Junk Status).

Moody's is the third and last of the major credit rating agencies to downgrade South Africa to junk status after Standard & Poor's and Fitch's both downgraded South Africa in 2017 (Duvenage, 2020).

While these sub-investment ratings are worrying for the country, it is difficult to understand and predict what will happen to the currency in the short and medium-term and currency fluctuations may occur. This is largely as a result of global dynamics that are currently in play, in particular the appetite for safe-haven assets which is a far more powerful force than any of the local challenges that are emerging (Duvenage, 2020).

One of the known impacts of the downgrade was that South Africa fell out of the World Government Bond Index (WGBI) and other popular bond indexes, an index that measures the performance of fixed-rate, local currency, investment-grade sovereign bonds. The sub-investment rating means that South Africa has dropped out of some of the widely used global bond indexes and forced international funds which track these indexes to sell South African bonds. It is estimated that between \$22-\$28 billion in the capital has already flowed out of local markets since 2018 with the recent downgrade account for between \$1,5 and \$8 billion (Duvenage 2020; McGregor 2020).

This will likely result in a rise in government debt-servicing costs which could bring strain to the already frail economic system with revenue shortfalls and contraction in GDP (Duvenage, 2020; McGregor, 2020).

Furthermore, on the 29th of April 2020, Standard & Poors Global Ratings further downgraded South Africa's sovereign credit rating into non-investment grade citing the impact of COVID-19 on South Africa's public finances and economic growth as one of the reasons for its ratings action (Swart & Goncalves, 2020). The downgrade casts further doubt over South Africa's ability to recover post-COVID-19.

Some other impacts expected from the downgrade, include the deterioration of South Africa's credit reputation, less access to conventional credit markets; deterioration in consumer and business confidence leading to a potential contraction in private investment and consumption demand; South Africa losing its status in various bond indices whereby some bond investors with mandate limitations are prohibited from buying the country's bonds; and a large forex outflow as foreign investors dump South African debt (Swart & Goncalves, 2020).

In terms of direct impacts on the construction of the proposed solar PV facility is that of currency fluctuations. With an unstable local currency, there may be unexpected and unplanned costs involved when importing technology for the project. The development and utilisation of local supply chains could go a long way in minimising the risks associated with currency fluctuations.

2.2.4 Assessment of business confidence levels in South Africa

The SACCI Business Confidence Index (BCI) grew by 2.3 index points from 92.2 index points in January 2020 to 94.5 index points in January 2021. This was followed by a slight drop in BCI to 94.3 in February 2021. However, BCI levels rose significantly to 97.0 in May 2021 making it the highest level since March 2018 (97.6 index points).

This was due to a huge improvement in the business climate owing to increased foreign merchandise export volumes caused by international higher commodity prices which positively impacted balance of payments, exchange rate and fiscal revenue coupled with the stronger rand, and to increased manufacturing output (SACCI, 2021a).

The BCI declined from 97.0 index points in May 2021 to reach 91.0 index points in September 2021. This represented a decrease of 2.3 index points year-on-year in business confidence between September 2020 (85.7 index points) and September 2021 (91.0 index points). This represented a 0.9 index point decrease from 91.9 index points in August 2021(SACCI, 2021a) (SACCI, 2021b).

The decrease in BCI in September 2021 was due to the decline in the business mood due to effects of the looting and disruption experienced in certain parts of South Africa during July 2021. The following indicators should be taken into consideration when analysing the business environment as they negatively contributed to the BCI:

- Lower decline in retail sales volumes
- Diminished manufacturing output
- Lower real value of building plans passed
- Higher inflation
- Share prices
- Energy and water supply (increase in the prices of utility tariffs) ()
- High fuel prices
- The US-dollar price of precious metals (SACCI, 2021b).

However, there were positive contributors to the BCI, including:

- Exports
- Imports
- Vehicle sales
- Real financing cost
- Rand exchange rate (SACCI, 2021b).

Thus, the business confidence levels in South Africa have been uncertain owing to the abovementioned conditions. Overall, the SACCI BCI trended downwards from 103.3 to 91.0 index points between September 2014 and September 2021. This was equivalent to -1.8% Compound Annual Growth Rate (SACCI, 2021b). Furthermore, business confidence levels in the country plunged to their lowest levels in more than two decades in the first

quarter of 2020 to reach 70.1 index points in May 2020 due to the effects of the COVID-19 and oil price drops. These issues affect both the local and global economies (SACCI, 2021b). It should be noted that the BCI does not factor in the full potential economic impact of COVID-19 and only highlights the recent trends of COVID-19 which still need to be fully quantified.

The further development of renewable energy would likely lead to an improved supply of electricity for the development of the economy. This is likely to improve business confidence in the country as sustainable energy supply is one of the key concerns of business moving forward. International investors have also noted, with concern, that the lack of availability of a consistent energy system does not lend itself to the growth of Foreign Direct Investment (FDI) (Santander, 2020). The development of renewable energy systems is seen by local and foreign business owners as the future of energy generation and may increase business confidence both locally and internationally (Kovaleski, 2019).

2.3 Synthesis

The review of the policy and planning legislation outlines that the proposed solar project development strongly aligns with the policies at a national, provincial, and local level. The needs and desirability section outlines the importance of such a development to the economy and society at large of the country.

3. SOCIO-ECONOMIC PROFILE OF THE STUDY AREA

This chapter documents various aspects of the primary study area including, population and household numbers, income levels and employment. In addition, the chapter also reviews the economic structure and performance of the study area.

The intention of this review is to provide an overview of the socio-economic context of the area so as to better understand the dynamics of the area and to inform the SEIA process.

3.1 Population, Income and Employment Profile

The Blue Crane Route Municipality falls within the Sarah Baartman District Municipality and collectively account for 19% of the population, and 18% of the households in the district. The Blue Crane Route Municipality is the least populous local municipality in the district with 41 324 inhabitants which makes up less than 9% of the total population of the district.

Population growth between 2008 and 2018 was 0,7% year-on-year for the Blue Crane Route Local Municipality which was fairly stagnant when compared to the Sarah Baartman District (1%) but, slightly larger than the Eastern Cape (0,2%) over the same period.

Table 3.1: Overview of the primary & secondary study areas population structure

Indicator	Eastern Cape	Sarah Baartman District	Blue Crane Route Local Municipality
Area (km ²)	168 966	58 243	11 069
Population	6 522 734	463 934	41 324
Number of Households	1 659 171	128 423	11 107
Population density (km ²)	38,6	8	3,7
Average household size	3,9	3,6	3,7
Annual population growth (2008-2018)	0,24%	1%	0,7%
Average monthly household income	R 9 139	R 10 758	R 8 705

Source: Quantec Standardised Regional (2020); Stats SA (2011) forecast to 2020

The disposable average monthly income of households in the Blue Crane Route Local Municipality was R 8 705 which was 19% lower than the average for Sarah Baartman District Municipality (R 10 758) and 5% lower than the average for the Eastern Cape. The number of households with no formal income in Blue Crane Route is 11% which is similar to the average for the district at 12,7% but, lower than the provincial level of 15%. These values indicate that the Blue Crane Route Municipality is a low income, low growth area of the province.

Table 3.2: Employment profile of the study areas

Indicator	Eastern Cape	Sarah Baartman District	Blue Crane Route Local Municipality
Employed	1 228 511	152 437	11 557
Unemployment Rate	32,8%	19,1%	21,6%
Not Economically Active	1 986 792	110 127	10 644
Labour force participation rate	47,9%	63,1%	58,1%

Source: Quantec Standardised Regional (2020)

The review of the employment profile of Blue Crane Route indicates that just over a fifth of the economically active population within the municipality is formally unemployed (see Table 3.2). The unemployment rate and labour force participation rate in the Blue Crane Route Local Municipality were slightly worse than that of the Sarah Baartman District Municipality (Unemployment rate: 19,1%; Labour force participation rate: 63,1%) but, better when compared to the Eastern Cape values.

The low population growth rate, relatively high unemployment rate and lower labour force participation relative to the district averages further suggests that the Blue Crane Route Local Municipality is subject to outward migration due to the limited number of employment opportunities available within the local municipality.

3.2 Economic Profile

The following subsection outlines the economic profile at a national as well as a provincial and local municipal level.

Nationally, South Africa's Real Gross Domestic Product (GDP) for the first quarter of 2019² declined by 3.2% quarter-on-quarter (seasonally adjusted and annualised). This was followed by a recovery of the economy, with a growth of 3.2% in the second quarter of 2019. However, the third quarter of 2019 saw a decline of 0.6%. A further decline of 1.4% was experienced in the fourth quarter of 2019 which indicates that South Africa is in a technical recession (StatsSA, 2019) (StatsSA, 2020).

3.2.1 Regional economic profile

The GVA (Gross Value Added) of the Blue Crane Route Local Municipality was R 1,3 billion in 2018 (constant prices), which collectively accounts for just over 6,9% of the district economy's GVA, and 0,6% of the Eastern Cape's GVA (Quantec, 2018). This suggests that the Blue Crane Route is small in terms of its GVA contribution to the Sarah Baartman District and has limited economic outputs. The largest sectors in the municipality include Trade (24%), Finance (17%), Community Services (14%) and Manufacturing (14%).

² Latest published data available

Table 3.3: Economic Structure of the Eastern Cape Province, Sarah Baartman District and Blue Crane Route Local Municipalities between 2008 and 2018 (constant 2010 prices)

Sector	Eastern Cape		Sarah Baartman District		Blue Crane Route Municipality	
	2008	2018	2008	2018	2008	2018
Agriculture and hunting	1,7%	1,6%	7,0%	6,4%	8,9%	6,3%
Mining and quarrying	0,3%	0,3%	0,1%	0,1%	0,0%	0,0%
Manufacturing	14,9%	13,6%	11,6%	13,9%	12,4%	14,1%
Electricity, gas, and water	1,4%	1,2%	1,7%	1,5%	1,4%	1,0%
Construction	3,6%	3,8%	5,0%	4,7%	4,6%	4,4%
Trade	19,4%	19,5%	21,7%	21,1%	21,3%	24,1%
Transport and communication	8,6%	8,9%	6,8%	7,7%	9,6%	12,1%
Finance and business services	19,9%	20,6%	19,4%	20,1%	14,0%	17,1%
Community services	22,6%	22,9%	19,1%	17,7%	19,4%	14,3%
General government	7,7%	7,5%	7,6%	7,0%	8,5%	6,6%
TOTAL GVA	R 189 068	R 214 384	R 16 134	R 19 183	R 1 073	R 1 330

Source: Quantec Standardised Regional (2020)

The growth of the Blue Crane Route Municipality over the last few years was largely due to the strong performance of the finance and business services sector (finance, insurance, professional business services), transport (shuttle services, taxi industry etc.), manufacturing (brickmaking, building equipment, aquaculture equipment etc.), and trade sectors. These sectors have grown their contribution to the GVA at a larger rate than other sectors e.g., Agriculture, Construction etc. Electricity, gas, and water only contribute a small margin to the economy of Blue Crane Route however, some of these industries have been strained, especially water.

Table 3.4: 2018 GVA per sector for the Blue Crane Route Local Municipality (2010 constant prices; in R' millions)

Sector	Blue Crane Route Local Municipality		
	2008	2018	Compound Annual Growth Rate (CAGR)
Agriculture and hunting	R95,8	R84,3	-1,2%
Mining and quarrying	R0,0	R0,0	-
Manufacturing	R132,7	R187,7	3,2%
Electricity, gas and water	R14,8	R13,5	-0,8%

Sector	Blue Crane Route Local Municipality		
	2008	2018	Compound Annual Growth Rate (CAGR)
Construction	R49,1	R59,1	1,7%
Trade	R228,0	R320,0	3,1%
Transport and communication	R103,5	R160,6	4,1%
Finance and business services	R150,1	R227,0	3,8%
Community services	R208,0	R189,6	-0,8%
General government	R90,9	R88,1	-0,3%
TOTAL GVA	R1 072,9	R1 329,9	2,0%

Source: Quantec Standardised Regional (2020)

Over the last ten years, the CAGR of Blue Crane Route was +2%. The growth of the above-mentioned sectors was somewhat offset by the stagnation of the agriculture sector and the reduction of the growth in the general government and community services sectors which have been in upheaval in the area especially with regards to the provision of health, water, and other essential services to communities in the area.

As evident by Table 3.5, the agricultural sector has experienced a significant decline in terms of its employment levels between 2008 and 2018. This has resulted in the sector shedding over 519 formal jobs in a ten-year period. This decline in employment could possibly be attributed to the longstanding drought that the area has recently experienced. The local area has also experienced a gradual movement away from traditional livestock farming towards game farming and eco-tourism.

The tourism sector is not accounted for as a stand-alone sector according to Statistics South Africa's Standard Industrial Classification (SIC) reporting of economic activities. Rather, elements of the industry are accounted for within the trade, agricultural & hunting, as well as finance & business services sectors. From a district-wide perspective the contribution of the tourism economy to the regional economy in terms of total spending as a percentage of GDP has reduced from 13.8% in 2006 to 7.4% a decade later (ECSECC, 2017). This is attributed to an annual average drop in tourist visits by -3.55% p.a in the same period. International Tourist visits over the period have seen a slow but steady increase of 1.75% p.a.

The local agricultural sector includes limited subsistence (informal) farming, unlike other areas in the Eastern Cape where this practice is more dominant. The presence of this

subsistence agricultural means that the number of households that are dependent on agricultural activities for income could be slightly greater than the figures presented in Table 3.5. This is due to the fact that the table only indicates those individuals that are formally employed in the agricultural sector.

Table 3.5: Employment structure and contribution of the Blue Crane Route Local Municipality between 2008 and 2018 per economic sector

Sector	Contribution to Employment per Sector		Change in Absolute Values 2008-2018
	2008	2018	
Agriculture and hunting	30,2%	24,9%	-15,3%
Mining and quarrying	0,0%	0,0%	-
Manufacturing	6,9%	6,9%	3,9%
Electricity, gas, and water	0,2%	0,2%	-7,4%
Construction	4,9%	5,7%	18,3%
Trade	19,1%	24,6%	32,5%
Transport and communication	2,6%	4,0%	56,7%
Finance and business services	7,7%	10,2%	36,0%
Community services	9,1%	8,2%	-7,7%
General government	19,3%	15,4%	-18,0%
TOTAL EMPLOYMENT	11 241	11 557	2,8%

Source: Quantec Standardised Regional (2020)

In general, agricultural activities are relatively labour intensive, thus a small decline in the size of the sector would generally lead to greater job losses than for example in manufacturing or utilities, which tend to be more capital intensive in nature. The agricultural sector is also frequently one of the largest employers in rural areas and it is for these two reasons that the sector is generally prioritised in development strategies. An important aspect to note is that finance and business services now account for a larger proportion of labourers in the municipality than agriculture.

In consideration of the proposed location for the solar project development, as well as all adjacent properties and properties within viewshed of the proposed development, the majority of these fall within Ward 6 of the Blue Crane Route Local Municipality. According to the latest Ward demographic data, a total of 2,704 individuals are employed and reside within this area of the municipality (Quantec Standardised Regional, 2020). It is anticipated given the land-use dynamics of Ward 6, that most employment positions are within the agricultural and tourism-related industries. Employed persons in Ward 6, comprise approximately 23% of total employment within the Blue Crane Route Local Economy.

Aside from the primary sector, industries such as General Government, Community Services, and Utilities a decline in employment levels between 2008 and 2018. Many of these job losses were, however, offset by growth in other industries within the tertiary sector, particularly Transport, Finance and Trade.

3.3 Profile of the Immediately Affected Environment

A profile of the immediately affected environment was developed utilising available secondary information and interviews with landowners of the affected area.

The solar project is planned to be developed in conjunction with the surrounding Redding Wind Farm, although it is noted that these are separate projects from an operational perspective. In order to develop a comprehensive understanding of formal economic activities and businesses that operate within the broader study area in which the proposed solar project and various renewable energy projects which are proposed to be developed, a database of farm portions and corresponding ownership was developed in conjunction with the Savannah Public Participation Team and the visual impact specialist. The intention of this database formulation and subsequent contact with landowners was to solicit business, and enterprise-specific data, so as to better understand the economic activity and employment dynamics of the area.

A full list of landowners contacted as part of the Redding WEF SEIA (to be developed on the same property), as well as new engagements held during the compilation of this SEIA is presented in Annexure A.

3.3.1 Land use and settlement patterns

The majority of the study area³ is sparsely populated (less than 10 people per km²) and consists of a landscape of wide-open spaces and very little development. The relatively low rainfall has as a consequence that the region has not been transformed by dryland agriculture, with irrigated agriculture (crop circles) and dryland crop production primarily limited to areas along the Brak and Little Fish Rivers (LOGIS, 2021b).

Besides the limited cultivation of crops, the study area is largely in a natural state, with mainly sheep and some game farming as additional economic activities.

Farm residences, or homesteads, dot the landscape at an irregular interval. These homesteads are generally located at great distances from each other (i.e., more than 3 km apart). Some of these within the study area include:

- Britskraal 1 and 2

³ As presented by the full spatial area in Map 1.1

- Sarahdale
- Stillerus
- Rooiplaas
- Jordaanskraal
- Karee Krans
- Glentana
- Alwingate
- Request
- Draai van Visrivier
- Glen Roy
- Stonefountain
- Russel Park (LOGIS, 2021).

Most of these homesteads are located on farms earmarked for the proposed Redding Wind Farm (LOGIS, 2021b).

There is an airfield (Henry's Flats Aerodrome) to the far north of the study area, approximately 5.5km north of the proposed PV facility (at the closest). This airfield is no longer operational. The airfield and the Jordaanskraal homestead are located on farms earmarked for the proposed Rippon Wind Farm. There is also another airfield (indicated on the SA 1:50 000 topographical maps) at the Glentana homestead (dairy farm), but it appears to be under irrigation and not functioning as an airfield anymore (LOGIS, 2021b).⁴

The N10 national road provides motorised access to the region from the city of Port Elizabeth, the largest urban centre closest to the site (approximately 130km by road). Another 16km gravel road (the Beenleegte secondary road) provides the quickest access to the proposed development site from the N10. This road splits off from the N10 near the Rippon Substation (LOGIS, 2021b).

There are no designated protected areas within the region and there are no other identified tourist attractions or destinations within the study area (LOGIS, 2021b).⁵

3.3.2 Socio-economic profile of the directly and indirectly affected areas

From the data obtained from surveyed landowners on which the various Wind Farm projects proposed in the area are to be developed, it is estimated that agricultural operations (including hunting and tourism) in the directly affected area employ approximately 50-60 people, the majority of whom are permanent employees. Most of the employees live on the farm and those who do not, live in Cookhouse, Paterson, or Somerset East. An additional 35 people live on the farms who are not labourers.

⁴ Information received from neighbouring landowners and the project proponent indicates that neither of the airfields is operational.

⁵ Sources: DEAT (ENPAT Eastern Cape), NBI (Vegetation Map of South Africa, Lesotho and Swaziland), NLC2013-14 (ARC/CSIR), REEA_OR_2021_Q1 and SAPAD2019-20 (DFFE).

It is recognised that many farms in the area practice a combination of crop, livestock and hunting activity. As such, most farms are involved in all three land uses as indicated previously. The dominant activity currently undertaken on farms that were surveyed was agriculture but, notable numbers of tourist activities occur on the farms. The following observations were made regarding land use:

- All of the farmers are commercial farmers
- Goats and sheep were the most common animals found in the area (6 150 animals) followed by game (580 animals and then beef cattle (150 animals) across all respondents surveyed
- The average size of property owned was 2 946 and ranged between 850 and 7 300 ha
- The majority of labourers live on the farms they work on with their family members
- Livestock animals reared for sale and kept for the production of food products include goats, sheep, and cattle
- All of the farms were the primary residence of the farm owner
- Very few, if any, international tourists visit directly affected farms for tourism or hunting
- Approximately 65 domestic tourists visited the area in a year. All being for hunting
- Some of the farms have accommodation facilities for visitors
- Farms receive visitors mostly between April and December
- Some of the game farms earn income through the trading of live game

The immediate area surrounding the proposed Sun Garden Solar PV Facility is very similar in terms of land use however there is no evidence of any tourism accommodation facilities offering overnight opportunities. In terms of the Blitzkraal Farm itself on which the largest footprint of the PV Facility will be developed, current economic activity can be described as follows:

- Agricultural activity is mainly focused on small-stock farming, this includes 120 Boer goats, 850 merino sheep and 150 dormer sheep. Limited cattle are kept on the property which consist of 11 Tuli cattle and 2 Jersey cattle.
- The total grazing area on the farm is approximately 2 700 ha.
- Only dryland agriculture is practised with no irrigation.
- There are around 5 residential houses on the property.
- Five families live permanently on the property, with a total of 4 permanent employees and 1 temporary employee all of whom reside on the property.
- Storage facilities comprise of 1 shearing shed and 5 storage facilities
- The owners intend to diversify, or expand farming operations if feasible and farm upgrades are likely to be undertaken on the farm which include fencing upgrades, adding irrigation and facilities to intensify farming operations and increasing livestock numbers, maintenance and upgrades of the current facilities, etc.

- The development is expected to positively impact employment as there is a possibility that more jobs will be created as the farming operations intensify and expand and no job losses are projected.

The owners have indicated that the potential revenue received from rental income derived from the PV facility could be utilised to invest in solutions to mitigate challenges currently facing the agricultural industry in the surrounding area i.e., droughts, feed prices etc. In addition, the owners are exploring options to diversify their farming activity and move into more intensive forms of agricultural activity, producing niche products for the regional market. Their intention is to retain all existing labour on the farm, and hopefully increase employment numbers when the need arises.

. 4. IMPACT ASSESSMENT ASSUMPTIONS

This chapter of the report describes the assumptions used in the socio-economic impact assessment study and specifically in the economic modelling exercise which aims to quantify the economic impact of the project. The assumptions presented in this chapter refer to construction, operation, and decommissioning assumptions applicable to the project as provided by Sun Garden (Pty) Ltd).

4.1 Sun Garden Solar PV Facility Assumptions

The proposed facility will have a maximum installed capacity of 400 MW. The assumptions specific to the phases of the project's lifespan are provided in the following sub sections.

4.1.1 Construction phase assumptions

The following assumptions regarding the construction phase of the proposed solar energy facility are made:

- The construction of the facility is assumed to commence in 2022/3 contingent on project approval and will take 30 months to complete.
- Construction will overlap for all projects sequentially.
- The total South African investment into the establishment of Sun Garden Solar PV Facility is valued at R 3.6 billion in 2021 prices.
- Only local expenditure is considered in this impact analysis.
- The construction of the facility will create short-term employment opportunities equivalent to 1 047 project-specific full-time equivalent (FTE) employment positions over the period of construction which **will be South African based residents**
- Only the South African based employment positions will be considered for this facility.

4.1.2 Operational phase assumptions

The assumptions regarding the operational phase of the project used in the modelling exercise are as follows:

- The facility is anticipated to begin operating once construction is completed in mid-2024.
- The facility will operate for 25 years.
- The operations and maintenance cost of the facility will be valued at R 150.4 million per annum over the 25-year operational life of the project.
- The operation of the facility will create an estimated 50 full time equivalent (FTE) employment positions annually (for 25 years) for the lifetime of the operation of the facility of which **all are intended to be South African based residents**
- Only South African based employment positions will be considered for this facility.

4.1.3 Decommissioning phase assumptions

The costs of decommissioning the plant are not yet known. Given the nature of solar technology and the unlimited solar energy resource, it is highly likely that instead of decommissioning the plant, the facility will be refurbished in order to extend its lifespan beyond the 25-year period.

5. POTENTIAL ECONOMIC IMPACTS AS A RESULT OF THE SOLAR ENERGY FACILITY

This chapter of the report seeks to describe the economic impacts that are expected to occur as a result of the development of the Sun Garden PV Facility.

5.1 Defining Economic Impacts

Economic impacts can be defined as the effects (positive or negative) on the level of economic activity in a given area(s). The net economic impact is usually measured as the expansion or contraction of an area's economy, resulting from the changes in (i.e., opening, closing, expansion or contraction of a facility, project, or programme).

5.1.1 Temporal nature of impacts

All new projects/interventions have two basic types of investments namely an initial capital injection/expenditure (CAPEX) which can take the form of either a greenfield development (i.e., new construction project on vacant land) or brownfield development (i.e., a modification of an existing structure and there is an annual investment made to maintain/operate the investment).

The economic impacts created by a capital injection (CAPEX) are once-off impacts that will only occur for the duration of construction. Thus, economic impacts associated with the construction phase are not sustainable economic impacts. Operational economic impacts, unlike capital expenditure economic impacts, are sustainable and thus are calculated as an annual impact based on operational expenditure (OPEX) for a given year.

It is important to note that due to the temporal nature of CAPEX and OPEX, impacts should not be accumulated to determine the 'total' economic impact.

5.1.2 Types of economic impacts

The net economic impact of an exogenous change in the economy will be translated according to various direct and indirect economic effects, as are defined below:

- **Direct economic impacts:** These are the changes in local business activity occurring as a direct consequence of public or private activities in the economy, or public programmes and policies. Furthermore, increased user benefits lead to monetary benefits for some users and non-users (individuals and businesses) within the geographical area:

- * For affected businesses, there may be economic efficiency benefits in terms of the product cost, product quality or product availability, stemming from changes in labour market access, cost of obtaining production inputs and/or cost of supplying

finished products to customers. For affected residents, benefits may include reduced costs for obtaining goods and services, increased income from selling goods and services to outsiders, and/or increased variety of work and recreational opportunities associated with greater location accessibility.

- **Indirect and induced impacts:** The direct benefits to businesses and the residents of communities and regions may also have broader impacts, including:
 - * Indirect business impacts – business growth for suppliers to the directly affected businesses and potential growth of municipal revenue due to raised taxes and service levies.
 - * Induced business impacts – business growth as the additional workers (created by direct and indirect economic impacts/effects) spend their income on food, clothing, shelter and other local goods and services.

5.1.3 Economic impacts considered

The direct and indirect economic impacts listed are measured according to the following broad economic variable categories:

- **Production/Business Sales:** refers to the value of all inter- and intra-sectoral business sales generated in the economy as a consequence of the introduction of an exogenous change. Explained more simply, new business sales equate to additional business turnover as a result of the introduction of an exogenous change in the economy.
- **Contribution to GVA:** GVA is a broader measure of the full income effect. This measure essentially reflects the sum of wage income and corporate profit generated in the study area as a result of an exogenous change in the economy.
- **Employment:** Refers to the employment resulting from the construction or operation of the project under investigation.
- **Personal Income:** Refers to the salaries and wages earned as a result of the employment generated from the development of the proposed solar PV facility

Using the Input/Output model methodology, various anticipated direct and indirect economic impacts of construction and operational phases of the proposed solar energy facility have been identified. These economic impacts have been derived using an understanding of economic cause-effect relationships. The principle of cause-effect is that for any economic activity, there can be a multitude of different economic reactions (effects).

5.2 Economic Impacts During the Construction Phase

The following table outlines the potential economic impacts during the construction phase of the proposed Sun Garden PV Facility. The total impact on production/business sales is likely to equate to R 9,2 billion (direct, indirect, and induced) for the duration of construction with a notable portion spent within the Eastern Cape. The total impact on GDP (direct, indirect, and induced) is likely to be R 1,8 billion and create 3 116 FTE employment positions over the period of 30 months. These will largely be felt through the construction sector and through the value chains associated with the construction of a solar PV facility.

Table 5.1: Estimated impact on the national and local economies (R' million, 2020 prices) as well as employment (FTE positions) for the duration of construction

Indicator	Direct	Indirect	Induced	TOTAL
Impact on Production				
TOTAL	R 3 600	R 4 058	R 1 580	R 9 238
Impact on Gross Domestic Product				
TOTAL	R 1 118	R 491	R 185	R 1 794
Impact on Personal Income				
TOTAL	R 475	R 545	R 203	R 1 223
Impact on Employment				
TOTAL	1 047	1 348	721	3 116

**As per the table above that total on-site staff numbers vary at different points during the 30-month construction process with peak direct on-site employment at 580 and off-site employment at 118.*

5.3 Economic Impacts During the Operational Phase

The table below provides the potential economic impacts during the operational phase of the proposed Sun Garden Solar PV Facility this specifically relates to the impact derived from the anticipated direct spend in the maintenance and upkeep of the facility.

The total impact on production/business sales is likely to equate to R 334.4 million (direct, indirect, and induced) per annum and will largely be spent in the Eastern Cape. The total impact on GDP (direct, indirect, and induced) is likely to be R 120,6 million per year. It is anticipated that 113 South African based FTE employment positions will be created for the operation of the proposed solar PV facility per annum. The total impact on employment will be 113 FTE employment positions which will largely be experienced in the utilities sector and other value chains associated with solar PV facility operations.

Table 5.2: Estimated impact on the national and local economies (R' million, 2020 prices) as well as employment (FTE positions) for the operational phase

Indicator	Direct	Indirect	Induced	TOTAL
Impact on Production				
TOTAL	R 150,3	R 116,6	R 67,4	R 334,4
Impact on Gross Domestic Product				
TOTAL	R 83,5	R 23,0	R 14,1	R 120,6
Impact on Personal Income				
TOTAL	R 92,0	R 33,6	R 14,7	R 140,3
Impact on Employment*				
TOTAL	50	56	7	113

**As per the table above the impact on employment was calculated based on the assumption that the 400 MW solar project would create 20 permanent jobs and 30 temporary jobs on-site, during the operational phase of the facility. Whereby, the temporary jobs are equivalent to 6 months' worth of work over a full year.*

6. ASSESSMENT OF IMPACTS AS A RESULT OF THE SOLAR ENERGY FACILITY

This chapter of the report seeks to describe and assess the economic and socio-economic impacts that are expected to occur as a result of the development of the Sun Garden PV Facility. This chapter also provides a net effect and trade-off analysis of the development of the solar energy facility in order to determine the preference of one option over another. This chapter has separated the assessment of the Sun Garden Solar PV Facility into the projects three lifecycle phases namely construction, operation, and decommissioning.

6.1 Construction Phase Impacts

The following sections indicate the impacts that are likely to occur during the construction phase of the proposed solar energy facility. Since the facility is expected to have both positive and negative effects in terms of the same indicator, the evaluation of impacts has been grouped accordingly.

6.1.1 Positive impacts during construction

a) Temporary stimulation of the national and local economy

The proposed Sun Garden Solar PV Facility will cost R 3,6 billion (2020 prices) to establish. This will equate to a total impact of R 9,2 billion (direct, indirect, and induced) on production/new business sales in the country. The localised expenditure on the project will stimulate the local and national economies albeit for a temporary period of 30 months during construction.

As indicated in Table 5.1 it is estimated that the project will increase the GDP directly in the country by R 1,1 billion in 2020 prices, which will translate into a total impact of R 1,8 billion (direct, indirect, and induced) of Gross Domestic Product (GDP) (see Table 5.1). These effects will take place for the duration of construction.

The greatest effects on production and GDP stimulated during construction activities will be created through the multiplier effects, specifically through a combination of production and consumption induced effects. The former refers to the impact generated along with backwards linkages when the project creates demand for goods and services required for construction and subsequently stimulates the business sales of the suppliers of inputs that are required to produce these goods and services. The latter refers to the effects of household spending which is derived from an increase in salaries and wages directly and indirectly stimulated by the project's expenditure.

Sectors and industries that will experience the greatest stimulus from this expenditure include:

- Basic metals, structural metal products and other fabricated metal products industries
- Trade
- Insurance
- Transport services
- Electrical machinery and apparatus

Nature: Temporary increase in the GDP and production of the national and local economies during construction		
	Without enhancement	With enhancement
Extent	National (4)	National (4)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	48 (Medium)	56 (High)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> • The developer should encourage the EPC contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies. • The developer should engage with local authorities and business organisations to investigate the possibility of procuring construction materials, goods and products from local suppliers were feasible. 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

b) Temporary increase in employment in the national and local economies

The construction of the facility will create 3 116 Full Time Equivalent (FTE) employment positions over the course of the development based in South Africa (see Table 5.1). Approximately 20% of the employment positions involve skilled Black South African construction workers, with the remaining being managers, professional engineers, and supervisors. Based on estimates by Sun Garden (Pty) Ltd, it is anticipated that 60% of the FTE positions will be filled by people from local communities.

As evident by Table 3.6, the construction sector of the Blue Crane Route Municipality is relatively small employing only 653 people in 2018 (Quantec, 2018). The area, however, is fairly close to the Nelson Mandela Bay Metro which has a significantly larger construction sector that employs approximately 19 951 people (Quantec, 2018). Given the size of the construction sector within these municipalities, it is anticipated that there will be sufficient local labour to satisfy the demand for 1 047 South African based construction workers. Furthermore, if most of the local staff comes from the Blue Crane Route Municipality it will

have a positive effect on local unemployment particularly since the area experiences an unemployment rate above the provincial average.

Beyond the direct employment opportunities that will be created by the project during the construction phase, the development will also have a positive spin-off effect on the employment situation in other sectors of the national and local economies. Through the procurement of local goods (i.e., consumption induced effects) the project will support an estimated total of 1 348 FTE employment positions (indirect). Most of these positions will be in sectors such as construction, business services and trade.

The expenditure on the project outside of the local economies will also have a positive effect on employment creation, albeit for a temporary period of 30 months. Through the production and consumption induced impacts the project is envisioned to create an estimated additional 721 FTE employment (induced) positions. Given that a significant portion of the multiplier effects will be generated through backward linkages, more than half of these FTE employment positions will be created along the supply chain and amongst industries providing inputs to the businesses in the supply chain.

Based on these figures the total contribution of the development towards employment creation in South Africa is estimated at 3 116 FTE employment positions. Throughout the construction phase, it is recommended that the developer encourage the EPC contractor to fill as many local positions as possible using labour from within Blue Crane Route Municipality rather than from outside of the municipal boundaries.

Nature: Temporary increase in employment in local and national economies		
	Without enhancement	With enhancement
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Very High (9)
Probability	Highly probable (4)	Highly probable (4)
Significance	52 (Medium)	56 (Medium)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> • Coordinate with the local municipality and relevant labour unions to inform the local labour force about the project that is planned to be established and the jobs that can potentially be applied for. • Establish a local skills desk (in Somerset East, Riebeek East and Cookhouse) to determine the potential skills that could be sourced in the area • Recruit local labour as far as feasible • Employ labour-intensive methods in construction where feasible • Sub-contract to local construction companies particularly SMMEs and BBBEE compliant enterprises where possible 		

<ul style="list-style-type: none"> Use local suppliers where feasible and arrange with the local SMMEs to provide transport, catering, and other services to the construction crews.
<p>Residual Impacts:</p> <ul style="list-style-type: none"> Experience gained in the construction of solar PV facilities.

c) Contribution to skills development in the country and local economy

The construction of the proposed Sun Garden Solar PV Facility is likely to have a positive impact on the skills development in South Africa. During the solar panel installation period which is included as part of the construction phase and is planned to be conducted in the Eastern Cape, it is likely that foreign technical experts will be involved. This will present an opportunity for skills and knowledge transfer between these technical experts and local manufacturers.

It is also expected that the construction staff involved in the project will gain knowledge and experience in respect of the development of solar energy facilities. This will be highly beneficial given South Africa’s target of generating 40 GW of solar energy by 2050 (DST, DOE, 2014). More skilled local construction staff would most likely also lower the cost of future solar projects in the province. Since it is estimated that 60% of the construction workers will be from local communities, these workers will probably be able to utilise these new skills over the long run, in other developments proposed in the local area.

In addition to the direct effects of the project on skills development in the country and the local economy, the project could contribute to the development of the local research and development (R&D) and manufacturing industries associated with solar technology. This could be achieved through partnerships with Rhodes University (situated in the Blue Crane Route Local Municipality) or the Nelson Mandela University (NMU) in Port Elizabeth. Partnerships of this nature could further enhance the development of new skills and expertise.

Nature: Contribution to skills development in the country and the local economy		
	Without enhancement	With enhancement
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Highly Probable (4)
Significance	33 (Medium)	44 (Medium)
Reversibility	No	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> Facilitate knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases 		

<ul style="list-style-type: none"> • Set up apprenticeship programmes to build onto existing skill levels or develop new skills amongst construction workers, especially those from local communities • Facilitate broader skills development programme as part of socio-economic development commitments
<p>Residual Impacts:</p> <ul style="list-style-type: none"> • South Africa’s human capital development • Improved labour productivity and employability of construction workers for similar projects • Possible development of local skills and expertise in R&D and manufacturing industries related to solar technology through partnerships with Rhodes University and NMU

d) Temporary increase in household earnings

The proposed solar energy facility will create an estimated total of 3 116 South African based FTE employment positions during construction generating R 1,2 billion of revenue for the affected households locally and around the country through direct, indirect, and induced effects. Of this figure R 475 million will be paid out in the form of salaries and wages to those individuals directly employed during the construction phase. The remaining R 748 million in households’ earnings will be generated through indirect and induced effects resulting from project expenditure. Given the average household size in the Blue Crane Route Local Municipality and Eastern Cape is 3,7 and 3,9 respectively, a total of between 5 169 and 5 448 people are likely to benefit from the employment positions created and the income derived through these 1 047 FTE employment positions.

Although temporary, this increase in household earnings will have a positive effect on the standard of living for these households. This is especially applicable to the households benefitting from the project that resides in the Blue Crane Route Municipality and broader Eastern Cape.

Nature: Temporary improvement of the standard of living of the positively affected households		
	Without enhancement	With enhancement
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Highly Probable (4)
Significance	33 (Medium)	52 (Medium)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> • Recruit local labour as far as feasible to increase the benefits to the local households • Employ labour-intensive methods in construction where feasible • Sub-contract to local construction companies where possible 		

<ul style="list-style-type: none"> Use local suppliers where feasible and arrange with local SMME's and BBBEE compliant enterprises to provide transport, catering, and other services to the construction crews
<p>Residual Impacts:</p> <ul style="list-style-type: none"> Possible increase of households' saving accounts Improved standard of living of the affected households

e) Temporary increase in government revenue

The investment in the Sun Garden Solar PV Facility will generate revenue for the government during the construction period through a combination of personal income tax, VAT, companies' tax etc. Additional government revenue will also be earned through corporate income tax, however since the gross operating surplus of the EPC contractor employed to construct the facility is not known, an estimate of the overall corporate income tax value is not possible at this stage. Government earnings will be distributed by the national government to cover public spending which includes amongst others the provision and maintenance of transport infrastructure, health, and education services as well as other public goods.

Nature: Temporary increase in government revenue		
	Without enhancement	With enhancement
Extent	National (4)	National (4)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	40 (Medium)	40 (Medium)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> None suggested 		
Residual Impacts:		
<ul style="list-style-type: none"> None envisioned 		

6.1.2 Negative impacts during construction

a) Negative changes to the sense of place

In order to determine the potential impacts of solar farms on the sense of place, a review of literature has been undertaken that specifically focused on examining the impact of solar farms on the sense of place, in areas that are generally associated with high visual sensitivity to man-made infrastructure (areas considered to be undeveloped i.e., rural). The following table summarises the key insights gathered from the review of the research undertaken in the above-mentioned areas.

Table 6.1: International Solar PV Facility Literature

Factor	Description
Study	The role of community acceptance in planning outcomes for onshore wind and solar farms: An energy justice analysis
Area	Great Britain
Date and authors	The study completed in 2018 by Philippa Roddisa, Stephen Carvera, Martin Dallimerb, Paul Normana, and Guy Ziva
Methodology	<ul style="list-style-type: none"> • Three case studies on England, Scotland and Wales with similar policy drivers and planning legislation for renewable energy and comparable data availability • Secondary research based on surveys undertaken with the communities residing in the study areas • Data were analysed using binomial logistic regression
Key findings	<ul style="list-style-type: none"> • Public consultation, statutory consultees, non-statutory consultees are undertaken to get views of the public on planning applications to the Local Planning Authority (LPA) • Citizens highlight material arguments relating to specific projects (in support or opposition) to decision-makers thus community acceptance was highly associated with planning outcomes for onshore wind and solar farms • Aesthetics and visual impacts are strongly associated with planning outcomes for both onshore wind and solar farms • Deployment of onshore wind and solar PV facilities can be beneficial to the local communities through community benefit packages, to landowners through land rental agreements or sales of electricity to the grid, and local authorities through the accrual of business rate • In terms of aesthetics, and increased ruggedness score decreased the likelihood of planning approval for solar farms by a 14.4% per unit increase • The proximity of the solar farm to Special Areas of Conservation or 'SACs' (protected areas designated under the EU Habitats Directive) had a positive effect on the likelihood of planning consent for solar farms: applications were 2.1% less likely to be approved every 1 km further away they were from a SAC • Non-agricultural lands were more likely to get approval for solar farms than productive lands (Roddis, P., Carver, S., Dallimer, M., Norman, P., Ziv, G., 2018)
Study	Renewable Energy, Authenticity, and Tourism: Social Acceptance of Photovoltaic Installations in a Swiss Alpine Region
Area	Switzerland
Date and authors	The study completed in 2015 by Annina Helena Michel, Matthias Buchecker, and Norman Backhaus
Methodology	<ul style="list-style-type: none"> • Examination of perceptions towards technical suitability and social acceptance of avalanche barriers as a site for solar panels • A questionnaire survey in order to examine tourist and resident's perception towards: <ul style="list-style-type: none"> ○ Photovoltaic installations on avalanche barriers ○ Factors influence these perceptions and attitudes

Factor	Description
	<ul style="list-style-type: none"> ○ Acceptance of avalanche barriers as sites for photovoltaic installations in comparison to acceptance of other photovoltaic sites ○ Questions supported by photographs regarding people's preferences for landscape.
Key findings	<ul style="list-style-type: none"> • Photovoltaic installations on avalanche barriers were accepted by all categories of survey participants • Acceptance of solar energy production sites is strongly related to the type of site i.e., urban, industrial settings; meaningful buildings; and open lands • Photovoltaic installations on avalanche barriers were accepted and only a little less positively rated than installations in urban, industrial settings • It is crucial to consider the local context when discussing solar energy acceptance • Diverse aspects can influence residents' perceptions of new infrastructure • There is a need to find a balance among economic benefits, landscape protection, and residents' and tourists' needs for local progress and preservation to establish a sustainable energy program (AH Michel, M Buchecker, N Backhaus, 2015)
Study	The Social-Environmental Impacts of Renewable Energy Expansion in Scotland
Area	Scotland
Date and authors	Completed in 2007 by E. Ariel Bergmann, Sergio Colombo, and Nick Hanley
Methodology	<ul style="list-style-type: none"> • The study used the Choice Experiment (CE) analysis to investigate the impacts of environmental changes and the costs or benefits imposed on people. It used two criteria to identify attributes for use in the Choice Experiment that selected attributes should be 1) significant for analytical purposes, so the findings will provide useful information for policy making and 2) be meaningful to respondents. Whereby the attributes were categorised into positive and negative impacts arising from a wide range of renewable energy projects that will be developed in the near future. Thus, to identify the attributes the study conducted a series of focus groups (Dewar, 2003) and informal interviews in urban and rural locations. The study considered numerous forms of renewable energy which comprised of windmills, hydro schemes, tidal and wave power, solar (photovoltaic and hot water panels), geothermal and biomass or waste combustion. <p>The following five attributes were selected through the focus groups for the choice experiment:</p> <ul style="list-style-type: none"> • impacts on landscape, • impacts on wildlife, • impacts on air pollution, • creation of long-term jobs and • increases in electricity prices.
Key findings	1) Renewable energy projects should have a lower environmental impact on air pollution than gas, oil, and coal. Even though both groups agreed with this notion the urban sample held heterogeneous preferences and around 10%

Factor	Description
	<p>of this group did not care if renewable energy projects even increase air pollution.</p> <p>2) Projects should not harm wildlife. Projects which have the potential to slightly harm the wildlife are less likely to be chosen. On the other side, projects that produce a slight improvement on wildlife were preferred to ones that have no impact on it by both rural and urban residents.</p> <p>3) Projects should be aesthetically pleasing. Though the preferences were heterogeneous for this attribute:</p> <ul style="list-style-type: none"> • Some people considered a solar PV facility or a reservoir for a hydro scheme as a beautiful feature of a modern landscape, whilst others considered them as negative aberrations on the landscape. <p>Other important characteristics which were identified were:</p> <ul style="list-style-type: none"> • the creation of high skill jobs with the rural respondents is influenced by projects that create new permanent jobs, unlike the urban sample. • a possible increase in electricity prices, the higher the cost associated with any alternative, the lower the probability that alternative had of being chosen. • the abundance and sustainability of resources, • and more opportunity for localised control and responsibility of the project • both age and education influenced choices. People who were younger than 41 years and/or earned a higher education degree were more likely to support renewable energy projects • income was not a significant determinant of choice which could be the result of the modest increase in electricity prices in the experiment still being affordable to all respondents (Bergmann, E.A., Colombo, S., and Hanley, N., 2007).

The conclusion that can be drawn from the above is as follows:

- A significant majority of residents engaged in the various studies considered, support the use of solar energy to generate “clean” electricity and they appear to be even more in favour than the wider public of alternative energy sources.
- Local residents in close proximity to solar farms are more likely to have negative perceptions and attitudes towards solar farms due to the negative impacts they could have on the environment, wildlife, and landscapes. This is particularly the case for those residents or stakeholders who are not involved and benefiting from the project (Bergmann, E.A., Colombo, S., and Hanley, N., 2007) (AH Michel, M Buchecker, N Backhaus, 2015).

From the above, it can be surmised that it cannot be ruled out with confidence whether solar farms have or do not have a negative impact on local communities’ sense of place but, those studies that pointed to the possible negative effects report marginal and not detrimental impact on sense of place (Roddis, P., Carver, S., Dallimer, M., Norman, P., Ziv, G., 2018) (Bergmann, E.A., Colombo, S., and Hanley, N., 2007). One trend that seems to be common though is that the outcry against solar farms is generally considerably greater during the pre-construction stage than during operations suggesting

that initially perceived negative impacts to be associated with solar farms do not always come to fruition.

A community's sense of place is developed over time as it embraces the surrounding environment, becomes familiar with its physical properties, and creates its own history. The sense of place is created through the interaction of a number of different factors such as the area's visual resources, its aesthetics, climate, culture, and heritage as well as the lifestyle of individuals that live in and visit the area. Most importantly, it is a highly subjective matter and depends on the demographics of the population that resides in the area and their perceptions regarding trade-offs.

For example, a community living in poverty is generally more likely to be accepting of industrial-type development that promises employment opportunities while a more affluent residential area is more likely to oppose such a development on the grounds that the development is not likely to generate gains for the community (Sinding, 2009).

The area proposed for the Solar Energy Facility development as well as its surrounds does not currently have any large-scale industries or high-rise buildings, however, the proposed development site of the PV facility is in close proximity to the N10 National Road. Noise and light intrusion during the night in the area is notable. Visitors and inhabitants to directly affected farms would already be familiar with recently constructed WEFs in the broader municipal area, these being the Cookhouse Wind Farm, Amakhala Emoyeni Wind Farm, Nojoli Wind Farm, Golden Valley Wind Farm and Nxuba Wind Farm. Given the above-described agricultural characteristics, the area can be defined as being largely rural.

During the construction of the proposed solar energy facility, there are likely to be noise and dust impacts caused by the movement of vehicles as well as construction activities on site. These impacts are anticipated to occur primarily during the day with illumination from the site being experienced during the night. The presence of this noise is likely to alter the way the surrounding environment is experienced by households in the area. As construction activities progress and the footprint of the facility grows, the visual impact will also become more apparent, and the sense of place experienced by households residing within the visually affected area will be altered further.

It is anticipated that residents residing on the farms on which solar PVs are proposed to be established will experience the greatest disruption in their sense of place during the construction period. Individuals who live on the surrounding farms will, over the course of the construction phase of the project, be subjected to either visual or noise disruptions that are currently not present in the area.

The anticipated visual impact of the proposed PV facility on the regional visual quality, and by implication, on the sense of place, is difficult to quantify but is generally expected to be of low significance. This is due to the relatively low viewer incidence within close proximity to the proposed development site (LOGIS, 2021b).

As stated, the sense of place of local residents is likely to begin to be altered once the construction of the proposed facility begins. Visual impacts will, however, remain for the entire operation of the development (This is discussed in more detail in Section 6.1.2). This means that although the effect on the sense of place could be relatively small considering the population to be affected, the duration of the impact increases it significantly. It is advisable that all efforts be made to address the factors that will affect an individual's sense of places such as visual effects and noise pollution to make them less intrusive.

Engagements undertaken by Urban-Econ with the neighbouring property owners that fall within the impact area (indicated in Map 1.1) revealed that they have not expressed any resistance to the development from a visual perspective. There are also very few visitors and no tourists that stay on the adjacent properties who will experience the diminishing value in the sense of place.

Nature: The potential impact on the sense of place of the region.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (21)
Reversibility	Negative	
Status (positive or negative)	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures:		
<u>Planning:</u>		
	➤ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude.	
<u>Operations:</u>		
	➤ Maintain the general appearance of the facility.	
<u>Decommissioning:</u>		
	➤ Remove infrastructure not required for the post-decommissioning use.	
	➤ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impacts:		
The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.		

Source: (LOGIS, 2021b)

b) Temporary increase in social conflicts associated with the influx of people

Neither the Blue Crane Route nor the surrounding municipalities are sufficiently diversified to supply the entire workforce for the construction of the proposed solar energy facility,

particularly in terms of skilled positions. A significant number of the unskilled and semi-skilled workers required during the construction phase will however be sourced locally. It is estimated that up to 60% of jobs that will be created during the construction phase could be filled by labour coming from the local municipalities and the nearby communities located outside of its boundaries. In addition, given the scale and extent of the development, the project is likely to attract job seekers from other parts of the country, particularly from within the Eastern Cape. This would be in addition to the migrant workers contracted to work on the project.

The migration of people to the area could result in social conflicts between the local population and the migrant work force as the local population could perceive these migrant workers as “stealing” their employment opportunities. Likewise, the influx of people into the area, could potentially lead to a temporary increase in the level of crime, illicit activity and possibly a deterioration of the health of the local community through the spread of infectious diseases. Semi-skilled and unskilled construction workers could also choose to remain in the area following the completion of the construction phase. Without any form of income these individuals run the risk of exacerbating the level of poverty within Blue Crane Route.

Aside from the broader community issues the increase in the number of people in the area is likely to have an adverse effect on crime levels, incidents of trespassing, development of informal trading and littering. There is also potentially a likelihood of increased stock theft.

The influx of job seekers and the potential social conflicts that can arise with in-migration of temporary workers to an area is difficult to mitigate. Appropriate awareness campaigns and strict adherence to recruiting practices could, however, reduce the extent of the adverse effect.

Addressing the challenges related to potential social impacts is best done in partnership with all stakeholders in the area, specifically the affected and adjacent property owners, local communities, ward communities and municipalities. This would promote transparency; information sharing and help build good relationships between all affected parties. In addition, all opportunities that would include the community in the project should be explored and where possible implemented. Employment opportunities, including the provision of ancillary services, are particularly relevant in this incidence as the creation of employment opportunities for locals could eliminate the potential alienation between the community and the project as well as migrant workers.

The developer has indicated that staff accommodation would be constructed to accommodate the staff who will be constructing the solar energy facility. Accommodation will allow the staff to remain separate from the broader community which may decrease social conflicts associated with the influx of the workers.

Nature: Temporary increase in social conflicts associated with the influx of construction workers and job seekers to the area		
	Without mitigation	With mitigation
Extent	Regional (3)	Regional (3)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Improbable (2)
Significance	36 (Medium)	18 (Low)
Reversibility	Reversibility within a short period	
Status (positive or negative)	Negative	Negative
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> • Set up a recruitment office in the nearby towns (i.e., Cookhouse, Riebeek East, Somerset East) and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in the hope of finding temporary employment • Employ locals as far as feasible through the creation of a local skills database • Establish a management forum comprising key stakeholders to monitor and identify potential problems that may arise due to the influx of job seekers to the area • Ensure that any damages or losses to nearby affected farms that can be linked to the conduct of construction workers are adequately reimbursed • Assign a dedicated person to deal with complaints and concerns of affected parties • The construction of on-site accommodation will likely mitigate some social conflicts from taking place. The developer should, however, organise appropriate transport for the workers from the site to the nearest towns in order to access services or to buy goods. This will reduce the amount of time the staff spend walking to or from the site. 		
Residual Impacts:		
<ul style="list-style-type: none"> • Contribution towards social conflicts in the area by construction workers and job seekers who decide to stay in the area after construction is complete and who are unable to find a sustainable income 		

c) Impact on economic and social infrastructure

The proposed solar energy facility will create and estimated 3 116 FTE employment positions for the duration of the project. Given that these workers will require services there is likely to be an increase in the demand for social services, access to water and electricity.

According to the Blue Crane Route Local Municipality's IDP (2020) there are six (6) clinics, one (1) hospital, and one (1) mobile clinic in the municipal area. There is also a clinic situated in Riebeek East. Given the proximity of the development site to Cookhouse and Somerset East, it is most likely that the health facilities in the area will experience additional demand for medical services brought about by the influx of works and job seekers.

Access to water can sometimes be a significant concern in the area, although in general there the area is supplied with water. The supply of electricity can sometimes be erratic as well. If a construction camp is established to accommodate workers there will be a need for additional water and electrical connections for both the camp as well as the site office. These connections will, however, be minimal and it is unlikely to alter the demand significantly.

The effects of the project on road infrastructure should also be considered as it is highly likely that the development will lead to an increase in traffic volumes on surrounding roads. This could lead to a significant deterioration of local road conditions, specifically the N10 National Route, R355 and R400 regional road, the latter of which is already in a poor state of repair. The deterioration of these roads could place additional financial burdens on the municipality through additional maintenance costs. Additional traffic volumes are also likely to impact the condition of secondary roads used to access surrounding farms. The deterioration of secondary roads could add additional operating costs to farmers in the area due to delays in deliveries and damage to vehicles.

Based on the above discussion it is expected that the basic service provision, health facilities and road infrastructure will be under additional strain during the construction period. Given that the project is anticipated to attract additional people to the area the significance of the impact is considered to be low. These impacts can however be mitigated if the developer engages with the local municipalities and plans accordingly.

It is not expected that there will be significant impact on housing and accommodation as the developer has indicated that staff accommodation will be constructed to accommodate the workers for the duration of the construction phase of the project.

<i>Nature: Added pressure on economic and social infrastructure during construction as a result of increase in local traffic and in migration of construction workers</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Short-term (2)	Short-term (2)
<i>Magnitude</i>	Low (4)	Minor (2)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	36 (Medium)	21 (Low)
<i>Reversibility</i>	Reversible within a short period	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Provide adequate signage along the N10, R355 & R400 to warn motorists of the construction activities taking place on the site • Engage with local authorities and inform them of the development as well as discuss with them their ability to meet the additional demands on social and basic services created by the in migration of workers 		

- Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations

Residual Impacts:

- Further eroding of economic infrastructure and social services in the region which may not be suited to a large number of people utilising them at one time.

6.2 Operational Phase Impacts

The following section describes the impact that the proposed solar energy facility will have once it is operational. The facility is envisaged to have a lifespan of approximately 25 years which means that the impacts observed during this phase, regardless of whether the impacts are positive or negative, will be long-lasting. Quantified impacts in this section are presented as annual figures.

6.2.1 Positive impacts during operations

a) Sustainable increase in production and GDP nationally and locally

The proposed facility will require an annual operational expenditure of R 334 million over 25 years. The total impact on production in the country as a result of the project's operations will equate to R 120,6 million per annum in 2020 prices for the 25 years. Aside from the utilities sector, industries that will experience the greatest stimulus from the project will include electrical machinery and apparatus, insurance, trade, transport service and chemical production industry.

It is estimated that the project will generate R 150,4 million of value add per year over the 25-year period (comprising gross operating surplus before taxes and labour) and taxes. Through indirect and induced effects, an additional R 67,4 million of GDP will be generated per annum, which means that the total impact of the project on the national GDP will equate to R 334,4 million per annum in 2020 prices. The production and consumption induced multiplier effects of the project are considered to be relatively small compared to conventional electricity generating industries. This is because the energy source used to produce electricity by the proposed solar energy facility is free, unlike conventional power stations where raw inputs (i.e., coal) and the transport therefore comprise a significant portion of operating expenditure. It is for this reason that such a facility is a highly attractive business venture. In addition to the positive production and GDP impacts arising from expenditure related to the operation of the PV facility, the local economy is anticipated to be positively stimulated by expenditure related to the developer's intended socio-economic development contributions in the immediate area, these are detailed in Section 5.4.

The contribution to the Blue Crane Route Municipality although small relative to the combined size of the municipality's economy will nevertheless be positive and more importantly, a sustainable contribution.

Nature: Sustainable increase in production and GDP nationally and locally		
	Without enhancement	With enhancement
Extent	National (4)	National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (5)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	52 (Medium)	56 (Medium)
Reversibility	Benefits are sustained only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> The operator of the solar energy facility should be encouraged to, as far as possible, procure materials, goods and products required for the operation and maintenance of the facility from local suppliers to increase the positive impact in the local economy 		
Residual Impacts:		
<ul style="list-style-type: none"> None foreseen at this stage 		

b) Creation of sustainable employment positions nationally and locally

The proposed facility will create an estimated 50 permanent employment positions across the operational phase of the development which, will be retained for approximately 25 years. Of these, an estimated 50 will be South African based positions. It is envisaged that 75% of the skilled and low skilled staff will be employed from within the local area with the remaining staff being sourced from other parts of the Eastern Cape and the country. This means that approximately 7,5 out of 10 positions are expected to be filled by local labour, which is a small but positive contribution towards addressing the high unemployment rates observed in both the Blue Crane Route and the Eastern Cape.

Aside from the direct employment opportunities, the facility will support an estimated 13 FTE employment positions created through the production and consumption indirect and induced effects. Due to the spatial allocation of procurement spending and direct employment created, most of the indirect and induced positions will also be created within the local area. The trade, agriculture and community and personal services sectors will benefit the most from these new employment opportunities.

In addition to the planned employment creation during operation and maintenance of the PV facility, the developer intends to make a positive contribution to employment opportunities in other non-solar related industries.

Nature: Creation of sustainable employment positions nationally and locally		
	Without enhancement	With enhancement
Extent	Mostly local or regional (4)	Mostly local or regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (4)	Moderate (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	48 (Medium)	48 (Medium)
Reversibility	Benefits are sustained only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> • Where possible, local labour should be considered for employment so as to increase the positive impact on the local economy • As far as possible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the facility 		
Residual Impacts:		
<ul style="list-style-type: none"> • Experience in operating and maintaining a solar energy facility 		

c) Skills development of permanently employed workers

South Africa has a number of large-scale solar energy facilities with a large proportion located in the Eastern Cape and the Blue Crane Route. It is thus assumed that the skills base to operate and maintain such facilities should be readily available in the province. It is, however, likely that highly skilled personnel would need to be recruited from outside of the Blue Crane Route Municipality as the economy would not be diversified enough to attract such specialists. These employees would include skilled "mechatronics" engineers (specialised in both electrical and mechanical engineering) likely to be recruited from the Nelson Mandela Bay Metro. Maintenance will be carried out throughout the lifetime of the solar PV facility. A maintenance schedule usually involves an initial inspection after commissioning, semi-annual inspection, an annual inspection and two- and five-year inspections but this varies according to the turbine. Typical activities during maintenance include changing of oil, replacement of brake linings and cleaning of components.

Nature: Skills development of permanently employed workers		
	Without enhancement	With enhancement
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Definite (5)
Significance	44 (Medium)	55 (Medium)
Reversibility	No	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No

Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> The developer should consider establishing vocational training programmes for the local labour force to promote the development of skills required by the solar energy facility and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere in the future 		
Residual Impacts:		
<ul style="list-style-type: none"> Human capital development of the affected workers 		

d) Improved standards of living for benefitting households

The creation of an estimated 50 FTE employment positions throughout the country will generate R 92,0 million of personal income (2020 prices), which will be sustained for the entire duration of the project's lifespan. Given the average household size in affected local municipalities and nationally, this increase in household earnings will support up to 185 people. The sustainable income generated as a result of the project's operation will positively affect the standard of living of all benefitting households. This is specifically applicable to the Blue Crane Route Municipality, as the average income per employee at the facility would far exceed the average household income within these municipalities.

Nature: Improved standard of living for benefitting households		
	Without enhancement	With enhancement
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (5)	Moderate (6)
Probability	Probable (4)	Probable (4)
Significance	48 (Medium)	52 (Medium)
Reversibility	Benefits are sustainable only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy As far as feasible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the facility 		
Residual Impacts:		
<ul style="list-style-type: none"> None foreseen at this stage 		

e) Sustainable increase in national and local government revenue

The proposed facility will, through property taxes and salaries and wages payments, contribute towards both local and national government revenue.

At a local level, the project will contribute to local government through payments for utilities used in the operation of the facility. It will also increase its revenue through an increase in property taxes compared to the current level.

Given that the Blue Crane Route Municipality has a relatively small economy and considering the low rates base derived by the municipality (Blue Crane Route, 2020), any additional income would greatly benefit the municipality.

On a national level, the revenue derived by the project during its operations, as well as the payment of salaries and wages to permanent employees will contribute to the national fiscus. Although it is impossible to trace exactly how such revenue is allocated, any additional revenue generated means that national governments can increase its spending on public goods and services.

Nature: Sustainable increase in national and local government revenue		
	Without enhancement	With enhancement
Extent	National (4)	National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	48 (Medium)	48 (Medium)
Reversibility	Benefits are sustained only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None suggested 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

f) Local economic and social development benefits derived from the project's operations

The proposed Sun Garden Solar PV Facility will make a notable contribution to poverty and social and community development in the area. The developer has pledged that 2.5% of the gross annual revenue will be dedicated to socio-economic and economic development initiatives for the duration of operation of the solar facility. Thus, this revenue share of the project can subsequently be utilised for local social and economic development projects.

Since the community has not yet been selected, it is not possible to quantify the number of households that will be direct beneficiaries of the project at this stage.

Furthermore, the social and economic development plan will prioritise numerous local welfare projects and community development initiatives that will be directed at uplifting local people and improving their standards of living. The developer has indicated that of

the 2.5% of revenue that will be directed at socio-economic and economic development initiatives, 0.5% will be allocated to the Just Energy Transition, will the remaining 2% will be for normal SED projects and initiatives. Given the electricity generation potential of this project the annual SED contribution of the developer is expected to amount to R 19,05 million.

Nature: Local community and social development benefits derived from the project's operations		
	Without enhancement	With enhancement
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Definite (5)
Significance	52 (Medium)	65 (High)
Reversibility	Benefits could stretch beyond project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	Yes (enhanced)	
Enhancement:		
<ul style="list-style-type: none"> • A social development and economic development programme should be devised by the developer and implemented throughout the project's lifespan • The plan should be developed in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits • These plans should be reviewed on an annual basis and, where necessary, updated • When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises • In devising the programmes to be implemented, the developer should take into account the local Integrated Development Plans and Local Economic Development Strategy (Blue Crane Route, 2020) 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

g) Sustainable rental revenue for farms where the solar PV facility is located

It is anticipated that farms where the solar PVs are located on will enter into a rental agreement with the developer, in the case of this project it will include the owners of Blitzkraal Farm. The owners will likely thus receive rental revenue as a result of hosting the solar PVs on their property. The revenue that the owners of the properties receive will have a positive impact on the local economies especially if spent in the local area. This revenue is also likely to assist local property owners in dealing with economic shocks to their current business activities such as drought or unfavourable economic conditions that currently prevail. The revenue generated from the rental of land for the solar PVs will additionally assist farmers in investing in new technologies to improve the efficiencies of their current agricultural practices and allow farmers to better compete in the open market. While these impacts are notably only for those farms who have solar PVs located on their properties, the impact of additional revenue is likely to be very significant to those

impacted. As indicated in Section 3.3.2, the owners, with the additional rental revenue are intending to explore options to diversify their farming activity and move into more intensive forms of agricultural activity, producing niche products for the regional market. Their intention is to retain all existing labour on the farm, and hopefully increase employment numbers when the need arises.

Nature: Sustainable rental revenue for farms where the solar PV facility is located		
	Without enhancement	With enhancement
Extent	Site (1)	Site (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	35 (Medium)	35 (Medium)
Reversibility	Benefits could stretch beyond project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None suggested 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

h) Sustainable increase in electricity available for the local region and South Africa

The development of the solar PV facility will lead to a sustainable increase in the supply of electricity for the country. For this specific project, the generated electricity will be supplied to private off-takers, this making available additional Eskom supplied power to existing or new customers. It was noted in section 3 that lack of electricity and load shedding has had a notable impact on the economy of the country and is one of the reasons stated by foreign investors for the lack of investment in the country. With an improved supply of power to industry, there is likely to be an improvement in the economy as a whole.

It should be noted that while this solar PV facility alone is unlikely to make a large impact in the shortages of electricity in the country, the cumulative impact of all the proposed solar PV facility products in the region will be substantial. The combined energy production for the solar PVs planned for the area will be approximately 400 MW which begins to reflect a notable positive injection into the energy generation capacity from the region.

Nature: Sustainable increase in electricity available for South African industry		
	Without enhancement	With enhancement
Extent	National (4)	National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)

Probability	Definite (5)	Definite (5)
Significance	50 (Medium)	50 (Medium)
Reversibility	Benefits during projects lifespan only	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None suggested 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

6.2.2 Negative impacts during operations

a) Negative changes to the sense of place

The effects on the community's sense of place will initially be felt during the construction period and will continue into the operational phase. However, the literature review carried out in Section 6.1.2 highlighted that solar farm impact on the local communities' sense of place is generally considerably greater during the pre-construction stage than during operations. Given the proximity of the PV development site to the N10, noise and visual disturbances are already common in the area, as a result the sense of place changes are not anticipated to be significant. Given that the immediate area that is expected to experience visual impacts does not contain any tourism accommodation or hospitality facilities, the change in sense of place is not expected to result in any material change to economic activity and revenue currently derived by directly and indirectly affected properties.

Nature: Impact on the sense of place experienced by the local community as a result of visual effects that appear during the operation phase		
	Without mitigation	With mitigation
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	Low (22)	Low (22)
Status (positive, neutral, or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	

Generic best practise mitigation/management measures:

Planning:

- Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Operations:

- Maintain the general appearance of the facility.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual impacts:

The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.

6.3 Decommissioning Phase Impacts

Upon the expiry of the Sun Garden Solar PV Facility lifespan, the facility would need to be disbanded, although the facility would likely be upgraded in order to maintain and prolong the lifespan of the facility.

If the facility is decommissioned, the land will be rehabilitated in order to return it to pre-project conditions. This also means that all impacts whether positive or negative, which take place during the operational phase will cease to exist. At the same time spending on the disassembly of the components and rehabilitation of land will increase the demand for construction services and other industries, thus stimulating economic activity in the local area, albeit over a temporary period.

Socio-economic impacts stimulated during the decommissioning phase are expected to be similar to those that took place during the construction phase. They will also be temporary in nature, but most likely will take a much shorter time than the construction phase. They will also be associated with some expenditure, although it will be considerably less than the investment required during the development phase. Besides the positive impacts on production, employment, household income and government revenue that could ensue from the project, some negative impacts could also occur. These would largely be related to a slight increase in noise in the area surrounding the site, increase in traffic congestion on the N10, R355 and R400 and concerns over local safety and security due to a greater number of people accessing the area.

All of the positive impacts can be enhanced to increase the benefits to the local communities, while the negative impacts could be mitigated. The impacts though are expected to be of low significance due to the very short duration and, therefore, of lower magnitude. Enhancement and mitigation measures proposed for the construction phase impacts would also apply to the decommissioning phase. Overall, the impact that would

ensue during the decommissioning phase will mostly be of low significance and should not affect the decision regarding the proposed development.

6.4 Cumulative Impacts

The proposed development of Sun Garden Solar PV Facility cannot be considered in isolation. Cumulative impacts from other proposed developments in the region need to be taken into consideration. The developments considered as part of this assessment include:

- Sun Garden PV - Blue Crane Route
- Solaris Fields PV - Blue Crane Route
- Fronteer Wind Farm - Makana
- Wind Garden Wind Farm - Makana
- Hamlett Wind Farm - Blue Crane Route
- Ripponn Wind Farm - Blue Crane Route
- Aeolus Wind Farm - Blue Crane Route

6.4.1 Positive cumulative impacts during construction

a) Temporary stimulation of the national and local economy

As stated above, several renewable energy facilities are proposed to be built in the region. It is highly likely that if the projects are approved by government the demand for goods and services required for the construction of similar facilities would grow especially if they were constructed simultaneously. This could provide sufficient economies of scale and thus open opportunities for the establishment of new industries in the country and new businesses in the local area, specifically in the sectors that are not well represented in the economy. This would have a significant positive impact on the regional economies and a notable impact on the national economy.

<i>Nature: Temporary increase in the GDP and production of the national and local economies during construction</i>		
	<i>Overall impact of the proposed project considered in isolation</i>	<i>Cumulative impact of the project and other projects in the area</i>
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Short term (2)	Medium-term (3)
<i>Magnitude</i>	Very High (9)	Very High (9)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	60 (High)	64 (High)
<i>Reversibility</i>	Benefit is terminated with the end of construction	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be enhanced?</i>	No	
<i>Enhancement:</i>		
<ul style="list-style-type: none"> • None beyond enhancement at an individual project level 		

Residual Impacts:

- None foreseen at this stage

b) Temporary increase in employment in the national and local economies

With the number of renewable energy facilities (including PV sites) that are proposed for the region, it is highly likely that if authorities approve the projects the number of people employed from the local area would be significant. It would likely result in a significant temporary reduction in the unemployment rate in the area and increase the number of employed in the area during the construction phase of the development. This would be particularly significant if all proposed developments were constructed simultaneously.

Nature: Temporary increase employment in the national and local economies		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Medium-term (3)
Magnitude	Very High (9)	Very High (9)
Probability	Highly probable (4)	Highly probable (4)
Significance	56 (Medium)	60 (High)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond enhancement at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

c) Contribution to skills development in the country and local economy

The potential construction of numerous renewable energy projects will have a notable impact on the skills development in the region especially in the field of renewable energy. This will have a positive impact on an area that has notably been lacking skills development and employment opportunities.

Nature: Temporary increase employment in the national and local economies		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Medium-term (3)
Magnitude	High (8)	Very High (9)
Probability	Highly Probable (4)	Highly probable (4)
Significance	52 (Medium)	60 (High)
Reversibility	No	

Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond enhancement at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • South Africa's human capital development • Improved labour productivity and employability of construction workers for similar projects 		

d) Temporary increase in household earnings

The living standards in the region will likely increase for the affected households as earnings increase in the region. If construction of all proposed projects occurs simultaneously then it is likely that the cumulative impact will be notable for the region. The injection of earnings at a household level will have induced and indirect impacts on the local and regional economy as spending increases.

In addition to the planned employment creation during operation and maintenance of the solar facility, the developer intends to make a positive contribution to employment opportunities in other non-solar related industries. As part of the 2,0% SED revenue commitment of the developer, up to 2% of this could potentially be channelled towards both short- and long-term job opportunities on an annual basis. Projects bid through the government IPP programme are also required to implement a similar SED programme.

Nature: Temporary improvement of the standard of living of the positively affected households		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Medium-term (3)
Magnitude	High (8)	Very High (9)
Probability	Highly Probable (4)	Highly probable (4)
Significance	52 (Medium)	60 (High)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond enhancement at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • Possible increase of households' saving accounts • Improved standard of living of the affected households 		

e) Temporary increase in government revenue

The development of the proposed projects will likely increase government revenue through VAT, companies' tax, PAYE and income tax and property taxes. The impact of increased revenues for the local economies will be notable. At a national level this will result in lower government debt and servicing costs as revenue increases.

Nature: Temporary improvement of the standard of living of the positively affected households		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	National (4)	National (3)
Duration	Short-term (2)	Medium-term (3)
Magnitude	Low (4)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	40 (Medium)	48 (Medium)
Reversibility	Benefit is terminated with the end of construction	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:	<ul style="list-style-type: none"> None beyond enhancement at an individual project level 	
Residual Impacts:	<ul style="list-style-type: none"> None envisaged 	

6.4.2 Negative cumulative impacts during construction

a) Negative changes to the sense of place

The development of the proposed renewable energy facilities may have a notable impact on the change to the sense of place of the area. The broader area is currently perceived by residents and visitors as rural and "wild". This perception may change with the construction of the proposed renewable energy structures, particularly those closer to wildlife and hunting orientated properties and accommodation facilities. This could be particularly evident if construction occurs simultaneously.

Nature: Impact on the sense of place experienced by the local community as a result of visual and noise effects that appear during the construction phase		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site & immediate surrounding area (2)	Regional (3)
Duration	Short term (2)	Medium-term (3)
Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	40 (Medium)	56 (Medium)

Reversibility	Possible to reverse but only with decommissioning	
Status (positive or negative)	Negative	Negative
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> Altered characteristics of the environment Change in the perception of tourists of the local environment 		

b) Temporary increase in social conflicts associated with the influx of people

The number of projects planned for the area may entice job seekers from outside the region to move to the area in search of employment. The increase in job seekers to an area with already low levels of employment may lead to increased conflicts in the area. Such conflicts will need to be managed by engaging the communities, local authorities, and local labour unions. Managing expectations of the community is important to avoiding such conflicts at a project-by-project level.

The simultaneous construction of all the planned projects in the region will drastically increase the number of workers present in the area. This will be mitigated somewhat by the presence of staff accommodation for some developments but the presence of additional workers in the area may be a cause for conflict for local community members. It is thus vitally important that local community members are employed for the development of projects in the region.

Nature: Temporary increase in social conflicts associated with the influx of construction workers and job seekers to the area		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Short-term (2)	Medium-term (3)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	18 (Low)	30 (Medium)
Reversibility	Reversibility within a short period	
Status (positive or negative)	Negative	Negative
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> Contribution towards social conflicts in the area by construction workers and job seekers who decide to stay in the area after construction is complete and who are unable to find a sustainable income 		

c) Impact on economic and social infrastructure

The number of projects planned for the area will increase the number of workers and job seekers in the area. This may drastically increase pressure on economic infrastructure and social services for the area. Despite the provision of accommodation at some facilities, the additional staff may cause strain on the already delicate social and economic infrastructure in the area. It is thus important to employ local community members to reduce the influx of people to the area. This should be managed at a project-by-project level.

<i>Nature: Added pressure on economic and social infrastructure during construction as a result of increase in local traffic and in migration of construction workers</i>		
	<i>Overall impact of the proposed project considered in isolation</i>	<i>Cumulative impact of the project and other projects in the area</i>
<i>Extent</i>	Regional (3)	Regional (3)
<i>Duration</i>	Short-term (2)	Medium-term (3)
<i>Magnitude</i>	Minor (2)	Low (4)
<i>Probability</i>	Probable (3)	Probable (3)
<i>Significance</i>	18 (Low)	30 (Medium)
<i>Reversibility</i>	Reversible within a short period	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	No	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • Contribution towards social conflicts in the area by construction workers and job seekers who decide to stay in the area after construction is complete and who are unable to find a sustainable income 		

6.4.3 Positive cumulative impacts during operations

a) Sustainable increase in production and GDP nationally and locally

If other renewable energy facilities that have been proposed are approved in the Eastern Cape, together with the Sun Garden Solar PV Facility project, sufficient economies of scale could be created to establish new businesses in the local economies. These businesses could then supply the goods and services required for the operation and maintenance of the facility that cannot currently be procured in the area. This would contribute to the local economies' growth and development. Additional impacts would be the improved energy supply in the country as well as the reduced carbon emissions associated with generation of electricity.

<i>Nature: Sustainable increase in production and GDP nationally and locally</i>		
	<i>Overall impact of the proposed project considered in isolation</i>	<i>Cumulative impact of the project and other projects in the area</i>
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Long-term (4)	Long-term (4)

Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	56 (Medium)	64 (High)
Reversibility	Benefits are sustained only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

b) Creation of sustainable employment positions nationally and locally

The development of the proposed projects will create a notable number of sustainable employment positions for the region. The development of the Sun Garden Solar PV Facility will create 50 direct employment positions alone. The development of other renewable projects will be notable in the region as they will likely create a similar number of sustainable positions for the duration of the operation of the facilities.

Nature: Creation of sustainable employment positions nationally and locally		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	National (4)	National (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	56 (Medium)	64 (High)
Reversibility	Benefits are sustained only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

c) Skills development of permanently employed workers

As per the statement above, the development of the proposed projects is likely to further develop the skills of those employed by the renewable energy projects in the region. This will further increase the skills base in the area. As part of the developer's intended SED contributions to the immediate area, both on-project, and non-solar energy skills development initiatives will be funded for each PV facility development. The non-solar energy skills to be developed should be relevant and required in the region and should seek to provide value to the community and the environment.

Nature: Skills development of permanently employed workers		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	55 (Medium)	65 (High)
Reversibility	No	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

d) Improved standards of living for benefiting households

Those workers who are employed by the renewable energy facilities are likely to experience improved standards of living. This will be fairly notable in the region which has low levels employment, high levels of poverty and limited access to resources. It is likely that the development of the proposed renewable energy facilities will support between 3,7 and 3,9 members per household.

Nature: Improved standard of living for benefiting households		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long-term (4)
Magnitude	Moderate (6)	High (8)
Probability	Probable (4)	Probable (4)
Significance	52 (Medium)	60 (High)
Reversibility	Benefits are sustainable only over project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

e) Local economic and social development benefits

The benefits of the economic and socio-economic development initiatives that are to be developed as a result of the establishment and operation of the renewable energy facilities will be very notable in the region. The cumulative financial resources provided by the renewable energy projects will assist in reducing the levels of poverty in the Blue Crane

Route Local Municipality and surrounds as a result of multiple socio-economic development projects that would be run concurrently in the area. This will lead to improved standards of living for the members of the community that benefit from these programmes.

Additionally, it is possible that improvements in access to services will be felt by the local communities such as access to healthcare and municipal services. Local infrastructure will also be improved through the social and economic programmes planned which will be a benefit to the local economy and community.

Finally, local SMEs and organisations will greatly benefit for the economic support provided by the established socio-economic and economic development plans.

Nature: Local economic and social development benefits		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long-term (4)
Magnitude	Moderate (6)	High (8)
Probability	Definite (5)	Definite (5)
Significance	65 (High)	75 (High)
Reversibility	Benefits could stretch beyond project's lifespan	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

f) Sustainable rental revenue for farms where solar farms are located

As with the development of the Sun Garden PV Facility, there will likely be increased household incomes for households who have renewable energy infrastructure situated on their properties. This increased infrastructure may potentially lead to improved buying power in the local economy and an ability to improve their current farming practices. This in itself will lead to increase in employment on the participating properties and may further increase the employment rate in the area.

Nature: Sustainable rental revenue for farms where solar PV facilities are located		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site (1)	Local (2)
Duration	Long term (4)	Long-term (4)
Magnitude	Minor (2)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	35 (Medium)	50 (Medium)
Reversibility	Benefits could stretch beyond project's lifespan	
Status (positive or negative)	Positive	Positive

Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

g) Sustainable increase in electricity available for the local region and South Africa

While the development of a single solar PV facility is unlikely to dramatically improve the levels of electricity provision in the country, the development of the proposed renewable energy projects will provide a notable injection of electricity supply to a system that is under significant pressure. The increased levels of electricity provision throughout the country will be welcomed by industry as well as the wider society and will be a boon to an economy under stress.

Nature: Sustainable increase in national and local government revenue		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	National (4)	National (4)
Duration	Long term (4)	Long-term (4)
Magnitude	Minor (2)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	50 (Medium)	60 (High)
Reversibility	Benefits during projects lifespan only	
Status (positive or negative)	Positive	Positive
Irreplaceable loss of resources?	No	No
Can impacts be enhanced?	No	
Enhancement:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

6.4.4 Negative cumulative impacts during operations

a) Negative changes to the sense of place

The effects on the broader community's sense of place will initially be felt during the construction period and will continue into the operational phase of the various renewable energy facilities and infrastructure. This change in sense of place may be fairly notable in an area that has limited development in terms of pre-existing renewable energy facilities, however this is not the case for many residents and travellers within the N10 corridor as a result of the various WEFs recently built within the Cookhouse REDZ. There may be an overall increase in negative perceptions of the area due to the presence of other solar farms and WEFs in the surrounding area and may distress select members of the community and visitors to the area seeking a more rural and wildlife orientated perspective. It is however anticipated that these negative impacts will predominantly be

experienced by select visitors to wildlife orientated and hunting reserves within viewshed to the proposed WEFs.

Nature: Impact on the sense of place experienced by the local community as a result of visual effects that appear during the operation phase of the renewable energy facilities		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Site & immediate surrounding area (2)	Regional (3)
Duration	Long term (4)	Long-term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	48 (Medium)	52 (Medium)
Reversibility	Possible to reverse but only with decommissioning	
Status (positive or negative)	Negative	Negative
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> • None beyond mitigation at an individual project level 		
Residual Impacts:		
<ul style="list-style-type: none"> • None foreseen at this stage 		

6.5 Net Effect and Trade-Off Analysis

The review of the proposed Sun Garden Solar PV Facility is associated with both positive and negative socio-economic impacts. In order to assess whether the project is beneficial, the additions to the environment brought about by the project need to be evaluated. The additional benefits of the intervention are the difference between the reference case position (i.e., the no-go option) and the position if the intervention is implemented. It involves the evaluation of the net effect and trade-offs associated with the proposed intervention.

The table below provides a summary of the socio-economic gains and losses that are expected to ensue from the project during the different phases (i.e., construction, operation, decommissioning). Where gains and losses are quantifiable, figures have been included into the table in order to illustrate the total gain or loss during a particular phase. Where it was possible, local impacts were also quantified. These included direct as well as production and consumption induced impacts that could ensue from the direct effects.

Table 6.2: Summary of socio-economic gains and losses during construction and operation

Impact	Nature of Impact	Before Mitigation	After Mitigation
CONSTRUCTION PHASE			
Temporary stimulation of the national and local economy	Positive	Medium - positive	High - positive
Temporary increase employment in the national and local economies	Positive	Medium - positive	Medium - positive
Contribution to skills development in the country and local economy	Positive	Medium - positive	Medium - positive
Temporary increase in household earnings	Positive	Medium - positive	Medium - positive
Temporary increase in government revenue	Positive	Medium - positive	Medium - positive
Negative changes to the sense of place	Negative	Low - negative	Low - negative
Temporary increase in social conflicts associated with the influx of people	Negative	Medium - negative	Low - negative
Impact on economic and social infrastructure	Negative	Medium - negative	Low - negative
OPERATIONAL PHASE			
Sustainable increase in production and GDP nationally and locally	Positive	Medium - positive	Medium - positive
Creation of sustainable employment positions nationally and locally	Positive	Medium - positive	Medium - positive
Skills development of permanently employed workers	Positive	Medium - positive	Medium - positive
Improved standards of living for benefiting household	Positive	Medium - positive	Medium - positive
Sustainable increase in national and local government revenue	Positive	Medium - positive	Medium - positive
Local economic and social development benefits derived from the project's operations	Positive	Medium - positive	High - positive
Sustainable rental revenue for farms where solar PV facilities are located	Positive	Medium - positive	Medium - positive
Provision of electricity for future development	Positive	Medium - positive	Medium - positive
Negative changes to the sense of place	Negative	Medium - negative	Medium - negative

The following can be concluded from the data presented in table above:

- During construction:* The comparison of gains and losses associated with the project during the construction phase indicates that gains related to production, employment, skills development, government revenue and household income far outweigh the expected losses with regard to the same indicators. This shows that from a pure economic perspective the project's construction would be highly beneficial to the national economy and specifically the local economy which is affected by a relatively high unemployment level. The project will, however, bring some form of disruption in the lives of the local communities and will put additional pressure on the local economic and social infrastructure. Furthermore, there is a very low probability that the property values of nearby farms could be affected although evidence at a national and international level indicate this is highly unlikely. The main trade-off during the

construction phase would therefore be between the economic net benefits that would accrue in the national and local economies and the socio-economic negative impacts experienced by the local communities. The positive net effect on the economy though is deemed to be significantly greater than the negative net effects that can ensue from the project.

- *During operations:* The project is associated with a notably greater set of positive net impacts than negative net impacts. It is also evident that when considering the nation-wide effects of the project on production, employment, income, and government revenue it is associated with greater potential gains than losses. Locally, the project is also associated with greater positive economic gains than losses, especially in respect of community benefits, employment, and household income. Net negative impacts that can ensue from the project are expected to relate to the loss of sense of place. This impact will be caused by changes in aesthetics and visual resources of the environment and can be mitigated although not entirely eliminated. Nevertheless, the positive net effects are expected to outweigh the net negative impacts.
- *During decommissioning:* The impacts that can occur during decommissioning would be similar to those observed during the construction phase. These impacts would however be experienced over a much shorter period and would be associated with significantly lower gains. Some impacts on the local infrastructure and the lives of the communities in the area could take place, however, they will also be short lived. Overall, the trade-offs between positive and negative impacts would be small.

Table 6.3: Summary of cumulative socio-economic gains and losses during construction and operation

Impact	Nature of Impact	Proposed Project Impact in Isolation	Cumulative Impact
CONSTRUCTION PHASE			
Temporary stimulation of the national and local economy	Positive	High - positive	High - positive
Temporary increase employment in the national and local economies	Positive	Medium - positive	High - positive
Contribution to skills development in the country and local economy	Positive	Medium - positive	High - positive
Temporary increase in household earnings	Positive	Medium - positive	High - positive
Temporary increase in government revenue	Positive	Medium - positive	Medium - positive
Negative changes to the sense of place	Negative	Medium - negative	Medium - negative
Temporary increase in social conflicts associated with the influx of people	Negative	Low - negative	Medium - negative
Impact on economic and social infrastructure	Negative	Low - negative	Medium - negative
OPERATIONAL PHASE			
Sustainable increase in production and GDP nationally and locally	Positive	Medium - positive	High - positive

Impact	Nature of Impact	Proposed Project Impact in Isolation	Cumulative Impact
Creation of sustainable employment positions nationally and locally	Positive	Medium - positive	High - positive
Skills development of permanently employed workers	Positive	Medium - positive	High - positive
Improved standards of living for benefiting household	Positive	Medium - positive	High - positive
Local economic and social development benefits derived from the project's operations	Positive	High - positive	High - positive
Sustainable rental revenue for farms where solar PV facilities are located	Positive	Medium - positive	Medium - positive
Provision of electricity for future development	Positive	Medium - positive	High - positive
Negative changes to the sense of place	Negative	Medium - negative	Medium - negative

- *Cumulative impacts:* The table above indicates that many of the positive impacts will increase with the development of other renewable energy projects in the region. Employment, income, and skills development would drastically improve as the region will host a number of renewable energy facilities. If mitigated at a project level, many of the negative impacts can be managed and will not pose:
 - an unacceptable risk,
 - an unacceptable loss,
 - a complete change to the environment
 - an unacceptable increase in impact

Cumulatively, the positive impacts will greatly outweigh the negative impacts.

The review of the net effects of the project and the trade-offs between positive and negative impacts suggest that positive effects and impacts would outweigh the negative effects. This is largely due to the fact that the project is expected to have a positive net impact on economic development, employment, household earnings, government revenue and skills development in the country and most importantly in the local community that experiences a high unemployment rate as well as a small economic base. The negative impacts that are expected to occur as a result of the project will be far more localised and would affect a significantly smaller number of people and households than in the case of the net benefits that would be derived by the project.

7. KEY FINDINGS AND RECOMMENDATIONS

This report contains the analysis of the socio-economic impact assessment for the proposed Sun Garden PV Facility. The facility is proposed to be established on several farms within the vicinity of near Cookhouse and Somerset East in the Eastern Cape. The facility is proposed to generate up to 400 MW of electricity. Once construction is completed the facility is anticipated to have an operational lifespan of 25 years.

The purpose of the socio-economic impact assessment is to determine, and where possible, quantify the potential socio-economic impacts that can result from the proposed project. It compares various alternatives and, based on these, provides recommendation in respect of the most beneficial option. The study made use of the economic modelling technique based on the Social Accounting Matrix to quantify the potential positive and negative impacts of the project where feasible and applicable.

The following section outlines the key findings of the study and provides recommendations on the way forward.

7.1 Policy Review and Baseline Assessment

The study includes an analysis of various strategic policies and documents, as well as the socio-economic characteristic of the study area to understand the context within which the proposed facility is to be established.

The review of the policy environment covered national, provincial, and municipal strategic documents. The review of national strategic documents suggested that the utilisation of renewable energy sources in the country is considered to be an integral means of reducing the carbon footprint of South Africa, diversifying the national economy, and reducing poverty. This means that any project that would contribute towards achieving the above-mentioned objectives could be considered to be strategically important. The review of the provincial and municipal strategic documents indicated that renewable energy projects are considered a priority as highlighted in both the Eastern Cape Provincial Industrial Development Strategy as well as the provincial Sustainable Energy Strategy. The tourism industry is defined as a key intervention area at both a provincial and local level and it is important to ensure that projects developed in the area do not jeopardise the growth of this industry.

It can thus be concluded that the policy reviewed supports the proposed development form a planning perspective as it will contribute to the development of the economic and social environment of the region.

The review of the local municipality's socio-economic characteristics revealed that the Blue Crane Route Municipality economy is relatively small and dependant on the trade, general government, and community services.

In 2018, Blue Crane Route had a population of approximately 40 717 as well as population growth trends that suggest out-migration. This figure is also indicative of an area with low employment absorption capacity and a small economic base. The average household income for the area was R 8 705 per month – which was 19% lower than the district figure. There is also a high unemployment rate (22%) and a relatively poor labour participation rate (58%). All of these figures suggest that households in the Blue Crane Route Local Municipality have a relatively low standard of living and are worse off, on average, than households in other parts of the district and province.

7.2 Impacts Associated with the Solar Energy Facility

The proposed solar energy facility will generate both positive and negative impacts starting from the construction period and ending with the decommissioning phase. The following paragraphs and tables summarise the key socio-economic impacts that were identified to have the potential to occur during the different phases.

7.2.1 Impacts during construction

During the construction phase, the proposed Sun Garden Solar PV Facility will have both positive and negative effects on the socio-economic environment.

The project is anticipated to make a prominent contribution towards the national and local economy. It is estimated that a total of R 9,2 billion of new business sales, R 1,8 billion of GDP and 3 116 FTE employment positions will be generated by the project in the national economy through multiplier effects. Aside from the above positive effects, the project will contribute to skills development in the country, specifically as far as construction of the solar facility is concerned as well as increasing household earnings. The increase in household earnings is also likely to improve the standards of living of the affected households albeit temporarily.

Aside from the positive impacts though, the project will be creating negative direct, secondary, and cumulative impacts on the local communities, specifically areas surrounding the site where the proposed facility is to be built. The main factors that will cause this negative impact are (1) the influx of workers and job seekers from outside of the local community and (2) visual and noise disturbances that would be created by the construction activities as the footprint of the facility grows.

Potential negative impacts can be mitigated, although some more successfully than others. Visual impacts though cannot be eliminated although it is possible to reduce their significance. The summary of the significant socio-economic impacts during construction is provided in Table 7.1.

Table 7.1: Summary of construction phase impacts resulting from the facility

Impact	Nature of Impact	Before Mitigation	After Mitigation
CONSTRUCTION PHASE			
Temporary stimulation of the national and local economy	Positive	Medium - positive	High - positive
Temporary increase employment in the national and local economies	Positive	Medium - positive	Medium - positive
Contribution to skills development in the country and local economy	Positive	Medium - positive	Medium - positive
Temporary increase in household earnings	Positive	Medium - positive	Medium - positive
Temporary increase in government revenue	Positive	Medium - positive	Medium - positive
Negative changes to the sense of place	Negative	Medium - negative	Medium - negative
Temporary increase in social conflicts associated with the influx of people	Negative	Medium - negative	Low - negative
Impact on economic and social infrastructure	Negative	Medium - negative	Low - negative

7.2.2 Impacts during operations

During the operation of the solar energy facility the socio-economic impacts are likely to last longer when compared to those observed during the construction phase. This is the case for both positive and negative effects.

The operation of the proposed solar energy facility will generate R 334.4 million of new business sales, contribute R 120.6 million to GDP and create 50 sustainable FTE employment positions. Funds from the developer (2% of annual revenue) will be set aside for social and economic development programmes. These funds will be allocated towards economic development in the area and are expected to bring a significant benefit to local communities.

Negative impacts include the potential loss of sense of place and potential loss of income from tourist-based organisations. These potential losses may, however, not occur as indicated in the international literature review and local property market examination.

As in the case with the impacts observed during construction, negative effects can be mitigated, and positive impacts enhanced. Mitigation of the negative impacts though will not result in their complete elimination as visual disturbance of the nature inherent to the project are difficult to eradicate entirely. Nevertheless, the significance ratings of the negative impacts are expected to be somewhat reduced.

Table 7.2: Summary of operational phase impacts resulting from the facility

Impact	Nature of Impact	Before Mitigation	After Mitigation
OPERATIONAL PHASE			
Sustainable increase in production and GDP nationally and locally	Positive	Medium - positive	Medium - positive
Creation of sustainable employment positions nationally and locally	Positive	Medium - positive	Medium - positive
Skills development of permanently employed workers	Positive	Medium - positive	Medium - positive
Improved standards of living for benefiting household	Positive	Medium - positive	Medium - positive
Sustainable increase in national and local government revenue	Positive	Medium - positive	Medium - positive
Local economic and social development benefits derived from the project's operations	Positive	Medium - positive	High - positive
Sustainable rental revenue for farms where solar PV facilities are located	Positive	Medium - positive	Medium - positive
Provision of electricity for future development	Positive	Medium - positive	Medium - positive
Negative changes to the sense of place	Negative	Medium - negative	Medium - negative

7.2.3 Impacts during decommissioning

Socio-economic impacts stimulated during the decommission phase are expected to be similar to those that take place during the construction phase. The impacts though are expected to be of low significance due to the noticeably short duration therefore and lower magnitude. Enhancement and mitigation measures proposed for the construction phase impacts would also apply to the decommissioning phase.

7.2.4 Net effect and trade off analysis

The assessment of the proposed facility, and its net effect from a socio-economic perspective, indicates that the project would generate greater socio-economic benefits during both the construction and operational phases than the potential losses that could occur as a result of its establishment. Stimulation of production, employment, government revenue, skills development, and household income as a result of the investment in the project and its subsequent operations will outweigh possible production, employment and household income losses that could be experienced by local businesses affected by changes in the areas aesthetic and visual resources. It should be noted though that the positive and negative impacts will be distributed mostly amongst different receptors but will not result in inequality. Adherence to the proposed mitigation measures, however, would ensure that the offset of impacts is more balanced and that it also considers communities and businesses that will be negatively affected.

The positive effects generated by the project will not offset many of the negative impacts. These include impacts on the sense of place and property and business values that could occur during both construction and operation, the effect on social and economic

infrastructure, and crime and social conflicts in the area that could be created during only the construction phase. These impacts though will only affect local communities either temporarily or over the long term. These impacts are not highly significant and can be traded off for the net positive impact created by the project in terms of production, employment, government revenue, community benefits and households' earnings. This means that when compared with the no-go option, the proposed project is associated with greater socio-economic benefits.

7.3 Recommendations

Based on the information presented in this report, the following can be recommended from the socio-economic perspective:

- The net positive impacts associated with the development and operation of the proposed solar energy facility are expected to outweigh the net negative effects. The project is also envisaged to have a positive stimulus on the local economy and employment creation, leading to the economy's diversification and a small reduction in the unemployment rate. The project should therefore be considered for development. It should, however, be acknowledged that any negative impacts would be largely borne by the farms in the immediate vicinity and households residing on them, whilst the positive impacts will be largely concentrated in the local and national economies. Due to this imbalance, it is recommended that the mitigation measures suggested being strictly adhered to. Application of these mitigation measures will ensure that the negative impacts on the nearby farms and businesses are minimised and that the distribution of the potential benefits of the project are more balanced.

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ANNEXURE A: LANDOWNER ENGAGEMENTS

Landowners/Representative Name	Applicable Properties	Telephone Discussion	Survey Distributed	Final Reminder Date
Andries Troskie & A.N Troskie Family Trust	Remaining Extent of the farm Klein Jas Kraal 161	Survey Completed during WEF SEIA Process		
	Portion 2 of the farm Van Aardts Kraal 163			
	Portion 8 of the farm Van Aardts Kraal 163			
	Farm Vaalkop No 164			
	The Remainder of Portion 1 (Middlevale) of the farm Van Aardts Kraal No 163			
	The Remainder of the farm Van Aardts Kraal No 163			
	Portion 1 of the farm Jaskraal No 160			
	Farm Bouwer No 165			
Petrus Jacobus Le Roux	Remaining extent of portion 2 of the farm Hartebeest Kuil 220	Survey Completed during WEF SEIA Process		
Chris Greeff Family Trust	Remaining extent of the farm Nieuwe Grond A No 129	Survey Completed during WEF SEIA Process		
Anthony Gowar	Portion 1 of the farm Request 271	Survey Completed during WEF SEIA Process		
Harold Webster	Farms 217, 1 & 2	Telephonic engagement completed, October 2021		
Nico & Willem Lombard	Portion 9 of the farm Britzkraal No 253, Division of Somerset East Portion 8 (a Portion of Portion 7) of the farm Britzkraal No 253, Division of Somerset East Portion 7 of the farm Britzkraal No 253, Division of Somerset East	Survey Completed, October 2021		
'Tjor Bosch 0829285148/0422433633 Johan Bosch 087 55 00 351 (Bad reception)	Remaining extent of the farm Riet Fontein A No 159	Call 1 – 13/05/21 – no answer	Link sent via WhatsApp on 21/05	27/05/21 & 04/06/21 WhatsApp sent
	Portion 1 of farm Riet Fontein A No 159			
	Remainder of the farm Jaskraal No 160	Call 2 – 17/05/21 – No answer		
	Remaining extent of the farm Bloemhof no 166			
	Portion 1 of the farm Leeuwfontein 169			
	Portion 2 of the farm Rietfontein A 159			

Christo Lombard 0827794763 Sophia du Toit (daughter)	Remaining extent of the farm Wilton No 409	Survey Completed during WEF SEIA Process with follow-up discussion in October 2021	
	Portion 2 of Farm Wilton No 409		
	Remainder extent of Portion 2 of the farm Middleton No 219		
	Portion 1 of Farm Wilton No 409		
	Remaining Extent of the farm Wellington Grove 381		
	Remaining extent of Farm 381		
	Portion 1 of Farm no 381		
	Portion 2 of Farm no 381		
	Portion 3 of Farm no 381		
	Portion 6 of Farm no 381		
	Portion 7 of Farm no 381		
	Portion 8 of Farm no 381		
	Remaining extent of Portion 9 of Farm no 381		
Jakkie Nel 082 845 6901 / 082 329 4545 jnel@jabama.co.za	Remaining Extent of the farm Hartebeest Kuil 220	Call 1 – 13/05/21 – no answer Call 2 – 17/05/21 – No answer Call 3 – link sent via email 21/05/21	27/05/2021 – replied to say he has not yet completed the survey 04/06/21 WhatsApp sent
	Remaining Extent of the farm Dornkloof 230		
	Portion 2 of the farm Dornkloof 230		
	Remaining extent of the farm Hartebeest Kuil 220		
	Portion 2 of the farm Doornkloof 230		
	Portion 3 of the farm Doornkloof 230		
	Remaining extent of the farm Somerset East 431		
	Remaining extent of Portion 21 of the the farm Draai Hoek 221		
Ernst Conradie 083 299 0223	Portion 14 of the farm Voorspoed 175	Responded that do not want to participate	
	Portion 18 of the farm Van Aardts Kraal 163		
Pieter Botha 083 282 6250	Remaining Extent of the farm Vontein 126	Family indicated Dr. Botha has passed away, not available to complete survey	
Johannes Botha 083 379 9800	Remaining Extent of the farm Langverwacht 131	Survey Completed during WEF SEIA Process	

Chad Comley	Twefontein Farm	In-person interview conducted & partial survey completed		
'John Moolman 0877003621 / 0422472195	Farm Wilde Honden Kloof No 216	Call 1 - 13/05/21	Link sent via e-mail	21/05/2021 follow up mail
	Remaining extent of portion 1 of the farm Bloemhof No 166			27/05/21 Follow up mail
	Portion 1 of the farm Bloemhof no 166			
	Farm 215			
	Remaining Extent of the farm Wilde Honden Kloof No 216			04/06/21 Follow up sms
	Portion 1 of the farm Bloemhof no 166			
	Farm 215			
'Mervin Gowar 0679290363 / 0835830853 / 0845001575	Portion 3 of the farm Draai Hoek 221	Survey Completed during WEF SEIA Process		
	Remaining extent of portion 5 (De Vlake) of the farm Draai Hoek 221			
	Remaining extent of portion 4 (Pruim Plaas) of the farm Draai Hoek 221			
	Portion 5 of the farm Draai Hoek 221			
	Portion 18 of the farm Draai Hoek 221			
	Portion 1 of the farm Voorspoed 175			
	Portion 10 of the farm Voorspoed 175			
Jimmy Truter 079 896 9757	Remaining Extent of Portion3 of the farm Driefontein 259	Survey Completed during WEF SEIA Process, could not be reached for specific inputs into the Solar SEIA study		
	Remaining Extent Farm 434			
	Farm 434			
	Portion 3 (Vlak Leegte) of the Farm Driefontein No 259			
	Remaining Extent of Farm 436			
	Remainder of the Farm Brand Rug No 268			
	Remainder of the Farm Varkens Kuil No 269			
	Remainder Extent of Portion 3 of the Farm Commadagga No 266			
	Farm no 436			
Johnty Truter 083 469 8004	Remaining Extent of the farm Gras Fonteyn 258	Call 1 – Voicemail on 21/05/21	Communicated via SMS	Follow-up 21/05/21
	Remaining Extent of the farm Driefontein 259			
	Remaining Extent Portion 5 of the farm Driefontein 259			

	Remaining Extent of the farm Brand Rug 268			
	Remaining Extent of the Farm 369			
	Remaining Extent of the farm Blydschap Annex 270			
	Portion 3 of the farm Varkens Kuil 269			
Andries Botha 082 893 6193	Remaining Extent of Bothas Hoop 358	Call 1 – Voicemail on 13/05/21	Link sent via email - Fri 2021/05/21 09:30	27/05/21 & 03/06/21 WhatsApp sent
	Remaining Extent of the farm Bothas Hoop 358			
	Portion 1 (Opmeet Fontein) of the farm Gras Fonteyn no 258	Call 2 – 17/05/21 – No answer		
	Remaining extent of the farm Draai Van Klein Visch Rivier 254			
	Portion 1 of the farm Bothas Hoop 358			
	Remaining extent of the farm Draai Van Klein Visch Rivier 254			
	Portion 1 of the farm Bothas Hoop 358			
Portion 1 (Opmeet Fontein) of the farm Gras Fonteyn no 258				
Roger von Holdt 0826585083	Remaining extent of Farm 382	Call 1 – No answer 21/05/21	link sent via WhatsApp on 21,05,21	27/05/21 Does not want to participate, asked to be removed
Johan Kritzinger (042 243 1375 (h) / 042 243 2841 (w) / 084 243 1375	Portion 1 Glen Roy of the farm Varkens Kuil 269	Survey Completed during WEF SEIA Process		
	Portion 3 Glen Roy a portion of portion 1 of the farm Modderfontein 302			
	Portion 2 Spitzkop of the farm Varkens Kuil 269			
	Portion 1 of the farm Varkens Kuil 269			
Jan Lapere 072 889 9904	Remaining Extent of the farm Nello 351	Survey Completed during WEF SEIA Process		
Charl Wilke 082 568 3602	Portion 1 of the farm Doornkloof 230	No answer 13/05/21 Call 2 on 21/05/21	link sent via WhatsApp on 21,05,21	27/05/21 & 03/06/21 WhatsApp sent
Frank Williams 072 102 7049	Remaining Extent of Portion 3 of the farm Rietfontein 225	No answer 13/05/21 Call 2 on 21/05/21	link sent via email - Friday, 21 May 2021 09:44	27/05/21 & 04/06/21 SMS link sent