

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

PROPOSED CONCENTRATING SOLAR POWER (CSP) PLANT AND ASSOCIATED INFRASTRUCTURE IN THE NORTHERN CAPE AREA

BRIEFING PAPER

March 2006

WHAT DOES THIS DOCUMENT TELL YOU?

This document aims to provide you, as an interested and/or affected party (I&AP), with background information regarding a CSP plant project proposed by Eskom Holdings Ltd, as well as provide information regarding the Environmental Impact Assessment (EIA) to be undertaken. It further indicates how you can receive information, or raise issues, which may concern and/or interest you. The sharing of information forms the basis of the public participation process and offers you the opportunity to become actively involved in the project from the outset. Public participation plays an important role in the undertaking of an EIA, as input from I&APs ensures all potential issues are considered within the study.

WHAT IS THE CSP PROJECT?

In order to explore new generation options, find solutions that can contribute to meeting the growing electricity demand and in an effort to utilise renewable energy resources, Eskom is assessing the feasibility of constructing a Concentrating Solar Power (CSP) plant with a maximum capacity of 100 MW electrically in the Northern Cape. This facility will utilise the sun as the fuel source.

WHY IS THE PROJECT NEEDED?

Eskom is responsible for the provision of reliable and affordable power to South Africa. Eskom generates approximately 95% of the electricity used in South Africa. Electricity cannot be stored in large quantities and generally must be used as it is generated. Therefore, electricity is generated in accordance with supply-demand requirements. The demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand is placing increasing pressure on South Africa's existing power generation capacity.

Increasing economic growth and social development within Southern Africa, on the other hand, is placing a growing demand on energy supply. Coupled with the rapid advancement in community development, is the growing awareness of environmental impact, climate change and the need for sustainable development. The use of renewable energy technologies as one of a mix of technologies needed to meet future energy

consumption requirements is being investigated as part of Eskom's long term strategic planning and research process.

Eskom's renewable energy strategy supports the South African Government's white paper on renewable energy. Eskom is committed to investigating and evaluating the options for the diversification of the energy mix over time (including renewable resources).

The successful use of renewable energy technology in South Africa still requires extensive investigation, however, the Concentrating Solar Power (CSP) technologies have been identified as being potentially viable and capable of being employed on a large scale. In order to meet the future energy needs, Eskom Holding Limited (Eskom) is currently assessing the feasibility of constructing a Concentrating Solar Power (CSP) plant in the Northern Cape Province, subject to the outcome of the EIA and feasibility study.

The CSP plant is required to be sited on a technically feasible site. A Pre-Environmental Scoping study together with Pre-Feasibility Study undertaken by Eskom, considered land availability, and land use capability, fuel availability and costs, and other related aspects. Through this study, the Upington area in the Northern Cape Province was identified as a feasible locality for the establishment of the CSP plant. Upington further has one of the high solar values (figure 1 and table 1), with a Direct Normal Insolation (DNI) level of approximately 2900 kWh/m² per year.

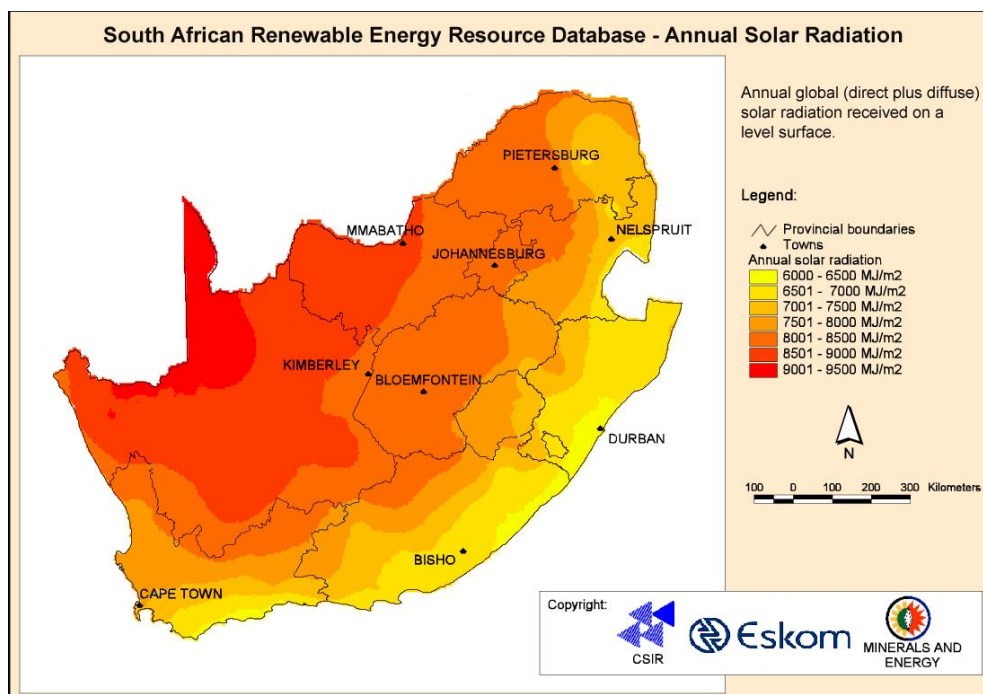


Figure 1: Annual incoming short wave radiation for South Africa.

Table 1: International Solar Potential relative to South Africa

Location	Site Latitude	Annual DNI (kWh/m2)	Relative Solar Resource
South Africa			
Uppington, North Cape	28°S	2,955	100%
United States			
Barstow, California	35°N	2,725	92%
Las Vegas, Nevada	36°N	2,573	87%
Albuquerque, New Mexico	35°N	2,443	83%
International			
Northern Mexico	26-30°N	2,835	96%
Wadi Rum, Jordan	30°N	2,500	85%
Ouarzazate, Morocco	31°N	2,364	80%
Crete	35°N	2,293	78%
Jodhpur, India	26°N	2,200	74%
Spain	34°N	2,100	71%

WHAT DOES THE PROJECT ENTAIL?

The project focuses on the possible establishment of a Concentrating Solar Power (CSP) plant in the Northern Cape area. The proposed CSP plant is proposed to consist of a maximum installed capacity of up to 100 MW. A 100 MW plant requires approximately 4 square kilometres of terrain with little relief to satisfy construction needs. The key factor, however, is the amount of thermal storage required, as this determines the number of heliostats to be installed. .



Figure 2: An example of a power plant using central receiver technology. This is a 10MW demonstration plant that was built in the United States – image courtesy NREL.

HOW DOES A CSP PLANT WORK?

The CSP Plant being considered is a molten salt-type, Central Receiver technology. This technology is based on the concept of thousands of large two-axis tracking mirrors (known as heliostats) which track the sun and reflect the beam radiation to a common focal point. This focal point (the receiver) is located well above the heliostat field in order to prevent interference between the reflected radiation and the other heliostats.

A heliostat is a mirror mounted on an axis by which the sun is steadily reflected onto one spot. Heliostats are arranged in an elliptical formation around the focal point with the majority of the reflective area weight to the more effective side of the heliostat field. It is estimated that approximately 6000 heliostats will be required to be constructed within the heliostat field in order to obtain a power output of approximately 100 MW electrically, while also enabling 8 hours of energy storage.



Figure 3: Single heliostat at roughly 130 m^2 – image courtesy NREL

The central receiver is situated on the top of the central tower. The central tower will be approximately 210 m high, with the central receiver taking up the top 20 m of the structure. This receiver is in essence a heat exchanger which absorbs the concentrated beam radiation, converts it to heat and transfers the heat to the working fluid (i.e. molten salt) which is in turn used to generate steam for conventional power generation.

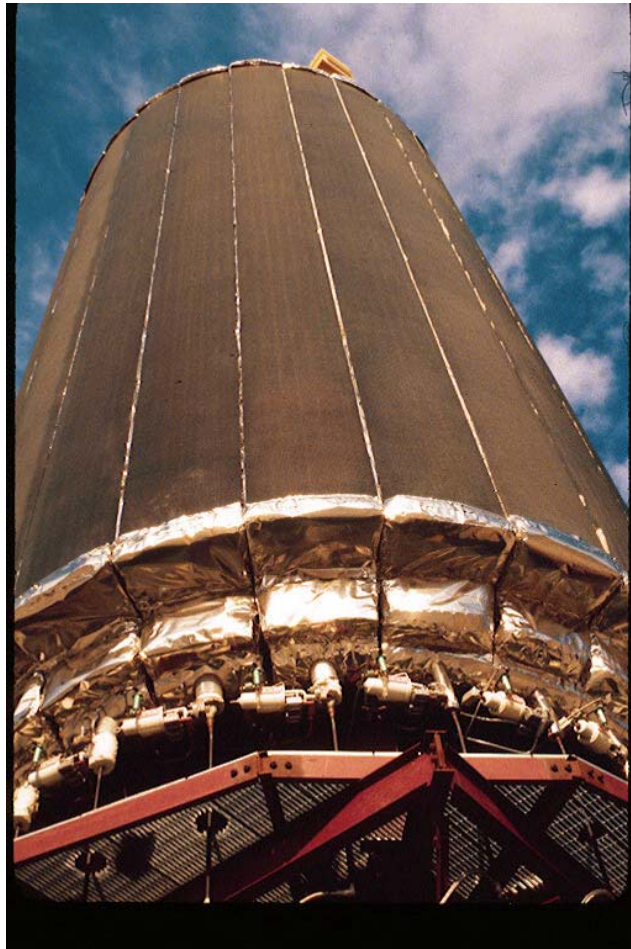


Figure 4: Receiver heat exchange panels – image courtesy NREL

Power is generated through a conventional Rankine cycle (steam turbine process). The working fluid is a salt mix of a 60:40 ratio of Sodium Nitrate (NaNO_3) and Potassium Nitrate (KNO_3). The cold salt is pumped up the central tower at approximately 300°C and flows through the central receiver where it is heated to approximately 600°C after which it can be stored for use in the conventional power generation process.

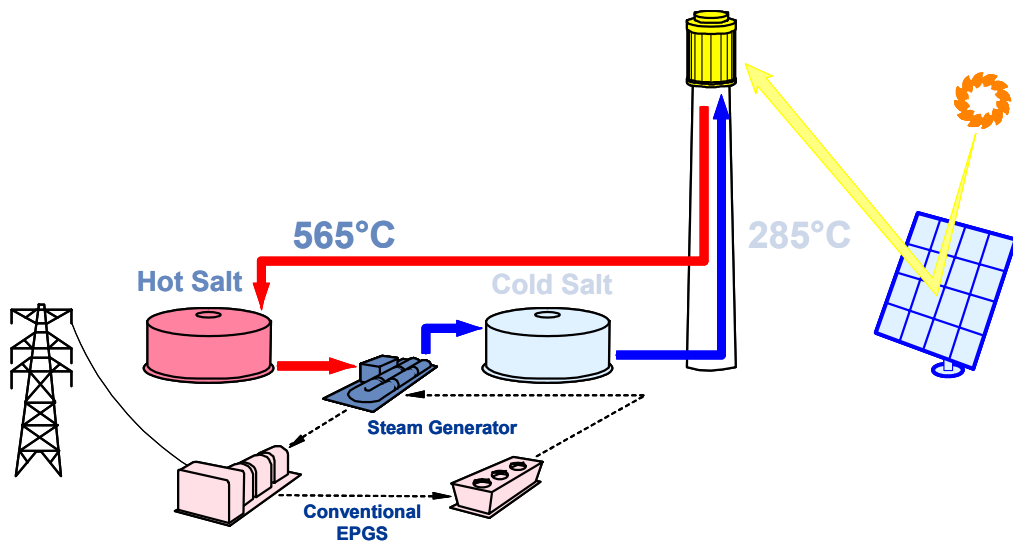


Figure 5: Flow diagram showing the power generation process in a CSP plant.

• **Candidate Sites for Selection:**

Three candidate sites have been identified as potentially feasible sites for the construction of the CSP Plant and will be evaluated by means of the environmental impact assessment process. The following alternative sites will be evaluated during the Environmental Scoping Study (ESS):

- * Site 1: Olyvenhoutsdrif (15 km west of Upington)
- * Site 2: Bokpoort (North of Garona substation).
- * Site 3: Tampansrust (Located north-west of Groblershoop right off the Witsand road)

A preferred site will be identified for further investigation in the EIA.

Alternative alignments for access roads, water supply pipelines and powerlines associated with the CSP Plant will also be identified and evaluated during the EIA.

WHAT ARE THE POTENTIAL ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED PROJECT?

A number of potential environmental impacts associated with the project have been identified. As part of the Scoping Study, desk-top specialist studies will identify potential issues which require further investigation within the EIA phase

Specialist Study	Organisation
Impacts on surface & groundwater	CSIR
Impacts on ecology & flora	MDA Consulting
Impacts on terrestrial fauna	MDA Consulting

Specialist Study	Organisation
Impacts on soils & agricultural potential	Agricultural Research Council: Institute for Soil, Climate and Water
Avifauna Impact Assessment	Endangered Wildlife Trust
Impacts on Heritage resources	University of the Free State
Noise impacts	Jongens Keet and Associates
Impacts on tourism	Grant Thornton
Social Impact Assessment and Land Use	Afrosearch
Visual impact assessment	MetroGIS

More detailed studies on potentially significant impacts will be investigated within the EIA phase of the project for each aspect. Input from the public through the public participation process provides valuable input in the identification of issues requiring investigation within this EIA process.

The Environmental Scoping Study will highlight areas that should be avoided in order to minimise potential impacts, and evaluate the alternative sites for the proposed solar thermal power plant and the associated infrastructures. The Scoping Study will recommend the most favourable alternative site for the plant and the most favourable alternative for the associated infrastructures for further investigation in the Environmental Impact Assessment phase.

WHY ARE ENVIRONMENTAL STUDIES NEEDED?

In terms of the Environmental Impact Assessment (EIA) Regulations, Eskom Holdings Ltd requires authorisation from the National Department of Environmental Affairs and Tourism (DEAT) for the undertaking of the proposed project. In order to obtain authorisation for this project, comprehensive, independent environmental studies must be undertaken in accordance with the EIA Regulations.

An Environmental Impact Assessment (EIA) is an effective planning and decision-making tool. It allows the environmental consequences of a proposed project to be identified and managed through the planning process. Eskom Holdings Ltd has appointed Bohlweki Environmental, as independent consultants, to undertake environmental studies to identify and assess all potential environmental impacts associated with the proposed project. As part of these environmental studies, all I&APs will be actively involved through a public participation process. The environmental studies will follow a three-phased approach:

- Phase 1: Environmental Scoping Study (ESS)
- Phase 2: Environmental Impact Assessment (EIA)
- Phase 3: Environmental Management Plan (EMP)

The ESS will evaluate the identified alternative sites, and will recommend the most favourable options for further investigation in the Environmental Impact Assessment phase. Comments and inputs from I&APs during the EIA process are encouraged in order to ensure that all potential impacts are being considered within the ambit of the study.

PUBLIC PARTICIPATION PROCESS

It is important that relevant I&APs are identified and involved in the public participation process from the outset of the project. To ensure effective public participation, the process includes the following steps:

- STEP 1: Advertise the EIA Process (regional and local press)
- STEP 2: Register I&APs and key stakeholders on the database (on-going)
- STEP 3: Consultation with and transfer of information to I&APs through consultation, public meetings, focus group meetings and key stakeholder workshops
- STEP 4: Record all comments, issues and concerns raised by I&APs within an issues trail, which will form an integral part of EIA Reports
- STEP 5: Invite I&AP comment and input on the draft Scoping and EIA reports (30-day comment period)

HOW CAN YOU GET INVOLVED?


1. By responding (by phone, fax or e-mail) to our invitation for your involvement which has been advertised in the regional and local newspapers.
2. By mailing or faxing the attached comment form to Bohlweki Environmental.
3. By attending the meetings to be held during the course of the project. Should you register as an I&AP you will be invited to attend these meetings. The meeting dates will also be advertised in local newspapers.
4. By telephonically contacting consultants if you have a query, comment or require further project information.
5. By reviewing the draft Scoping and EIA Reports within the 30-day review periods.

If you consider yourself an I&AP for this proposed project, we urge you to make use of the opportunities created by the public participation process to become involved in the process and provide comment, or raise those issues and concerns which affect and/or interest you, or about which you would like more information. Your input into this process forms a key part of the environmental studies and we would like to hear from you to obtain your views on the proposed project.


By completing and submitting the accompanying response form, you automatically register yourself as an I&AP for this project, and ensure that your comments, concerns or queries raised regarding the project will be noted.


Comments and Queries


**Direct all comments, queries or responses to:
Bohlweki Environmental**

 PO Box 11784, Vorna Valley, Midrand, 1686

Nicolene Venter or Ndivhuwo Netshilaphala

 Phone: (011) 466 3841

 Fax: (011) 466 3849

 E-mail: csp-eia@bohlweki.co.za

Website: www.bohlweki.co.za

Potential Candidate Sites for the Concentrated Solar Thermal Plant and Associated Infrastructure

Site 1

Olyvenhouts
Diff

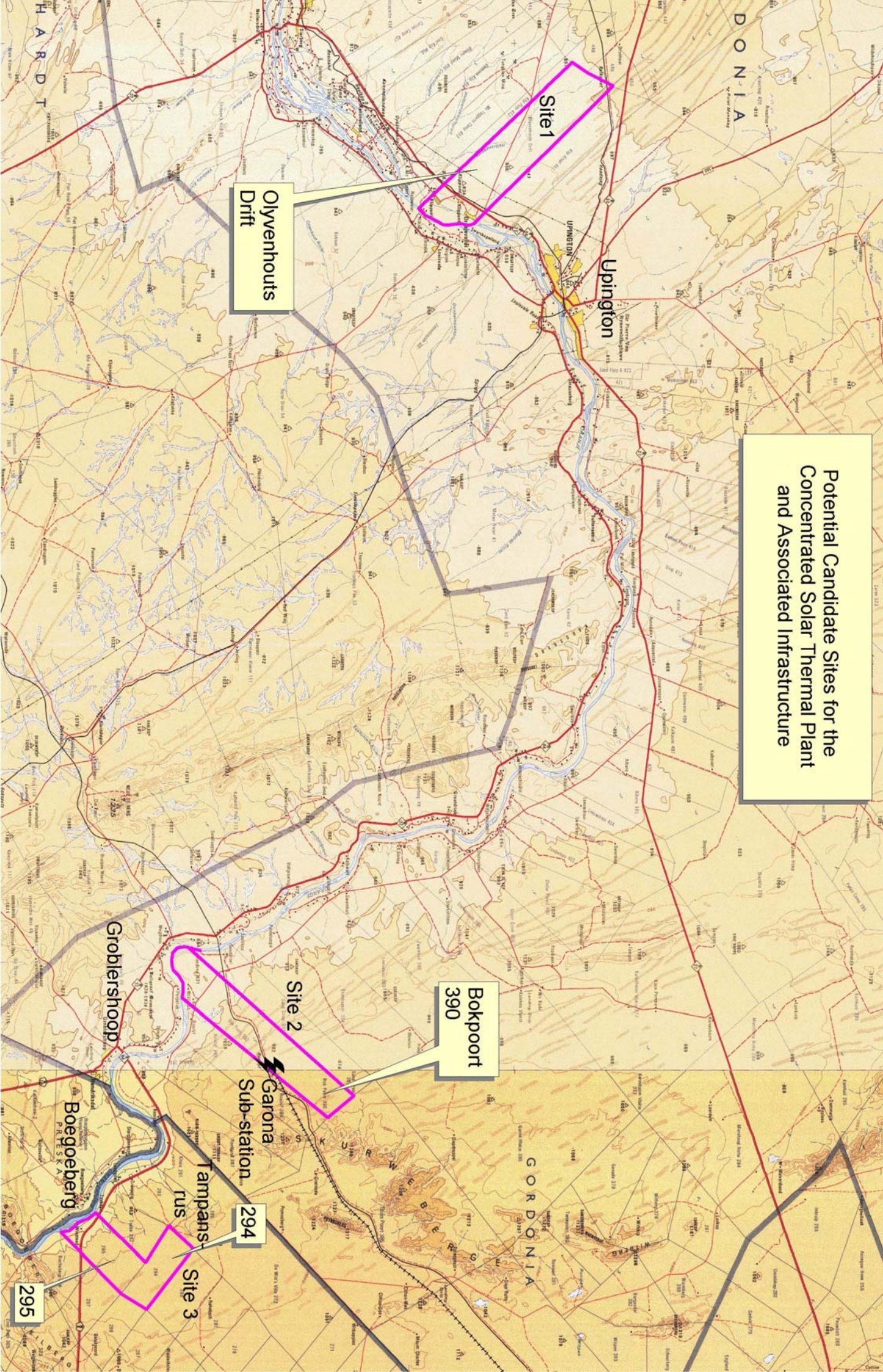
Bokpoort
390

Site 2

Garona
Sub-station
294

Site 3

295



**ENVIRONMENTAL IMPACT ASSESSMENT – SCOPING PHASE
PROPOSED CONSTRUCTION OF A CONCENTRATING SOLAR POWER (CSP) PLANT
AND RELATED INFRASTRUCTURE:
NORTHERN CAPE PROVINCE**



**REGISTRATION AND COMMENT FORM FOR THE PUBLIC PARTICIPATION PROCESS
March 2006**

KINDLY COMPLETE THIS FORM IN DETAIL AND RETURN IT TO:

Nicolene Venter or **Ndivhuwo Netshilaphala**

Bohlweki Environmental
PO Box 11784,
Vorna Valley, MIDRAND
1686

E-mail: csp-eia@bohlweki.co.za

Telephone: (011)-466-3841

Facsimile: (011) 466-3849

CONTACT DETAILS:

Title: **First Name:**.....

Surname:

E-mail: **Cell:**.....

Telephone: **Fax:**

Organisation (if applicable):

Capacity (e.g. Chairperson, member, etc):

Physical Address:

Town: **Code:**

Postal Address:

Town: **Code:**

1. What is your main area of interest with regards to the proposed project?
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.....
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2. Are there any concerns you would like to raise, at this stage, regarding the proposed project?
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3. Are there any additional role-players whom we should involve in the process? **YES/NO**
If **"yes"**, please provide us with their contact details (Name, address & telephone nos):
.....
.....

THANK YOU FOR YOUR TIME
Sien keersy vir Afrikaans - Please add more pages if necessary