

DOORNHOEK PV CLUSTER

SITE SELECTION MOTIVATION



Prepared for:

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Date: 29 April 2022

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DOCUMENT HISTORY

REVISION HISTORY

Revision No	Revision Date	Author
Draft	29 April 2022	Amy Hill
Updated Draft	30 April 2022	Michael Johnson
Final		

APPROVAL FOR RELEASE

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DISTRIBUTION

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1. INTRODUCTION

The proposed Doornhoek PV Cluster consists of two solar PV facilities:

- Doornhoek 1 - Net generation (contracted) capacity of up to 115 MWac
- Doornhoek 2 - Net generation (contracted) capacity of up to 50 MWac

located approximately 11km north of Klerksdorp in the North West Province. The development area falls within the jurisdiction of the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality.

The property earmarked for the proposed projects (Portion 18 of the Farm Doornhoek No. 372-IP) covers an area of approximately 609 ha (see **Error! Reference source not found.** below).

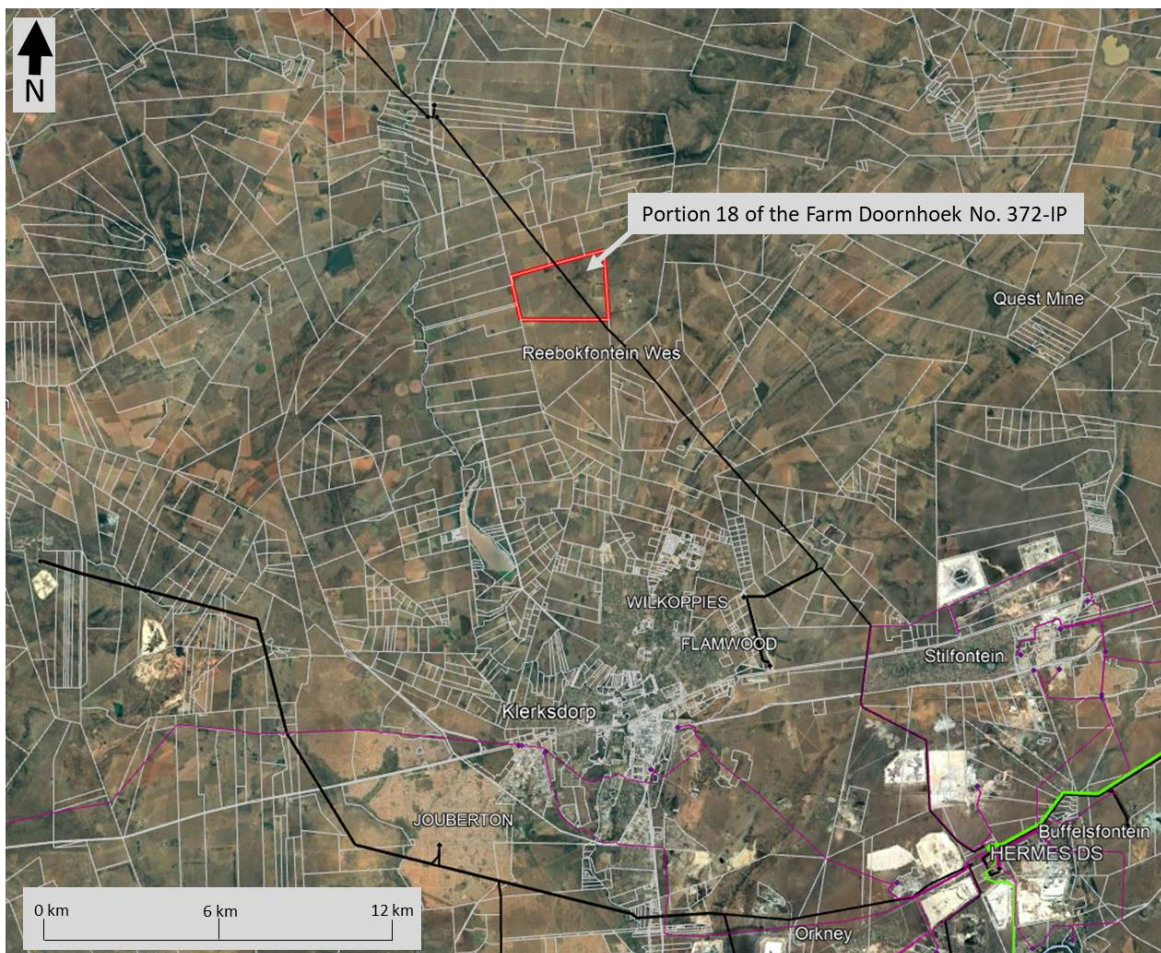


Figure 1: Doornhoek PV Cluster Locality Map.

2. PROPERTY SELECTION

The identification of the above mentioned property for the development of the Doornhoek PV cluster was based on the following location characteristics.

2.1 PROXIMITY TO TOWNS WITH A NEED FOR SOCIO-ECONOMIC UPLIFTMENT

The proposed cluster is situated approximately 11km north of Klerksdorp in the North West Province within the jurisdiction of the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality.

Mining is the dominant economic activity of the district. Additional sectors in terms of employment are social services, trade and farming.

The declining mining industry has resulted in the number of people living in poverty in the City of Matlosana almost doubling between 1996 and 2011. Although Klerksdorp has always been the main economic hub of the greater municipal area, it has not specifically been involved in the mining activities but has maintained the function of a regional service centre in terms of agricultural supplies, retail facilities, schools and medical services which stretches further than the boundaries of the Dr Kenneth Kaunda District Municipality into the North West Province and even Botswana. It is precisely this notion which has helped sustain the area in a period of considerable mining decline over the last 20 years.

The overarching direction of CMLM IDP articulates a vision for economic growth and development, provision of basic services (service delivery improvement) and infrastructure development. Due to the close proximity to Klerksdorp town, local labour and service providers would be easy to source.

In this regard the development has the potential to support private sector investment and create employment and skills development opportunities within the Klerksdorp area and surrounds.

2.2 SOLAR IRRADIATION

The economic viability of a solar PV facility is directly dependent on the annual solar irradiation at the site. From a regional site selection perspective, this region is considered to be preferred for solar energy development by virtue of its annual solar irradiation values. The GHI for the area derived from the World Bank Group's Global Solar Atlas is approximately 2 094 kWh/m²/annum.

The irradiation level is an important factor in a highly competitive bidding environment under REIPPPP; the economic viability of a project is a critical success factor.

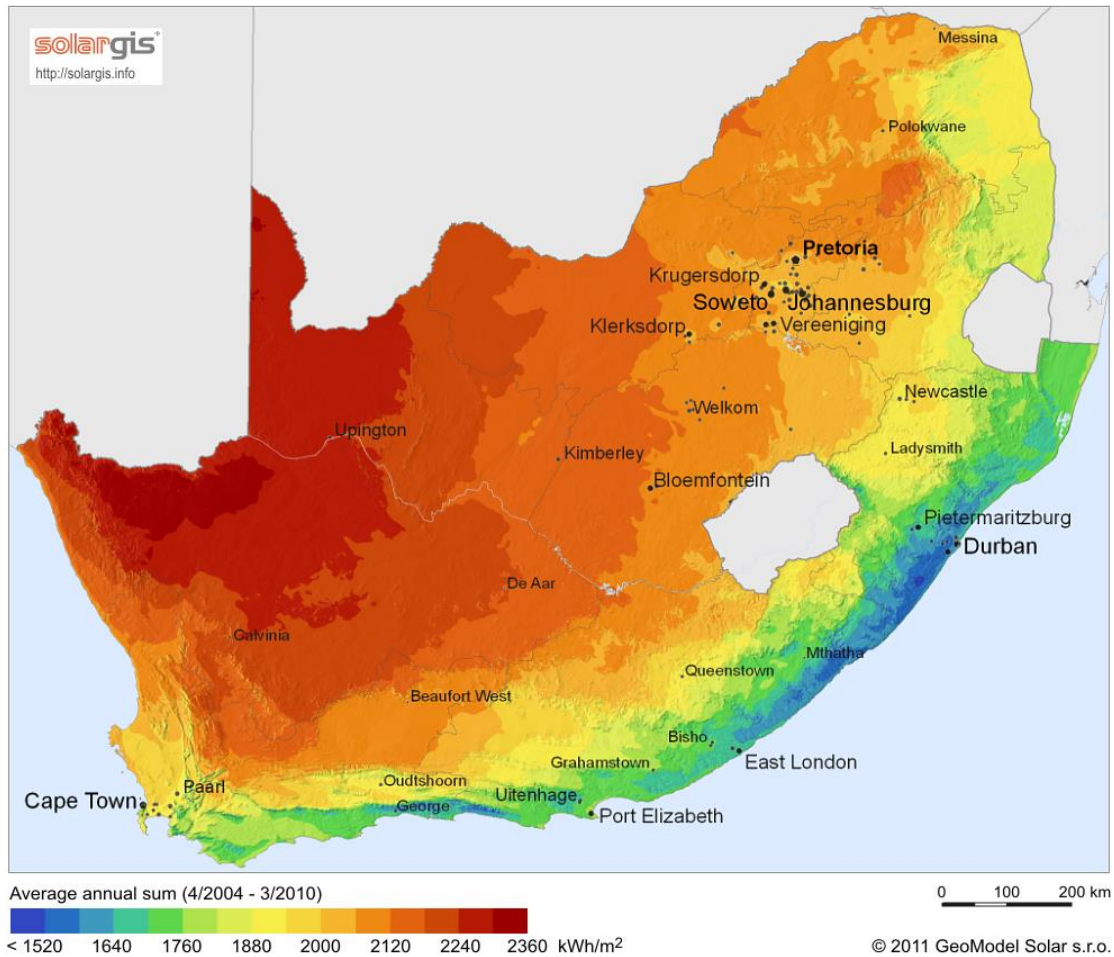


Figure 2: Global Horizontal Irradiation of Doornhoek PV Cluster (© 2019 The World Bank, Source: Global Solar Atlas 2.0, solar resource data: Solargis)

2.3 ACCESS TO GRID

2.3.1 Strategic Transmission Corridors

Eskom’s ‘2040 Transmission Network Study’ has drawn on various scenarios to determine the grid’s development requirements, as well as to identify critical power corridors for future strategic development.

The national power corridors consisting of five transmission power corridors of 100 km in width have been gazetted by the Department of Environmental Affairs (DEA) following the outcome of the strategic environmental assessment (SEA) which aimed to identify environmentally acceptable routes over which long-term environmental impact assessment (EIA) approvals can be secured.

The Doornhoek cluster falls within the Central corridor (refer to Figure 3).

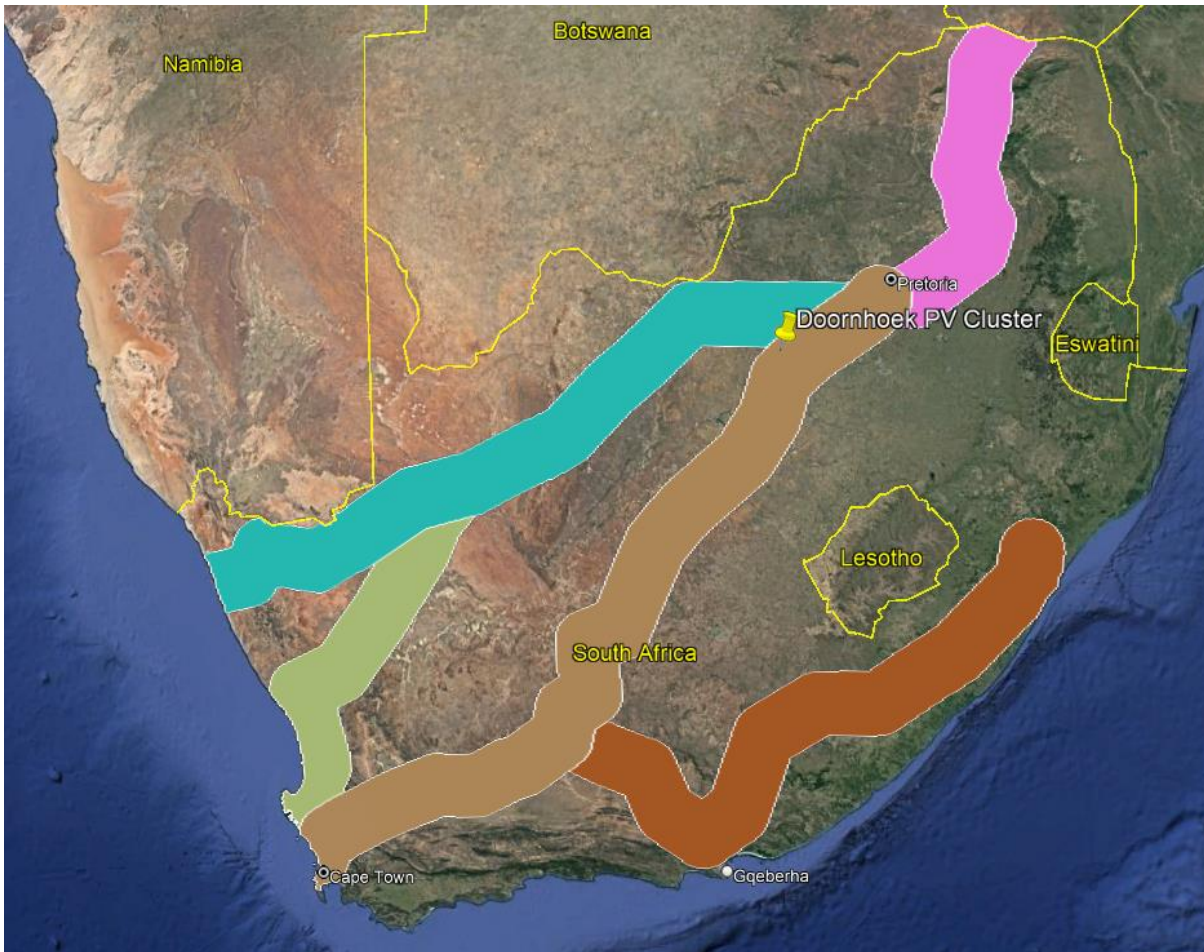


Figure 3: Eskom “Critical Power” Corridors. The Doornhoek Cluster is located within the central corridor as shown by the yellow pin

2.3.2 North West Supply Area Generation Connection Capacity

The Doornhoek PV cluster falls within the North West Supply Area, and more specifically, the Carletonville local area.

With the exception of Mookodi and Pluto, the North West supply area has transformation capacity at all the substations, and furthermore, has available transfer capacity at all the substations.

2.3.3 Proximity to Watershed–Klerksdorp 1 132kV power line

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are in close proximity to a connection point and/or demand centre are favourable, and reduce the losses associated with power transmission.

The Doornhoek PV cluster proposes to connect into the existing Watershed–Klerksdorp 1 132kV power line via a Loop in Loop out (LILO) connection approximately 200 m south-east of the facility substations (see Figure 4).

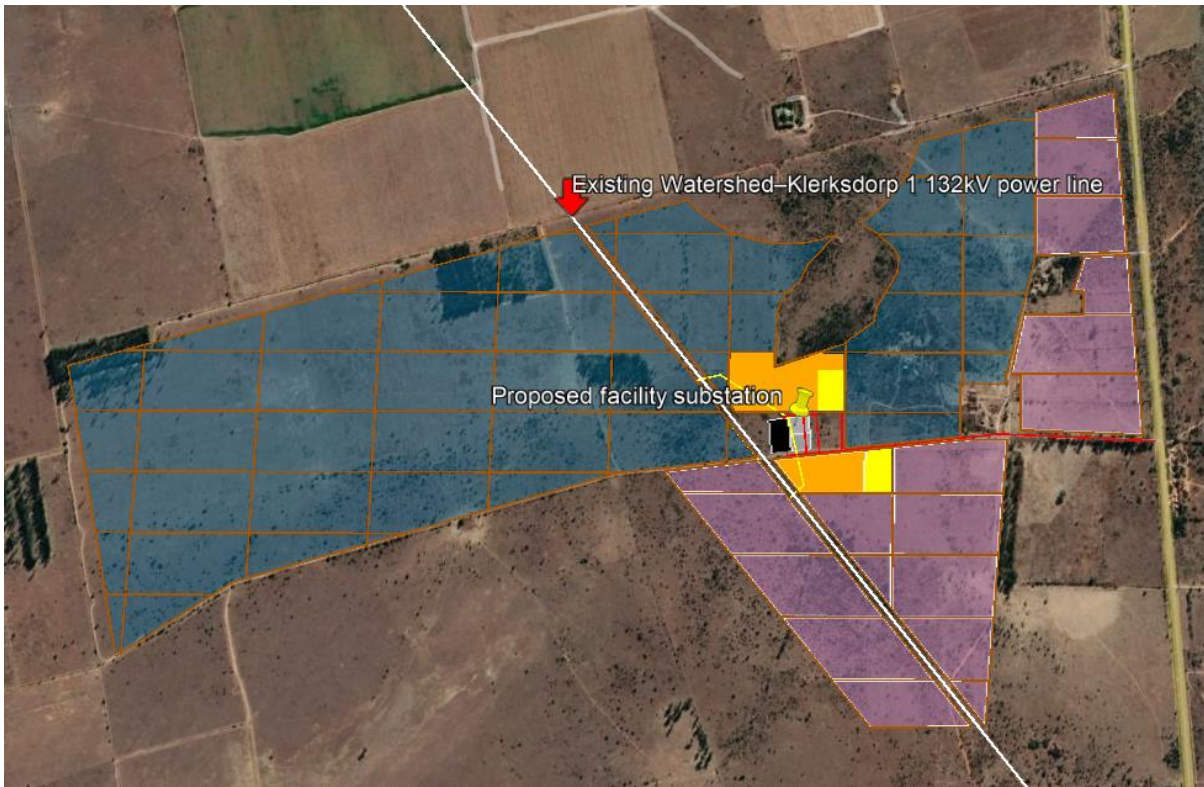


Figure 4: Doornhoek 1 & 2 Facility Substation in relation to Watershed-Klerksdorp 1 132kV power line

2.4 RENEWABLE ENERGY DEVELOPMENT ZONE

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country.

The Doornhoek PV cluster is located within the Klerksdorp REDZ (REDZ10), which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large scale solar farms.

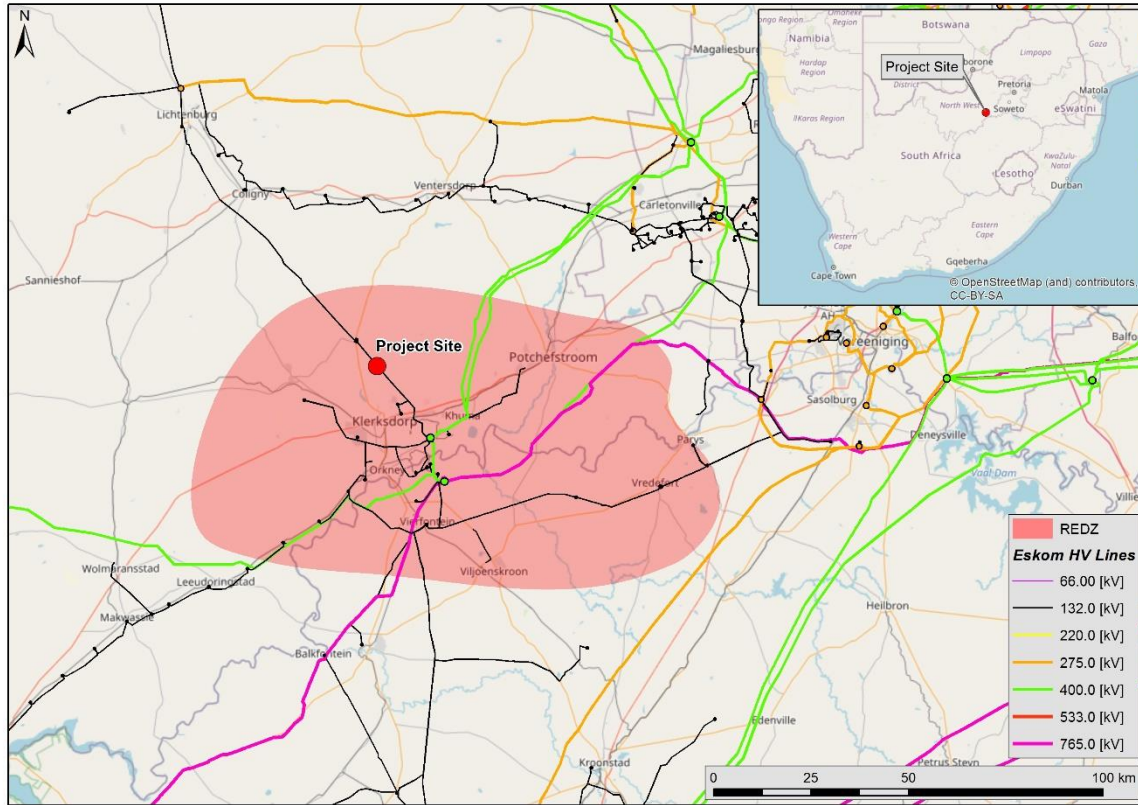


Figure 5: The Project Site in Proximity to the Klerksdorp REDZ

2.5 CONSIDERATION OF FOOD PRODUCTION AND SECURITY

The designation of the REDZ has taken into account the country's need to balance renewable energy development against the need to ensure the conservation of land required for agricultural production and national food security.

The land selected for Doornhoek PV cluster is of limited land capability and is not suitable or used for crop production. There is not a scarcity of such agricultural land in South Africa and its conservation for agricultural production is therefore not a priority.

2.6 PROXIMITY TO ACCESS ROAD FOR TRANSPORTATION OF MATERIAL AND COMPONENTS

The site for this development is located off a local district road, which provides multiple farms in the area with access to the greater road network. The road is a two-lane surfaced road and links to District Road in Klerksdorp, to the south of the site. The major routes in the immediate vicinity of the site are the R30 to the west of the site, N12 to the south of the site and R507 to the north-west of the site.

As material and components would need to be transported to the project site during the construction phase of the project, the accessibility of the site was a key factor in determining the

viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the Department of Energy's (DoE) REIPPPP.

2.7 LANDOWNER SUPPORT

The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The support from the landowner for the development to be undertaken on the affected property has been solidified by the provision of the consent for the project to proceed on the property through the signing of a land lease agreement with the developer.

2.8 ENVIRONMENTAL SENSITIVITY

Availability of large areas with few environmental constraints can be a restraining factor for the development of a solar PV facility. The proposed project site is approximately 280ha. This is considered sufficient for the installation of the solar PV facilities, while allowing for avoidance of any sensitive areas or features that may occur within the property/project site.

3. NEED AND DESIRABILITY OF THE DEVELOPMENT AT THE PREFERRED SITE LOCATION

Taking the above into consideration, in conjunction with other large-scale solar PV projects that have been authorised within the vicinity of the project site, the development of the Doornhoek PV cluster is considered to be desirable and will ultimately contribute to, and further develop the successful power generation activities undertaken within the area.