

ENVIRONMENTAL IMPACT ASSESSMENT

Background Information Document

Proposed Humansrus Solar Thermal Energy Power Plant near Postmasburg, Northern Cape Province

DEA Reference: 12/12/20/2316

July 2011

SOLARRESERVE[®]

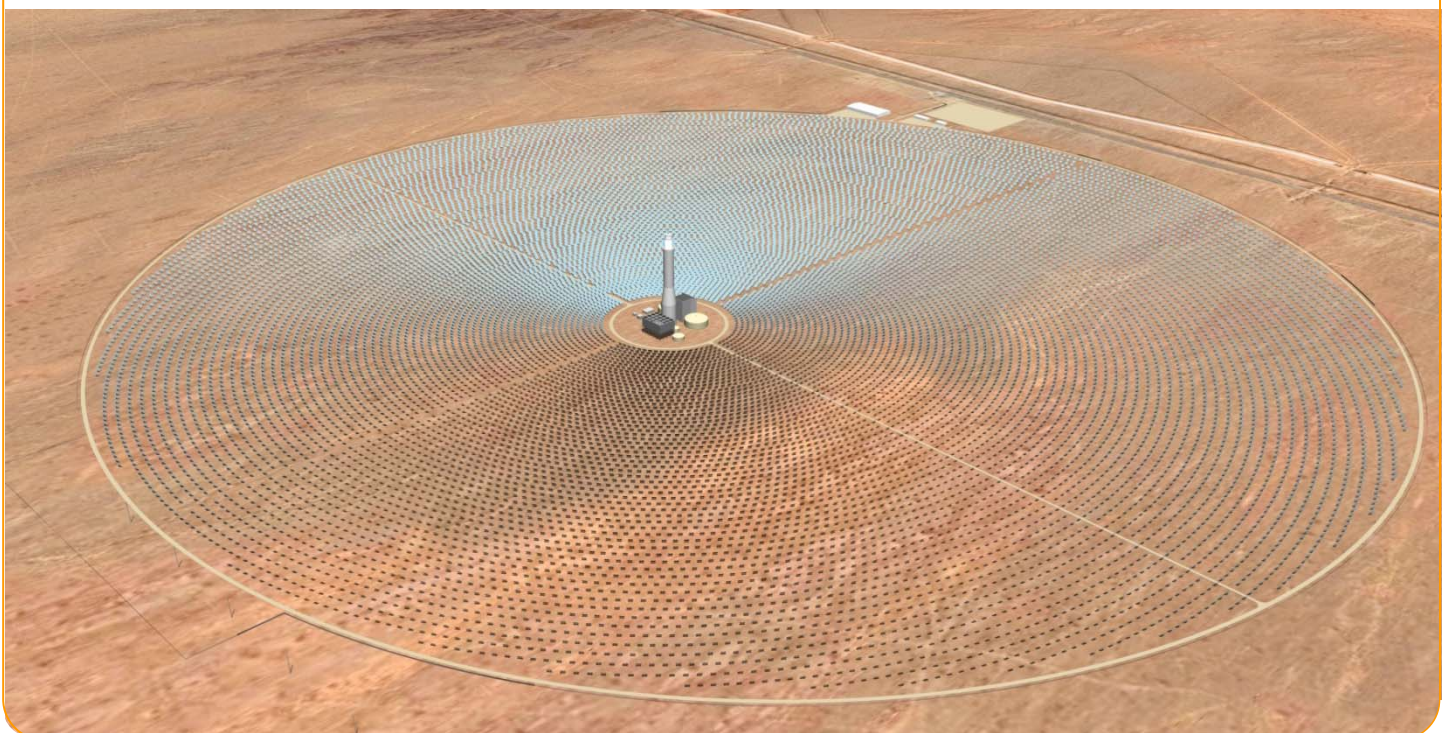


ENGINEERS AND ENVIRONMENTAL CONSULTANTS



WorleyParsons

resources & energy



INTRODUCTION

The ever increasing and growing demand for energy as well the need to find more sustainable and environmentally friendly energy resources have prompted developers to explore new energy generation options.

In an effort to utilise renewable energy resources, SolarReserve SA (Pty) LTD is proposing to construct a 100 MegaWatt (MW) Concentrating Solar Thermal Energy Power Plant on the Farm 469 Hay RD (also known as the farm Humansrus), located approximately 30 km east of Postmasburg, Northern Cape Province (refer to Figure 1). The development site is located within the institutional boundaries of the Tsantsabane Local and Siyanda District Municipalities.

In terms of the Environmental Impact Assessment (“EIA”) Regulations (April 2006) promulgated under Sections 24 and 24D of the National Environmental Management Act (Act No. 107 of 1998) [NEMA] and the National Environmental Management: Waste Act (Act No. 107 of 1998) [NEM: WA], various aspects of the intended development are considered listed activities which may have an impact on the environment, therefore requiring authorisation from the National Department of Environmental Affairs (DEA) prior to the commencement of such activities.

SolarReserve SA (Pty) LTD(the applicant) has appointed Worley Parsons RSA and SSI Engineers and Environmental Consultants (known as the Worley Parsons SSI Environmental Partnership or “WPSEP”) as independent Environmental Assessment Practitionersto the project in fulfillment of legislative requirements in support of an application for *Environmental Authorisation* and a *Waste Management License*.

The following primary listed activities have been applied for:

- *NEMA EIA Regulations (2010):*

GN.R545 (2010)

Activity 1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.
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- *NEM: WA: List of Waste Management Activities:*

GN.R718 (2009) (Category B)

Activity 1	The storage including the temporary storage of hazardous waste in lagoons.
Activity 5	The treatment of hazardous waste using any form of treatment regardless of the size or capacity of such a facility to treat such waste.
Activity 11	The construction of facilities for activities listed in Category B

In terms of the NEMA EIA Regulations (2010) and NEM: WA the undertaking of an *Environmental Impact Assessment (EIA) Process* to identify and assess the potential environmental impacts associated with the proposed development activities will be required.

NEED AND DESIRABILITY OF PROJECT

The intention of SolarReserve SA (Pty) LTD is to develop numerous large-scale commercial renewable energy projects to diversify the local energy generation ‘mix’ and reduce South Africa’s dependency on non-renewable fossil fuel resources (i.e. coal). Emergency load shedding imposed by Eskom (national electricity utility) in 2007 and 2008 highlighted the challenges facing South Africa in terms of electricity generation, transmission and distribution. The National Energy Response Plan (NERP), drafted at the time, acknowledged the role that independent power producers (IPPs) could play in ensuring sustainable electricity generation and supply.

The following is the project locality map:



Figure1: Project Locality Map

PURPOSE OF THE DOCUMENT

This document aims to provide you, as an interested and/or affected party (I&AP), with background information regarding the proposed project and information regarding the Environmental Impact Assessment (EIA) Process to be undertaken. Furthermore, the document advises how you can receive information and/or raise issues, which may concern and/or be of interest to 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 the EIA Process, as input from I&APs ensure that all potential issues are identified and considered during the study.

All stakeholders are therefore invited to register as an Interested and Affected Party (I&AP) and to assist WPSEP in identifying potential impacts associated with the proposed development on the environment and further make suggestions regarding possible mitigation of identified impacts and/or feasible project alternatives.

Please complete the enclosed reply sheet and forward it to the project consultants (details provided below):

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The demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand can be attributed to rapid economic growth and social development within South Africa and Southern Africa, which places significant pressure on South Africa's existing power generation capacity and supply capability.

Coupled with the rapid advancement in community development, is also the growing awareness of environmental impacts, climate change and the need for sustainable development.

PROJECT DESCRIPTION

The CSP plant being considered is a molten salt-type, Central Receiver (tower) technology and will primarily comprise of the following four components (Figure 2):

- a) **Solar Field** - consists of all services and infrastructure related to the management and operation of the heliostats (reflective mirrors);
- b) **Molten Salt Circuit** - includes the thermal storage tanks for storing liquid salt, a concentration receiver/tower, pipelines and heat exchangers;
- c) **The Power Block** – housing the steam turbine.
- d) **Auxiliary facilities and infrastructure** - includes a condenser-cooling system, electricity transmission lines to allow for grid connection, access routes, water treatment and supply amenities and a CSP plant start-up energy supply unit (gas or diesel generators).

This technology utilizes thousands of large 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 at a predetermined height above the heliostat field in order to prevent interference between the reflected radiation and the other heliostats.



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

The heliostats are mounted on pedestals and arranged in an elliptical formation around the focal point (Figure 2).

It is estimated that approximately 17 000 heliostats with an area of approximately 65 m² each will be required for the solar field in order to obtain a power output of approximately 100 MW, while also enabling approximately 12-18 hours (base load) of energy storage.

The central receiver is situated on the top of the central tower. This receiver is in essence a heat exchanger (Figure 4) which absorbs the concentrated beam radiation, converts it to heat. The heat is then transferred to a working fluid (i.e. molten salt mixture) and then used to generate steam for conventional power generation.

Power is generated through a conventional Rankine cycle (steam turbine process). The cold salt (approximate temperature: 260°C) is pumped through the central tower to the central receiver where it is heated to approximately 550°C after which the thermal energy of the salt is stored for use in the conventional power generation process (maintaining 98% thermal efficiency) – refer to Figure 5 for a diagrammatic illustration of the power generation process.



Figure 3: Single heliostat – image courtesy NREL

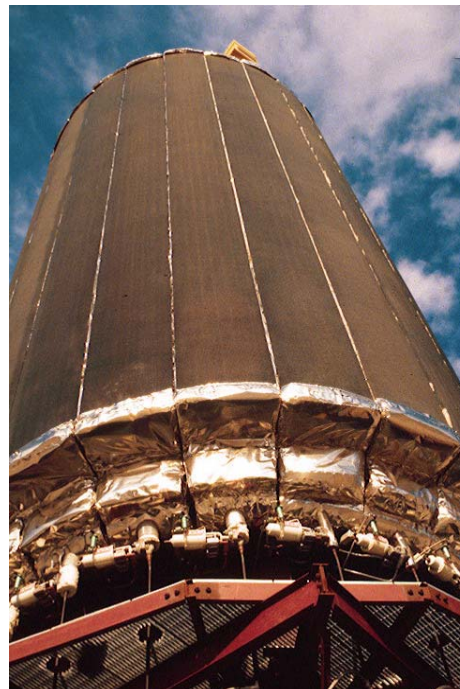


Figure 4: Centralreceiver heat exchange panels – image courtesy: NREL

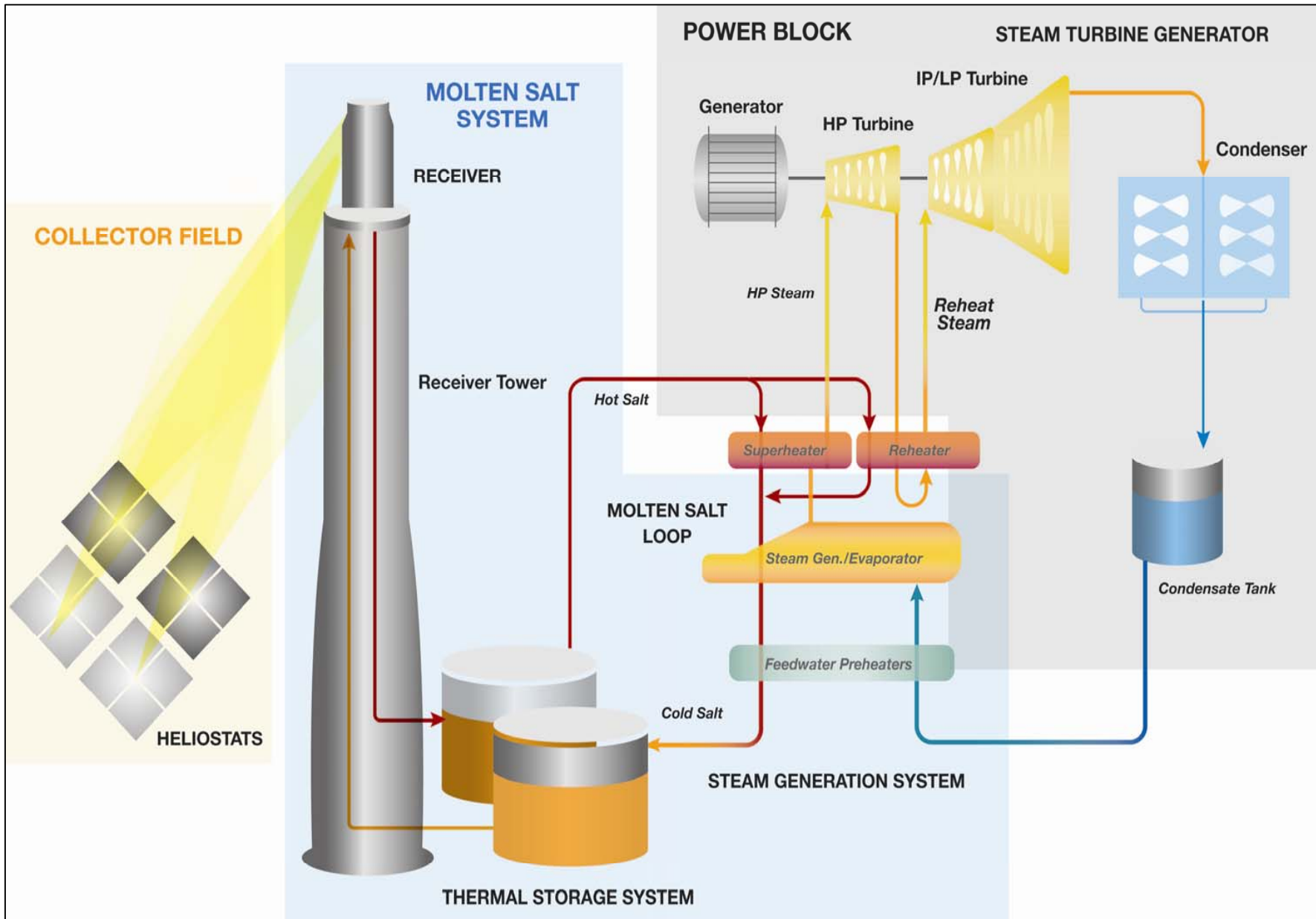


Figure 5: Flow diagram showing the power generation process in a CSP plant.

The plant requires approximately 6km² 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.

ALTERNATIVES

In terms of the NEMAEIA Regulations, feasible alternatives are required to be considered during the EIA Process. All identified, feasible alternatives are required to be evaluated in terms of social, biophysical, economic and technical factors. The following alternatives will be considered for the project:

- Site Location Alternatives;
- Site Layout Alternatives;
- Technology Alternatives; and
- No-go Alternative.

POTENTIAL ENVIRONMENTAL IMPACTS

A number of potential environmental impacts associated with the project have been identified. As part of the Scoping Phase of the project, desk-top specialist studies will identify potential issues which will require further investigation during the EIA Phase. The following specialist studies will be commissioned:

- Air quality assessment;
- Agricultural potential;
- Avi-fauna (birds);
- Biodiversity (fauna and flora);
- Geohydrology (groundwater);
- Heritage impact assessment;
- Hydrology (surface water);
- Noise impact assessment;
- Socio-economic assessment;
- Tourism assessment;
- Visual impact assessment;
- Wetland delineation;
- CAA; and
- Waste study.

OVERVIEW OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

An EIA is a planning and decision-making tool undertaken to identify, predict and assess all the potential impacts –positive or negative – for any proposed activity or development which requires authorisation in terms of national legislation. The EIA process consists of the following phases:

- Scoping Phase: Scoping Report and Plan of Study for EIA is submitted to the competent environmental authority [in this instance the National Department of Environmental Affairs, “DEA”] for review and approval; and
- EIA Phase: Environmental Impact Assessment Report (EIAR) which includes an Environmental Management Programme (EMPr) is submitted to the DEA for review and decision-making.

SCOPING PHASE AND SCOPING REPORT

During the Scoping Phase, the existing status of the proposed site and surrounding environments are investigated. This includes aspects such as the biophysical, social and economic environment and provides a baseline assessment which informs and guides any further studies and investigations that may be required during the EIA phase. These potential impacts will also then be considered in the planning of the proposed activity.

EIA PHASE AND EIA REPORT

The EIA Report primarily consists of findings of the specialist studies and addresses the aspects identified through the Scoping Phase and issues identified by stakeholders.

This includes the assessment of the pre-developing environment, identification of potential impacts and appropriate mitigation measures for each anticipated impact in order to minimise or avoid negative impacts, measures for enhancing the positive aspects of the proposal, and environmental management and monitoring measures.

The objective of the EIA Report is to provide decision makers with sufficient, relevant and objective environmental information to assist them in determining whether to grant or deny the applicant environmental authorisation.

IMPORTANCE OF THE PUBLIC PARTICIPATION PROCESS

Public Participation forms an important part of the EIA process and takes place throughout the duration of the EIA in both the Scoping and EIA phases.

The National Environmental Management Act (Act 107 of 1998) (NEMA) governs environmental impact assessments, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment.

Effective public involvement is a vital component of the EIA process, and effective community involvement empowers communities to play an active role in the authorisation process. The public participation process is designed to provide sufficient and accessible information to Interested and Affected parties (I&APs) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been captured;
- Verify that their issues have been considered by the technical investigations; and
- Comment on the findings of the EIA.

WHO ARE INTERESTED AND AFFECTED PARTIES (I&APS)?

Any person, company, authority or other entities that might be directly or indirectly affected by the proposed activity can register as an Interested or Affected Party (I&AP). This includes, but is not limited to landowners, tenants, municipal and provincial authorities, interest groups, Non-Government Organisations and conservation groups. The stakeholder

database is compiled through networking and advertising.

I&APs are invited to participate in the consultation process by sharing inputs, comments and/or suggestions throughout the process. Please note that the process is structured according to timeframes and it is kindly request that adherence to the timeframes, which will be communicated to registered I&APs throughout the process, be kept. Input received will be included in an Issues & Response Register as part of the EIA Report to be submitted to the DEA.

Please note that only registered I&APs will receive follow-up information as the application process continues. Stakeholders can at any time throughout the EIA register as an Interested & Affected Party, taking note of certain activities and engagement opportunities that might have lapsed as a result of the fixed process and timeframes.

All I&APs are also encouraged to identify and nominate any other parties deemed to be notified regarding this proposed activity or to share this information document with them. These parties will be registered and contacted directly once nominated or identified.

How can you be involved?

The purpose of an EIA is to provide the authorities with information that will allow them to make a decision on whether to give environmental clearance for the proposed project or not and, if approved, outline the conditions of approval. The contributions of stakeholders from all sectors of society assists informed decision-making. All stakeholders are encouraged to participate and to submit any comments or information about the proposals, alternatives and impacts to consider that are deemed to be useful to the EIA process. If you wish to register or comment, please complete the attached registration/comment sheet, write a letter (by post or fax) or email the contact person.

**Environmental Impact Assessment
Proposed Humansrus Solar Thermal Energy Plant (DEA Ref: 12/12/20/2316)
REGISTRATION AND COMMENT SHEET**

CONTACT DETAILS: SSI Engineers and Environmental Consultants Attention: Mr. Frank Benedek PO Box 867 Gallo Manor 2052 Tel: 011 789 6430 / Fax: 011 789 6010 Email: frankb@ssi.co.za	CONTACT DETAILS: WorleyParsonsRSA (Pty) Ltd Attention: Leanna Rautenbach PO Box 36155 Menlopark 0102 Tel: 012 425 6300 / Fax 012 460 9978 Email: leanna.rautenbach@worleyparsons.com
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Please complete and return to Ms Leanna Rautenbach (details top right)

TITLE		FIRST NAME	
INITIALS		SURNAME	
ORGANISATION		EMAIL	
POSTAL ADDRESS			
TEL NR		CODE	
		FAX NR	

Please formally register me as an interested and affected party so that I may receive further information and notifications during the EIA process. (Please circle applicable box)	YES	NO
I would like my notifications by (Please circle applicable box)	Letter (mail)	
	Email	
	Fax	

COMMENTS (please use a separate sheet if required)

I suggest that the following issues of concern be investigated in the EIA:

I suggest the following for the EIA process and / or the public participation process:

Any other comments:

Please ask the following of my colleagues/friends to register as an Interested and Affected Party for this EIA:

NAME	ORGANISATION	CONTACT DETAILS

Signature

Date

THANK YOU FOR YOUR CONTRIBUTION