DRAFT SOCIO-ECONOMIC ASSESSMENT REPORT

FOR

LICHTENBURG SOLAR PARK

LOCATED IN

DITSOBOTLA LOCAL MUNICIPALITY IN THE NORTHWEST PROVINCE

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EXECUTIVE SUMMARY

The purpose of this report is to reflect socio-economic considerations as part of the environmental impact assessment process for the proposed Lichtenburg Solar Park located in the Ditsobotla Local Municipality in the Northwest Province.

AGES Limpopo (Pty) Ltd was appointed by Matrigenix (PTY) LTD to conduct a socio-economic impact assessment as part of the application for the proposed development of the Lichtenburg Solar Park on Portion 25 of the Farm Houthaalboomen 31 IP and Portion 10 of the Farm Lichtenburg Town and Townlands 27 IP, Ditsobotla Local Municipality in Northwest Province.

The chosen site is suitable for the installation of a solar power plant due to its appropriate morphologically (flat terrain) and favourable radiation conditions. The Lichtenburg Solar Park is expected to deliver/distribute 120MW of electric energy into the Eskom Grid. The anticipated project footprint is 240 hectares.

Construction and commissioning could take approximately 18 months. The useful life of the proposed projects could be 30 years. It could employ approximately 40 people, comprising 10 in managerial or technical positions and 30 in maintenance or security posts.

The Ditsobotla municipal population was approximately 190,000 people in 2021. Estimated GDP was small at less than R6 billion in that year, with community and social services being the predominant sector, followed by manufacturing (mainly cement).

The National Development Plan supports the procurement of at least another 20 GW of renewable energy by 2030. The findings of the 2019 update of the national Integrated Resource Plan (IRP) include the need both for additional energy supply in the long term and to mitigate the risk of immediate energy shortages.

The Northwest Provincial Strategy for 2020-25 lists solar power as a strength and opportunity with a high influence, which may be inferred as evidence that there is policy support for solar energy generation from Provincial Government. The Ditsobotla Municipality IDP and LED strategies have no articulation on this matter

Northwest Province currently has 5 renewable energy projects that cumulatively generate 275MW. All of them are solar energy projects and they are in commercial operation.

The socio-economic impact of the proposed Lichtenburg Solar Project is considered positive and the application is supported, provided that all the mitigation measures proposed by specialist consultants are implemented. The project is consistent with development policies at the national, provincial and local government levels.

Contents

1. PURPOSE

The purpose of this report is to reflect socio-economic considerations as part of the environmental impact assessment process for the proposed Lichtenburg Solar Park located in the Ditsotbola Local Municipality in the Northwest Province. The methodology will be to:

- Document the project proposal,
- Describe the local socio-economic conditions,
- Consider the policy environment relating to renewable energy with reference to solar PV,
- Conduct a desk-top analysis of socio-economic considerations, including consideration of other specialist reports,
- Make an informed recommendation about the socio-economic impact of the proposed project based on the desk top analysis.

2. INTRODUCTION

2.1 The Proposed Project

AGES Limpopo (Pty) Ltd was appointed by Matrigenix (PTY) LTD to conduct a socio-economic impact assessment as part of the application for the proposed development of the photovoltaic Lichtenburg Solar Park on Portion 25 of the Farm Houthaalboomen 31 IP and Portion 10 of the Farm Lichtenburg Town and Townlands 27 IP, Ditsobotla Local Municipality in Northwest Province. Province.

Ditsobotla Municipality comprises of a total area of approximately 6,500km² and has a population of less than 200,000 people.[1] Population growth has been relatively low at 1% per year and could decline in the medium term. Lichtenburg and Coligny are the main towns. There are four semi-urban areas (Itsoseng, Tlhabologang, Itekeng and Boikhutso) and several rural villages scattered between commercial farms.

The chosen site is suitable for the installation of a photovoltaic (PV) power plant due to its appropriate morphologically (flat terrain) and favourable radiation conditions. The available radiation allows a high rate of electric energy production, as a combination of latitude-longitude and climatic conditions. The Lichtenburg Solar Park is expected to deliver/distribute 120MW of electric energy into the Eskom Grid. The anticipated project footprint is 240 hectares. Terrestrial biodiversity sensitivity is considered high due to 20 hectares of indigenous vegetation that may have to be cleared. This will require mitigation.

Construction and commissioning could take approximately 18 months. The useful life of the proposed projects could be 30 years. It could employ approximately 40 people, comprising 10 in managerial or technical positions and 30 in maintenance or security posts.

Access to the Lichtenburg Solar Park, located approximately 8km north of Lichtenburg town, will be from the R505 tar road to Zeerust. Staff accommodation and the need for goods and services can be provided from Lichtenburg.

[1] Draft IDP for Ditsobotla Local Municipality, 2022

Figure 1: Location Map for the Proposed Lichtenburg Solar Park

The next figure provides a more detailed image of the proposed project site on the eastern side of the R505.

Figure 2: The Proposed Project Site

The proposed development (the Photovoltaic (PV) Power Plant and its connection infrastructure) consists of the installation of the following infrastructure, facilities and equipment:

- Photovoltaic modules (mono-crystalline, poly-crystalline or bi-facial modules).
- Mounting systems for the PV arrays (single-axis horizontal trackers or fixed structures) and related foundations.
- Internal cabling and string boxes.
- Medium voltage stations, hosting DC/AC inverters and LV/MV power transformers.
- Medium voltage receiving station(s).
- One on-site high-voltage substation with high-voltage power transformers, stepping up the voltage to 132kV, and one high-voltage busbar with metering and protection devices.
- 132 kV powerline to the Tabor Substation, or loop-in, loop-out lines directly into the Eskom powerlines that runs along the southern border of the property.
- Electrical system and UPS (Uninterruptible Power Supply) devices.
- Lighting and grounding system.
- Internal roads.
- Fencing of the site and alarm and video-surveillance system.
- Water access point, water supply pipelines, water treatment facilities.
- Sewage system.

2.2 Site Characteristics

The study area is situated within the summer rainfall region with very dry winters and severe frost that occurs frequently (37 days) during the colder winter months. The mean annual precipitation for the Carletonville Dolomite Grassland vegetation type being the main vegetation type of the area is 593mm, while the mean annual temperature is 16.1˚C. The monthly distribution of average daily maximum temperatures for Lichtenburg ranges from 17.7°C in June to 30°C in January. According to the IDP, summer temperatures can exceed 40 degrees Celsius.[2] The region is the coldest during June when the mercury drops to 0°C on average during the night.[3]

Most properties situated within a 500m radius are being used for livestock and game farming. The proposed development land is used for wildlife grazing at present. The natural vegetation of the site is mostly intact.[4]

The Agriculture ecosystem specialist report for the project found that the site had low potential due to the climatic conditions and shallow gravelly to rocky nature of the soils, making these areas marginally suitable for crop cultivation under arable conditions.

Planted pasture to supplement livestock production is not an option considering the limited water availability for extensive irrigation.[5]

[2] Draft IDP for Ditsobola Local Municipality for 2022
[3] Lichtenburg Solar Park Terrestrial Biodiversity Animal Plant Species Assessment Report
[4] Ibid
[5] Ibid

Figure 3: Site Landscape

Photograph from Lichtenburg Solar Park Terrestrial Biodiversity Animal Plant Species Assessment Report

3. SOCIO-ECONOMIC PROFILE OF DITSOBOTLA MUNICIPALITY

The information presented below is an extract from the draft 2022 Integrated Development Plan for Ditsobotla Local Municipality that is published on their website.

3.1 Population projections

According to the 2022 Draft IDP, the municipal population was 181,865 in 2016 (54,154 households). At a projected population growth rate of 1% per year, the population could have increased to 191,000 in 2021. The migration of young households from rural to urban areas in search of work is one of the contributors to a steady decline in average household size.

The female proportion in the population is 51%, which is similar to the national average. The population composition is mostly African (91%), followed by 7% White and 2% Coloured. A significant proportion of the appropriate age population (21%) is still without formal schooling. This is correlated with low skills levels.

Poverty levels are high, with 46% of households earning between R10,000 and R40,000 per annum in 2016. Only 28% of households earned more than R40,000 per annum.

Almost 42% of employees were in elementary positions and only 15% in professional or associate professional positions.

3.2 The Local Economy

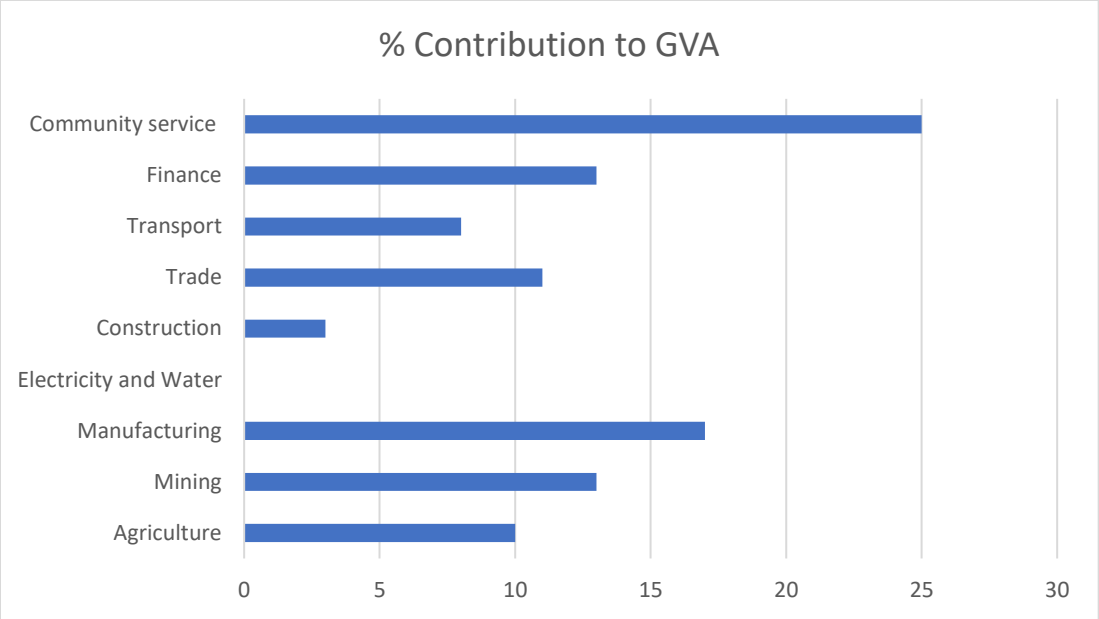
The draft IDP of Ditsobola Local Municipality for 2022 has not updated its economic value of production estimates per sector since 2012. The estimated GDP was R5 billion for that year and the sectoral distribution is reflected in the table below.

Table 1: Sectoral Contribution to the Value of Production, 2012

Sector	**% Contribution to GVA**
Agriculture	10
Mining	13
Manufacturing	17
Electricity and Water	0
Construction	3
Trade	11
Transport	8
Finance	13
Community service (including government)	25
TOTAL	100

Source: Draft IDP for Ditsobotla Local Municipality, 2022

Figure 4: Sectoral Contribution to the Value of Production, 2012



The community services sector is dominant with a contribution of 25%, increasing from 24% in 2011. This sector is even more dominant at the district and provincial levels, where it contributes 49% and 29% respectively. The sectoral contribution to employment from this sector in Ditsobotla LM was similar at 26%. Institutional capacity for development has been raised as a challenge during IDP engagements, despite the large contribution of this sector to expenditure in the Municipality.

Manufacturing is the second largest sector, which is mostly driven by cement production west of Lichtenburg. It contributes 17% to the local economy, although the labour absorption is not as high.

Mining is also significant, with a 13% contribution to the added value of production in the local economy. Limestone deposits located near Dudfield, north-west of Lichtenburg-Boikhutso as well as the deposits found in the Bodibe and Welverdiend areas, are mined and commercially utilized for cement manufacturing. The finance and business services sector also contributes 13% to the local value of production. This sector is largely determined by the imputed value of land. The trade sector is relatively small with a contribution of 11% to the local economy, which could imply that higher order goods and services are acquired from outside the Municipality.

Although agricultural activities are prevalent, this sector only contributes 10% to the value of production in the local economy. It is a very important contributor to employment and absorbs 18% of the labour force. The agricultural eco-system specialist report for the project found that the grazing potential of the site is low and the most suitable and optimal utilization of the area would be grazing by small livestock or game species.[6] Sorghum, wheat and sunflowers are farmed on a small scale.

Unemployment was high at 28% and is likely to have worsened.

[6] Lichtenburg Solar Park Terrestrial Biodiversity Animal Plant Species Assessment Report

4. THE POLICY ENVIRONMENT FOR RENEWABLE ENERGY PROJECTS

4.1 National Policy

4.1.1 Integrated Resources Plan, Oct 2019 Update

The National Development Plan envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy services at competitive rates; is socially equitable through expanded access to energy at affordable tariffs; and environmentally sustainable through reduced emissions and pollution. It supports the procurement of at least another 20 GW of renewable energy by 2030, which has been raised to 24 GW by the updated IRP. This leaves some way to go from the 6.5 GW that is currently procured under REIPPPP.

South Africa is a signatory to the Paris Agreement on Climate Change. The energy sector contributes 80% to greenhouse gas emissions of which 50% are from electricity generation and liquid fuel production alone. There are actions to reduce emissions with investment in renewable energy, energy efficiency and public transport. The IRP is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, security of supply and the environment, aimed at minimizing emissions and water usage.

The 2019 IRP indicates that a total of 6 422 MW has been procured under the Renewable Energy Independent Power Producers Programme (REIPPP) since 2010, with 3 876 MW already operational and made available to the grid. In addition, Independent Power Producers have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants.

Coal currently contributes 74% to the total of 51.7GW of installed capacity in the South African electrical power system. However, several coal-fired power stations are scheduled for decommissioning because they are at the end of their 50-year design life. The shutdown of some units at Grootvlei, Komati and Hendrina has been brought forward. Approximately 5 400 MW of electricity from coal generation by Eskom will be decommissioned by 2022, increasing to 10 500 MW by 2030 and 35 000 MW by 2050.

Solar PV, wind and CSP with storage, present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present considerable potential for the creation of new industries, job creation and localisation across the value chain.

Investment in renewable energy is continuing to increase as countries transition their power systems to cleaner sources of energy. New investment in fossil fuel (coal) fired power plants is in decline with local and international financial institutions, including development financial institutions, announcing a stop on financing coal and adopting the OECD position to only finance high-efficiency and low-emissions plants of specific sizes.

According to the IRP, solar energy has the potential to address the need for energy access in remote areas, create jobs and increase localisation. This is becoming increasingly evident from the growing number of own-generation facilities in the form of rooftop PV installations in households. There is also an increasing number of commercial and industrial facilities that are installing PV systems to supplement electricity from the grid. This is considered part of the changing electricity landscape and advancement in technology.

The findings of the 2019 update of the national Integrated Resource Plan (IRP) include that there is a need both for additional energy supply in the long term and to mitigate the risk of immediate energy shortages. The immediate shortages are exacerbated by the low energy availability factor (EAF) of the Eskom power station fleet. This risk plus the associated energy shortages gets worse when considering the non-compliance status of some Eskom plants vis a vis NEMA. Eskom is also unlikely to meet the deadline for compliance (postponements granted in year 2015) with minimum emission standards (MES) due to constrained finances and project execution delays. Assuming that non-compliant power plants are shut down, the reality of power disruptions manifests significantly from year 2019 onwards. These anticipated power disruptions have occurred. Continued underperformance and late commissioning by Medupi and Kusile units exacerbate the load shedding risk.

The 2019 update of the IRP therefore expects that the installed capacity for electricity generation from solar PV plants will expand rapidly from the 2020 base of approximately 1,600 MW, to almost 8,300 MW by 2030. The short-term capacity gap was estimated at 2,000 MW. It calls for short-term supply and demand side interventions to minimise the risk of load shedding and/or extensive usage of diesel peaking plants due to Eskom's low EAF. Solar PV, wind and gas are found to be the least cost options for energy generation because of new technology and its positive effect on price. The Department of Mineral Resources and Energy therefore launched a Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) during August 2020. The objective of the RMIPPPP is to fill the current short-term supply gap, alleviate the current electricity supply constraints and reduce the extensive utilisation of diesel-based peaking electrical generators.

The proposed Lichtenburg Solar PV plant is perfectly consistent with the modelling and findings of the 2019 update of the national Integrated Resource Plan. It is also consistent with the objectives of the RMIPP. This proposed project in Ditsobotla Local Municipality, could contribute 120MW of the current short-term energy capacity gap in the country.

4.1.2 Renewable Energy Independent Power Producers Procurement Programme

The Independent Power Producers Programme is an urgent national intervention to enhance the power generation capacity in the country. The mandate is to secure electricity from the private sector from renewable and non-renewable sources. Programme implementation from renewable sources (REIPPPP) is further advanced. Energy systems are deeply embedded in socio-economic factors. In addition to the procurement of energy, the IPPPP was therefor also designed to contribute to the broader national development objectives of job creation, social upliftment and the broadening of economic ownership.

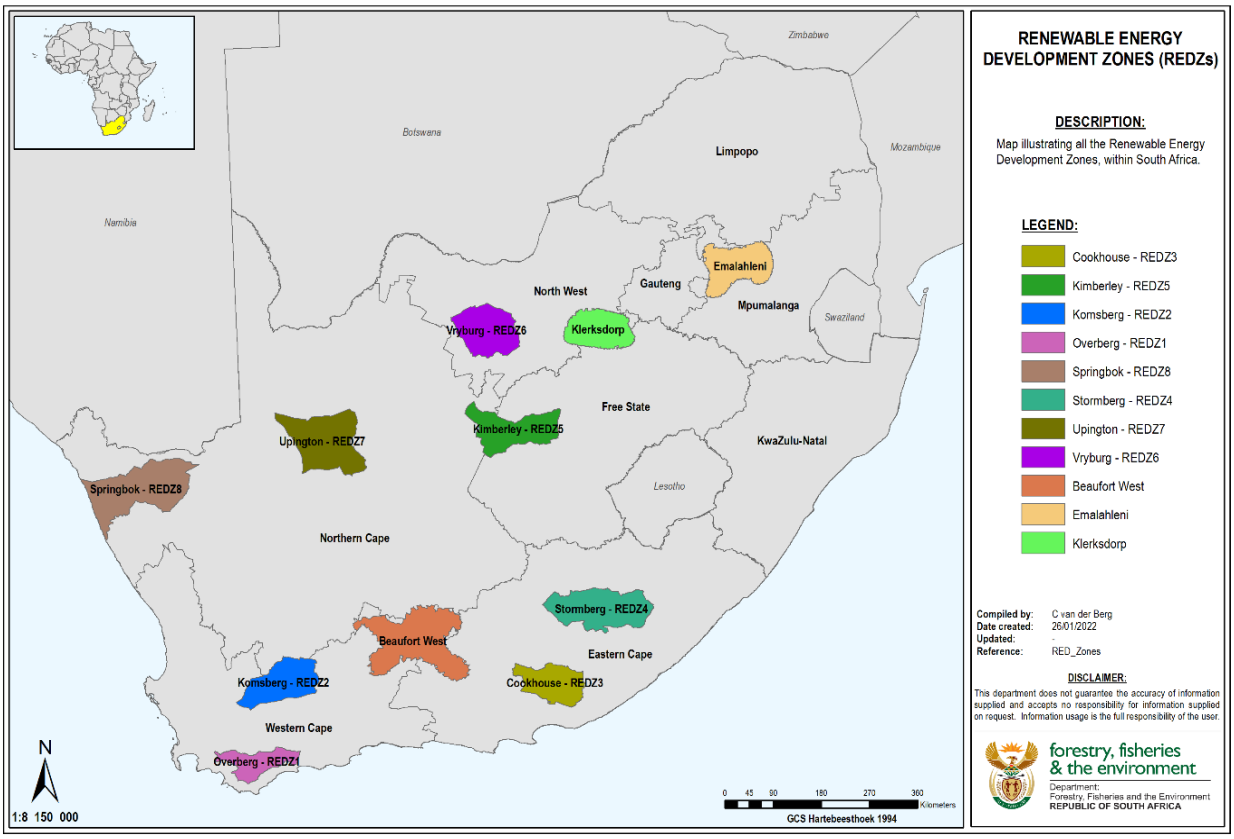
A key driver of the global shift is government policy support and renewable energy prices dropping below R0.62/kWh under competitive processes. This government policy support is evident in South Africa and in several provinces. The CSIR Energy Centre Report of December 2016 indicated that solar and wind energy tariffs were R0.62/kWh, compared to the coal tariff of R1.03/kWh.

Most of the renewable energy projects that have been approved to date are in the Northern Cape, Eastern Cape and Western Cape, because this is where the renewable energy resources offer the greatest potential for any particular technology. The programme produces a separate report for each of these provinces. The Northwest report is combined with other provinces and is referred to in the provincial policy section below.

4.1.3 Renewable Energy Development Zones (REDZ)

The South African government has established 11 renewable energy development zones in the country where large scale solar PV and wind turbine projects, with their associated transmission lines, are promoted. Environmental impact application procedures have been simplified in the zones and timeframes for processing such applications have been shortened. The proposed Lichtenburg Solar Park is not located within any of the REDZ, although it is in reasonable proximity to Klerksdorp and Vryburg, which are located in REDZ.

Figure 5: Renewable Energy Development Zones in South Africa



4.2 Provincial Policy on Renewable Energy

4.2.1 Northwest Growth and Development Strategy

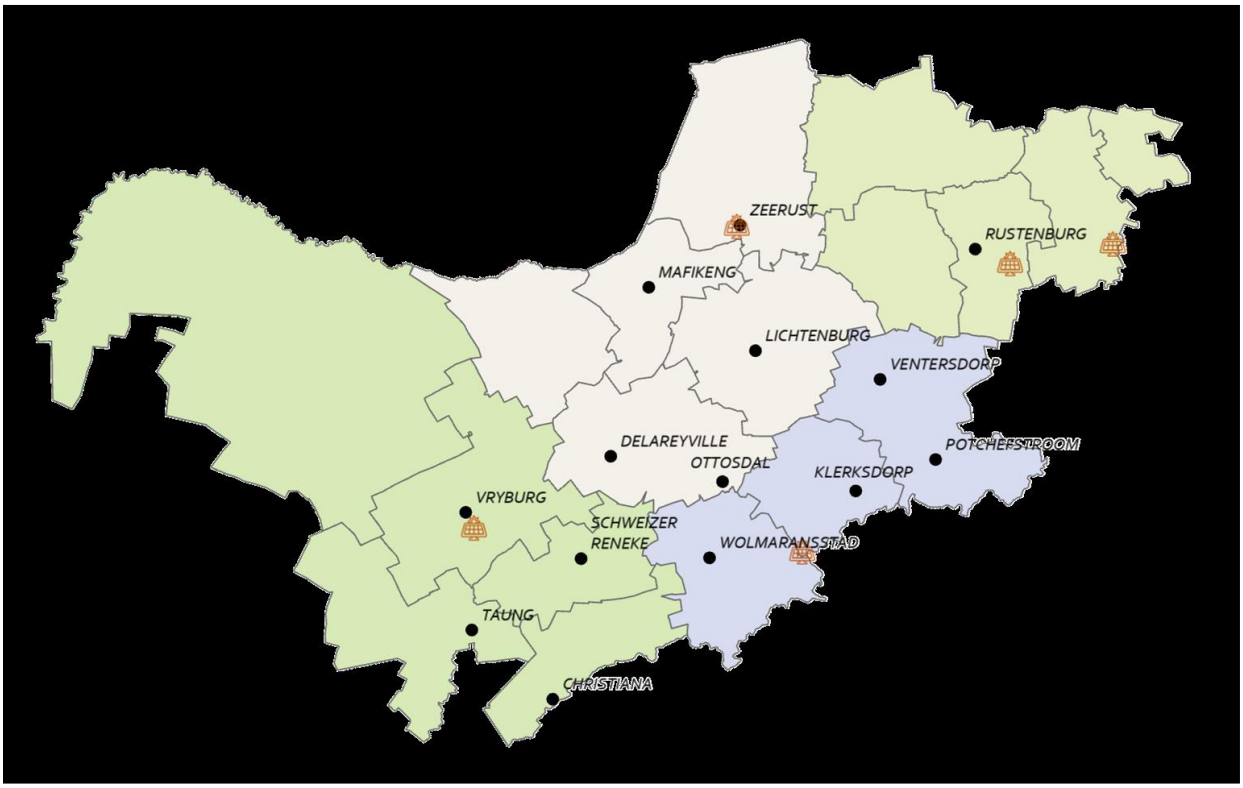
Solar power is listed in the Northwest Provincial Strategy for 2020-25 as a strength and opportunity with a high influence. This can be accepted as policy support for solar energy generation from the Northwest Provincial Government.

4.3 REIPPPP Provincial Report for Northwest Province

Northwest Province has procured 275MW of solar energy from 5 projects to date (Dec 2021) all of which is operational.[7] The first of them, with a capacity of 7MW, came into operation near Rustenburg in 2013. This project has saved 98,000 tons of carbon dioxide emissions to date. Waterloo (near Vryburg) and Zeerust are the two largest projects, with a capacity of 75MW each. The remaining two operational solar projects in Northwest Province are Bokamosa with a capacity of 68MW near Wolmaranstad, and De Wildt with a capacity of 50MW near Brits.

The total capital invested in these projects is R6.3 billion and 7,400 job years have been created. Community equity will amount to almost R1 billion and socio-economic benefits of almost R930 million are recorded in the national quarterly REIPPPP report for Northwest Province. After the big renewable energy generation provinces of Northern, Western and Eastern Cape, Northwest is the largest province in this category with its five projects and their generating capacity of 275MW.

Figure 6: Location of 5 Existing and Operational Solar Energy Projects in Northwest Province



Source: REIPPPP Provincial Report, Dec 2021, p19

[7] REIPPPP Provincial Report, Dec 2021

4.4 Municipal Policy on Renewable Energy

Ditsobotla Local Municipality does not have an explicit policy on renewable energy.

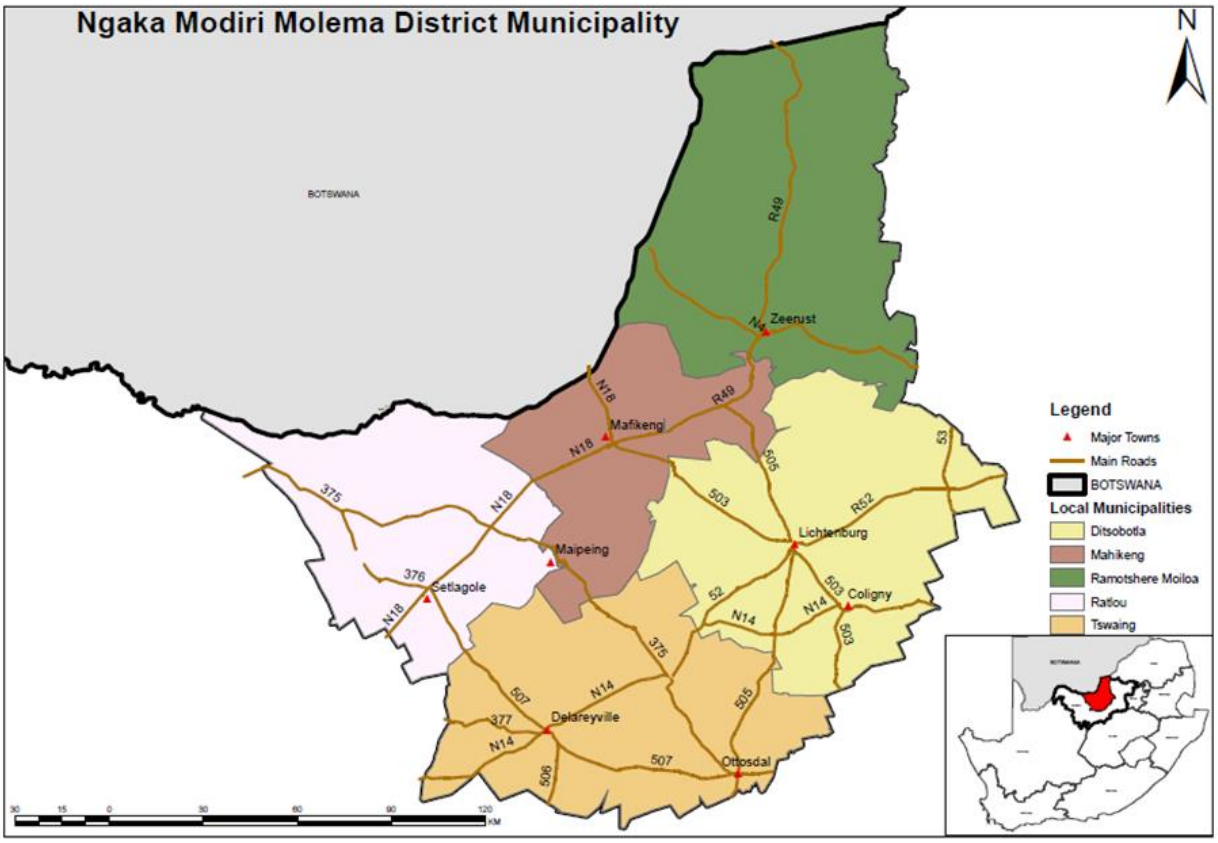
The spatial development vision is to address key national, provincial and local priorities by focussing the provision of socio-economic infrastructure in areas with the highest growth potential (with prospects of the highest return on capital and social upliftment) but still attending to the basic needs of people elsewhere.[8] The Lichtenburg area, where the proposed project is to be located, is the priority development node of the Municipality. Strategic objectives to realize the vision are listed below:

- Municipal Transformation and Organisational Development
- Municipal Financial Viability
- Local Economic Development, and
- Basic Services and Infrastructure Development

There is no specific reference to renewable energy under the strategic objective of basic services and infrastructure development.

The figure below provides a useful orientation for the Municipality.

Figure 7: Orientation Map for Ditsobotla Local Municipality



[8] Draft IDP, 2022

Regarding local economic development, the strategy was adopted in January 2016 and contains the following focus areas:

- Improved municipal governance processes
- SMME and community business support
- Agricultural beneficiation and value chain development, and
- Enhance benefits from strategic location.

Although there is no reference to renewable development, this could be inferred from the development vision and from the strategic location benefits, which includes favourable conditions for solar energy generation.

5. SOCIO-ECONOMIC IMPACT ASSESSMENT

Based on desk-top considerations and with the information that was made available in April 2022, the socio-economic impact of the proposed Lichtenburg Solar PV Project is assessed as follows:

5.1 Operational Phase

5.1.1 Contribution to the Constrained National Electricity Grid

The project will contribute up to 120 MW to a constrained national grid, thereby reducing the need for load shedding with its negative consequences for economic production, growth and job creation; and maintenance of equipment. The impact is positive with a high significance.

5.1.2 Capital Formation and Investment Attraction

Capital investment of approximately R2.4bn will be required (120 MW at R20m/MW) of which a substantial proportion is likely to be foreign capital as indicated by the REIPPPP projects that have been procured to date. The impact is positive with a moderate significance.

5.1.3 Reduction in CO_2 Emissions per Unit of Electricity Generated

CO_2 emissions for 120 MW of solar energy will be reduced relative to coal fired power generation, which is the current national standard. The quantity of CO_2 potentially avoided by this project will be approximately 280,000 tons per year based on the average Eskom emission factor of 1.015 tons/MWh and assuming that the PV modules will be mounted on trackers. This impact is positive with moderate significance.

5.1.4 Lower Tariffs per Unit will Reduce Inflationary Pressure

Lower and declining electricity tariffs from solar energy compared to fossil fuel generated electricity (solar and wind energy tariffs are R0.62/kWh, compared to the coal tariff of R1.03/kWh). This will have a mitigating effect on administered prices and therefore on inflation. The economic impact of the proposed project will therefore be positive with a moderate significance.

5.1.5 Promotion of the Solar Energy Value Chain

Every new solar project that is developed in South Africa makes the establishment of an industry to support local manufacturing of components more viable. The footprint for such industry development has already been created in various industrial parks in South Africa. The economic impact of the proposed project will therefore be positive with a low to moderate significance.

5.1.6 Job Creation and Skills Development

Permanent job creation on the proposed project could be 40 people. More jobs will emerge within the value chain for the manufacturing of components. Albeit important, these numbers are relatively small in the context of current unemployment in Ditsobotla Municipality, which is in the order of 15,000 people. An important new range of renewable energy industry skills will be acquired, which are essential for the local competitiveness of this industry. This socio-economic impact is positive, but with a low significance.

5.1.7 Community Development

In terms of REIPPPP prescriptions, developers are expected to contribute 1.5% of turnover to community development in the vicinity of the project. Although this commitment has not yet been formalised, it could and should be structured in a way that will contribute meaningfully to the quality of life of a local community who could be identified, probably in Lichtenburg and surrounds, and engaged in consultation with the local municipality. The impact is positive with a low significance in terms of the methodology for impact calculation, although the impact on the community itself could be significant.

5.1.8 Risk of Vandalism

Vandalism of property is a risk associated with high levels of poverty. This impact is potentially negative, considering the high value of solar PV panels. Mitigation measures will be required in the form of equipment design and on-site security.

5.2 Construction Phase

5.2.1 Promotion of the Solar Energy Value Chain

Almost the entire impact of the proposed project on the local solar energy industry value chain referred to in section 5.1.5 above will occur before and during the construction phase, because this is when the components will be required. As indicated, this impact is positive, with a low significance.

5.2.2 Job Creation and Skills Development

Approximately 100 construction and panel installation jobs are expected to be created for a 120 MW project, for a period that is unlikely to exceed 18 months. Skills development, especially for panel installation, will contribute meaningfully to the viability of other potential solar project developments in Northwest Province. This impact will be positive, but with relatively low significance due to its short duration.

5.2.3 Crime and Social Disruption

Construction projects are associated with increased levels of crime and disruption to established local social relationships. The risk of an increase in Covid-19 infections could also arise when contractors are recruited from a different location. This impact could be negative, albeit low. The significance can be further reduced by way of mitigation measures that should include an appropriate security and workplace safety protocols that the main contractor and all subcontractors should adhere to.

5.3 Conclusion on Socio-Economic Assessment

The socio-economic impact of the proposed Lichtenburg Solar Project is considered positive and the application is supported, provided that all the mitigation measures proposed by specialist consultants are implemented.

The project is consistent with development policies at the national, provincial and local government levels.

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