ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED KHAUTA SOUTH SOLAR PV FACILITY AND ASSOCIATED INFRASTRUCTURE IN FREE STATE

Economic Impact Assessment Report

Final Report

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Report prepared for:

Enviroworks

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He has managed projects for various property and economic studies, such as integrated housing projects and socio-economic impact assessments. He has also facilitated a number of urban and rural renewal and development projects focusing on job creation opportunities and broadening the local economic base through investment attraction in bankable projects. Pierre currently serves as manager of infrastructure projects as well as of Urban-Econ in Mpumalanga and is responsible for the day-to-day operations of the office.

It can be declared that the Urban-Econ Development Economists has contributed independently during the course of this study and the completion thereof.

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1. INTRODUCTION

Enviroworks was commissioned by **WKN-Windcurrent** to undertake an Economic Impact Assessment for the proposed Khauta Solar PV Cluster which is located near Welkom situated in the Free State Province. As part of the specialist studies, it was identified that an **Economic Impact Assessment (SEIA)** was required. Enviroworks subsequently appointed **Urban-Econ Development Economists** to conduct the EIA process. This report seeks to assess the potential economic impacts and has included recommendations to enhance the positive impacts and reduce the potential negative impacts of the project. This is done in order to enhance the foreseeable benefits of the development. This report will focus on the South Solar PV Facility, referred as Khauta South.

1.1. BRIEF DESCRIPTION OF PROJECT

Khauta Solar is to be located approximately 16 km northeast of the town of Welkom in the Free State Province of South Africa and in close proximity of Riebeeckstad. Site access is via the R730/R34/R70 which is depended on the direction from the proposed development area. The project site is approximately 700 ha.

The Project will be divided into four (4) subprojects, namely:

- Khauta North Solar PV Facility – 165MW
- Khauta South Solar PV Facility – 110MW
- Khauta West Solar PV Facility – 80MW
- Khauta e Nyane Solar PV Facility – 50MW

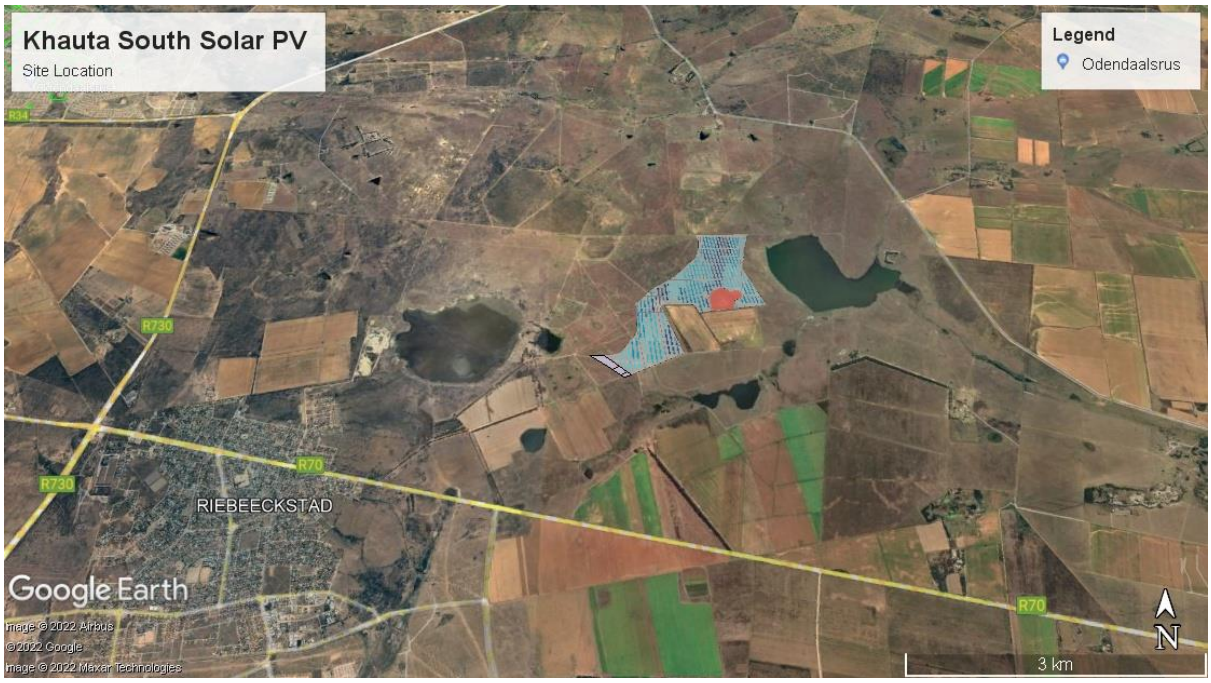
This report focuses on the 110MW Khauta South PV Facility. The site for the proposed Project occupies the central areas of Matjhabeng Local Municipality in the Lejweleputswa District of Free State province (Map 1-1). The closest adjacent town is that of Riebeeckstad and Welkom.

The project site comprises the following farm portions:

Table 1-1: Farms covered by Khauta South

Khauta South Solar PV Facility	• Portion 9 of Farm Commandants Pan No. 382; • Farm Tafel Baai No. 413; and • Portion 12 of Farm Nooitgedacht No. 74

Map 1-1: Site locality



Source: (Google Earth Pro, 2022)

1.2. SCOPE AND PURPOSE OF THE PROJECT

The economic impact assessment contains information that together with other specialists allows assessment of the project from a sustainable development perspective and assists in identifying "the most practicable environmental option" that provides the "most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society", in the long-term and the short-term. In light of the above and in line with the Environmental Impact Assessment (EIA) Regulations of 2014 as well as the new NEMA GN 320 regulations, the purpose of the economic impact assessment is to assess the need and desirability of the project. It specifically aims to ensure that the project, if approved, provides for justifiable economic development outcomes. As such it aims to:

- identify, predict and evaluate economic aspects of the environment that may be affected by the project activities and associated infrastructure
- advise on the alternatives that best avoid negative impacts or allow to manage and minimise them to acceptable levels, while optimising positive effects

Based on the understanding of the project's objectives, the scope of work for the economic specialist is outlined in the following list.

- Delineate the zone of influence in consultation with other specialists on the team
- Determine the affected communities and economies located in the zone of influence and identify sensitive receptors and beneficiaries within the delineated study area, i.e., people, land uses and economic activities that could be directly or indirectly negatively affected by the proposed project or benefit from it

- Determine the data required to assess potential impacts and respond to the questions outlined in the guidelines related to needs and desirability assessment
- Review secondary data and assess data gaps
- Engage with the environmental practitioner, other specialists on the team and the client to gain necessary background on the project
- Conduct a site visit and collect primary social and economic data (through personal or telephonic interviews) of the parties that may be directly or indirectly be affected (positively or negatively) by the proposed project to address data gaps
- Create a socio-economic profile of the potentially affected and benefiting environment, which would then represent a status of the environment under the "no-go" alternative and would be used to assess the potential changes ensued from the proposed project
- Quantify the potential positive and negative social and economic effects of the proposed development on the local and regional economic activities
- Evaluate the potential positive and negative impacts following the environmental specialist's methodology
- Assess cumulative impacts
- Develop a mitigation plan by proposing mitigation measures for negative effects and enhancement measures for positive impacts

1.3. DELINEATION OF THE STUDY AREA

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

1.4. PRIMARY, SECONDARY, AND TERTIARY STUDY AREA

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

- Primary zone of influence: For the purpose of the analysis of the impact on property values and the agricultural industry, as well as the assessment of potential local economic impacts that could ensue from the project, the primary zone of influence is determined to be Matjhabeng LM.
- Secondary and tertiary zones of influence: Economic benefits and impacts will not be limited to the site or the nearby towns and settlements only. Most of the goods and services that will be

purchased for the construction and will be required for operation of the wind farm will be secured from outside the primary zone of influence and specifically from areas such Johannesburg. Therefore, the Free State and the rest of South Africa are defined as the secondary and tertiary zones of influence of the proposed project from an economic perspective.

1.5. METHODOLOGICAL APPROACH

1.5.1 Economic Impact Assessment Method

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

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

- Indirect effects relate to the changes in economic indicators that are triggered along the upstream industries that supply goods and services to the intervention.
- Induced effects refer to the changes in economic indicators that are stimulated by changes in consumption expenditure of households that were directly or indirectly affected by the intervention.

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

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

Projection of the initial impacts and multiplier effects are usually done by employing an input-output model or a General Equilibrium Model. The use of these models in economic impact assessments allows for the quantification of potential impacts in terms of a number of economic indicators such as production, Gross Value Added (GVA), employment and income. The scale of these impacts is dependent on the size and diversification of the economy under analysis which in turn determines the leakage.

Secondary and cumulative effects can be identified through an expert opinion technique, consultations, development matrices and interviews. Such impacts can be difficult to quantify. Overall, an economic

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

The economic impact assessment made use of the economic models based on the Free State Social Accounting Matrix (SAM) developed in 2011 and forecast to represent 2022 figures. The SAM is a comprehensive, economy-wide database that contains information about the flow of resources that takes place between the different economic agents, in this case the Free State economy. The selection of this model in the assessment is attributed to the expected spatial distribution of procurement during both the construction and operation phases of the project.

1.5.2 Impact assessment model

All impacts identified were assessed in terms of the extent, duration, magnitude, probability and significance. The impact model used was provide by Enviro Works, and is explained in Annexure A.

1.6. DATA COLLECTION

As part of the data collection process for the economic impact assessment of the Project the following activities were undertaken:

1.6.1 Review of planning documents

In order to document the economic context of the study area within the Matjhabeng Municipality, a number of important documents or sources of information were reviewed, referenced, and used to inform the SEIA. The policy review was conducted in section 2 of this report.

1.6.2 Literature review

In order to substantiate the findings of the economic impact assessment a number of secondary research documents have been considered as they relate to the proposed project. These documents include academic journals and studies available through online publication or print media. It is intended that these documents substantiate the baseline profile, provide for benchmarking in the industry, while at the same time provide context to the project.

1.6.3 Interviews with stakeholders

Targeted and structured surveys were undertaken as part of the SEIA to collect information from landowners whose property will be directly impacted by the development of the Project. These surveys were conducted electronically via Survey Monkey between July 2022 and August 2022. These surveys formed the basis of the primary data collection and assisted with the gathering of baseline information as well as establishing the stakeholder's perceptions, interests, and concerns. A list of individuals contacted can be found in Appendix B.

2. POLICY AND PLANNING ENVIRONMENT & NEEDS AND DESIRABILITY

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

2.1. POLICY AND PLANNING ENVIRONMENT

The overall aim of this review process is to provide insight into the government's priorities and plans in terms of renewable energies. This assists in determining the relevance of the project with regard to the development objectives of the various spheres of government as well as in identifying potential developmental conflicts that the project might create. A brief review of the most relevant documents is provided in Table 2-1.

Table 2-1: Brief Overview of relevant policies

Policy	Key Policy Objectives	Source
National Policy: South Africa		
National Development Plan 2030	• Creating jobs and livelihoods • Expanding infrastructure • Transitioning to a low-carbon economy • Transforming urban and rural spaces • Improving education and training • Providing quality health care • Building a capable state • Transforming society and uniting the nation • Fighting corruption and enhancing accountability	(NPC, 2012)
New Growth Path Framework 2011	• Infrastructure investment • Main economic sectors as employment sectors • Seizing the potential of new economies • Investing in social capital and public services • Fostering rural development and regional integration	(South African Government, 2011)
Renewable Energy Vision 2030 South Africa	• Renewable energy as an exceptional source of flexible supply within the context of uncertain energy demand • Comprehensive renewable energy base will support a resilient South African future • A sustainable energy mix that excludes undue risks for the environment of society	(World Wildlife Fund, 2014)
Integrated Resource Plan 2019	The IRP (2019) has indicated that South Africa should continue to track a diversified energy mix which lessens reliance on a few primary energy sources. The IRP document expects a total of 9 980 MW of additional wind capacity to be introduced in South Africa by 2030. The wind IPPs constitute the largest single renewables technology procured to date under the Renewable Energy Independent Power Producer Procurement Programme. Allocations to safeguard the development of wind energy projects aligned with the Integrated Resource Plan (IRP) 2010 should continue to be pursued: o Ensure energy security and supply o Reduce environmental impacts o Endorse job creation and localisation o Lessen cost of energy o Reduce water consumption o Diversify supply sources	(Department of Energy, 2019)

Policy	Key Policy Objectives	Source
	○ Promote energy efficiency ○ Promote energy access Additionally, the IRP (2019) indicates that: • Wind energy will be 22.5% of the energy mix compared to solar at 11% by 2030	
The Constitution of South Africa 1996	• "Everyone has the right to an environment that is not harmful to their health or well-being" (S24) • The environment should be protected for the benefit of present and future generations, through reasonable legislative and other measures that: • Prevent pollution and ecological degradation • Promote conservation • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development	(Republic of South Africa, 1996)
White Paper on Energy Policy of the Republic of South Africa 1998	Seeks to ensure that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options Aims to create energy security by diversifying the energy supply and energy carriers	(Department of Minerals and Energy, 1998)
White Paper on the Renewable Energy Policy of RSA 2003	Pledges government support for the development, demonstration and implementation of renewable energy sources for both small and large-scale applications	(Department of Minerals and Energy, 2003)
Provincial Policy: Free State		
Free State Growth and Development Strategy, 2013	The FSGDS is an ambitious and elaborate framework to profoundly redefine the long-term provincial inclusive growth and development landscape. The FSGDS identifies the following key sectors: • Infrastructure • Mining • Green Economy • Manufacturing • Agriculture • Tourism The MEGDP focus on building the capacity of the province to manage household waste and to equip them with green technologies will contribute towards alleviating pressures on the grid and save people's incomes. In addition, the landscape of the province allows for massive opportunities for the harvesting of solar energy.	(Free State Provincial Government, 2013)
Free State Green Economy Strategy, 2014	This FSGES was developed in alignment with the national green economy strategy elaborated in the National Green Economy Framework and Green Economy Accord, as well the FSGDS. The objective was to develop a green economy strategy to assist the province to: • Improve environmental quality and economic growth • Develop green industries and energy efficiency • Expand productive capacity and service delivery • Adopt sustainable consumption and production processes • Improve policy making, permitting, monitoring and enforcement on Green Economy Initiatives/Programmes • Create decent green jobs and build capacity of relevant personnel from DETEA, municipalities and other relevant stakeholders	(Department of Economic Development and Environmental Affairs, 2014)

Policy	Key Policy Objectives	Source
District & Local Municipal Policy: Lejweleputswa DM & Matjhabeng LM		
Lejweleputswa District Municipality IDP, 2021-2022	The IDP states that the solar energy project in Dealesville should be expanded into a solar energy hub. A suitable area for a solar and carbon credit area is situated south of Lejweleputswa and continues further into Xhariep. The primary purpose of this strategy is to use the space and natural abundance of sunshine associated with the Free State Province and to capitalize on the carbon credit opportunities to be unlocked.	(Lejweleputswa District Municipality, 2021)
Matjhabeng Local Municipality LED Strategy, 2019	The LED states that the municipality need to develop and Energy Resource Plan which will address diversification of energy supply and facilitate the introduction of renewable energy sector. The plan must also address mitigation of carbon emissions and the associated carbon tax. The municipality need to address the complemented of initiatives for the demand side to bring down existing energy consumption levels whilst maintaining long-term sustainable levels of consumption, the LED future states that alternative sources of energy, such as solar panels can be considered.	(Matjhabeng Local Municipality, 2019)
Matjhabeng Local Municipality Spatial Development Framework, 2021	The SDF states within the urban design guidelines, that buildings should be orientated so that solar panels have maximum access to the sun. The SDF further supports methods to reduce climate change by complying to the guidelines of the CSIR Green Book tool.	(Housing Development Agency, 2021)

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

From a provincial and municipal policy perspective the facilitation of renewable energy projects and interventions that relate to the broader green economy are seen as a priority in terms of the policies and strategies developed.

2.2. NEED AND DESIRABILITY

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

2.2.1 South African electricity supply

South Africa's energy mix is largely focused on the use of non-renewable fossil fuels. The Department of Energy (DoE) notes that 83% of electricity production in South Africa is supplied by coal followed distantly by 6% pumped storage, 5% gas, 4% nuclear, 2% hydroelectric and 0,2% wind (National Department of Energy (DOE), 2019). It is noted by the DoE that renewables are the future of energy generation in South Africa especially as the costs of generating electricity through traditional means increases (National Department of Energy (DOE), 2019). South Africa is also considered to be the world's 14th largest emitter of greenhouse gases (McSweeney & Timperley, 2018). The CO_2 emissions are principally due to a heavy reliance on coal to produce energy. South Africa has also pledged (through the Paris Accord) to reduce emissions and cap the amount of greenhouse gasses that would be emitted. This commitment was aligned to the national planning policy which promoted the utilisation of renewable resources to generate energy (McSweeney & Timperley, 2018).

Despite the impacts of the COVID-19 pandemic, renewable energy set a record in new power capacity in 2020 and was the only source of electricity generation to register a net increase in total capacity. As in past years, the highest share of renewable energy use was in the electricity sector (26% renewables); however, electrical end- uses accounted for only 17% of total final energy consumption. The transport sector, meanwhile, accounted for an estimated 32% of TFEC and had the lowest share of renewables (3.3%). The remaining thermal energy uses, which include space and water heating, space cooling, and industrial process heat, represented more than half (51%) of TFEC; of this, renewables supplied some 11% (REN21, The Renewables 2021 Global Status Report, 2021).

Installed renewable power capacity grew by more than 256 gigawatts (GW) during the pandemic, the largest ever increase. Continuing a trend dating back to 2012, net additions of renewable power generation capacity outpaced net installations of both fossil fuel and nuclear power capacity combined. China again led the world in renewable capacity added, accounting for nearly half of all installations in 2020 and leading the global markets for concentrating solar thermal power (CSP), hydropower, solar PV and wind power. China added nearly 117 GW, bringing online more renewable capacity in 2020 than the entire world did in 2013 and almost doubling its additions from 2019. By the end of 2020, at least 19 countries had more than 10 GW of non-hydropower renewable capacity, up from 5 countries in 2010. Renewable energy reached a record share – an estimated 29% – of the global electricity mix. Despite these advances, renewable electricity continued to face challenges in achieving a larger share of global electricity generation, due in part to persistent investment in fossil fuel (and nuclear) power capacity (REN21, The Renewables 2019 Global Status Report, 2019).

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

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

Table 2-2: The consequences of power interruptions

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

Source: (Goldberg, 2015)

These costs are associated with losses to productivity and limitation of growth for companies and as a result limit the growth of the country (Goldberg, 2015). Load shedding thus threatens jobs, economic recovery, and the livelihood of many South Africans around the country. Local research done through government agencies has also noted the need for change in the electricity industry. The National Energy Regulator of South Africa (NERSA), (National Electricity Industry Regulation: A different focus on the electricity supply industry challenges and possible solutions, 2020) has examined the electricity supply industry challenges and possible solutions for those challenges and has maintained that continued price increases for electricity is unsustainable as it reduces demand. The increase in electricity prices has led to an increase in export of un-beneficiated ore which is likely to increase as the electricity price increases (NERSA, 2020).

It has also been noted that there has been a reduction in export volumes of minerals which is likely a result of the increased price of electricity and unstable electricity supply. It has also been noted that the negative trend in exports mimic the Gross Domestic Product (GDP) growth trends, which seems to be inversely proportional to electricity prices (NERSA, 2020). NERSA has also noted that electricity price is a significant cost driver for some sectors. The increase in electricity cost has a greater impact on some sectors such as the metals, steel and mining industry and less of an impact on other industries such as the transport industry.

New energy trends have also been noted by NERSA (NERSA, 2020). Their position is that the obligation to supply the majority of domestic, commercial, and small industries energy (day load) should be removed from Eskom and be supplied by renewable energy IPP sources (NERSA, 2020). It can thus be deduced that at a national level any additional energy production which is sustainable, and renewable would improve energy security, further South Africa's goals towards international agreements, provide employment and assist in improving investor confidence in the country.

2.2.2 Just Energy Transition (JET)

According to IISD (Strategies for just energy transitions, 2018), energy transitions are shifts in the way people produce and consume energy using different technologies and sources. A low-carbon energy transition is a type of energy transition involving a shift from high-carbon energy sources such as oil, gas and coal to low-carbon and zero-carbon energy sources such as renewables. A just energy transition is a negotiated vision and process centred on dialogue, supported by a set of guiding principles, to shift practices in energy production and consumption. It aims to minimize negative impacts on workers and communities with stakes in high-carbon sectors that will wind down, and to maximize positive opportunities for new decent jobs in the low-carbon growth sectors of the future. It strives to ensure that the costs and benefits of the transition are equitably shared.

Acting sooner rather than later can make energy transitions less expensive and more equitable, while also providing new opportunities for countries to build low-carbon industries. Nonetheless, overcoming "carbon lock-in" is difficult, and targeted political and media efforts are required to speed up just energy transitions. Much may be done to help these processes, which are either underway or in the early stages in many nations. Based on case studies and research, the table below lists concrete steps that governments can take to begin or accelerate a just energy transition (International Institute for Sustainable Development, 2018).

Table 2-3: Implementation Steps for JET

Understanding the context	• Map the political economy of an energy transition • Use detailed analyses of positive and negative impacts of an energy transition (at national, regional or even plant level)
Identifying champions	• Facilitate international and regional exchange and peer learning between countries at different stages of energy transition processes, including engagement with labour, businesses, civil society, especially for developing country contexts • Round tables at the country level to start or enhance a conversation on a just transition between all concerned stakeholders • High-level dialogue between countries in similar situations to promote the idea of a just transition at the highest levels of government (e.g., at the EU, OECD or G20 level or bilaterally)
Making the case	• Develop communications strategies for just energy transitions • Set up inclusive processes for "two-way communications" • Train government officials in communications
Implementing just transition measures	• Promote localized green jobs, including in decentralized energy and energy efficiency, and link this explicitly to the energy transition • Mobilize additional funding to promote visible and tangible just transition measures, and communicate about the benefits • Share best practices of just transition measures

Source: (International Institute for Sustainable Development, 2018)

According to TIPS (Making sense of jobs in South Africa's just energy transition: Managing the impact of a coal transition on employment, 2021), South Africa's just transition plan is both essential and conspicuously absent as the reality of a coal transition and coal power decommissioning approaches. The need to manage the transition's effects on employees and local economic development, particularly in coal-dependent regions and communities, is urgent. It is necessary to have a credible fact base from which to make suitable and widely supported decisions.

Several specific political consensuses must be brokered in this conceptual clearing in order to enable policy creation and execution, as well as investment, for a green and just transition.

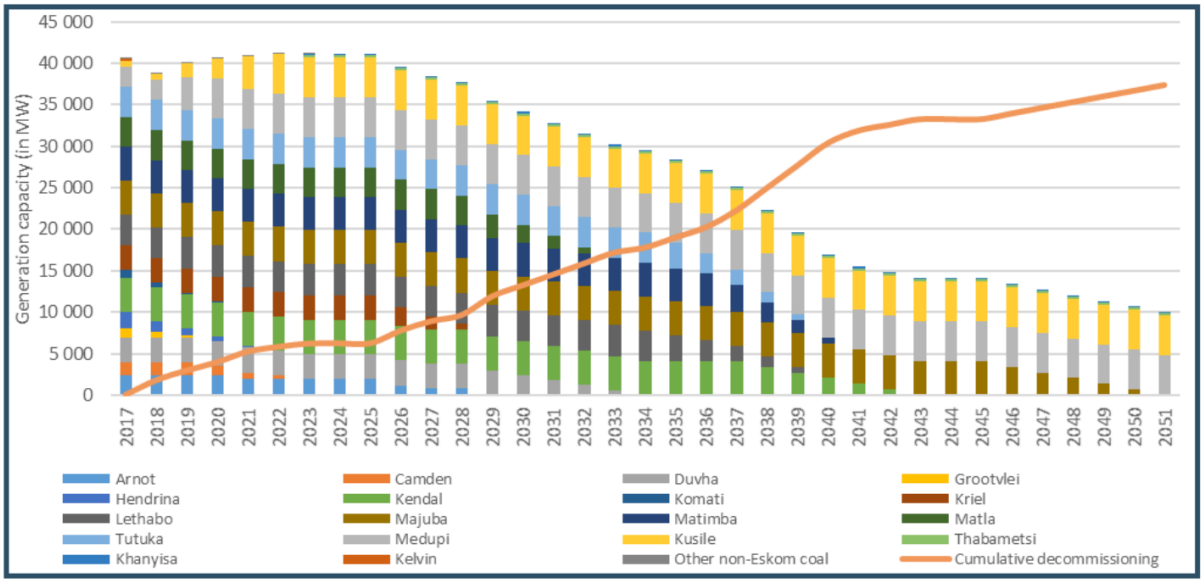


Figure 2-1: South Africa's coal-based generation capacity and scheduled decommissioning (Trade & Industry Policy Strategies, 2021)

The 2019 Integrated Resource Plan (IRP) for electricity scheduled the decommissioning of Eskom's fleet of coal-fired power stations, stipulating that 5 200 MW of coal-based generation capacity will be decommissioned by 2022, 11 000 MW by 2030, and 35 000 MW by 2050. This trajectory will fundamentally alter the energy mix in South Africa with broad socio-economic implications.

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

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

Emerging markets risk bearing the heaviest burden in this time of distress. In fact, emerging markets have experienced the sharpest portfolio flow reversal on record—about $100 billion or 0.4 percent of their GDP—posing stark challenges to more vulnerable countries (Adrian & Natalucci, 2020). South Africa has not been spared this burden, which has been exacerbated as a result of the sub-investment downgrade by credit ratings agencies in 2017 and 2020. At a local level, sources expect the GDP of South Africa to contract between 4%-8% e-SEK (Making sense of COVID-19's impact on South African businesses, 2020) and van Week (SA's "big bazooka" stimulus package explained, 2020), with a revenue shortfall of between R 70 and R 100 billion. The budget deficit is expected to accelerate from an initial forecast of 6.8% of GDP to more than 10% (van Wyk C. , 2020).

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

2.2.4 National sub-investment downgrades

On March 27th, 2020 Moody's Investor Service (Moody's) downgraded South Africa's long-term foreign-currency and local-currency issuer ratings to Ba1 from Baa3 (Junk Status). Moody's is the third and last of the major credit rating agencies to downgrade South Africa to junk status after Standard & Poor's and Fitch's both downgraded South Africa in 2017 (Duvenage, 2020). While these sub-investment ratings are worrying for the country, it is difficult to understand and predict what will happen to the currency in the short and medium term and currency fluctuations may occur. This is largely as a result of global dynamics that are currently in play, in particular the appetite for safe haven assets which is a far more powerful force than any of the local challenges that are emerging (Duvenage, 2020).

One of the known impacts of the downgrade was that South Africa fell out of the World Government Bond Index (WGBI) and other popular bond indexes, an index that measures the performance of fixed-rate, local currency, investment-grade sovereign bonds. The sub-investment rating means that South Africa has dropped out of some of the widely used global bond indexes and forced international funds which track these indexes to sell South African bonds. It is estimated that between $22-$28 billion in capital has already flowed out of local markets since 2018 with the recent downgrade account for between $1,5 and $8 billion (Duvenage, 2020). This will likely result in a rise in government debt-servicing costs which could bring strain to the already frail economic system with revenue shortfalls and contraction in GDP (Duvenage, 2020). Furthermore, on the 29th of April 2020, Standard & Poors Global Ratings further downgraded South Africa's sovereign credit rating into non-investment grade citing the impact of COVID-19 on South Africa's public finances and economic growth as one of the reasons for its ratings action (Swart & Goncalves, 2020).

The downgrade casts further doubt over South Africa's ability to recover post COVID-19. Some other impacts expected from the downgrade, include the deterioration of South Africa's credit reputation, less access to conventional credit markets; deterioration in consumer and business confidence leading to a potential contraction in private investment and consumption demand; South Africa losing its status in various bond indices whereby some bond investors with mandate limitations are prohibited from buying the country's bonds; and a large forex outflow as foreign investors dump South African debt (Swart & Goncalves, 2020).

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

2.2.5 Assessment of business confidence levels in South Africa

The South African Chamber of Commerce and Industry (SACCI) Business Confidence Index (BCI) increased by 7.4 index points from 86.5 index points in 2020 to 93.9 index points in 2021. This was followed by a slight increase in BCI to 95.6 in March 2022. However, BCI levels continued on its recovery path after the unrests and disruptions in July 2021. The unexpected Russian military campaign in Ukraine added to uncertainty in the global business environment and caused the BCI to lose thrust after indicating a faster recovery in January and February 2022 as the Covid-19 effect waned. The SACCI BCI average for the first quarter of 2022 improved by 2.3 index points over the fourth quarter of 2021 to 95.5 and is 1.2 index points higher than the first quarter of 2021. (SACCI, 2020a) (SACCI, 2020b).

The improved BCI over the previous year is primarily due to more new vehicles sold; increased real value of building plans passed; and a stronger rand exchange rate, despite higher nominal interest rates and a still lower real prime rate than a year ago. The most prominent negative factors that hampered business confidence were higher inflation than in March 2021, lower merchandise export volumes, and significantly higher energy prices. The following indicators should be taken into consideration when analysing the business environment as they negatively contributed to the BCI:

- Energy Supply
- Exports
- Imports
- Inflation
- Share prices (SACCI, 2020a) (SACCI, 2020b).

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

- Manufacturing
- Vehicle sales
- Retail sales
- Construction – buildings
- Real finance cost
- Preciouses metal prices
- Rand exchange rate (SACCI, 2020a) (SACCI, 2020b).

The global economy continues to move from one uncertainty to the next, affecting economies all over the world. After the Covid-19 pandemic, global interaction and business links are once again disrupted. The global interdependence was threatened by the Covid-19 lockdown, and the conflict between Russia and Ukraine has once again exposed the vulnerability of global trade and linkages. This has an impact on supply chain logistics as well as a more pragmatic view on self-reliance where possible, putting international trade's comparative advantages under pressure. So far, the short-term effect of global reaction has been to improve on the setback of Covid19 and get economies back on track. However, the latest geopolitical conflicts should be approached with caution, as the global economy remains vulnerable and susceptible to further disruptions. Against this backdrop, South Africa's business confidence may struggle to maintain its current higher levels. The promotion of investor confidence in South Africa among both foreign and domestic investors remains critical to the country's approach to global issues.

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

2.2.6 Agricultural Price Increases

Fuel and diesel are commonly used for tillage, harvesting, machinery and transportation, making them a critical component for both small-scale and commercial farmers, as well as the entire agricultural value chain (Maree, 2019). According to van Wyk, (SABC News, 2018) the continuous rise in fuel price is having a negative impact on the agricultural sector. Diesel is now the second most expensive input cost for grain farmers after fertiliser. In a country where maize is a staple food, the rise in diesel will also have a negative effect on poor communities.

Rising input costs — higher fuel, labour, fertiliser, energy and agrochemical costs for those in field crops and horticulture — are squeezing producers and calls have been made for some sort of intervention. Regarding direct input products, herbicides such as glyphosate, atrazine and metolachlor, prices were up by 99%, 33% and 32% respectively in 2021. The same trend persists in major fertilisers such as ammonium nitrate, urea and potassium chloride, the prices of which were up 107%, 58% and 125% respectively (Sihlobo & Kapuya, 2021). These increases in input costs continuously put pressure on farmers on a daily basis. It is worth mentioning that the proposed Project could help diversify the landowner’s income, potentially helping to counter these escalating costs.

2.3. SYNTHESIS

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

3. SOCIO-ECONOMIC PROFILE OF THE STUDY AREA

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

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

3.1. POPULATION, INCOME AND EMPLOYMENT PROFILE

The Matijhabeng Local Municipality falls within the Lejweleputswa District Municipality and collectively account for 64% of the population, and 67% of the households in the district.

Population average growth between 2010 and 2020 was 0,2% year-on-year for the LM which was less than the DM (0,3%) and Free State (0,5%) over the same period.

Table 3-1: Overview of the primary & secondary study areas population structure

Indicator	Free State	Lejweleputswa District Municipality	Matjhabeng Local Municipality
Area (km^2)	129 825	31 930	5 155
Population	2 959 501	656 936	421 022
Number of Households	882 988	191 613	127 768
Population density (km^2)	22,8	20,6	81,7
Average household size	3,4	3,4	3,3
Annual population growth (2010-2022)	0,5%	0,3%	0,2%
Average monthly household income	**R 6 441**	**R 6 187**	**R 6 725**

Source: Quantec Standardised Regional (2022); Stats SA (2011) forecast to 2022

The disposable average monthly income of households in the LM was R 6 725 which was 8,7% higher than the average for DM (R 6 187) and 4,41% higher than the average for the Free State.

Table 3-2: Employment profile of the study areas

Indicator	Free State	Lejweleputswa District Municipality	Matjhabeng Local Municipality
Employed	792 752	192 611	131 860
Unemployment Rate	26,7%	26,7%	27,2%
Not Economically Active	810 913	173 661	106 790
Labour force participation rate	41,7%	44,1%	45,8%

Source: Quantec Standardised Regional (2022)

The review of the employment profile of the LM indicates that 27% of the economically active population within the municipality is formally unemployed (see Table 3-2). The unemployment rate in the LM is higher than the DM and province, however the labour participation rate is highest with 46%, versus 41% and 44% of the province and DM.

The relatively higher unemployment rate relative to the district averages further suggests that the LM is subject to outward migration due to the limited employment opportunities available within the local municipality.

3.2. ECONOMIC PROFILE

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

The South African economy recorded its fourth consecutive quarter of growth, expanding by 1,2% in the second quarter of 2021 (April–June). This followed a revised 1,0% rise in real gross domestic product (GDP) in the first quarter (January–March). Despite the gains made over the last four quarters, the economy is 1,4% smaller than what it was before the COVID-19 pandemic. The economy has seen consistent growth since that shock, but not enough to return to pre-COVID-19 levels. Real GDP was R1 131 billion in the second quarter of 2021, 1,4% down from the reading in the first quarter of 2020.

3.2.1 Regional economic profile

The GVA (Gross Value Added) of the LM was R 77 million in 2020 (constant prices), which collectively accounts for 77% of the district economy's GVA, and 19% of the Free State's GVA (Quantec, 2022). This suggests that, although the LM is relatively small in terms of its GVA, it is important in the broader DM in terms of economic output.

Table 3-3: Economic structure between 2010 and 2020 (constant 2015 prices; R' millions)

Sector	Free State		Lejweleputswa District Municipality		Matjhabeng Local Municipality	
	2010	**2020**	**2010**	**2020**	**2010**	**2020**
Agriculture and hunting	7,11%	7,07%	7,11%	7,36%	2,17%	2,35%
Mining and quarrying	9,19%	7,73%	30,05%	25,34%	35,63%	30,10%
Manufacturing	23,37%	20,68%	16,63%	16,67%	16,22%	17,16%
Electricity, gas and water	3,91%	3,75%	2,80%	2,73%	2,57%	2,63%
Construction	4,06%	3,49%	3,22%	2,94%	3,14%	2,96%
Trade	12,50%	12,67%	11,20%	11,91%	10,73%	11,11%
Transport and communication	8,39%	8,46%	5,99%	6,34%	6,21%	6,58%
Finance and business services	13,57%	15,63%	9,91%	11,78%	10,76%	12,80%
Community services	7,86%	9,23%	5,51%	6,39%	5,28%	6,12%
General government	10,06%	11,30%	7,59%	8,54%	7,30%	8,17%
TOTAL GVA	**R408 839**	**R428 206**	**R101 192**	**R104 895**	**R77 932**	**R80 998**

Source: Quantec Standardised Regional (2022)

The growth of the LM over the last few years was largely due to the strong performance of the finance and business services, community services and general government sectors. Utilities is a small industry in the municipality with no large solar energy facilities such as the proposed development. Any new development would likely greatly increase the contribution of the utilities and construction sectors to the GVA.

Table 3-4: 2020 GVA per sector for the Matjhabeng Local Municipality (2010 constant prices; in R' millions)

Sector	Matjhabeng Local Municipality		
	2010	**2020**	**Compound Annual Growth Rate (CAGR)**
Agriculture and hunting	R1 693,76	R1 906,60	1,19%
Mining and quarrying	R27 767,50	R24 382,85	-1,29%
Manufacturing	R12 637,58	R13 898,98	0,96%
Electricity, gas and water	R2 003,82	R2 128,37	0,60%
Construction	R2 447,73	R2 398,50	-0,20%
Trade	R8 360,70	R9 002,79	0,74%
Transport and communication	R4 837,51	R5 332,36	0,98%
Finance and business services	R8 383,85	R10 371,20	2,15%
Community services	R4 111,99	R4 957,05	1,89%
General government	R5 687,21	R6 619,29	1,53%
TOTAL GVA	**R77 931,7**	**R80 998,0**	**0,39%**

Source: Quantec Standardised Regional (2022)

Over the last ten years, the CAGR of Matjhabeng was +0,39%. The growth of the above-mentioned sectors was somewhat offset by the stagnation of the manufacturing, electricity, gas and water, trade, transport and communication sectors and the reduction of the growth in the mining and quarrying and construction sectors.

As evident by Table 3-5 the mining and quarrying sector employs the most with a 22,83% contribution in 2020, which reduced from 32,15% in 2010.

The local agricultural sector includes limited subsistence (informal) farming, unlike other areas in the Free State, where this practice is more dominant. The presence of this subsistence agricultural means that the number of households that are dependent on agricultural activities for income could be slightly greater than the figures presented in Table 3-5. This is due to the fact that the table only indicates those individuals that are formally employed in the agricultural sector.

Table 3-5: Employment structure and contribution of the Matjhabeng Local Municipality between 2010 and 2020 per economic sector

Sector	Contribution to Employment per Sector	
	2010	2020
Agriculture and hunting	3,38%	4,30%
Mining and quarrying	32,15%	22,83%
Manufacturing	5,36%	6,35%
Electricity, gas, and water	0,33%	0,37%
Construction	3,03%	3,96%
Trade	17,31%	19,59%
Transport and communication	2,99%	3,43%
Finance and business services	9,73%	11,80%
Community services	4,98%	5,90%
General government	20,74%	21,47%
TOTAL EMPLOYMENT	**140 990**	**131 860**

Source: Quantec Standardised Regional (2022)

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

3.3. PROFILE OF THE IMMEDIATELY AFFECTED ENVIRONMENT

A profile of the immediately affected environment was developed utilising available secondary information and surveys conducted with landowners of the affected area. The area for the Khauta South Solar PV Facility is illustrated in Map 3-1.

In order to develop a comprehensive understanding of formal economic activities and businesses that operate within the broader study area in which the proposed Project is to be developed, a database of farm portions and corresponding ownership was created. The intention of this database formulation, and subsequent contact with landowners was to solicit business, and enterprise-specific data, so as to better understand the economic activity and employment dynamics of the area. It should be noted that not all owners chose to respond to the survey, or to some of the specific questions.

The engagements were carried out via Survey Monkey as well as phone calls, between July 2022 and August 2022. Table 3-6 below presents a synopsis of the engagements carried out with affected landowners. A full list of landowners contacted is presented in Annexure A.

Table 3-6: Survey & Landowner Engagements

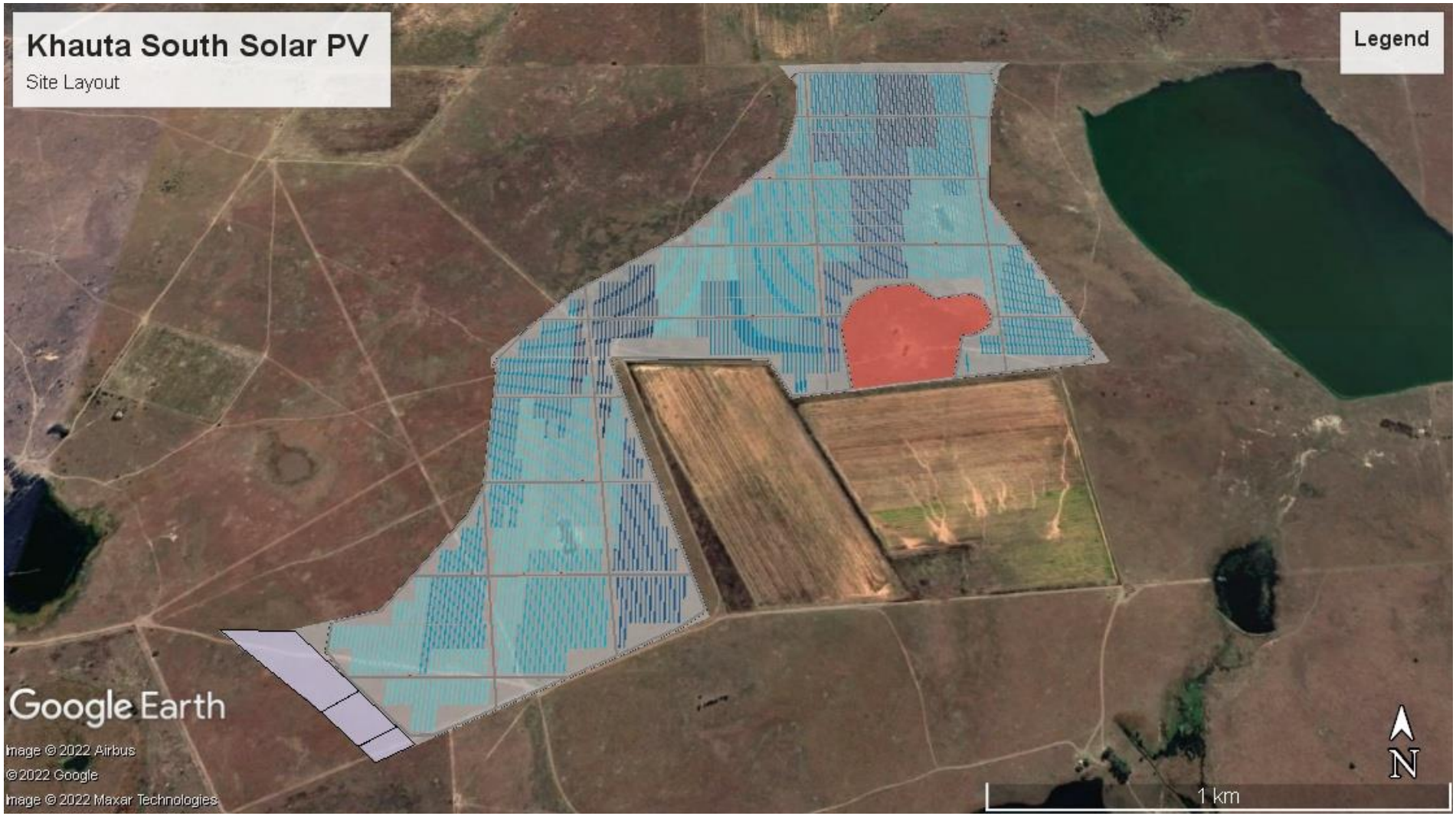
Indicator	**Number**
Total land portions identified	22
Total number of unique owners identified	16
Total number of owners spoken to telephonically	4
Total number of owners who did not respond	6
Total number of surveys distributed via emailed or electronic link	9
Total number of interviews and/or completed responses received	6

3.3.1 Land use profile of the directly affected area

The land portions on which the proposed Project (Khauta North, South, West and e Nyane) will be located are currently used for agriculture (predominant use) as well as tourism such as hunting. One responded mentioned that the farm is currently not being utilised for any operations. This farming is in the form of livestock farming with the predominant form of livestock being beef.

Overall, the landowners which responded is concerned about social impacts that the Project could cause. One responded mentioned that he will have a loss in grazing space for is cattle, which will have an economic impact on the farmer. However, the Project will compensate the farmers for the use of their property and thus the farmers will have limited to no loss of income, or even benefit from the additional monthly income.

Map 3-1: The Khauta South Solar PV Site Layout



4. ECONOMIC IMPACT ASSESSMENT ASSUMPTIONS

This section of the report describes the assumptions used in the economic impact assessment study and specifically in the economic modelling exercise which aims to quantify the economic impact of the project. The assumptions presented in this section refer to construction, operation, and decommissioning assumptions for the Khauta South Solar PV Facility.

4.2.1 Construction phase assumptions

The following assumptions regarding the construction phase of the proposed facility is made:

- The estimated construction time and when construction will start is still to be confirmed.
- Construction will overlap with the other three (3) facilities that forms part of the Project.
- The total South African investment into the facility is valued at R 1.683 billion.
- Only local expenditure is considered in this analysis.
- The construction of the facility will create an estimated 333 project specific full time equivalent (FTE) employment positions (including foreign FTE positions) over the period of construction.

4.2.2 Operation phase assumptions

The assumptions regarding the operation phase of the facticity used in the modelling exercise are as follows:

- The facility's operation date is still to be confirmed.
- The facility will operate for 20 years.
- The operations and maintenance cost of the facility will be valued at R 25 million per annum over the 20-year operational life of the project.
- The operation of the facility will create an estimated 15 full time equivalent (FTE) employment (including foreign FTE positions) positions annually (for 20 years) for the lifetime of the operation of the facility.

4.2.3 Decommissioning phase assumptions

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

5. POTENTIAL ECONOMIC IMPACTS AS A RESULT OF THE FACILITY

This section of the report seeks to describe the economic impacts that are expected to occur as a result of the development of the Project.

5.1. DEFINING ECONOMIC IMPACTS

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

5.1.1 Temporal nature of impacts

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

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

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

5.1.2 Types of economic impacts

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

- **Direct economic impacts:** These are the changes in local business activity occurring as a direct consequence of public or private activities in the economy, or public programmes and policies. Furthermore, increased user benefits lead to monetary benefits for some users and non-users (individuals and businesses) within the geographical area:
    - For affected businesses, there may be economic efficiency benefits in terms of product cost, product quality or product availability, stemming from changes in labour market access, cost of obtaining production inputs and/or cost of supplying finished products to customers. For affected residents, benefits may include reduced costs for obtaining goods and services, increased income from selling goods and services to outsiders,

and/or increased variety of work and recreational opportunities associated with greater location accessibility.

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

5.1.3 Economic impacts considered

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

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

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

5.2. ECONOMIC IMPACTS DURING THE CONSTRUCTION PHASE

The following table outlines the potential economic impacts during the construction phase of the Khauta South Solar PV Facility. The total impact on production/business sales is likely to equate to R 6.8 billion (direct, indirect and induced) for the duration of construction and will largely be spent in Free State and Gauteng.

The total impact on GDP (direct, indirect, and induced) is likely to be R 1.9 billion and create 333 FTE employment positions over the construction period with the total impact on employment being 1 357 FTE employment positions. These will largely be felt through the construction sector and through the value chains associated with the construction of a solar farm.

Table 5-1: Estimated impact on the national and local economies (R' millions 2011 Basic Prices) as well as employment (FTE positions) for the duration of construction

Indicator	Direct	Indirect	Induced	TOTAL
Impact on Production	R1 683,0	R2 939,0	R2 230,3	**R6 852,4**
Impact on Gross Domestic Product	R481,0	R840,0	R637,5	**R1 958,5**
Impact on Personal Income	R229,5	R400,7	R304,1	**R934,3**
Impact on Employment	333	582	442	**1 357**

5.3. ECONOMIC IMPACTS DURING THE OPERATION PHASE

The table below provides the potential economic impacts during the operation phase of the proposed Khauta South Solar PV Facility, this specifically relates to the impact derived from the anticipated direct spend in the maintenance and upkeep of the facility. This does not account for the developer's mandated spend on community development projects, otherwise referred to as socio-economic development spend (SED).

The total impact on production/business sales once the project is fully operational is likely to equate to R 67.5 million (direct, indirect, and induced) per annum and will largely be spent in Free State and Gauteng. The total impact on GDP (direct, indirect, and induced) is likely to be R 41.0 million per year. It is anticipated that 15 South African based FTE employment positions will be created during the operational phase of the facility. The total impact on employment will be 41 FTE employment positions which will largely be experienced in the utilities sector and other value chains associated with solar farm operations.

Table 5-2: Estimated impact on the national and local economies (R' million, 2011 Basic prices) as well as employment (FTE positions) for the duration of operation

Indicator	Direct	Indirect	Induced	TOTAL
Impact on Production	R25,0	R20,2	R22,4	**R67,5**
Impact on Gross Domestic Product	R15,2	R12,2	R13,6	**R41,0**
Impact on Personal Income	R4,2	R3,4	R3,8	**R11,3**
Impact on Employment	15	12	13	**41**

5.4. ECONOMIC IMPACT OF SED SPEND

As required by the National Energy Regulator of South Africa in relation to an Application for an Electricity Generation Licence in terms of the Electricity Generation Act (No. 4 of 2006), the applicant is required to demonstrate certain commitments to empowerment and economic development within the designated local area. The client has not yet indicated the SED plan, so the following provides guidelines of how SED could be incorporated. The usual spend for SED for a fully operational project will be approximately 2,5% of the Gross Annual Revenue generated. Of the 2,5%, 0,5% could be contributed to the Just Energy Transition Fund, with the remaining 2% being spent on community development initiatives within the immediate vicinity of the proposed project.

The objectives of the above are set out as follows:

Socio-economic spend objectives:

- Increase in the level and diversify the type of skills in communities required to support conscious conservation; and
- Creation of sustainable employment opportunities for the local community which results in a sustainable increase in household income.

The SED spend commitments related to local community enrichment initiatives are detailed below. In future planning, specific budget allocations from the total annual figures could be targeting at the following initiatives:

- Skills Development: Both on-project, and non-solar energy skills development initiatives will be funded. The non-solar energy skills to be developed should be relevant and required in the region and should seek to provide value to the community and the environment.
- Employment Opportunities: In addition to the planned employment creation during construction and 20-year operation of the project, the developer could make a positive contribution to employment opportunities in other non-solar related industries.
- Standard of living for local communities: skills development coupled with sustainable employment creation opportunities listed above, are expected to contribute towards an improved standard of living amongst families that might not have had a sustainable income previously.

6. ASSESSMENT OF IMPACTS AS A RESULT OF THE FACILITY

This section of the report seeks to describe and assess the economic impacts that are expected to occur as a result of the development of the facility. This section has separated the assessment of the facility into the projects three lifecycle phases namely construction, operation and decommissioning.

6.1. CONSTRUCTION PHASE IMPACTS

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

6.1.1 Positive impacts during construction:

a) Temporary stimulation of the national and local economy

The proposed facility will cost R 1.6 billion (2022 prices) to establish. This will equate to a total impact of R 6.8 billion (direct, indirect, and induced) on production/new business sales in the country. The localised expenditure on the project will stimulate the local and national economies albeit for a temporary period of 24 months during construction. It is estimated that the project will increase the GDP directly in the country by R 481.0 million in 2022 prices, which will translate into a total impact of R 1.9 billion (direct, indirect, and induced) of Gross Domestic Product (GDP). These effects will take place for the duration of construction.

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

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

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

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	**After Mitigation**
Temporary stimulation of the national and local production - Positive		
Nature of Impact	The initial investment spend on the project will inject significant business sales/ production for the local and regional economy. The economic impact arising from the initial investment will be felt throughout the economy with windfall effects benefitting related sectors in the economy. The effect is allocated according to direct, indirect and induced impacts, together forming the "multiplier effect".	
Magnitude:	8	8
Duration:	2	2
Extent:	3	3
Irreplaceable:	2	2
Reversibility:	5	5
Probability:	5	5
Total SP:	100	100
Significance rating:	**High**	**High**
Cumulative Impact:	Low	Low
Proposed Enhancement:	The project developer should use locally sourced inputs where feasible in order to maximize the benefit to the local economy. Sub-contracting of local construction companies to occur as far as possible for the construction of facilities.	

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	**After Mitigation**
Temporary stimulation of the national and local GDP - Positive		
Nature of Impact	Temporary increase in country's GDP due to capital expenditure during construction. The primary method of expanding GDP levels is through investment into infrastructure and enterprises that generate goods and services. Investment into the creation of new and improved goods and services, creates heightened levels of value added within the economy. Industries that will experience the largest temporary growth in value added, as a result of this, will include the building and construction, manufacturing and trade and accommodation sectors.	
Magnitude:	6	6
Duration:	2	2
Extent:	3	3
Irreplaceable:	2	2
Reversibility:	5	5
Probability:	5	5
Total SP:	90	90
Significance rating:	**Medium - High**	**Medium - High**
Cumulative Impact:	Low	Low
Proposed Enhancement:	The project developer is to use locally sourced inputs where feasible in order to maximize the benefit to the economy.	

b) Temporary increase employment in the national and local economies

The construction of the facility will create 333 Full Time Equivalent (FTE) employment positions over the course of the development. The total number of employment opportunities that will be created is estimated to 1 357 (including direct, indirect and induced). As evident by Table 3.5 the construction sector of the Local Municipality is relatively small employing only 5 222 people in 2022 (Quantec, 2022). Given the size of the construction sector within the municipality, it is anticipated that there will be sufficient local labour to satisfy the demand for 417 South African based construction workers.

Furthermore, if most of the local staff comes from the Local Municipality it will have a positive effect on local unemployment particularly since the area experiences an unemployment rate above the provincial average. Beyond the direct employment opportunities that will be created by the project during the construction phase the development will also have a positive spin-off effect on the employment situation in other sectors of the national and local economies. Through the procurement of local goods (i.e., consumption induced effects) the project will support an estimated total of 582 FTE employment positions (indirect). Most of these positions will be in sectors such as construction, business services and trade. The expenditure on the project outside of the local economies will also have a positive effect on employment creation, albeit for a temporary period of 24 months.

Through the production and consumption induced impacts the project is envisioned to create an estimated additional 442 FTE employment (induced) positions. Given that a significant portion of the multiplier effects will be generated through backward linkages, more than half of these FTE employment positions will be created along the supply chain and amongst industries providing inputs to the businesses in the supply chain.

Throughout the construction phase it is recommended that the developer encourage the EPC contractor to fill as many local positions as possible using labour from within the Local Municipality rather than from outside of the municipal boundaries.

Construction Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Temporary increase employment in the national and local economies - Positive		
Nature of Impact	The construction of the project will positively impact on the community and beyond by creating a number of job opportunities (albeit temporary).	
Magnitude:	8	8
Duration:	2	2
Extent:	2	2
Irreplaceable:	2	2
Reversibility:	3	3
Probability:	4	4
Total SP:	68	68
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	Organise local community meetings to advise the local labour on the project that is planned to be established and the jobs that can potentially be applied for. Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	

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

The construction of the proposed facility is likely to have a positive impact on the skills development in South Africa. During the assembly and manufacturing period which is included as part of the construction phase and is planned to be conducted in Free State, it is likely that foreign technical experts will be involved. This will present an opportunity for skills and knowledge transfer between these technical experts and local manufacturers.

It is also expected that the construction staff involved in the project will gain knowledge and experience in respect of the development of solar energy facilities. This will be highly beneficial given South Africa's target of adding 6GW of renewable energy capacity each year between 2023 and 2027 to reach the target of 30GW renewable energy by 2030 (Just Energy Transition IP, 2022). More skilled local construction staff would most likely also lower the cost of future wind projects in the province.

In addition to the direct effects of the project on skills development in the country and the local economy, the project could contribute to the development of the local research and development (R&D) and manufacturing industries associated with solar technology. This could be achieved through partnerships with the University of Free State (situated in Bloemfontein). Partnerships of this nature could further enhance the development of new skills and expertise.

Construction Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Contribution to skills development- Positive		
Nature of Impact	Employees will develop and enhance skills thereby increasing experience and knowledge.	
Magnitude:	2	2
Duration:	2	2
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	5	5
Probability:	3	3
Total SP:	**33**	**33**
Significance rating:	**Low**	**Low**
Cumulative Impact:	Low	Low
Proposed Enhancement:	The project developer is to use locally sourced inputs where feasible in order to maximize the benefit to the economy.	

d) Temporary increase in household earnings

The proposed facility will create an estimated total of 1 357 South African based FTE employment positions during construction generating R 934.2 million of revenue for the affected households in the country through direct, indirect, and induced effects. Of this figure R 229.4 million will be paid out in the form of salaries and wages to those individuals directly employed during the construction phase. The remaining R 704.8 million in households' earnings will be generated through indirect and induced effects resulting from project expenditure. Given the average household size in the Local Municipality and Free State is 3,4 and 3,3 respectively, a total of between 1 100 and 1 200 people are likely to benefit from the employment positions created and the income derived through these 333 FTE employment positions.

Although temporary, this increase in household earnings will have a positive effect on the standard of living for these households. This is especially applicable to the households benefitting from the project that reside in the Local Municipality and broader Free Sate.

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
Positive impact on household income and improved standard of living - Positive		
Nature of Impact	Employed individuals will increase the income of their respective households and thereby experience an improvement in their standard of living.	
Magnitude:	8	8
Duration:	2	2
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	4	4
Total SP:	64	64
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	Local employment will benefit local households and the local area.	

e) Temporary increase in government revenue

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

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
Temporary increase in government revenue - Positive		
Nature of Impact	Government revenue will be increased by the additional tax that will be paid from the labourers.	
Magnitude:	4	4
Duration:	2	2
Extent:	4	4
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	3	3
Total SP:	45	45
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	None	

6.1.2 Negative impacts during construction:

a) Impact on economic and social infrastructure

The proposed solar energy facility will create and estimated 333 FTE employment positions (South African based positions) for the duration of the project. Given that these workers will require services there is likely to be an increase in the demand for social services, access to water and electricity. Given

the proximity of the development site to Riebeeckstad and Welkom, it is most likely that the health facilities in the area will experience additional demand for medical services brought about by the influx of job seekers.

These connections will, however, be minimal and it is unlikely to alter the demand significantly. The effects of the project on road infrastructure should also be considered as it is highly likely that the development will lead to an increase in traffic volumes on surrounding roads. The deterioration of these roads could place additional financial burdens on the municipality through additional maintenance costs. Additional traffic volumes are also likely to impact the condition of secondary roads used to access surrounding farms.

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

Construction Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Impact on economic and social infrastructure - Negative		
Nature of Impact	Additional workforce will put pressure on service delivery which will have an economic impact on the local municipality.	
Magnitude:	2	2
Duration:	2	2
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	5	5
Probability:	4	3
Total SP:	**44**	**33**
Significance rating:	**Medium**	**Low**
Cumulative Impact:	Low	Low
Proposed Mitigation:	Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations.	

b) Negative impact on the local agriculture operations

As construction begins at the proposed site, disturbances will likely be minimal. The presence of construction machinery, increased traffic to and from the site (transporting staff, equipment, and material) and staff on or near the site will likely be the largest disturbances. The longer construction continues, the greater the disturbances will likely be. As the infrastructure are erected there is likely to be an increased disturbance as it become increasingly visible in the surrounding area.

Once construction is completed the disturbances associated with the vehicular traffic, equipment and staff will be reduced and the remaining disturbance will be that of the solar farm itself. According to the landowner's survey's they indicated that some agricultural land will be lost, but the economic impact

thereof will be minimal, as the farmers will get compensation for the installed infrastructure. Thus, the impact on the agricultural operations will be low.

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	**After Mitigation**
Impact on local agriculture operations - Negative		
Nature of Impact	Construction activities can impact the farmers due to increase in noise and space	
Magnitude:	4	2
Duration:	2	2
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	5	5
Probability:	3	3
Total SP:	**39**	**33**
Significance rating:	**Low**	**Low**
Cumulative Impact:	Low	Low
Proposed Mitigation:	Ensure that the farm owners are aware of construction activities that will take place on their premisses.	

c) Impact on Safety and Security

The perception exists that an influx of jobseekers, and / or construction workers to an area is a contributor to increased criminal activities in an area, such as increased safety and security risk for neighbouring properties and damage to property, increased risk of veld fire, stock theft, and crime etc.

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	**After Mitigation**
Impact on Safety and Security - Negative		
Nature of Impact	The in-migration of job seekers to the area could be perceived to result in increased criminal activity	
Magnitude:	4	2
Duration:	2	2
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	4	3
Probability:	3	3
Total SP:	**36**	**27**
Significance rating:	**Low**	**Low**
Cumulative Impact:	Low	Low
Proposed Mitigation:	Have a detailed consultation and communication plan with neighbouring property owners to keep them informed with regards to construction progress, issues and potential dangers Ensure proper health and safety plans in place during the construction period to ensure safety on and around site during construction, including fencing of the property and site access restriction	

6.2. OPERATION PHASE IMPACTS

The following sub-section describes the impact that the proposed solar energy facility will have once it is operational. The facility is envisaged to have a lifespan of approximately 25 years which means that

the impacts observed during this phase, regardless of whether the impacts are positive or negative, will be long-lasting.

6.2.1 Positive impacts during operations:

a) Sustainable increase in production and GDP nationally and locally

The proposed facility will require an annual operational expenditure of R 25 million over 20 years. The total impact on production in the country as a result of the project's operations will equate to R 67.5 million per annum in 2022 prices for the 20 years. Aside from the utilities sector, industries that will experience the greatest stimulus from the project will include electrical machinery and apparatus, insurance, trade, transport service and chemical production industry.

It is estimated that the project will generate R 41.0 million of value add per year over the 20-year period (comprising gross operating surplus before taxes and labour) and taxes. The production and consumption induced multiplier effects of the project are considered to be relatively small compared to conventional electricity generating industries. This is because the energy source used to produce electricity by the proposed solar energy facility is free, unlike conventional power stations where raw inputs (i.e., coal) and the transport therefore comprise a significant portion of operating expenditure. It is for this reason that such a facility is a highly attractive business venture. In addition to the positive production and GDP impacts arising from expenditure related to the operation of the facility, the local economy is anticipated to be positively stimulated by expenditure related to the developer's intended socio-economic development contributions in the immediate area. The contribution to the Local Municipality, although small relative to the combined size of the municipality's economy, will nevertheless be positive and more importantly, a sustainable contribution.

Operational Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Increased Production - Positive		
Nature of Impact	The initial investment spend on the project will inject significant business sales/ production for the local and regional economy. The economic impact arising from the initial investment will be felt throughout the economy with windfall effects benefitting related sectors in the economy. The effect is allocated according to direct, indirect and induced impacts, together forming the "multiplier effect".	
Magnitude:	4	4
Duration:	4	4
Extent:	2	2
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	5	5
Total SP:	75	75
Significance rating:	**Medium-High**	**Medium-High**
Cumulative Impact:	Low	Low
Proposed Enhancement:	The project developer should use locally sourced inputs where feasible in order to maximize the benefit to the local economy. Sub-contracting of local construction companies to occur as far as possible for the operation of facilities.	

Operational Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	**After Mitigation**
Impact on GDP - Positive		
Nature of Impact	Positive impact on GDP due to operating expenditure during operations. The primary method of expanding GDP levels is through investment into infrastructure and enterprises that generate goods and services. Industries that will experience the largest growth in value added, as a result of this, will include the transport, storage and manufacturing sectors. The operational spend on the project will create value added for the local and regional economy.	
Magnitude:	4	4
Duration:	4	4
Extent:	2	2
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	4	4
Total SP:	**60**	**60**
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	The project developer is to use locally sourced inputs where feasible in order to maximize the benefit to the economy.	

b) Creation of sustainable employment positions nationally and locally

The proposed facility will create an estimated 15 permanent employment positions across the operation phase of the development which, will be retained for approximately 20 years. Of these, an estimated 15 will be South African based positions. It is envisaged that some of the skilled and low skilled staff will be employed from within the local area with the remaining staff being sourced from other parts of Free State and the country. Aside from the direct employment opportunities, the facility will support an estimated 41 FTE employment positions created through the production and consumption induced effects. Due to the spatial allocation of procurement spending and direct employment created, most of the indirect and induced positions will also be created within the local area. The trade, agriculture and community and personal services sectors will benefit the most from these new employment opportunities.

Operational Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	**After Mitigation**
Employment Creation - Positive		
Nature of Impact	The construction of the project will positively impact on the community and beyond by creating a number of job opportunities (albeit temporary).	
Magnitude:	2	2
Duration:	4	4
Extent:	2	2
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	4	4
Total SP:	**52**	**52**
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	

c) Improved standards of living for benefiting households

The creation of an estimated 15 FTE employment positions throughout the country will generate R 4.1 million of personal income (2022 prices), which will be sustained for the entire duration of the project's lifespan. Given the average household size in affected local municipalities and nationally, this increase in household earnings will support several people. The sustainable income generated as a result of the project's operation will positively affect the standard of living of all benefitting households. This is specifically applicable to the Local Municipality, as the average income per employee at the facility would far exceed the average household income within these municipalities. Skills development coupled with sustainable employment creation opportunities as a result of the developer's intended SED spend, are expected to contribute towards an improved standard of living amongst families that might not have had a sustainable income previously.

Operational Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Positive impact on household income and improved standard of living - Positive		
Nature of Impact	Employed individuals will increase the income of their respective households and thereby experience an improvement in their standard of living.	
Magnitude:	4	4
Duration:	4	4
Extent:	2	2
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	4	4
Total SP:	**60**	**60**
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	Local employment will benefit local households and the local area.	

d) Sustainable increase in national and local government revenue

The proposed facility will, through property taxes and salaries and wages payments, contribute towards both local and national government revenue. At a local level, the project will contribute to local government through payments for utilities used in the operation of the facility. It will also increase its revenue through an increase in property taxes compared to the current level. Given that the Local Municipality has a relatively small economy, any additional income would greatly benefit the municipality. On a national level, the revenue derived by the project during its operations, as well as the payment of salaries and wages to permanent employees will contribute to the national fiscus. Although it is impossible to trace exactly how such revenue is allocated, any additional revenue generated means that national governments can increase its spending on public goods and services.

Operational Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
Increased Government Revenue - Positive		
Nature of Impact	Government revenue will be increased by the additional tax that will be paid from the labourers.	
Magnitude:	4	4
Duration:	4	4
Extent:	4	4
Irreplaceable:	1	1
Reversibility:	3	3
Probability:	3	3
Total SP:	**48**	**48**
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	None	

e) Sustainable rental revenue for farms where the facility is located

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

Operational Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
Compensation for landowners - Positive		
Nature of Impact	The landowners will get compensations from the area used by the project, this will result in additional income for the landowners	
Magnitude:	4	4
Duration:	4	4
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	3	3
Total SP:	**42**	**42**
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Low	Low
Proposed Enhancement:	None	

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

The development of the solar farm will lead to a sustainable increase in the supply of electricity for the country. It was noted in Section 3 that lack of electricity and load shedding has had a notable impact

on the economy of the country and is one of the reasons stated by foreign investors for the lack of investment in the country. With an improved supply of power to industry, there is likely to be an improvement in the economy as a whole. It should be noted that while this solar farm alone is unlikely to make a large impact in the shortages of electricity in the country, the cumulative impact of all the proposed renewable energy products in the country will be substantial.

Operational Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Improvement in Energy Sector Generation - Positive		
Nature of Impact	Improved energy security and energy sector will result due to the development of the Solar PV project.	
Magnitude:	4	4
Duration:	4	4
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	5	5
Total SP:	**70**	**70**
Significance rating:	**Medium**	**Medium**
Cumulative Impact:	Medium	Medium
Proposed Enhancement:	None	

6.2.2 Negative impacts during operations:

a) Negative impact on agricultural operations

The impact of agricultural land was assessed through a survey that was distributed among the landowners. Some of the landowners indicated that they will be impacted by reduced dryland farming portions due to the infrastructure. The main agriculture activity indicated was livestock farming (cattle) and tourism activities in the form of hunting. Overall, the landowners which responded is concerned about social impacts that the Project could cause. One responded mentioned that he will have a loss in grazing space for is cattle, which will have an economic impact on the farmer. However, the Project will compensate the farmers for the use of their property and thus the farmers will have limited to none loss of income, or even benefit from the additional monthly income.

Operational Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
Impact on agriculture - Negative		
Nature of Impact	The infrastructure will take space that was previously used as grazing land for cattle.	
Magnitude:	2	2
Duration:	4	4
Extent:	1	1
Irreplaceable:	1	1
Reversibility:	4	4
Probability:	4	3
Total SP:	**48**	**36**
Significance rating:	**Medium**	**Low**
Cumulative Impact:	Low	Low
Proposed Mitigation:	Utilise space that will reduce grazing space the least.	

6.3. DECOMMISSIONING PHASE IMPACTS

Upon the expiry of the Project's lifespan, the facility would need to be disbanded, although the facility would likely be upgraded in order to maintain and prolong the lifespan of the facility. If the facility is decommissioned, the land will be rehabilitated in order to return it to pre-project conditions. This also means that all impacts whether positive or negative, which take place during the operation phase will cease to exist. At the same time spending on the disassembly of the components and rehabilitation of land will increase the demand for construction services and other industries, thus stimulating economic activity in the local area, albeit over a temporary period. Economic impacts stimulated during the decommissioning phase are expected to be similar to those that took place during the construction.

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

- ***During construction:*** The comparison of gains and losses associated with the project during the construction phase indicates that gains related to production, employment, skills development, government revenue and household income outweigh the expected losses with regard to the same indicators. This shows that from a pure economic perspective the project's construction would be highly beneficial to the national economy and specifically the local economy which is affected by a relatively high unemployment level. The project will, however, bring some form of disruption in the lives of the local communities and will put additional pressure on the local economic and social infrastructure. The main trade-off during the construction phase would therefore be between the economic net benefits that would accrue in the national and local economies and the economic negative impacts experienced by the local communities. The positive net effect on the economy though is deemed to be notably greater than the negative net effects that can ensue from the project.

- ***During operations:*** The project is associated with a notably greater set of positive net impacts than negative net impacts. It is also evident that when considering the nation-wide effects of the project on production, employment, income, and government revenue it is associated with greater potential gains than losses. Locally, the project is also associated with greater positive economic gains than losses, especially in respect of community benefits, employment and household income.
- ***During decommissioning:*** The impacts that can occur during decommissioning would be similar to those observed during the construction phase. These impacts would however be experienced over a much shorter period and would be associated with significantly lower gains. Some impacts on the local infrastructure and the lives of the communities in the area could take place, however, they will also be short lived. Overall, the trade-offs between positive and negative impacts would be small.

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

7. KEY FINDINGS AND RECOMMENDATIONS

This report contains the analysis of the economic impact assessment for the Khauta South Solar PV Facility. The facility is proposed to be established on several farms within the vicinity of near Riebeeckstad and Welkom in the Free State Province. The facility is proposed have a generating capacity up to 110 MW of electricity. Once construction is completed the facility is anticipated to have an operational lifespan of 25 years.

The purpose of the economic impact assessment is to determine, and where possible, quantify the potential economic impacts that can result from the proposed project. The study made use of the economic modelling technique based on the Social Accounting Matrix to quantify the potential positive and negative impacts of the project where feasible and applicable. The following section outlines the key findings of the study and provides recommendations on the way forward.

7.1. POLICY REVIEW AND BASELINE ASSESSMENT

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

The review of the policy environment covered national, provincial, and municipal strategic documents. The review of national strategic documents suggested that the utilisation of renewable energy sources in the country is considered to be an integral means of reducing the carbon footprint of South Africa, diversifying the national economy, and reducing poverty. This means that any project that would contribute towards achieving the above-mentioned objectives could be considered to be strategically important. It can thus be concluded that the policy reviewed supports the proposed development from a planning perspective as it will contribute to the development of the economic and social environment of the region.

The review of the local municipality's socio-economic characteristics revealed that the Local Municipality economy is relatively small and dependant on the mining and quarrying, manufacturing and finance and business services sectors. This indicates that the proposed project will further contribute to these strong economic sectors in the Local Municipality.

In 2022, Local Municipality had a population of approximately 421 022 as well as population growth trends that suggest in-migration. This figure is also indicative of an area with low employment absorption capacity and a small economic base. The average household income for the area was R 6 725 per month. There is also a high unemployment rate (27%) and a relatively poor labour participation rate (45%). All of these figures suggest that households in the Local Municipality have a relatively low standard of living and are worse off, on average, compared to households in other parts of the district and province.

7.2. SUMMARY OF IMPACTS ASSOCIATED WITH THE FACILITY

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

Table 7-1: Summary of construction phase impacts

Impact	Nature of Impact	Before Mitigation	After Mitigation
CONSTRUCTION PHASE			
Temporary increase in the production of the national and local economies during construction	Positive	High (100)	High (100)
Temporary increase in the GDP of the national and local economies during construction	Positive	Medium-High (90)	Medium-High (90)
Temporary increase employment in the national and local economies	Positive	Medium (68)	Medium (68)
Temporary increase in household earnings	Positive	Medium (64)	Medium (64)
Temporary increase in government revenue	Positive	Medium (45)	Medium (45)
Contribution to skills development in the country and local economy	Positive	Low (33)	Low (33)
Impact on the agriculture operations	Negative	Low (39)	Low (33)
Impact on economic and social infrastructure	Negative	Medium (44)	Low (33)
Impact on safety and security	Negative	Low (36)	Low (27)

Table 7-2: Summary of operational phase impacts

Impact	Nature of Impact	Before Mitigation	After Mitigation
OPERATIONAL PHASE			
Sustainable increase in the production of the national and local economies	Positive	Medium-High (75)	Medium-High (75)
Sustainable increase in the GDP of the national and local economies	Positive	Medium (60)	Medium (60)
Creation of sustainable employment positions nationally and locally	Positive	Medium (52)	Medium (52)
Improved standards of living for benefiting households	Positive	Medium (60)	Medium (60)
Sustainable increase in national and local government revenue	Positive	Medium (48)	Medium (48)
Sustainable rental revenue for farms where the solar farm is located	Positive	Medium (42)	Medium (42)
Sustainable increase in electricity available for the local region and South Africa	Positive	Medium (70)	Medium (70)
Impact on the agriculture operations	Negative	Medium (48)	Low (36)

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

7.3. NET EFFECT AND TRADE OFF ANALYSIS

The assessment of the proposed facility, and its net effective impact from an economic perspective, indicates that the project would generate greater economic benefits during both the construction and operation phases than the potential losses that could occur as a result of its establishment. It should be noted though that the positive and negative impacts will be distributed mostly amongst different receptors but will not result in inequality. Adherence to the proposed mitigation measures, however, would ensure that the offset of impacts is more balanced and that it also takes into account communities and businesses that will be negatively affected.

7.4. RECOMMENDATIONS

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

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

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ANNEXURE A: LANDOWNER ENGAGEMENTS

Farm Portion	Owner	Comment
Commadants Pan No. 382	Louis Steenkamp	None
Portion 9 of Commandants Pan No. 382		
Portion 3 of Kopje Aleen No. 81	Retha Barnard	None
Remaining Extent of Kopje Alleen No. 81	Willem de Wet	Grazing hectares will be reduced.
Portion 1 of Kopje Alleen No. 81		
Commadants Pan No. 424	Wimpie Botha	No major issues but did note safety as a concern – additional foot traffic and people in the area.
Portion 1 of Commadants Pan No. 424		
Newlands No. 42	Gawie Greef	Said he will sell his entire property for project/Hunters come here to experience Africa and they do not want to see developments during their visits
Kopje Alleen No. 81	Piet Viljoen	Said that he is not aware of any project on his land
Kopje Alleen No. 81		
Uitkijk No. 509	Abri (surname unknown)	No Response
Portion 1 of Klein Koppie Aleen No. 182	Chris Gouws	Chris noted that power lines cause fires. Chris Gouws does not want the line going through the middle of the field. This is Preferred option, following the edge of his field and the road going through the middle of his field. This option will also be less of fire risk.
Klein Kopje Aleen No. 182	Fanie van Rensburg	Do not know of the project
Dankbaarheid	Quartus Meyer	Game farm is part of his retirement plan. Very concerned that the solar farm will detract from the sense of place and his game farm will be useless. Sense of place is particularly important for overseas clients. Chief concerns would be visual impact – i.e. if the solar farm is visible from the game farm then the sense of place will be negatively affected. Said if solar farm is to go ahead the developer should buy his farm.
Hartplaats No. 194	Joseph Vinger (Brother - Johannes Vinger)	No Response
Helderwater No. 494	Buks Steenkamp	No Response
Nooitgedacht No.74	Petrus Letisitsa	No Response
Portion 1 of Mimosa No. 334	Frank (I.F. de Franca)	No Response
Portion 1 of De Hoop No. 276	Henk Pottas	Does not want any powerlines going through his property.
Portion 1 of Elsinore No. 12		
Portion 14 of Wonderkop No. 15	Evyn Thorne	Want to know if the landowners will get access to the electricity generated
Remaining Extent of Wonderkop No. 15	David Tullies	No Response

ANNEXURE B: Impact Assessment Methodology

Evaluation component	Ranking scale and description (criteria)
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	**10 - Very high**: Bio-physical and/or social functions and/or processes might be *severely* altered. **8 - High**: Bio-physical and/or social functions and/or processes might be *considerably* altered. **6 - Medium**: Bio-physical and/or social functions and/or processes might be *notably* altered. **4 - Low** : Bio-physical and/or social functions and/or processes might be *slightly* altered. **2 - Very Low**: Bio-physical and/or social functions and/or processes might be *negligibly* altered. **0 - Zero**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	**10 - Very high (positive)**: Bio-physical and/or social functions and/or processes might be *substantially* enhanced. **8 - High (positive)**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced. **6 - Medium (positive)**: Bio-physical and/or social functions and/or processes might be *notably* enhanced. **4 - Low (positive)**: Bio-physical and/or social functions and/or processes might be *slightly* enhanced. **2 - Very Low (positive)**: Bio-physical and/or social functions and/or processes might be *negligibly* enhanced. **0 - Zero (positive)**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
DURATION	**5 - Permanent** **4 - Long term**: Impact ceases after operational phase/life of the activity > 60 years. **3 - Medium term**: Impact might occur during the operational phase/life of the activity – 60 years. **2 - Short term**: Impact might occur during the construction phase - < 3 years. **1 - Immediate**
EXTENT (or spatial scale/influence of impact)	**5 - International**: Beyond National boundaries. **4 - National**: Beyond Provincial boundaries and within National boundaries. **3 - Regional**: Beyond 5 km of the proposed development and within Provincial boundaries. **2 - Local**: Within 5 km of the proposed development. **1 - Site-specific**: On site or within 100 m of the site boundary. **0 -** None
IRREPLACEABLE loss of resources	**5 – Definite** loss of irreplaceable resources. **4 – High** potential for loss of irreplaceable resources. **3 – Moderate** potential for loss of irreplaceable resources. **2 – Low** potential for loss of irreplaceable resources. **1 – Very low** potential for loss of irreplaceable resources. **0 - None**
REVERSIBILITY of impact	**5 –** Impact **cannot** be reversed. **4 – Low** potential that impact might be reversed. **3 – Moderate** potential that impact might be reversed. **2 – High** potential that impact might be reversed. **1 –** Impact **will be** reversible. **0 –** No impact.
PROBABILITY (of occurrence)	**5 - Definite**: >95% chance of the potential impact occurring.
	4 - High probability: 75% - 95% chance of the potential impact occurring.
	3 - Medium probability: 25% - 75% chance of the potential impact occurring
	2 - Low probability: 5% - 25% chance of the potential impact occurring.
	1 - Improbable: <5% chance of the potential impact occurring.
Evaluation component	**Ranking scale and description (criteria)**
CUMULATIVE impacts	**High**: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Medium**: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Low**: The activity is localised and might have a negligible cumulative impact. **None**: No cumulative impact on the environment.

Significance Points	Environmental Significance	Description
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.