

14.1

INTRODUCTION

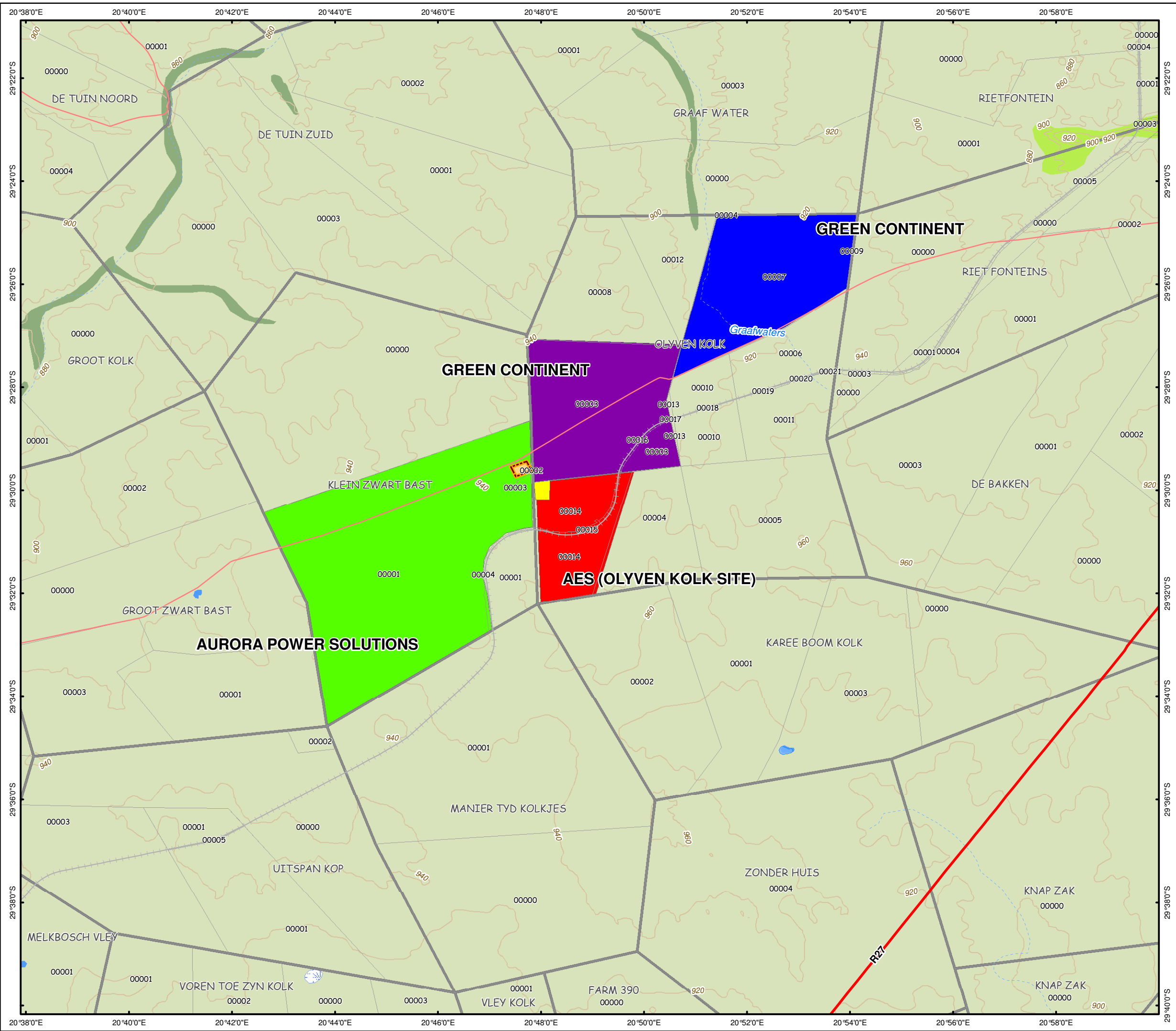
Cumulative impacts are impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the project under consideration (e.g. the combined effect of other similar projects in the general area). An impact to a resource in itself may not be considered significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse developments in the area.

There has been a substantial increase in renewable energy developments recently in South Africa as legislation is evolving to facilitate the introduction of Independent Power Producers (IPPs) and renewable energy into the electricity generation mix. The focus of the solar energy developments have largely been in the Northern Cape. It should however be noted, that not all the solar power plants presently under consideration will become operational because of the following reasons:

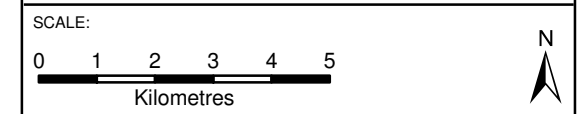
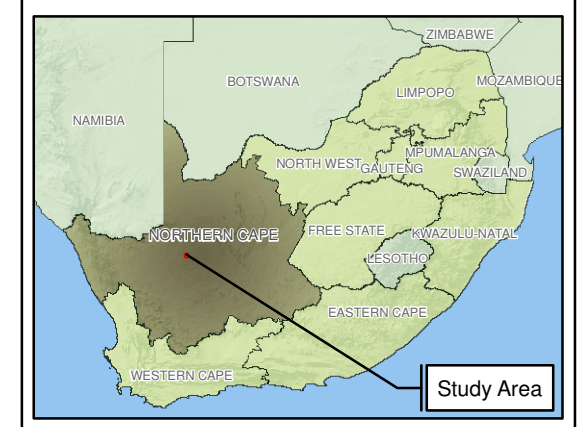
- There are limitations to the capacity of the existing Eskom grid;
- not all applications will receive positive environmental authorisation from the DEA;
- there are stringent requirements to be met by applicants in the competitive bidding process; and
- not all solar power plants will be successful in securing financial support.

The preceding impact assessment chapters have assessed the impacts associated with the Olyven Kolk solar power plant largely in isolation. It is important to, and there is a legislated requirement to, assess cumulative impacts associated with a proposed development. This chapter looks at whether the proposed project's potential impacts become more significant when considered in combination with the other existing and proposed infrastructure including solar power projects within the area.

Figure 14.1 shows the proposed location of the Olyven Kolk solar power plant in relation to all other known commercial sized solar developments. It is important to note that the location and information available for each proposed development has been taken from the public domain and other developers.



- Legend**
- Perennial Rivers
 - Non Perennial Rivers
 - Dry Rivers
 - Contours (20m)
 - Main Roads
 - Secondary Roads
 - Railway Line
 - Parent Parcels
 - Subdivisions
 - Eskom Aries Sub-station
 - AES (Block 10)
 - AES Olyven Kolk Site
 - Aurora Power Solutions
 - Green Continent
 - Green Continent
- Landcover**
- Forest and Woodland
 - Shrubland and low Fynbos
 - Thicket & bushland
 - Waterbodies
 - Wetlands



TITLE:

**Figure 14.1
Cumulative Impacts**

CLIENT:

AES Solar Energy

DATE: Oct 2011	CHECKED: IE	PROJECT: 0126393
DRAWN: LDT	APPROVED: SHC	SCALE: 1 : 130 000
DRAWING: Fig14.1_Cumulative Impacts.mxd		REV: 2

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Projection: Geographic, Datum: WGS84
Chief Directorate National Geo-Spatial Information
Source: EnPat (2001) Demarcation Board (2011)
Inset Map, Esri Data & Maps

SIZE:
A3

All reasonable effort has been made to review the current position with respect to other existing or proposed solar power plants and major infrastructure within a 10 km radius of the Olyven Kolk solar power plant. There are currently no existing commercial solar power plants within the Northern Cape and therefore this chapter focuses on any known proposed solar developments. These developments are listed in *Table 14.1* as well as the known status of each within their development cycle at the time of this assessment.

Table 14.1 *Planned Solar Power Plants in the vicinity of the Olyven Kolk Project*

Wind Farm (Developer)	Status of EIA	MW output	Distance (km)
Aurora Power Solutions	Unknown	Unknown	2
Aurora Power Solutions(basic)	RoD	10	2
Green Continent (basic)	Final EIR	20	5
Green Continent (full)	EIA in process	Unknown	1
AES Solar Energy Ltd	Draft BAR	10 MW	Adjacent to site

It is evident from *Table 14.1* that there are four known proposed solar power plants in addition to the Olyven Kolk solar power plant in the 10 km study area all of which are looking to feed into the Eskom Aries Substation.

As there is uncertainty as to whether all the above mentioned developments will be implemented, it is difficult to quantitatively assess the potential cumulative impacts. It is however important to explore the potential cumulative impacts qualitatively to meet legislative requirements as well as to provide a better understanding of these impacts and the possible mitigation that may be required. The assessment and implementation of mitigation measures should be lead by Government in collaboration with the renewable energy sector and relevant NGO's. As these cumulative impacts are explored in more detail the trade-offs between promoting renewable energy (and the associated benefits in terms of reduction in CO₂ emissions) versus the local and regional environmental and social impacts and benefits (i.e. impacts on bird populations, landscape, tourism, flora, employment etc) will become evident. It is only when these trade-offs are fully understood, that the true benefits of renewable energy can be assessed.

In the sections below the potential cumulative impacts of several developments within a 10km radius of the Olyven Kolk solar power plant are explored. The discussion and associated conclusions must be understood in the context of the uncertainty associated with the proposed and known developments and the qualitative nature of the assessment.

14.2 *GEOLOGY, SOILS, SURFACE AND GROUNDWATER*

When preparing sites for PV panels, some developers clear the entire site of vegetation, often leveling and grading the entire sites. The results are soil compaction, soil removal and erosion. As the proposed PV solar facilities occupy large sites impacts could be significant is not managed properly.

The proposed project sites are all located in areas have extensive dendretic drainage patterns as shown in *Figure 14.2*. These drainage lines convey stormwater and surface water run off. Should developers all take the appropriate mitigation measures to avoid disturbance to the drainage lines, cumulative impacts associated with the proposed solar facilities will be minimal.

Figure 14.2 Drainage Lines



Source: Google 2011

14.3 ECOLOGY

In addition to the number of proposed solar developments found within 10 km of the Olyven Kolk site, there are numerous solar energy projects of a commercial scale planned across the Northern Cape, some of which may also fall within Bushmanland Basin Shrubland, thereby contributing towards cumulative impact within the vegetation type. There is high uncertainty as to how many of these developments will go ahead nevertheless, the cumulative impacts of solar developments on this habitat type is considered to be low.

Bushmanland Basin Shrubland is one of the most extensive vegetation types within the country and has been little impacted by transformation. Therefore the potential of the proposed solar energy facilities to contribute towards the broad-scale fragmentation of habitat or to impinge on conservation targets for the associated vegetation types is considered low. Furthermore, the broad area has a low topographic diversity and as a result, broad-scale ecological

processes are likely to operate in a diffuse manner and the site is therefore not likely to function as part of a movement or migration corridor for fauna and flora. The larger fauna which occurs in the area is typical of arid and semi-arid areas and constitutes species which are able to avoid human contact through mobility or their secretive behaviour. Such species will be able to persist within the developed areas, or will be able to avoid them. In addition, the area is already relatively impacted due to the presence of the existing Sishen-Saldanha railway line as well as Eskom's Aries substation and associated transmission lines. The overall impact on the connectivity of the landscape and the further disruption of ecosystem processes is reduced by the proximity to a large amount of existing development.

14.4 *BIRDS*

The most significant potential impact on birds of any solar energy facility is the displacement or exclusion of threatened, rare, endemic or range-restricted species from critical areas of habitat. Given the considerable space requirements of commercially viable facilities (>50-100 ha), this effect could be regarded as significant in some instances when taking into consideration the various proposed solar energy facilities planned around the Aries substation and elsewhere in the Northern Cape. However, it is understood that it is likely that not all the proposed solar power plants will either not all become operational (see *Section 14.1*).

Lanner Falcons and Martial Eagle are known to nest on the pylons within the site. The former species is known to occupy a breeding territory approximately centred on the Aries Substation, but has not generally been a productive territory, with breeding recorded only once in the period 2002-2006 (Jenkins *et al.* 2007). The additional proposed developments within close proximity to the site may cause increased pressure on these species unless appropriate mitigation and monitoring is undertaken.

14.5 *LANDSCAPE AND VISUAL*

Should many more of these types of solar energy development take place in close proximity to each other, there is a possibility that the area will exceed the carrying capacity created by the agricultural sense of place and that the sense of place will be defined by the solar energy facilities. However, due to the limited visual resources in the area and the limited number of receptors, any potential cumulative impact would be contained to the area and would not negatively impact on the tourism.

14.6 *SOCIO-ECONOMIC*

Benefits to the local, regional and national economy through employment and procurement of services could be substantial should all the renewable energy

facilities proceed. This benefit will increase significantly should critical mass be reached that allows local companies to develop the necessary skills to support construction and maintenance activities and that allows for components of the solar energy facilities to be manufactured in South Africa. Over time, as businesses develop locally to meet the needs of the solar energy sector, levels of procurement may increase.

The potential for the proposed Olyven Kolk solar power plant and other future projects to result in greater impacts on the local and national economy as a whole is primarily dependent on economies of scale. Initially import content will be high. However, if the sector grows in size it should provide opportunities for growth of the local supply chain and the additional benefits that would flow from this. The introduction of large numbers of PV plants could provide local economic opportunities for component manufacture, and with an appropriate industrial policy it would be possible to leverage South Africa's relatively cheap steel resources. The distance from other international manufacturers will also present a competitive advantage, especially for less-specialised large-scale components such as array support structures.

The cumulative impact in terms of loss of agricultural land could potentially be extensive due to the large land take required for PV plants and considering the number of plants planned in close proximity in the area of Aries. However, the agricultural potential of the land is classified as low (see *Chapter 6*) and therefore impacts are not considered to be significant. The sense of place value however would be threatened, but given the presence of the Aries Substation and its sheer size, the solar power plants will be insignificant in the landscape.

14.7

CONCLUSIONS

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of solar energy facilities in the Northern Cape. The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant. Should impacts be management and proper monitoring put in place, impacts to environmental receptors are not considered to be significant.