SOCIO-ECONOMIC IMPACT ASSESSMENT

OF THE

PROPOSED VELD

PV SOUTH ENERGY FACILITY

2019

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Acronyms

CSP	Concentrated Solar Power
DOE	Department of Energy
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
GVA	Gross Value Added
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
LED	Local Economic Development
LM	Local Municipality
MW	Megawatt
NC	Northern Cape Province
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REIPP	Renewable Energy Independent Power Producer Procurement
SA	South Africa
SDF	Spatial Development Framework

Section One: Introduction

1.1. Introduction

This document is prepared by **Urban-Econ Development Economists** as a result of a request by **Aurecon South Africa (Pty) Ltd (Aurecon)** for a Specialist Socio-Economic Impact Assessment for the proposed Veld PV South. This document forms part of the deliverable for the Environmental Impact Assessment managed by Aurecon.

1.2. Scope of Study

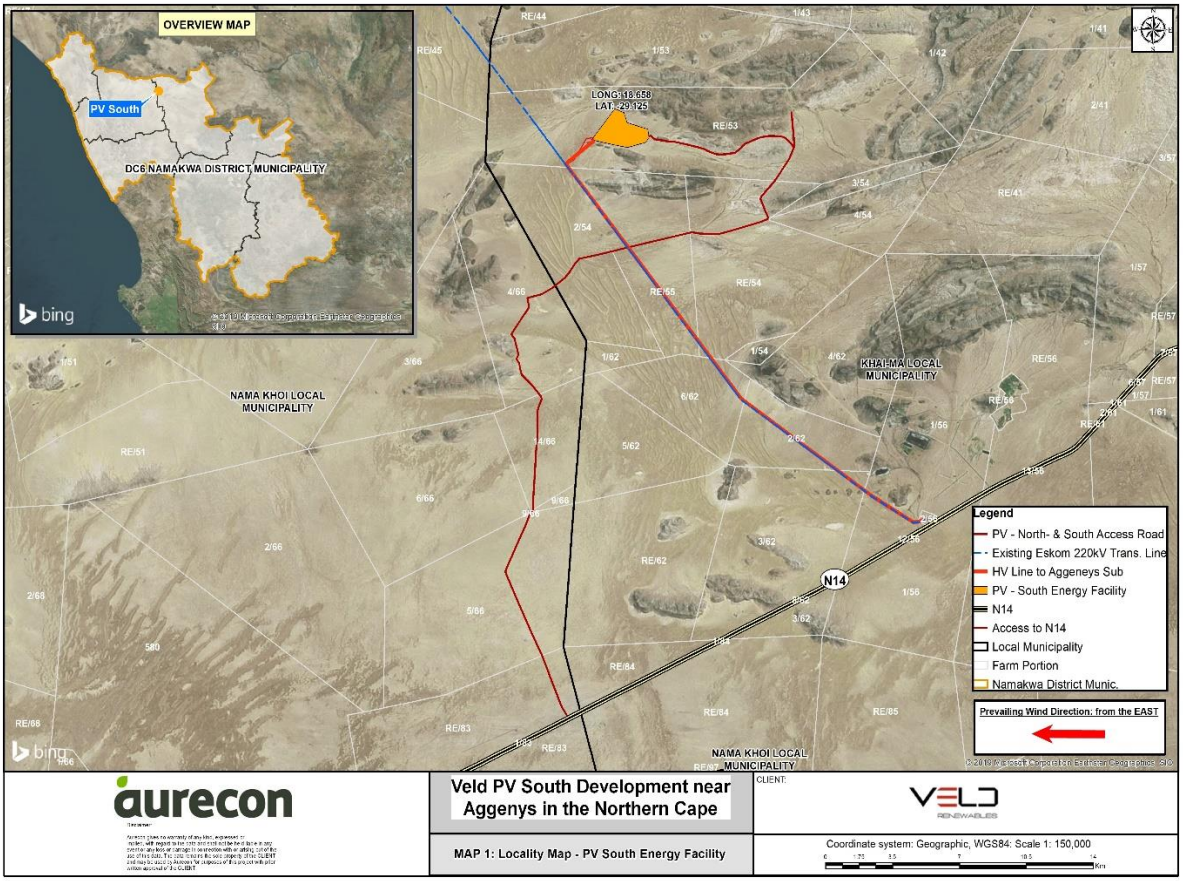
The purpose of the socio-economic impact assessment is to determine the potential socio-economic implications of the proposed Veld PV South, and to compare its effects with the "no-go" alternative. The "no go" alternative assumes that the proposed Veld PV South is not established, which means that it represents the status of the environment, including the socio-economic situation. The purpose of the socio-economic impact assessment is to determine the following:

- Collect information on the extent and magnitude of the socio-economic activities that will be directly or indirectly affected by the proposed Veld PV South;
- Quantify potential positive and negative effects of the proposed Veld PV South on socio-economic activities;
- Evaluate the change in size of the local and regional economies that will be stimulated by the proposed Veld PV South;
- Evaluate the potential positive and negative socio-economic impacts following the environmental specialists' methodology;
- Undertake a comparative analysis of alternatives; and
- Provision of mitigation measures.

1.3. Project Description and Study Area Delineation

The proposed Veld PV South is located in the Khâi-Ma Municipality within the Namakwa District Municipality in the Northern Cape Province. **Map 1** provides a visual illustration of the location of proposed Veld PV South.Location of the Veld PV South

Map 1: Location of the Veld PV South



(Aurecon, 2019)

Veld PV South (Pty) Ltd (Veld PV South) proposes developing a 75 MW Photovoltaic (PV) solar energy facility on Haramoep (Remainder of Farm 53) in the Namakwa District Municipality approximately 20 km north-west of Aggeneys in the Northern Cape. The development has been designed with the intention that the Veld Namakwa Solar Farms (PV South) would form part of a consolidated solar development which will consist of the proposed Veld PV South (75 MW) and the proposed Veld PV North (75 MW) PV facilities. These proposed facilities would utilise shared infrastructure where possible to minimise their overall footprint. To evacuate the power generated by the proposed Veld PV North (and South), a grid connection is required between the solar farm project area and the Aggeneys substation.

The site was selected as it falls within an area considered to have some of the highest solar resource in South Africa. The proposed grid connection will consist of a 132 kilovolt (kV) overhead powerline, approximately 25 km in length that would feed into the national electricity grid at the Aggeneys substation. A 35m servitude will be required for the construction of the powerline and it will run adjacent to the existing 220 kV powerline that runs past the site, comprising single circuit steel monopoles with bird perches.

The following components would be required for the solar farm and to evacuate the power generated by the proposed Veld PV South.

- **A photovoltaic component**, comprising of numerous arrays of PV solar panels mounted on steel tracking mounts and footings with associated support infrastructure to generate up to 75 MW of renewable energy;
- **On-site substations**, including amongst others;
    - **Inverters**, to convert the direct current (DC) generated by the PV modules into alternating current (AC);
    - **Transformers**, to step up the 33-kV power generated by the inverters to 132 kV to connect to the new 132 kV overhead transmission line;
- **Internal cabling** laid underground when feasible to connect the PV modules to the on-site substation and inverters;
- **Internal access roads** for servicing and maintenance of the site;
- **Stormwater infrastructure;**
- **Temporary construction areas** for use during construction;
- **Buildings,** including an operations and maintenance building, a connection building, control building, guard cabin;
- **Weather stations** within and along the fenced perimeter of the site; and
- **Perimeter fencing.**

Furthermore, the site was also strategically selected as it falls within the Springbok Renewable Energy Development Zone identified as part of a Strategic Environmental Assessment. The Springbok Renewable Energy Development Zone is a geographical area "where solar photovoltaic technologies can be:

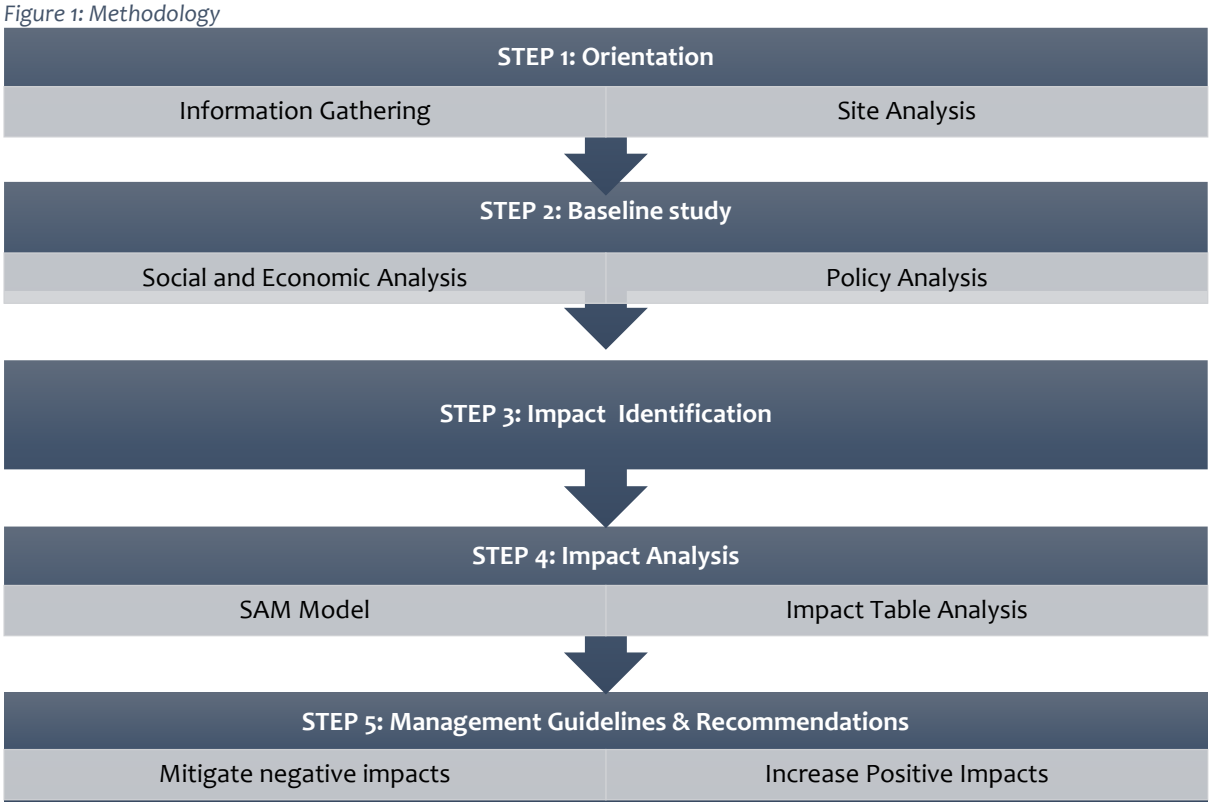
- Incentivized;
- Deep grid expansion can be directed; and
- Regulatory processes will be streamlined.

1.4. Methodology

The methodology utilised for this report is highlighted in **.**

Figure 1.

Figure 1: Methodology



1.5. Report Outline

The report will discuss the following:

- **Section Two: Policy Review** – provides an overview of relevant National, Provincial and local policies and strategies that need to be taken into consideration;
- **Section Three: Socio-Economic Profile** – provides a socio-economic overview as well as an overview of economic trends in the area;
- **Section Four: Economic Impact Model** – this section depicts the results from the SAM modelling process;
- **Section Five: Impact Analysis** – this section assesses the impacts of the proposed Veld PV South, and further explains the results of the SAM models completed; and
- **Section Six: Conclusion and Recommendations** – this final section summarises the findings of the study and provides relevant recommendations that will generate success for the proposed Veld PV South.

Section Two: Policy Review

2.1. Introduction

The review of the legislative environment provides valuable insight into the government's priorities and plans. This will assist in determining the importance and alignment of the project regarding the developmental objectives of various government spheres, as well as in identifying potential developmental conflicts and socio-economic impacts that the project might create. Policies from all sectors of government within the specified delineated areas – local, provincial, and national – will be examined to ensure alignment of the project with agendas of relevant government entities. The integration of the policy objectives from a national to local spheres is fundamental when developing a sustainable and positive socio-economic approach for the proposed Veld PV South.

2.2. National Policies

National government aims to stimulate and maintain economic growth in order to create jobs in the national economy. Government also recognises that social and economic development is mutually reinforcing and therefore aims to utilise the latter to strengthen the former. One of the main recurring themes in national policy is the concept of sustainable development and government recognises that sustainable development encompasses three spheres which are inextricably linked, namely economic, social and environmental. To ensure sustainable development under the United Nations Environmental Program definition of "development that meets the needs of the present without compromising the ability of future generations to meet their own needs", sustainable development has been included in government economic development and infrastructure development policies. The four main policies with regards to this project is the National Climate Change Response policy (2012), the National Infrastructure Plan (2012), the Energy Security Master Plan: Electricity (2007-2025) and the Integrated Resource Plan for Electricity (2010-2030). The focus of these policies is on economic development and development of energy infrastructure, focusing on electricity generation, distribution and the sustainability of the overall economy. This thus advocates for a greater share of renewable sources of energy.

Other national level policies that are relevant to this project, as listed in the introduction to this chapter, can act as supportive measures to the four main policies discussed above. These policies outline action plans for the implementation of sustainable economic and social development. Some of the most significant policies are the Carbon Tax policy (2013) which aims to mitigate climate change through the imposition of a tax on carbon emissions and the National Green Economy policy (2013) which outlines the philosophy and plans for the 'greening' of the South African economy through the employment of cleaner, carbon neutral technologies and processes. Finally, there is the National Renewable Energy Policy Roadmap (2010) which gives an outline of South Africa's renewable energy needs through a discussion of projected scenarios which considers South Africa's international agreements, economic growth potential and developmental needs.

These policies are broader developmental plans that makes only a passing mention of sustainability and the desire for renewable sources of energy.

2.3. Provincial Policies

The Northern Cape's developmental goals are very similar to the national policy goals, with the added aim of unlocking the latent potential of the province in terms of its arid-region desert-type economy, as well as its resource potential. The Province recognises the potential of solar resources and the possibility of renewable generation of electricity from this resource through the Northern Cape Renewable Energy Strategy (2013), as well as the Economic Potential in South Africa's Arid Areas: A Selection of Niche Products and Services (2008). The Renewable Energy Strategy goes further by establishing a target for diversifying the provincial energy mix, which is to have 25% of energy generation from renewables by 2020. Carbon neutrality in terms of electricity generation is another main objective of this policy, along with becoming a net exporter of electricity sourced from renewables by 2030. Another main policy with regard to this project is the Northern Cape Provincial Spatial Development Framework (2018). The focus areas on the Northern Cape Provincial Spatial Development Framework include urban and rural development; enhancing regional connectivity; promoting infrastructure investment; and protecting local resources. Thus, the concept of sustainability is central to provincial economic policies, as well as to its social development agenda.

The solar energy sector is seen as a priority industry for provincial government due to the recognition that there is considerable latent potential in the generation of solar energy in the province. An objective of the Northern Cape Provincial Growth and Development Strategy (2004-2014) is to enhance infrastructure for economic growth and social development. Economic infrastructure such as electricity infrastructure that supports industry is therefore high on the Northern Cape Government's agenda. This agenda, together with the goals set out in the Renewable Energy Strategy (2013) of driving solar power generation as part of the diversification of the energy mix contributes to creating a very attractive policy environment for the provision of renewable solar power infrastructure in the province.

2.4. District Policies

The Namakwa District Municipality aims to enhance social development, and the living standards of its citizens, through the sustainable management of economic growth and the sustainable provision of support infrastructure. These goals are highlighted in all the main policies of the Namakwa District Municipality, namely: the Namakwa District Municipality Integrated Development Plan (2017 - 2022), the Namakwa District Municipality Local Economic Development Strategy (2009), the Namakwa District Municipality Environmental Management Framework (2011), and the Namakwa District Municipality Rural Development Plan (2017). The Namakwa District Municipality Environmental Management Framework (2011) also provides an evaluation of the state of the environment, sets out an environmental vision and details the constraints, opportunities, management measures, monitoring indicators and desired state of the environment for the various environmental elements.

The Namakwa District Municipality Integrated Development Plan (2017 – 2022) contains certain strategic and long-term information (strategies, goals, targets, etc) pertaining to economic growth; social development; and good governance that are an integral part of the development process of the District. The Namakwa District Municipality Local Economic Development Strategy (2009) also outlines these goals and aims to create a stable and safe environment which is essential for prosperous growth and development, thus creating an enabling environment for communities. It contains various sector development programmes to achieve these goals and these include agricultural, mining, industrial development, renewable energy development (including wind, wave, solar, and biogas energy), space research and development spin-offs, and tourism development. The Namakwa District Rural Development Plan (2017) outlines the need for solar energy generation within the District. It stated that Solar and Green Energy should be promoted in the District as it is seen as a vital player in the generation of electricity.

2.5. Local Policies

The three most relevant policies for Khâi-Ma Municipality is the Integrated Development Plan (2017 – 2022), the Rural Spatial Development Framework/Land Development Plan (2010), and the Local Economic Development Framework (2011). One of the main focus areas of these documents is the promotion of job creation and the fostering of economic development. To this end, the Spatial Development Framework (2011) proposes the creation of access to strategic surrounding areas and the spatial concentration of economic activities in strategic locations. The Integrated Development Plan (2017 - 2022), on the other hand, proposes investment in infrastructure and the use of labour-intensive methods to create jobs in the local municipality. Sustainable development in terms of the protection of natural assets and the efficient use of resources, also features prominently in these policy documents, with the Local Economic Development Framework (2011) advocating economic interventions in sector development such as agriculture, mining, tourism and renewable energy.

The Khâi-Ma Municipality Rural Spatial Development Framework (2010) focuses more on spatial integration of the built and natural environment and this resonates in the human settlements and local economic visions for the municipality. Another important recurring theme in the local policies is the concept of spatial and economic inclusion and integration. The Integrated Development Plan (2017 – 2022), advocates economic inclusion through the promotion of labour intensive infrastructure projects (mostly through the expanded public works programs), whereas the Rural Spatial Development Framework (2010) takes a more spatial approach by seeking to connect human settlements with accessible nodes of economic activities and as well as encouraging the development of economic nodal spaces. Furthermore, it is envisioned that spatial integration with the surrounding areas will contribute to economic development by improving mobility and encourage the flow of goods and services in the area.

2.6. Conclusion

From the review of the above-mentioned policies it can be concluded that proposed Veld PV South aligns with the National, Provincial, District and Local Policies. The objectives of government that need to be considered in this project are sustainable development through job creation, as well as the reduction of harmful emissions. The National Development Plan (2030) in particular, recognises that the economy is "electricity intensive", and given the effect of the 2008 energy crisis observed in the country, the importance of adequate and uninterrupted supply of electricity is evident. The development of alternative electricity generation technologies which are able to efficiently service South Africa, alleviates dependence on the national grid and reduces the possibility of production drops due to insufficient power supply. Therefore, stimulating local economic development is of critical importance to the government. **Given the reviewed documentation, it is evident that no fatal flaws from an economic policy perspective exist in the implementation of the proposed project**.

Section Three: Socio-Economic Profile

3.1. Introduction

The purpose of compiling an economic profile and a socio-demographic profile is to develop an understanding of the trends, issues and dynamics of the local economy in terms of its micro and macro context. This is essential as it provides both qualitative and quantitative data related to the economies under observation, creating a baseline against which the impacts can be assessed.

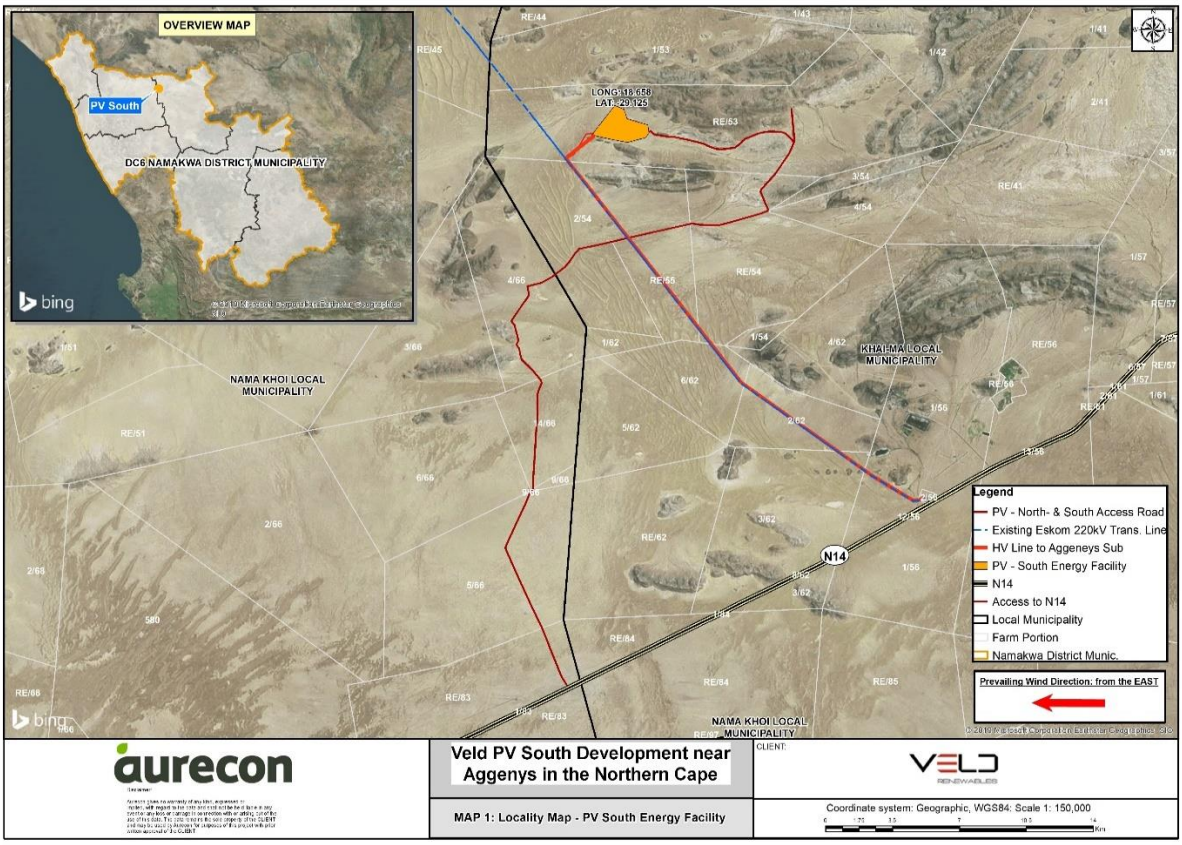
3.2. Spatial Composition and Land Use

Approximately 90% of South Africa's electricity is generated in coal-fired power stations, with nuclear (5%) and hydro-electric and pumped storage schemes (5%) contributing 5% to total capacity (DOE, basic electricity, 2016). South Africa promotes investment in renewable energy projects to curb the adverse effects of carbon emissions generated from burning coal on the environment. Increased demand in electricity from industrial sectors and residences has applied pressure on Eskom's capacity, thereby creating the need for extra capacity to be fed into the national grid. The South African government has set targets for the procurement of new generation capacity from renewable energy at 3,725MW by 2016, 3,200MW by 2020 and 6,300MW by 2025 (DOE, State of renewable energy in South Africa, 2015). These amounts were derived from the Integrated Resource Plan (IRP) 2010-2030 target of 17,800MW.

The Northern Cape is spatially the largest province within South Africa with a total land mass of 361,830km^2, equating to approximately 30.5% of South Africa's spatial composition. It holds the smallest population of 1.2 million people which is equal to 2.1% of the total national population. The Northern Cape is a hot and dry region with low rainfall and scarce water resources, exceptional mineral wealth, and scattered urban and quasi-urban population clusters.

The Northern Cape offers some of the best conditions in the world for solar electricity generation and, therefore, it is not surprising that the province hosts 100% of the CSP and 65% of the solar PV capacity procured in bid windows to date (Oliveira, 2016). The proposed Veld PV South is located near Aggeneys, in the Khâi-Ma Municipality, within the Namakwa District Municipality in the Northern Cape Province. **Map 2** provides a visual illustration of the spatial composition and location of the proposed Veld PV South.

Map 2: Spatial Composition & Location of Proposed Project



(Aurecon, 2019)

The proposed Veld PV South is located ±20km from Aggeneys, ±55km from Pofadder and ±35km from Pella. The N14 National Road runs past Aggeneys, connecting Springbok, Aggeneys, Pofadder, Kakamas, and Upington. Pofadder developed as an agricultural service centre and is the main seat of Khâi-Ma Municipality. Pofadder accommodates a few businesses and institutions such as the municipal offices, schools, a hospital, a clinic, a police station and a gravel airstrip. Aggeneys is a mining town, primarily accommodating the workers of the Black Mountain Mine. Aggeneys includes a primary and secondary school, a police station, a clinic, a golf course and a tarred airstrip. Pella originally functioned as a mission station, providing a sanctuary for Khoisan driven out of Namibia. Pella has limited infrastructure consisting of a primary school, police station, library, clinic, restaurants/taverns and the old cathedral, which is a tourist attraction.

The main economic activities within the Namakwa District Municipality are agriculture and mining. Stock farming in the Namakwa District Municipality includes sheep, cattle, goat and ostrich farming. Flower bulbs and wool production are important contributors to the agricultural sector. The Orange River plays a key role in the region's agricultural activities and alluvial diamond mining activities. In Khâi-Ma Municipality the grazing potential (measured in hectares required to sustain one large livestock unit) is relatively low, therefore necessitating large farming units, mainly used for livestock (cattle, sheep and antelope) and game farming (Khâi-Ma Municipality Integrated Development Plan 2012-2017). Khâi-Ma Municipality is also rich in minerals (i.e. sillimanite, zinc, copper, lead, granite, quartz and aventurine) and the Black Mountain Mine at Aggeneys mines copper, lead and zinc. There is also a gypsum mine located in Pofadder.

The Orange River forms the northern boundary of the Khâi-Ma Municipality. The river is an important source of water for agriculture and domestic use. Table grapes and dates are cultivated on the banks of the river, which are mainly produced for export purposes. *Hoodia* and *Geranium* are cultivated at Onseepkans and Pella for oils and medicinal purposes.

3.3. Demographic Profile

3.3.1. Population and Access to Services

The population in any geographical area is the mainstay of development, as it influences economic growth through the provision of labour and entrepreneurism and determines the demand for production output. Analysing population trends is crucial in gaining insight and understanding of the people who are likely to be affected by the proposed Veld PV South. The consumption of electricity is done at a household level and therefore the analysis of household data and trends provides important indicators for the current study. This information is also useful for determining the magnitude of economic impact that will be created by the proposed Veld PV South. **Table 1** provides an overview of the population and households in the study areas.

Table 1: Population & Household Totals (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
Population Total	57 725 606	1 225 555	111 418	11 605
Average Population Growth (2008 - 2018)	1.6%	1.3%	0.0%	0.0%
Households Total	16 092 377	322 199	32 436	3 542
Average Household Size	3.6	3.8	3.4	3.3

(Urban-Econ, 2019)

The population in Khâi-Ma Municipality is 11 605 people, with a total of ± 3 500 households consisting of an average size of 3.3 individuals per household. Khâi-Ma Municipality experienced an average population growth rate of 0.0% between 2008 and 2018, which is similar to the District's growth rate of 0.0% for the same period. Low or negative growth rates could be a result of several factors such as the increase in the death rate, a decrease in child birth or even the migration of people out of the district (Namakwa District Municipality, 2018/2019).

In terms of access to basic services:

- The majority (85.6% - 89.7%) of the population in the study areas (Northern Cape, Namakwa District Municipality, Khâi-Ma Municipality) have access to electricity as a source of energy for lighting, whilst the remaining population depend either on solar, gas, paraffin or candles as a source of energy for lighting.

- The majority (92.2%) of the population in Khâi-Ma Municipality have access to piped water in their dwellings and inside their yards, compared to 95.5% and 77.6% in Namakwa District Municipality and the Northern Cape, respectively.
- The majority (75.4%) of the population in Khâi-Ma Municipality have access to a flush/chemical toilet while the remainder makes use of pit latrines and bucket latrines. This statistic of the Khâi-Ma Municipality is higher than the average for the Northern Cape but lower than the Namakwa District Municipality.

The arid nature of the area, surface and underground water supplies are insufficient to provide higher levels of infrastructure (such as waterborne sanitation), which creates grievances and resentment. There are also no regional or district hospitals in Khâi-Ma Municipality. There is only 1 community health centre, 3 clinics and 2 mobile clinics. Furthermore, the living conditions of remote settlements of farm workers tend to be poor, with low mobility and difficult access to health, education, recreation and shopping amenities. Increasing aridity, due to global warming, may lead to rising unemployment, declining underground water levels, and greater difficulties for commonage farmers. Nama Khoi Municipality has 2 hospitals and 14 clinics, but the hospitals need upgrading (NKLM, 2014).

3.3.2. Energy Used for Lighting

The level of access to energy supply and social infrastructure gives an indication of the standard of living in households. The availability of the different energy sources creates a baseline against which the potential impacts of the proposed Veld PV South can be assessed. **Table 2** indicates the energy supply used for lighting in the various study areas.

Table 2: Energy Used for Lighting (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
Solar/other/unspecified	0.7%	1.5%	4.1%	2.9%
Electricity	85.3%	85.6%	86.6%	89.7%
Gas	0.2%	0.2%	0.2%	0.2%
Paraffin	2.8%	1.7%	0.5%	0.6%
Candles	11.0%	11.1%	8.6%	6.6%

(Urban-Econ, 2019)

The majority of households in Khâi-Ma Municipality (89.7%) have access to electricity, while 6.6% in Khâi-Ma Municipality make use of candles for lighting. These statistics are higher than the average statistics for Namakwa District Municipality and the Northern Cape.

3.3.3. Level of Education

In any society, education levels have a significant influence on economic and human development. It is evident that low levels of education translate into a low skills base in an area, thereby resulting in a less

competitive workforce. However, an area with high levels of education is characterised by a workforce capable of operating industries at a competitive level, producing a skilled and highly skilled population. People increase their earning potential by developing and enhancing their capabilities, reaffirming that household and personal income levels are either positively or adversely affected by education levels. Also, a skilled population does not necessarily aspire to employment but to entrepreneurship, which adds businesses and increases economic activity in an area, consequently increasing the number of jobs available. **Table 3** depicts the level of education in the various study areas.

Table 3: Level of Education (Aged 20+) (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
No schooling	6.9%	9.3%	5.6%	3.2%
Some primary	26.7%	30.9%	28.9%	29.4%
Complete primary	5.3%	6.6%	9.2%	8.2%
Some secondary	30.8%	31.0%	35.1%	40.3%
Grade 12	27.1%	20.7%	19.9%	18.2%
Education level: Higher	3.2%	1.4%	1.3%	0.7%

(Urban-Econ, 2019)

Around 6.9% of South Africa's population, and in the Northern Cape 9.3% of the population, over the age of 20, has had no schooling. In the Namakwa District Municipality 5.6%, in Khâi-Ma Municipality 3.2%, of the population over the age of 20 has had no form of schooling. The majority of the population over the age of 20 in Khâi-Ma Municipality (40.3%) has some secondary education, 18.2% have Grade 12, and 0.7% of the population over the age of 20 has a tertiary education.

This is a bit lower than the South African average. A high percentage of the population have not completed Grade 12. This implies there is a low education and skills level in the area, which has a direct impact on the type of employment available to the people and subsequently their earning capacity. In a region driven by a single sector, low education and skills levels hinder developments aimed at diversifying and broadening the local economy. In Khâi-Ma Municipality there are 6 Early Childhood Development Centres (ECD), 5 Primary Schools and 2 High Schools. There is no access to tertiary education institutions in the Khâi-Ma Municipal area.

3.4. Local Economic Profile

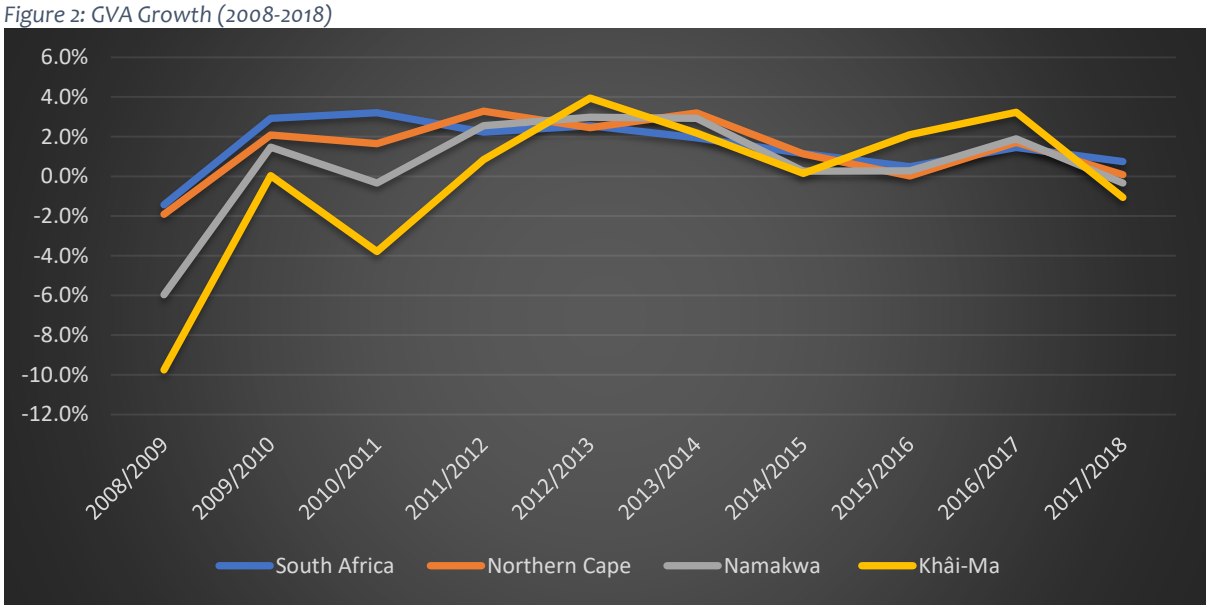
3.4.1. Gross Domestic Product

Conducting an analysis of the local economy is imperative to gain insight and an understanding of the impact of a proposed activity on output and trends in various economic sectors. The structure of an economy also gives an indication of its vulnerabilities and reliance on particular sectors, as well as the extent to which it could react to fluctuations in global and regional markets. Gross Domestic Product (GDP) comprises the value of all final goods and services, produced during a year within the boundaries of a specific region, and

is commonly used to measure the level of economic activity in a specific area. For analytical purposes, GDP is utilised as an important indicator of economic activity. Generally, if the economy as a whole is performing well, demand for electricity will also intensify.

As the total aggregates of taxes on products, and subsidies on products, are only available at whole economy level, GVA (Gross Value Added) is used for measuring GDP and other measures of the output of entities smaller than a whole economy. GVA is the difference between output and intermediate consumption for any given sector/industry. That is the difference between the value of goods and services produced, and the cost of raw materials and other inputs which are used in production. GVA is linked as a measurement to GDP. **Figure 2** provides a visual illustration of the GVA growth.

Figure 2: GVA Growth (2008-2018)



(Urban-Econ, 2019)

South Africa and the Northern Cape Province had an average GVA growth rate of 1.5% and 1.4% respectively between 2009 and 2018. The average GVA growth rate of the Namakwa District Municipality and the Khâi-Ma Municipality was 0.6% and -0.2% respectively between 2008 and 2018. The -0.2% average GVA growth of Khâi-Ma Municipality between 2008 and 2018 can be linked to the global economic recession in 2008 during which the municipal area contracted by 9.8%.

Recent macro-economic changes have affected the economic outlooks across countries and regions globally. These major macro-economic changes include the slowdown and rebalancing in China; the further decline in commodity prices, i.e. crude oil, with sizeable redistributive consequences across sectors and countries; a related slowdown in investment and trade; and declining capital flows to emerging markets and developing economies (IMF, 2016). The prolonged drought in South Africa, which started in 2015, is having an impact on the agriculture value chain and, together with inflation, is having a negative impact on the local economy. These changes, together with a host of non-economic factors including geopolitical tensions, are generating substantial uncertainty, especially in the two main economic sectors of the study areas, namely

agriculture and mining. The economic sectors that made the largest contribution to the GVA of the study areas are highlighted in **Table 4**.

Table 4: GVA Contribution (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
Agriculture, forestry & fishing	2.6%	7.0%	7.9%	19.8%
Mining & quarrying	8.1%	28.9%	41.3%	36.4%
Manufacturing	13.5%	3.2%	2.6%	6.6%
Electricity, gas & water	2.3%	2.9%	2.3%	1.1%
Construction	3.8%	2.5%	2.6%	3.6%
Wholesale & retail trade, catering & accommodation	15.1%	11.7%	9.4%	7.3%
Transport, storage & communication	9.6%	9.8%	7.9%	5.0%
Finance, insurance, real estate & business services	22.4%	13.9%	8.2%	3.8%
General government	16.7%	15.2%	13.4%	12.4%
Community, social & personal services	6.0%	4.9%	4.3%	3.9%

(Urban-Econ, 2019)

The economic sectors that contributed the most to Khâi-Ma Municipality's GVA in 2018 were:

- Agriculture, forestry and fishing (19.8%)
- Mining and quarrying (36.4%)
- General government (12.4%)

3.4.2. Employment Status

The employment profile of the study area is an important indicator of human development, but also of the level of disposable income, and subsequently the expenditure capacity, of the residing population. The employment rate refers to those economically active people who are unemployed and looking for work, as well as persons who are unemployed and not looking for work but would accept work if it was offered to them. This category also includes those in the population who are not economically active, including people who are not working but are housewives, scholars/full-time students, pensioners, disabled people and people not wishing to work. **Table 5** indicates the employment status of the various study areas.

Table 5: Employment Status (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
Employed	43.0%	42.7%	51.5%	60.3%
Unemployed	17.0%	14.2%	10.3%	12.9%
Not economically active	40.0%	43.1%	38.2%	26.9%

(Urban-Econ, 2019)

More than half of the population in Khâi-Ma Municipality (60.3%) is employed, while 12.9% is unemployed and 26.9% is not economically active. This is similar to the Namakwa District Municipality; and the Northern Cape and South African average.

3.4.2. Employment Per Sector

Employment per sector indicates which economic sectors residents are employed in, indicating the types of skills found in the area. **Table 6** indicates the employment per sector in the various study areas.

Table 6: Employment Per Sector (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
Agriculture, forestry & fishing	7.0%	19.4%	20.9%	47.9%
Mining & quarrying	3.1%	4.6%	9.0%	5.3%
Manufacturing	9.3%	4.5%	3.5%	5.4%
Electricity, gas & water	0.4%	0.4%	0.4%	0.1%
Construction	6.2%	5.6%	5.8%	3.2%
Wholesale & retail trade, catering & accommodation	22.4%	19.3%	18.6%	11.4%
Transport, storage & communication	4.4%	3.4%	3.0%	1.5%
Finance, insurance, real estate & business services	17.6%	10.6%	8.3%	4.3%
General government	12.1%	16.3%	15.9%	11.8%
Community, social & personal services	17.4%	15.8%	14.8%	9.0%

(Urban-Econ, 2019)

The majority of the population in the Khâi-Ma Municipality is employed in:

- Agriculture, forestry and fishing (47.9%);
- General government (11.8%); and
- Wholesale and retail trade, catering and accommodation (11.4%).

3.4.3. Skills Level

Skills levels of the labour force have an impact on the level of income earned (i.e. the higher the skills level the higher the annual income that could be earned). **Table 7** indicates the skills level of the various study areas.

Table 7: Skills Level (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality
Skilled	25.9%	19.2%	19.0%	12.6%
Semi-skilled	46.7%	44.6%	44.9%	40.5%
Low skilled	27.4%	36.2%	36.1%	46.9%

(Urban-Econ, 2019)

The majority of the population in Khâi-Ma Municipality (46.9%) have low skill levels, while 40.5% are semi-skilled and 12.6% are skilled. The low-skilled population of the Khâi-Ma Municipality is higher than that of the South African, Northern Cape, and Namakwa District Municipality averages. A population with low skills will not be able to improve their income and therefore it would be important to implement skills development programmes and job creation in higher skilled occupations to uplift people to qualify for better jobs. This is also important in order to leverage the economy from being primary-sector (agriculture) based, to being more diversified across primary, secondary and tertiary (more skills intensive) sectors.

3.4.4. Household Income

In order to determine people's living standards and understand their livelihoods, we need to analyse the income levels of the employed population. This is done with the objective to establish affordability constraints in acquiring basic services such as water, electricity and sanitation. Generally, analysing household income levels is one of the methods used to determine poverty levels in a community. Additionally, the income levels of a particular area provide some insight into the economic behaviour of a particular community, i.e. the purchasing power of that community, the potential poverty levels that a community might be experiencing and vulnerability to changes in the economy.

Table 8 indicates the annual household income of the various study areas.

Table 8: Annual Household Income (2018)

2018	South Africa	Northern Cape	Namakwa District	Khâi-Ma Municipality	Income Category
R1 - R6332	14,9%	12,1%	8,6%	8,4%	Low
R6 333 - R12 664	4,5%	3,6%	2,7%	2,4%	
R12 665 - R25 328	7,5%	6,2%	5,0%	4,1%	
R25 329 - R50 656	17,1%	19,4%	19,3%	18,3%	
R50 657 - R101 313	19,1%	21,3%	22,7%	22,5%	Middle
R101 314 - R202 625	13,1%	14,6%	17,2%	18,2%	
R202 626- R405 250	9,3%	10,5%	12,1%	14,4%	
R405 251 - R810 500	7,3%	7,3%	7,6%	6,8%	High
R810 501 - R1 621 000	4,8%	3,7%	3,8%	4,3%	
R1 621 001 - R3 242 002	1,9%	1,0%	0,9%	0,7%	
R3 242 003 or more	0,6%	0,3%	0,3%	0,1%	

(Urban-Econ, 2019)

The majority of households in Khâi-Ma Municipality (55.1%) are middle income earners, which is higher than the South African, Northern Cape Province, and Namakwa District Municipal averages. Just over 30% of households in Khâi-Ma Municipality (33.1%) are low income earners, while 11.8% are high income earners. The level and type of employment adopted by the population of an area directly affects the income levels of its people. A high poverty level has social consequences, for example not being able to pay school fees, not having enough food in the house, not affording proper medical care, etc. Income categories will not improve unless skills and knowledge of the population improve through training programmes, better education attainment opportunities and job creation in higher skilled economic sectors.

3.5. Conclusion

In terms of the socio-economic profile of the study areas, the following main trends have been identified:

- The population in Khâi-Ma Municipality comprises 11 605 people, with a total of ± 3 500 households consisting of an average size of 3.3 individuals per household. Khâi-Ma Municipality experienced an average population growth rate of 0.0% between 2009 and 2018, which is similar to the Namakwa District Municipality's growth rate of 0.0% for the same period.
- The economic sectors that contributed the most to Khâi-Ma Municipality's GDP in 2018 were mining and quarrying (36.4%), agriculture, forestry and fishing (19.8%), and general government (12.4%).

- The majority of Khâi-Ma Municipality has access to basic services (i.e. water, electricity, sanitation) but due to the arid nature of the area, surface and underground water supplies are insufficient to provide higher levels of infrastructure (such as waterborne sanitation). Also, the living conditions of farm workers in remote settlements tend to be poor, with low mobility, and difficult access to health, education, recreation and shopping amenities. There are no regional or district hospitals in Khâi-Ma Municipality, only 1 community health centre, 3 clinics, and 2 mobile clinics.
- The majority of the population over the age of 20 in Khâi-Ma Municipality (40.3%) have acquired some secondary education, 16.1% have Grade 12/Matric, and 0.7% of the population over the age of 20 have a tertiary education. This is reflected in the skills level of Khâi-Ma Municipality where 46.9% of the population have a low skills level, 40.5% are semi-skilled and 12.6% are skilled.
- More than half of the population in Khâi-Ma Municipality (60.3%) are employed, while 12.9% are unemployed and 26.9% are not economically active. Just over 30% of households in Khâi-Ma Municipality (33.1%) are low income earners, while 55.1% are middle income earners and 11.8% are high income earners.
- **Thus, from a socio-economic perspective, the study area is highly sensitive to the proposed Veld PV South and the proposed Veld PV South would have a positive impact on the community.**

Section Four: Economic Impact Model

4.1. Introduction

The purpose of this section is to develop a better understanding of the potential economic impact of the proposed Veld PV South in the study area. Economic impact refers to the effect on the level of economic activity in each area because of some form of external intervention in the economy. In the case of this study, the local impacts will be impacted on a regional level. These impacts are measured because of the capital investment in the proposed Veld PV South. This analysis focuses on the changes that could be expected in the economy and community and can be estimated by using a technique called the Social Accounting Matrix (SAM) model.

4.2. Understanding the SAM Model

While there are many methods of regional economic impact analysis, the SAM modelling approach has proven to be a particularly effective method for evaluating the implications of introducing an exogenous change to the economy. The modelling approach is recognised and accepted both nationally and internationally. A SAM represents flows of all economic transactions that take place within an economy (regional or national). SAMs refers to a single year providing a static picture of the economy, based on national accounting statistics and input-output tables that are compiled and published by Statistics South Africa (Stats SA), using primarily South African Reserve Bank Accounts data. The model has however been amended to include the local conditions.

Importantly, it is the matrices that can be derived from the model that are used as instruments for economic analysis. The fundamental assumptions regarding the model, as well as the use of this model for analytical purposes, are:

- Production activities in the economy are grouped in homogeneous sectors;
- The mutual interdependence of sectors is expressed in meaningful input functions;
- Each sector's inputs are only a function of the specific sector's production;
- The production by different sectors is equal to the sum of the separate sectors of production;
- The technical coefficients remain constant for the period over which forecast the projections is made; and
- There will be no major change in technology.

It should also be noted that:

- All the Rand values in this report represent 2019 Rand values (cost excluding 15% VAT);
- The different measures of economic impact (jobs, Gross Geographic Product and new business sales) cannot be added together and should be interpreted as separate economic impacts.

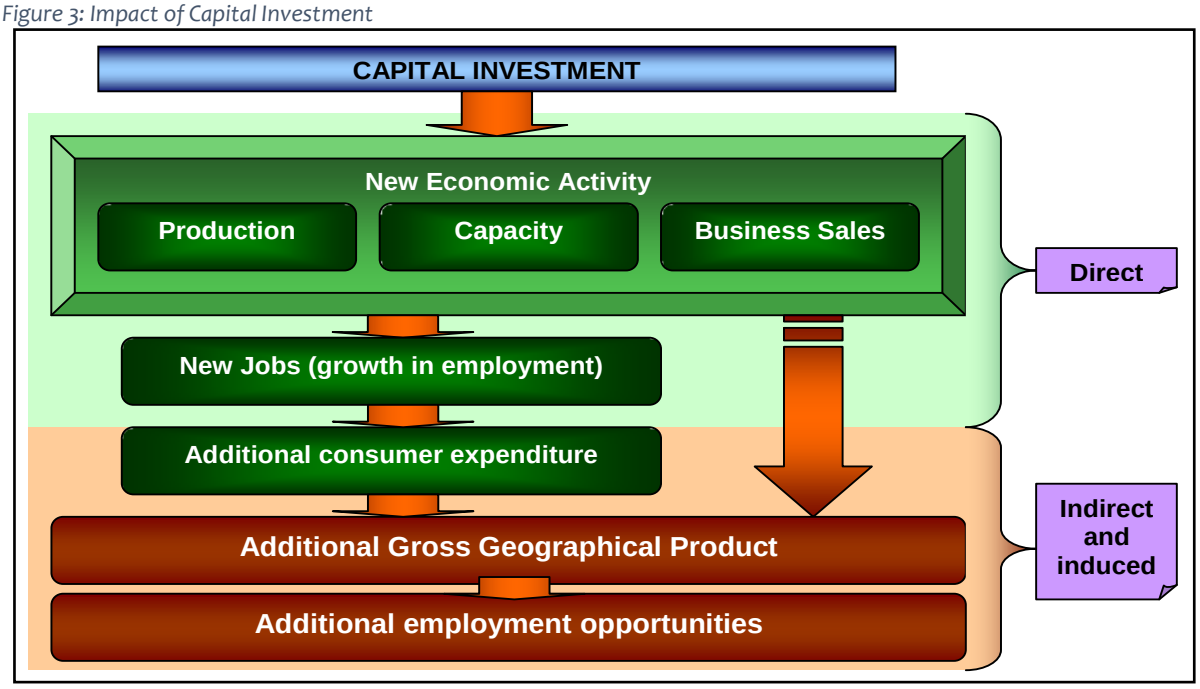
- The model quantifies direct and indirect economic impacts for a specific amount of time. Therefore, the estimates that are derived do not refer to gradual impacts over time.

Two types of economic impacts can be measured, namely, direct and indirect impacts:

- **Direct Impacts** – changes in local business activity occurring as a direct result or consequence of public or private sector capital expenditure. Direct economic effects are generated when the new business creates new jobs and purchases goods and services to operate the new facility. Direct impacts result in an increase in job creation, production, business sales, and household income.
- The multiplicative effects can be grouped into two distinct effects, namely:
    - **Indirect Impacts** – occur when the suppliers of goods and services to the new business experience larger markets and potential to expand. Indirect impacts result in an increase in job creation, GDP, and household income;
    - **Induced Impacts** – represent further shifts in spending on food, clothing, shelter and other consumer goods and services because of the change in workers and payroll of directly and indirectly affected businesses. This leads to further business growth/decline throughout the local economy. Examples include the income of employees and shareholders of the project as well as the income arising through the backward linkages of this spending in the economy. The impact is sometimes confused with the forward linkages of a project.

Figure 3 indicates direct, indirect and induced impacts in more detail.

Figure 3: Impact of Capital Investment



Economic impacts can also be viewed in terms of their duration, or the stage of life cycle in which the development takes place, (1) the construction phase (CAPEX) and (2) the operational phase (OPEX) and (3) the decommissioning phase[1].

Due to the duration of these phases, the impacts are separated into those observed during the construction phase and those experienced during the operational phase. The construction phase economic impacts are of a temporary nature, and therefore have a temporary effect. On the other hand, the operational phase of the proposed Veld PV South would last decades; hence the impacts during this stage would be of a sustainable nature.

The economic impacts during construction and operational phases can be viewed in terms of a change in the following:

- **Job creation** – the number of additional jobs created by economic growth. This includes jobs in planning and constructing the facility and sustainable jobs at the facility once it is operational. Indirect and induced job creation will also occur because of direct job and income creation.
- **Value-added (or GDP)** – the value of all final goods and products produced during a one-year period within the boundaries of a specific area, as a direct, indirect and induced result of activities for/at the precinct during planning, construction and operation.
- **Business output (or sales volume)** – the value of all inter- and intra-sectoral business sales generated in the economy because of the planning, construction and operation of the development.

Any of these measures can be an indicator of improvement in the economic well-being of residents, which is generally the goal of any investment project. The net economic impact is usually viewed as the expansion or contraction of an area's economy, resulting from the induced changes. The precise quantum of these impacts will be influenced by changes in the project (such as precise land-use mix, technologies employed, imported versus local goods and services, timing and funding options, amongst others) and changes in the project environment (such as property market cycles, interest rates, legislation, the structure of the economic sectors primarily influencing and affected by the development and the labour market, amongst others). **Table 9** provides an overview of the impacts modelled.

Table 9: Impacts Modelled

Impact on:	CAPEX	OPEX
Additional new business sales (NBS) (additional production/output	The construction work on the infrastructure and buildings will lead to the expansion of business sales for existing businesses located within the area, as well as the broader Northern	The increased need for goods and services, because of the construction of infrastructure and the operation of different activities within the proposed development. Due to the maintenance

[1] The decommissioning phase was not considered in this section as it is too far in the future to predict its potential economic impacts.

Impact on:	CAPEX	OPEX
generated by the development)	Cape region. For example, materials used in the construction process such as PV modules, racking, fencing, concrete, building sand, and so on will be purchased, as well as services such as engineers and other specialists. These changes are measured in terms of new business sales, i.e. new sales that will be generated in the economy as a direct result of the capital investment in the development project.	and upkeep of the photovoltaic facilities and transmission lines it is expected that the result will be an overall sustainable expansion of the business sales/annual turnover generated in the area.
Additional GDP	One of the most important indicators used to indicate economic growth and value is the GDP. The GDP measures the value of all final goods and services produced/provided within one year of the area's economy.	The generation of additional business sales and employment opportunities will initiate an on-going ripple effect through the sub-region, resulting in an increase in product and service value (measured in GDP).
Additional employment (direct and indirect)	Construction activities will result in direct jobs being created on site and other directly related sectors such as the transport and manufacturing sectors. Indirect jobs are also created due to the multiplier effect in the economy. For example, an additional number could lead to an increased number of jobs being created in these businesses, i.e. to increase the output of these businesses.	Because of the new activities on the site, it can be estimated that the study area will be able to eventually sustain a substantial number of new employment opportunities.

4.3. Capital Expenditure (CAPEX)

This section discusses the potential economic impact of the construction phase of the proposed Veld PV South. It must be noted that these impacts are temporary, considering that they are only apparent during the implementation process. This phase will utilise a combination of both intensive labour and machinery to construct the development.

Table 10 depicts the results of the impact modelling for the duration of the construction phase.

Table 10: Impact During Construction Phase

Impact	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
Production (@ 2019 R-value)	R1,110 billion	R1,139 billion	R582 million	R2,831 billion
GDP (@ 2019 R-value)	R250 million	R433 million	R234 million	R917 million
Jobs	401	2 081	816	3 298
Household Income (@ 2019 R-value)	R145 million	R192 million	R94 million	R431 million

(Urban-Econ, 2019)

As the table shows, the construction of the proposed addition will generate approximately R2,831 billion in production or in other words new business sales. Approximately R1,110 billion will be created through direct effects and R1,139 billion through indirect effects. This means that the major beneficiary of these effects will be the construction industry. Secondly, this increase in output will induce a further impact on the gross value added in the country, which is found at R917 million from the proposed Veld PV South, the model suggests that 3 298 direct, indirect and induced employment opportunities will be created during construction, which will increase household incomes by R431 million.

Table 11 shows the total impact on each sector during the construction phase.

Table 11: Impacts During Construction Phase on Sectors

Sector	Total Impact on Production	Total Impact on GDP	Total Impact on Employment	Total Impact on Household Income
Agriculture	1.2%	1.6%	2.9%	1.0%
Mining	0.2%	0.2%	0.1%	0.2%
Manufacturing	18.2%	15.8%	17.8%	15.4%
Electricity	0.6%	1.0%	0.5%	0.7%

Sector	Total Impact on Production	Total Impact on GDP	Total Impact on Employment	Total Impact on Household Income
Water	0.3%	0.3%	0.0%	0.2%
Building and Construction	52.0%	36.2%	33.4%	44.6%
Trade and accommodation	5.1%	8.0%	11.7%	8.1%
Transport and storage	4.8%	6.3%	2.8%	5.0%
Financing	2.5%	5.5%	1.3%	4.0%
Real estate and business services	11.0%	16.7%	12.9%	12.0%
Government services	4.1%	8.3%	16.7%	8.8%

(Urban-Econ, 2019)

The SAM model suggests that the following sectors will experience the greatest positive impact from the construction of the proposed Veld PV South.

- Manufacturing;
- Building and construction;
- Real estate and business services; and
- Government services.

4.4. Operational Expenditure (OPEX)

Once the construction of the proposed Veld PV South is complete further impact on the economy and community will be created through operational functions. Similarly, to the construction phase, the impact of the development is assessed by considering the change in new business sales, Gross Domestic Product and employment opportunities created. **Table 12** shows the results of the impact modelling exercise for the operational period per annum.

Table 12: Impact During the Operational Phase

Impact	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
Production (@ 2019 R-value)	R26 million	R14 million	R15 million	R55 million

Impact	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
GDP (@ 2019 R-value)	R13 million	R6 million	R6 million	R25 million
Jobs	13	18	21	52
Household Income (@ 2019 R-value)	5 million	2 million	2 million	9 million

(Urban-Econ, 2019)

The results show that R55 million will be generated from new business sales, with R26 million generated as a direct impact and R15 million as an indirect impact per annum. The increase in production output will result in an increase in Gross Domestic Product in the country to the value of R25 million per annum. The addition will furthermore create 52 employment opportunities during operations and an R9 million increases in household incomes per annum. **Table 13** depicts the results of the modelling per economic sector during the operational phase of the development.

Table 13: Impacts During Operational Phase Per Sector

Sector	Total Impact on Production	Total Impact on GDP	Total Impact on Employment	Total Impact on Household Income
Agriculture	1.6%	1.5%	4.6%	1.2%
Mining	0.5%	0.5%	0.5%	0.5%
Manufacturing	16.6%	12.0%	15.1%	14.2%
Electricity	49.7%	54.9%	26.9%	51.4%
Water	0.4%	0.3%	0.0%	0.3%
Building and Construction	6.3%	3.2%	12.7%	4.7%
Trade and accommodation	4.7%	5.1%	13.6%	6.2%
Transport and storage	4.1%	3.8%	3.1%	3.7%

Sector	Total Impact on Production	Total Impact on GDP	Total Impact on Employment	Total Impact on Household Income
Financing	3.6%	5.8%	2.3%	5.1%
Real estate and business services	10.0%	9.2%	8.7%	8.1%
Government services	2.6%	3.7%	12.5%	4.7%

(Urban-Econ, 2019)

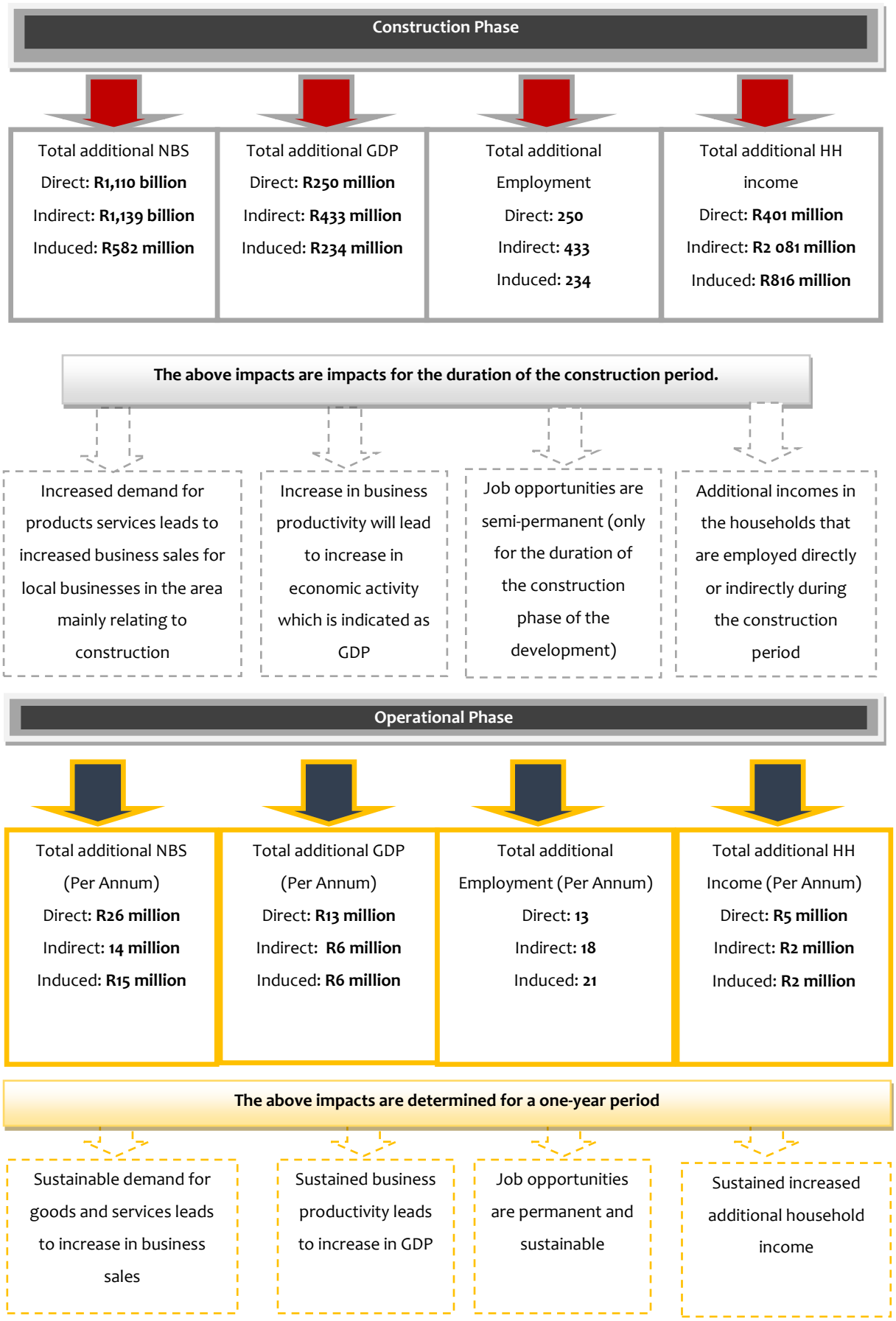
The SAM model suggests that the following sectors will experience the greatest positive impact from the operating of the proposed Veld PV South:

- Manufacturing;
- Electricity;
- Building and construction;
- Trade and accommodation;
- Real estate and business services; and
- Government services.

4.5. Conclusion

Figure 4 provides a visual illustration of the CAPEX and OPEX for the proposed Veld PV South.

Figure 4: CAPEX and OPEX Summary



Section Five: Impact Analysis

5.1. Introduction

The proposed Veld PV South will have various impacts as discussed in previous sections. The purpose was to identify possible impacts which could occur because of activities which will take place during the construction and operational phase of the development. The assessment of the additional new business sales, additional gross domestic product and additional employment are measured against the baseline numbers as indicated in the Socio-Economic Profile. As previously explained, these impacts are determined as direct impacts and indirect impacts for both the construction and operational phases of the proposed Veld PV South. Only the direct impacts were used to establish the impact on the study area. The main reason for not using the total numbers is because it would be very difficult to determine which percentage of the indirect impacts would also be felt within the study area that would mean that the total impacts would than need to be measured against the national economy and the national employment numbers. However, one must remember that in addition to what has been presented there will be significant indirect impacts.

5.2. Impact Table Assessment Methodology

The assessment of the significance of impacts for a proposed development is by its nature, a matter of judgement. To deal with the uncertainty associated with judgement and ensure repeatable results, Aurecon rates impacts using a standardised and internationally recognised methodology adhering to ISO 14001 and World Bank/IFC requirements.

For each predicted impact, criteria are applied to establish the **significance** of the impact based on likelihood and consequence, both without mitigation being applied and with the most effective mitigation measure(s) in place.

The criteria that contribute to the **consequence** of the impact are **intensity** (at the indicated spatial scale), which also includes the **type** of impact (being either a positive or negative impact); the **duration** (length of time that the impact will continue); and the **extent** (spatial scale) of the impact. The sensitivity of the receiving environment and/or sensitive receptors is incorporated into the consideration of consequence by appropriately adjusting the thresholds or scales of the intensity, duration and extent criteria, based on expert knowledge. For each impact, the specialist applies professional judgement to ascribe a numerical rating for each criterion according to the examples provided in **Error! Reference source not found.**. The c onsequence is then established using the formula:

Consequence = type x (intensity + duration + extent).

Depending on the numerical result, the impact's **consequence** would be defined as either extremely, highly, moderately or slightly detrimental; or neutral; or slightly, moderately, highly or extremely beneficial. These categories are provided in Error! Reference source not found..

To determine the significance of an impact, the **probability** (or likelihood) of that impact occurring is also considered. In assigning probability, the specialist considers the likelihood of occurrence but also takes cognisance of uncertainty and detectability of the impact. The most suitable numerical rating for probability is selected from **Error! Reference source not found.** below and applied with the consequence according to t he following equation:

Significance = consequence x probability

When assigning **probability** to an impact, it is vitally important to distinguish this from the concepts of **frequency and confidence,** with which it is sometimes confused.

- **Probability** refers to the likelihood that an impact will occur;
- **Frequency** refers to the regularity with which an impact occurs. To illustrate the difference between frequency and probability, it must be considered that something that happens infrequently may still be a certainty (i.e. have a high probability). For instance, Halley's Comet only comes close to the sun every 75 to 76 years (i.e. it has a very low frequency), but it is still a certainty;
- **Confidence** (see **Error! Reference source not found.**) refers to the degree of certainty of a prediction. C onfidence may be related to any of the impact assessment criteria (extent, intensity, duration or probability) and is not necessarily only related to probability. Confidence may be influenced by any factors that introduce uncertainty into a prediction.

Depending on the numerical result of this calculation, the impact would fall into a **significance category of very low, low, moderate or high**, and the type would be either positive or negative. Examples of these categories are provided in Error! Reference source not found..

Once the significance of an impact occurring without mitigation has been established, the specialist must apply his/her professional judgement to assign ratings for the same impact after the proposed mitigation has been implemented. Lastly, a further point is important when applying these criteria to impacts:

- Specialists need to assess the impact, **not** the source or origin of the impact (i.e. the activity that causes the impact). For instance, although the activity that causes a specific impact may take place over a long period of time, this does not necessarily imply that the impact itself will persist for the same length of time. The assessment must focus on the impact (the change in the environment) rather than on the activity that causes an impact.

The tables on the following pages show the scales used to classify the above variables and define each of the rating categories.

Table 14: Definition of extent, intensity, duration (Consequence criteria)

Criteria	Category	Description	Rank
Extent or spatial influence of impact	**National**	Beyond a 20km radius of the site	4
	Regional	Within a 20 km radius of the site	3
	Local	Within a 2 km radius of the centre of the site	2
	Site specific	On site or within the boundaries of the property	1
	None	None	0
Intensity of impact (at the indicated spatial scale) <u>Note:</u> this incorporates whether the type of impact is negative (-1) or positive (+1)	**High**	Natural and/ or social functions and/ or processes are *severely* altered	4 or -4
	Medium	Natural and/ or social functions and/ or processes are *notably* altered	3 or -3
	Low	Natural and/ or social functions and/ or processes are *slightly* altered	2 or -2
	Very Low	Natural and/ or social functions and/ or processes are *negligibly* altered	1 or -1
	None	Natural and/ or social functions and/ or processes remain *unaltered*	0
Duration of impact	**Permanent**	More than 10 years (after operation)	4
	Long Term	5- 10 years (after operation)	3
	Medium Term	0-5 years (after operation)	2
	Short Term	Up to 18 months	1
	None	Zero time	0

Table 15: Definition of probability criteria

Criteria	Category	Description	Rank
Probability	**Definite**	Estimated greater than 95 % chance of the impact occurring.	4
	Very likely	Estimated 50 to 95% chance of the impact occurring	3
	Fairly likely	Estimated 5 to 50 % chance of the impact occurring.	2
	Unlikely	Estimated less than 5 % chance of the impact occurring.	1
	None	Definitely no chance of occurrence	0

Table 16: Application of consequence ratings

Range		Consequence Rating
-12	-11	**Extremely detrimental**
-10	-9	**Highly detrimental**
-8	-7	**Moderately detrimental**

-6	-5	**Slightly detrimental**
-4	4	**Negligible**
5	6	**Slightly beneficial**
7	8	**Moderately beneficial**
9	10	**Highly beneficial**
11	12	**Extremely beneficial**

Table 17: Application of significance ratings

Range		Significance Rating
-48	-37	**High – negative**
-36	-25	**Moderate - negative**
-24	-13	**Low – negative**
-12	-3	**Very low – negative**
-2	2	**Neutral**
3	12	**Very Low - positive**
13	24	**Low – positive**
25	36	**Moderate – positive**
37	48	**High – positive**

Despite attempts at ensuring objectivity and impartiality, environmental assessment remains an act of judgement and can never escape the subjectivity inherent in attempting to define significance. The determination of the significance of an impact depends on context (spatial and temporal) and intensity of that impact. Since the rationalisation of context and intensity will ultimately be prejudiced by the observer, there can be no wholly objective measure by which to judge the components of significance, let alone how they are integrated into a single comparable measure.

This notwithstanding, in order to facilitate informed decision-making, environmental assessments must endeavour to come to terms with the significance of the environmental impacts. Recognising this, Aurecon has attempted to address potential subjectivity in the current Basic Assessment process as follows:

- Being explicit about the difficulty of being completely objective in the determination of significance, as outlined above;
- Developing an explicit methodology for assigning significance to impacts and outlining this methodology in detail. Having an explicit methodology not only forces the specialist to come to terms with the various facets that contribute to significance (thereby avoiding arbitrary assessment), but also provides the reader with a clear summary of how the specialist derived the significance; and
- Utilising a team approach and internal review of the assessment to facilitate a rigorous and defendable system.

Although these measures may not totally eliminate subjectivity, they provide an explicit context within which to review the assessment of impacts. The specialists appointed to contribute to this impact assessment have empirical knowledge of their respective fields and are thus able to **comment on the confidence** they have in their findings based on the availability of data and the certainty of their findings (example provided in Table 18). During the assessments specialists are requested to note the **Reversibility** of the impacts and **Irreplaceability** of the resource being assessed (refer to **Table 19** and **Table 20**, respectively).

Table 18: Definition of confidence ratings

Rating	Criteria
Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 19: Definition of reversibility ratings

Rating	Criteria
Irreversible	The activity will lead to an impact that is permanent.
Reversible	The impact is reversible, within a period of 10 years.

Table 20: Definition of irreplaceability ratings

Rating	Criteria
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

5.3. Impact on Production and Gross Domestic Product

5.3.1. During Construction

The biggest effects on production and Gross Domestic Product stimulated during construction activities, such as through the construction of the bulk infrastructure, retail, educational and medical facilities, etc, will be created through the multiplier effects, specifically through production and consumption induced effects. The former refers to the impacts generated along backward linkages when the project creates the demand for goods and services required for construction and this, in turn, 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. Besides the value added that could be generated by the local construction businesses through sub-contracting agreements and employment of free-lancers, the sectors

that are expected to benefit the most from the production and consumption induced effects are tertiary services such as building and construction, real estate and business services, manufacturing, etc. **Table 21** indicates the direct net regional economic gain in production and Gross Domestic Product during the construction phase of the proposed Veld PV South.

Table 21: Impact on Production and Gross Domestic Product during Construction

Impact on:	Direct (Construction)
Alternative 1 (Preferred Alternative)	
Production (@2019 R-Value)	R1,110 billion
GDP (@ 2019 R-Value)	R250 million
No Go Option	
Production (@2019 R-Value)	N/A
GDP (@ 2019 R-Value)	N/A

(Urban-Econ, 2019)

Table 22 provides an overview of the impact on production and GDP during construction of the proposed Veld PV South.

Table 22: Impact on Production and Gross Domestic Product during Construction

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	High	High	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Extremely Beneficial - Increase in production and GDP due to project capital expenditure	Extremely Beneficial - Increase in production and GDP due to project capital expenditure	Proposed site will remain in its current state and there would be no impact from GDP and production	Proposed site will remain in its current state and there would be no impact from GDP and production
Confidence	Certain	Certain	N/A	N/A
Probability	Definite	Definite	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Irreversible	Irreversible	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
Indirect impacts	Improvement in economy	Improvement in economy	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Unavoidable	Unavoidable	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Partly	Partly	N/A	N/A
Significance	High Positive	High Positive	Neutral	Neutral
Residual Impact	Improved local and regional economy	Improved local and regional economy	N/A	N/A

(Urban-Econ, 2019)

5.3.2. During Operation

This impact is created through the production and consumption multiplier effect. The production effect refers to that which is created when demand for the goods generated requires construction which then creates business sales as developers require a supply of operational inputs. The consumption effect refers to the fact that the operational phase of the development leads to the increase in household incomes of those who receive a salary from permanent employment at the project. This then increases household spending. These two effects stimulate the economy and increase regional Gross Domestic Product. The developer is encouraged to procure materials, goods and products required for the operation of the facility from local suppliers to increase the positive impact on the local economy. **Table 23** indicates the direct net regional economic gain in production and Gross Domestic Product during the operation of the proposed Veld PV South.

Table 23: Impact on Production and GDP during Operation

Impact on:	Direct (Operation)
Alternative 1 (Preferred Alternative)	
Production (@2019 R-Value)	R26 million
GDP (@ 2019 R-Value)	R13 million

Impact on:	Direct (Operation)
No Go Option	
Production (@2019 R-Value)	N/A
GDP (@ 2019 R-Value)	N/A

(Urban-Econ, 2019)

Table 24 provides an overview of the impact on production and GDP during operation of the proposed Veld PV South.

Table 24: Impact on Production and GDP during Operation

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Medium to High	Medium to High	N/A	N/A
Duration	Permanent	Permanent	N/A	N/A
Consequence	Highly Beneficial -- Increase in production and GDP due to project capital expenditure	Highly Beneficial -- Increase in production and GDP due to project capital expenditure	Proposed site will remain in its current state and there would be no impact from GDP and production	Proposed site will remain in its current state and there would be no impact from GDP and production
Confidence	Certain	Certain	N/A	N/A
Probability	Definite	Definite	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Irreversible	Irreversible	N/A	N/A
Indirect impacts	Improvement in economy	Improvement in economy	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality,	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality,	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	and the Northern Cape Province.	and the Northern Cape Province.		
Avoidance	Unavoidable	Unavoidable	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Partly	Partly	N/A	N/A
Significance	Moderate to High Positive	Moderate to High Positive	Neutral	Neutral
Residual Impact	Improved local and regional economy	Improved local and regional economy	N/A	N/A

(Urban-Econ, 2019)

5.4. Impact on Employment and Skills Development

5.4.1. During Construction

The local and national economies have high unemployment rates, and government has set a target to create 11 million jobs by 2030. Unemployment is high within the Khâi-Ma Municipality (14.2%) and the Namakwa District Municipality (10.3%) with the remainder within the district and the local municipality being not economically active (43.1% and 38.2%, respectively). In addition to direct jobs, jobs will also be created indirectly (among suppliers) and induced jobs will be created through greater income circulation. Due to the nature of work that needs to be performed, a significant amount of employment opportunities exists for unskilled and semi-skilled workers. Amongst others, construction involves activities that require unskilled labour for which locals could be employed. These include clearance of vegetation, digging trial pits at main foundation points, excavation of foundation where access is poor, mixing of concrete where access is poor, rehabilitation of land, site security, and other activities requiring labourers. It is important to ensure that most of the employment opportunities created as part of the development are allocated to the local communities. This would result in individuals gaining more skills (learning various building skills) and would then be able to search for other job opportunities relating to the same kind of building opportunities after the completion of the proposed Veld PV South.

Table 25 indicates the number of jobs that will be created during the construction.

Table 25: Impact on Employment during Construction

Impact on:	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
Alternative 1 (Preferred Alternative)				
Jobs	401	2 081	816	3 298
No Go Option				

Jobs	N/A	N/A	N/A	N/A

(Urban-Econ, 2019)

Table 26 provides an overview of the impact on employment during construction for the proposed Veld PV South.

Table 26: Impact on Employment during Construction

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Medium	Medium to High	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Highly Beneficial - Creation of short-term employment in local economies	Highly Beneficial - Creation of short-term employment in local economies	Proposed site will remain in its current state and there will be no impact from employment and skills transfer	Proposed site will remain in its current state and there will be no impact from employment and skills transfer
Confidence	Certain	Certain	N/A	N/A
Probability	Very Likely	Very Likely	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Reversible - The benefit will be terminated at end of construction	Reversible - The benefit will be terminated at end of construction	N/A	N/A
Indirect impacts	Improved standard of living	Improved standard of living	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Municipality, and the Northern Cape Province.	Municipality, and the Northern Cape Province.		
Avoidance	Partly	Partly	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Moderate	Moderate	N/A	N/A
Significance	Moderate	Moderate to High Positive	Neutral	Neutral
Residual Impact	Improved living standards of the directly and indirectly affected households	Improved living standards of the directly and indirectly affected households	N/A	N/A

(Urban-Econ, 2019)

5.4.2. During Operation

The local and national economies have high unemployment rates, and government has set a target to create 11 million jobs by 2030. Unemployment is high within the Khâi-Ma Municipality (14.2%) and the Namakwa District Municipality (10.3%) with the remainder within the district and the local municipality being not economically active (43.1% and 38.2%). The proposed Veld PV South will create 52 employment opportunities of which 13 will be direct, 18 will be indirect and 21 will be induced. It is important to note that these employment opportunities will be sustainable, compared to the employment opportunities created during construction that will fade away once construction is completed. Additionally, indirect jobs will be created at various businesses providing goods and services to the development activities when required.

Table 27 indicates the number of jobs that will be created during operation of the proposed Veld PV South.

Table 27: Impact on Employment during Operation

Impact on:	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
Alternative 1 (Preferred Alternative)				
Jobs	13	18	21	52
Alternative 2 (No Go Option)				
Jobs	N/A	N/A	N/A	N/A

(Urban-Econ, 2019)

Table 28 provides an overview of the impact on employment during operation of the proposed Veld PV South.

Table 28: Impact on Employment during Operation

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Low	Low	N/A	N/A
Duration	Permanent	Permanent	N/A	N/A
Consequence	Moderately Beneficial - Creation of Long-term employment in economies	Moderately Beneficial - Creation of Long-term employment in economies	Proposed site will remain in its current state and there will be no impact from employment	Proposed site will remain in its current state and there will be no impact from employment
Probability	Very Likely	Very Likely	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Irreversible	Irreversible	N/A	N/A
Indirect impacts	Improved standard of living	Improved standard of living	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Partly	Partly	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Moderate	Moderate	N/A	N/A
Significance	Low Positive	Low Positive	Neutral	Neutral

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
Residual Impact	Improved living standards of the directly and indirectly affected households	Improved living standards of the directly and indirectly affected households	N/A	N/A

(Urban-Econ, 2019)

5.5. Impact on Household Income

5.5.1. During Construction

The proposed Veld PV South would have a positive impact on the household income as it will generate approximately R432 million across 3 298 employment positions. This increase in household income levels is due to the anticipated increase in unskilled to skilled employment opportunities (construction workers, site managers, security, engineers, builders, machine operators, etc) to be created as part of the construction phase of the development. Depending on the employment position, salaries and wages within low to high-income levels would be paid out. Although temporary, this increase in household earnings would have a positive effect on nutrition, living conditions, access to better health care, access to more options regarding education, and improved ability to make economic choices.

Table 29 indicates the household income that will be created during construction.

Table 29: Impact on Household Income during Construction

Impact on:	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
Alternative 1 (Preferred Alternative)				
Household Income	R145 million	R192 million	R94 million	R432 million
No Go Option				
Household Income	N/A	N/A	N/A	N/A

(Urban-Econ, 2019)

Table 30 provides an overview of the impact on household income during construction.

Table 30: Impact on Household Income during Construction

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
Extent	National	National	N/A	N/A
Intensity	High	High	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Highly Beneficial - Improvement in household income of people employed directly/ indirectly by the proposed Veld PV South	Highly Beneficial - Improvement in household income of people employed directly/ indirectly by the proposed Veld PV South	Proposed site will remain in its current state and there will be no impact from household income	Proposed site will remain in its current state and there will be no impact from household income
Confidence	Certain	Certain	N/A	N/A
Probability	Very Likely	Very Likely	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Irreversible	Irreversible	N/A	N/A
Indirect impacts	Improved standard of living	Improved standard of living	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Partly	Partly	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Moderate	Moderate	N/A	N/A
Significance	Moderate Positive	Moderate to High Positive	Neutral	Neutral
Residual Impact	None foreseen as impact would dissipate post	None foreseen as impact would	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	construction period	dissipate post construction period		

(Urban-Econ, 2019)

5.5.2. During Operation

The proposed Veld PV South will create employment opportunities in the long term (operational phase). It is important to note that these employment opportunities will be sustainable, compared to the employment opportunities created during construction that will fade away once construction is completed. The sustainable income generated because of the proposed Veld PV South operation will be approximately R9 million per annum which will have a positive impact for the 52 employment positions created. This in turn will positively affect the nutrition, living conditions, access to better health care, access to more options regarding education, and improved ability to make economic choices.

Table 31 indicates the household income per annum that will be created during the operation of the proposed Veld PV South.

Table 31: Impact on Household Income during Operation

Impact on:	Direct (Construction)	Indirect (Suppliers)	Induced (Salaries and Wages)	Total
Alternative 1 (Preferred Alternative)				
Household Income	R5 million	R2 million	R2 million	R9 million
No Go Option				
Household Income	N/A	N/A	N/A	N/A

(Urban-Econ, 2019)

Table 32 provides an overview of the impact on household income during operation.

Table 32: Impact on Household Income during Operation

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Low	Low	N/A	N/A
Duration	Permanent	Permanent	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
Consequence	Highly Beneficial - Improvement in household income of people employed for the proposed Veld PV South	Highly Beneficial - Improvement in household income of people employed for the proposed Veld PV South	Proposed site will remain in its current state and there will be no impact from household income	Proposed site will remain in its current state and there will be no impact from household income
Confidence	Certain	Certain	N/A	N/A
Probability	Very Likely	Very Likely	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Irreversible	Irreversible	N/A	N/A
Indirect impacts	Improved standard of living	Improved standard of living	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Partly	Partly	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Moderate	Moderate	N/A	N/A
Significance	Low Positive	Low to Moderate Positive	Neutral	Neutral
Residual Impact	Improved standard of living of those employed (directly/ indirectly) within development	Improved standard of living of those employed (directly/ indirectly) within development	N/A	N/A

(Urban-Econ, 2019)

5.6. Impact on Government Revenue

5.6.1. During Construction

The investment from proposed Veld PV South will generate revenue for the local municipality through a combination of personal income tax, VAT, companies' tax, bulk infrastructure levies, etc. Due to a limited economic base and low-income levels, the local municipality's revenue base is limited, which in turn negatively impacts on its ability to provide services to its residents. Government earnings will be distributed by the local 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.

Table 33 provides an overview of the impact on rates and taxes during construction.

Table 33: Impact on Government Revenue

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Intensity	Medium	Medium	N/A	N/A
Consequence	Moderately Beneficial - Generation of revenue	Moderately Beneficial - Generation of revenue	No generation of revenue	No generation of revenue
Confidence	Certain	Certain	N/A	N/A
Probability	Definite	Definite	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Reversible - Benefits terminated at the end of the construction period	Reversible - Benefits terminated at the end of the construction period	N/A	N/A
Indirect impacts	Improvement in the local economy	Improvement in the local economy	N/A	N/A
Cumulative Impacts	High - Could be high considering	High - Could be high considering	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.		
Avoidance	Unavoidable	Unavoidable	N/A	N/A
Managed	Fully	Fully	N/A	N/A
Mitigated	Not Mitigated at All	Not Mitigated at All	N/A	N/A
Significance	Moderate Positive	Moderate Positive	Neutral	Neutral
Residual Impact	Short term improvement of the local economy	Short term improvement of the local economy	N/A	N/A

(Urban-Econ, 2019)

5.6.2. During Operation

The proposed Veld PV South would contribute to the local municipality through payments for utilities used in the operation of the facility. Additionally. In addition to the above rates and taxes the following taxes could also be received:

- Business income taxes, as well as personal income tax for those employed within the development, will also be collectable by the South African Revenue Services;
- The indirect impacts stem from the additional business sales and Gross Domestic Product, which supplies the authorities with increased taxes on personal and business incomes;

Table 34 provides an overview of the impact on rates and taxes during operation.

Table 34: Impact on Government Revenue during the Operation Phase

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Low	Low	N/A	N/A
Duration	Long Term	Long Term	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
Consequence	Slightly Beneficial - Generation of revenue	Slightly Beneficial - Generation of revenue	No generation of revenue	No generation of revenue
Confidence	Certain	Certain	N/A	N/A
Probability	Definite	Definite	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Irreversible	Irreversible	N/A	N/A
Indirect impacts	Improvement in the local economy	Improvement in the local economy	N/A	N/A
Cumulative Impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Unavoidable	Unavoidable	N/A	N/A
Managed	Fully	Fully	N/A	N/A
Mitigated	Not mitigated at all	Not mitigated at all	N/A	N/A
Significance	Low Positive	Low Positive	Neutral	Neutral
Residual Impact	Long term improvement of the local economy	Long term improvement of the local economy	N/A	N/A

(Urban-Econ, 2019)

5.7. Impact on In-Migration

5.7.1. During Construction

The proposed Veld PV South would create many job opportunities during the construction phase and should construction companies utilise labourers from different areas then this could potentially result in an influx of workers to the proposed site. The negative impact would be due to the increased usage of services such as water and electricity infrastructure. Although it would be difficult to ensure that contractors only employ labourers from the area (in order to minimise migration) it would be mandatory to manage this through a proposed labour desk.

The migration of people to the area could result in social conflicts between the local population and the migrants, as the former could perceive the latter to steal the employment opportunities in the area that are already in short supply. An influx of people into the area, especially by job seekers, could further lead to a temporary increase in the level of crime, prostitution, and possibly deterioration of health amongst the people of the local communities due to the spread of sexually transmitted diseases. The issue of semi-skilled and unskilled construction workers and job seekers that decide to stay in the area after the project's establishment is also a concern. Left without income, these individuals could resolve to crime and contribute to the increase in the level of poverty in the local communities. Aside from the broader community issues, the presence of the workforce on site could lead to negative impacts in the surrounding area such as theft and burglaries, trespassing on adjacent properties, development of informal trading, and littering.

Table 35 provides an overview of the impact of in-migration during the construction of the proposed Veld PV South.

Table 35: Impact of In-Migration

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Negative	Negative	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Low	Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental - Influx of migrant workers	Neglible to Slightly Detrimental - Influx of migrant workers	Proposed site will remain in its current state and there will be no impact from the in-	Proposed site will remain in its current state and there will be no impact from the

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
			migration of workers	in-migration of workers
Confidence	Certain	Certain	N/A	N/A
Probability	Fairly Likely	Fairly Likely	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Reversible	Reversible	N/A	N/A
Indirect impacts	Investment into improving healthcare, policing service and economic infrastructure	Investment into improving healthcare, policing service and economic infrastructure	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Partly	Partly	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Partly	Partly	N/A	N/A
Significance	Moderate Negative	Low to Moderate Negative	Neutral	Neutral
Residual Impact	Negative influence within local communities and infrastructure	Negative influence within local communities and infrastructure	N/A	N/A

(Urban-Econ, 2019)

5.8. Impact on Basic Services, Social and Economic Infrastructure

5.8.1. During Construction

Should migrant workers come into the area they will be creating an additional demand for rental accommodation, social services, and access to water and electricity. The majority of Khâi-Ma Municipality's population has access to basic services (i.e. water, electricity, sanitation) but due to the arid nature of the area, surface and underground water supplies are insufficient to provide higher levels of infrastructure (such as waterborne sanitation). The proposed developer is envisioning to establish a construction camp on site, which means that construction workers coming from outside the area would not need to be accommodated in the nearby towns.

Table 36 provides an overview of the impact of in-migration during the construction of the proposed Veld PV South.

Table 36: Impact of In-Migration

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Negative	Negative	N/A	N/A
Extent	National	National	N/A	N/A
Intensity	Low	Low	N/A	N/A
Duration	Short Term	Short Term	N/A	N/A
Consequence	Slightly Detrimental - Impact on economic and social infrastructure	Neglible to Slightly Detrimental - Impact on economic and social infrastructure	Proposed site will remain in its current state and there will be no impact on economic and social infrastructure from the project	Proposed site will remain in its current state and there will be no impact on economic and social infrastructure from the project
Confidence	Certain	Certain	N/A	N/A
Probability	Fairly Likely	Fairly Likely	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Reversible	Reversible	N/A	N/A
Indirect impacts	Capital expenditure requirements by local municipality to improve deteriorated social and economic infrastructure	Capital expenditure requirements by local municipality to improve deteriorated social and economic infrastructure	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Municipality, and the Northern Cape Province.	Municipality, and the Northern Cape Province.		
Avoidance	Partly	Partly	N/A	N/A
Managed	Partly	Partly	N/A	N/A
Mitigated	Partly	Partly	N/A	N/A
Significance	Low Negative	Low Negative	Neutral	Neutral
Residual Impact	Negative influence within local communities and infrastructure	Negative influence within local communities and infrastructure	N/A	N/A

(Urban-Econ, 2019)

5.9. Investment in the local communities and economic development projects as part of a Social Economic Development and Enterprise Development Plan

5.9.1. During Operation

The local economy lacks employment opportunities and opportunities to further skills development, which could be attributed to the area lacking community facilities and the lack in the number of businesses. The project will form part of the Independent Power Producer Procurement Programme. This implies that the operating company would allocate a certain percentage of the project's revenue to community development.

Table 35**Table 37** provides an overview of the impact of in-migration during the construction of the proposed Veld PV South.

Table 37: Impact of Investment in Local Communities and Economic Development Projects as Part of the Social Economic Development and Enterprise Development Plan

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	Regional	Regional	N/A	N/A
Intensity	Medium to High	Medium to High	N/A	N/A
Duration	Long Term	Long Term	N/A	N/A

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
Consequence	Impact on local communities and projects	Impact on local communities and projects	Proposed site will remain in its current state and there will be no impact from investment	Proposed site will remain in its current state and there will be no impact from investment
Probability	Definite	Definite	N/A	N/A
Irreplaceable loss of resources	No Loss in Resources	No Loss in Resources	N/A	N/A
Reversibility	Partly	Partly	N/A	N/A
Indirect impacts	Improved standard of living	Improved standard of living	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	N/A	N/A
Avoidance	Unavoidable	Unavoidable	N/A	N/A
Managed	Fully	Fully	N/A	N/A
Mitigated	Not Mitigated at All	Not Mitigated at All	N/A	N/A
Significance	Moderate to High Positive	Moderate to High Positive	Neutral	Neutral
Residual Impact	Improved standard of living of those directly affected by the investment	Improved standard of living of those directly affected by the investment	N/A	N/A

(Urban-Econ, 2019)

5.10. Impact on the Supply of Electricity

5.10.1. During Operation

The proposed Veld PV South falls within the Springbok Renewable Energy Development Zone as well as one of the identified power corridors which will assist in enabling the efficient and effective expansion of key strategic transmission infrastructure designed to satisfy national transmission requirements up to 2040. The Springbok Renewable Energy Development Zone is a geographical area "where solar photovoltaic technologies can be:

- Incentivized;
- Deep grid expansion can be directed; and
- Regulatory processes will be streamlined.

The Springbok Renewable Energy Development Zone in which the proposed Veld PV South is located will act as an energy generation hub that provides anchor points for grid expansion thereby allowing for strategic and proactive expansion of the grid. The Renewable Energy Development Zone and Power Corridors support 2 of the 18 Strategic Integrated Projects which were identified in the Infrastructure Development Plan which is aimed at promoting catalytic infrastructure development to stimulate economic growth and job creation. The proposed Veld PV South is would assist/ strengthen the electricity network of the South African National grid, meeting growing demand for electricity in the area and improving service quality and reliability. Reliable, i.e. uninterrupted, supply of electricity to the country is one of the prerequisites for development and economic growth as businesses cannot function without electricity, while the quality of social services without access to electricity is poor. **Table 38** provides an overview of the impact of in-migration during the construction of the proposed Veld PV South.

Table 38: Impact of the Supply of Electricity

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**
Nature	Positive	Positive	N/A	N/A
Extent	National	National	N/A	N/A
Duration	Long Term	Long Term	N/A	N/A
Intensity	High	High	N/A	N/A
Consequence	Extremely Beneficial - Impact on electricity supply	Extremely Beneficial - Impact on electricity supply	Proposed site will remain in its current state and there will be no provision of	Proposed site will remain in its current state and there will be no provision of

Assessment				
	Alternative 1 (Preferred Alternative)		No Go Option	
			additional electricity into the grid	additional electricity into the grid
Confidence	Certain	Certain	N/A	N/A
Probability	Definite	Definite	N/A	N/A
Irreplaceable loss of resources	Low	Low	N/A	N/A
Reversibility	Reversible	Reversible	N/A	N/A
Indirect impacts	Improved standard of living	Improved standard of living	N/A	N/A
Cumulative impacts	High - Could be high considering the potential for solar and other projects (such as mining) in Khâi-Ma Municipality, and the Northern Cape Province.	Investment in the local communities and economic development projects as part of a Social Economic Development and Enterprise Development Plan	N/A	N/A
Avoidance	Unavoidable	Unavoidable	N/A	N/A
Managed	Fully	Fully	N/A	N/A
Mitigated	Not Mitigated at All	Not Mitigated at All	N/A	N/A
Significance	High Positive	High Positive	Neutral	Neutral
Residual Impact	Improved supply of electricity/ standard of living	Improved supply of electricity/ standard of living	N/A	N/A

(Urban-Econ, 2019)

5.11. Conclusion

The purpose was to identify possible social and economic impacts that could occur as a result of activities, which will take place during the construction and operational phase of the proposed Veld PV South. It is evident that the proposed Veld PV South would result in several positive impacts, such as a decrease in the unemployment numbers; improved income, government revenue, electricity supply, etc; while it could result in a negative impact in term of an in-migration of workers into the area seeking employment during the construction phase. Mitigation measures have been provided for both positive and negative impacts. The

positive impacts, such as the provision of employment opportunities, will result in residents being able to obtain jobs and in return can earn an income, which would then improve on their standard of living. Considering the low levels of employment within the Khâi Ma Local Municipality the provision of employment opportunities would assist local residents employed improving upon their standard of living. Furthermore, the consolidation of the Renewable Energy Development Zones within the Northern Cape, such as the one in Springbok in which the proposed Veld PV South falls under wills assist in not only strengthening the provision of electricity but also promote economic growth and employment creation through the provision of additional infrastructure.

Section Six: Conclusion and Recommendations

The proposed Veld PV South will have various social and economic impacts. The purpose of this study was to identify possible impacts that could occur as a result of activities, which will take place during the construction and operational phase of the proposed Veld PV South. It is evident that the proposed Veld PV South would result in impacts during the construction phase as highlighted in **Table 39**.

Table 39: Nature of Impacts during Construction and Operation

Impacts	Alternative 1 (Preferred Alternative)	Alternative 2 – (No Go Option)
Construction Phase		
Impact on Production and Gross Domestic Product	Positive	N/A
Impact on Employment and Skills Development	Positive	N/A
Impact on Household Income	Positive	N/A
Impact on Government Revenue	Positive	N/A
Impact on In-Migration	Positive	N/A
Impact on Basic Services, Social and Economic Infrastructure	Negative	N/A
Operation Phase		
Impact on Production and Gross Domestic Product	Positive	N/A
Impact on Employment and Skills Development	Positive	N/A
Impact on Household Income	Positive	N/A
Impact on Government Revenue	Positive	N/A
Impact on Investment in Local Communities and Economic Development Projects as Part of the Social Economic Development and Enterprise Development Plan	Positive	N/A
Impact on the Supply of Electricity	Positive	N/A

Source: *Urban-Econ, 2019*

Mitigation measures have been provided for both the positive and negative impacts to improve on their significance which is indicated in **Table 40**.

Table 40: Mitigation Measures

Impact	Mitigation Measures (Construction)	Mitigation Measures (Operation)
Impact on Production and GDP	• The developer should encourage the EPC contractor to increase the local procurement practices and	• The operator of the proposed development should be encouraged to procure materials,

Impact	Mitigation Measures (Construction)	Mitigation Measures (Operation)
	employment of people from local communities as far as feasible to maximise the benefits to the local economies.	goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy as far as possible.
Impact on Employment and Skills Development	• Establish a local skills desk in the study area to determine the potential skills that could be sourced in the area. • Recruit local labour as far as feasible. • Sub-contract to local construction companies where possible. • Knowledge sharing and on-the-job-training should be viewed as a prerequisite, where feasible, for all service contractors/service providers working on the development and employing local labour.	• Where possible, local labour should be considered for employment to increase the positive impact of the local economy. • If possible, goods and services should be procured from local small businesses, this will stimulate indirect job creation.
Impact on Household Income	• Recruit local labour as far as feasible to increase the benefits to the local households • Sub-contract to local construction companies where possible • Use local suppliers where feasible for goods and services	• Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy • When feasible local procurement of goods and services should be implemented to further increase the benefit of local communities.
Impact on In-Migration	• Set up a recruitment office in the nearby towns and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in hope to find temporary employment.	• N/A

Impact	Mitigation Measures (Construction)	Mitigation Measures (Operation)
	• Employ locals as far as feasible through the creation of the local skills database and recruitment of suitable candidates. • Control the movement of workers between the site and areas of residence to minimise loitering around the proposed facility by providing scheduled transportation services between the urban areas and the construction site. • Engage communities with respect to their possible involvement during construction in providing supporting services such as catering, temporary housing of workers, transportation, etc. • Establish a proper fencing around the property to reduce the desire of workers to trespass between the construction site and adjacent properties. • Set up a gate and controlled access system to monitor the movement of people to and from the property, as well as to reduce the influx of job seekers to the site itself. • Ensure that any damages or losses to the nearby farms that can be linked to the conduct of the construction workers are adequately reimbursed. • Assign a person to deal with complaints and concerns of the affected parties.	

Impact	Mitigation Measures (Construction)	Mitigation Measures (Operation)
Impact on Basic Services, Social and Economic Infrastructure	• Provide adequate signage along the roads 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 the ability of the municipality to meet the demands for social and basic services created by the migrant construction workers. • Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate making use of the social responsibility allocations.	• N/A
Impact on Investment in Local Communities and Economic Development Projects as Part of the Social Economic Development and Enterprise Development Plan	• N/A	• N/A
Impact on the Supply of Electricity	• N/A	• N/A

By following these mitigation strategies, the impacts identified can be monitored and controlled to allow for the success of the construction and operational phases of the proposed development.

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