ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

PROPOSED OPEN CYCLE GAS TURBINE (OCGT) PLANT AND ASSOCIATED TRANSMISSION LINES AND SUBSTATION AT ATLANTIS, WESTERN CAPE PROVINCE

BRIEFING PAPER

MAY 2005

WHAT IS THE ATLANTIS OCGT PROJECT?

In order to supplement the need for new peaking electricity generation capacity with a short lead-time to commercial operation, Eskom Holdings Limited (Eskom) propose to construct an Open Cycle Gas Turbine (OCGT) Power Station within the Atlantis Industria area in the Western Cape Province. This facility can utilise natural gas or liquid distillate fuel as a fuel source. In order to integrate this proposed power station into the existing National Transmission Network, Eskom further proposes the construction of a new substation and four 400 kV Transmission lines in parallel between the existing Koeberg-Aurora Transmission lines and the proposed Atlantis Substation.

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 this project proposed by Eskom Holdings Limited, as well as information regarding the Environmental Impact Assessment (EIA) to be undertaken. It further indicates how you can become involved in the project, 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 provides 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 the community contributes to ensuring that all potential issues are considered within the study.

WHY IS THE PROJECT NEEDED?

Eskom is responsible for the provision of reliable and affordable power to South Africa. Electricity cannot be stored in large quantities and generally must be used as it is generated. Therefore, electricity must be 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. South Africa is expected to require additional peaking electricity generation capacity (i.e. times of peak demand for electricity) by 2007, and baseload electricity generation capacity (i.e. average/normal electricity demand) by 2010, depending on the average growth rate. Government through the Department of Minerals and Energy, the National Electricity Regulator (NER)

and Eskom need to address what can be done to meet these electricity needs both in the short- and long-term.

Eskom continually assesses the projected demand for electricity through it's Integrated Strategic Electricity Planning (ISEP) process. The NER has a parallel process called the National Integrated Resource Plan (NIRP) that also gives a long-term view of electricity demand and supply in South Africa. Through these processes, the most likely future electricity demand based on long-term Southern African economic scenarios is forecasted, and provides the framework for Eskom and South Africa to investigate a wide range of supply and demand-side technologies and options.

In February 2004, Eskom, through its ISEP process, identified Open Cycle Gas Turbine (OCGT) technology as the preferred option for the provision of peaking electricity generation capacity in the short-term. Eskom has identified two areas where such technology would be feasible namely Mossel Bay and Atlantis. This EIA process covers the Atlantis site. The Mossel Bay site is the subject of a separate EIA.

The OCGT power station is required to be sited on a technically feasible site. A technical pre-feasibility study undertaken by Eskom therefore, considered land availability and land-use compatibility, load variances in the area, fuel availability and costs, ease of integration with, and impacts on the existing National Transmission Network, impacts on the Transmission network, and benefits to transmission load variances. Through this study, the Farm 1183 and a portion of the Farm Witzand 2 within the Atlantis Industria area was identified as a feasible site for the establishment of the OCGT power station.

In order to integrate this new plant into the existing National Transmission Network, the establishment of the OCGT power station will be associated with a new transmission substation and Transmission lines. The integration of this power station into the National Transmission Network must be undertaken with the least risk to the existing network in terms of network losses and fault levels. A preferred option for this integration has been identified through a pre-engineering study undertaken by Eskom, which involves the looping-in of both existing Koeberg-Aurora 400 kV Transmission lines to the proposed Atlantis transmission substation, a distance of approximately 2,5 km.

WHAT IS AN OPEN CYCLE GAS TURBINE (OCGT) AND HOW DOES IT WORK?

An open cycle gas turbine (OCGT) power station consists of a combustion chamber, a compressor, a gas turbine and a generator. The compressor and the gas turbine are mounted on the same shaft. The compressor draws fresh air from the atmosphere and raises that air pressure, by compressing it, before sending this air to the combustion chamber. At the combustion chamber fuel is added to the compressed air and the total mixture is combusted resulting in hot gas entering the turbine at a temperature greater than 1300ºC. This hot gas imparts the majority of its energy via a turbine to both the compressor and a generator. The open cycle gas turbine discharges exhaust to the atmosphere. Figure 1 below provides a representation of the power generation process using a gas turbine.

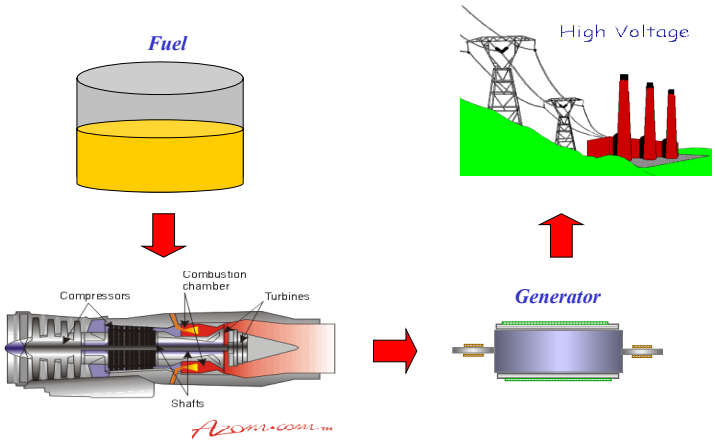

Figure 1: A graphical representation of the power generation process using a gas turbine.

WHAT DOES THE PROJECT ENTAIL?

The proposed project includes the construction of a new OCGT Power Station, a new substation and four 400 kV Transmission lines in parallel between the new substation and the existing Koeberg-Aurora 400 kV Transmission lines.

The proposed OCGT power station at Atlantis is proposed to consist of 3-5 units, each with a nominal capacity of between approximately 120 MW – 250 MW each. The total nominal capacity of the power plant is proposed to be a maximum of 1 000 MW. The number of units required and exact output will depend on the specification of the equipment from the supplier selected for the project and the ambient operating conditions. Each unit will consist of one gas turbine driving an electric generator. The power station units will be constructed on a site in Atlantis Industria, to be purchased by Eskom (remainder of farm 1183). A total area of approximately 20 ha is required for the OCGT power station and associated infrastructure. An area of approximately 250 m x 350 m (i.e. 9 ha) is required for the construction of the OCGT power station itself. The footprint of each unit is approximately 25 m x 75 m.

The OCGT power station can utilise natural gas or liquid distillate fuel as a fuel source. Due to the availability of these fuel sources, the proposed power station will use Liquid Distillate No 1 (kerosene) as a fuel source in the short-term. It is proposed that, in the short-term, this fuel would be transported by road from the Caltex refinery in Milnerton, approximately 25 km from the proposed site. In the long-term, the option of constructing a fuel pipeline between the refinery and the power plant will be investigated in order to ensure the efficient transfer of fuel. The construction of this pipeline will be the subject of a separate EIA process in the future. An estimated 1,9 million litres of fuel is required per week in order to supply the power station for peaking capacity requirements. This equates to approximately fifty 40 000 litre tankers. In order to accommodate an emergency supply of fuel at the power station site, two fuel storage tanks of 2,5 million litres each is proposed to form a fuel storage buffer between actual fuel usage and fuel delivery.

In order to integrate the new power station into the National Transmission Network the following infrastructure is required:

- The construction of a new substation at the Atlantis OCGT site. The substation will be accommodated within the 20 ha which is required for the OCGT power station and associated infrastructure. An area of 9 ha is required for the substation high voltage yard.
- The establishment of 4 X 2,5 km 400 kV Transmission lines between the new substation and the existing Koeberg-Aurora 400 kV Transmission lines. It is proposed that the two Koeberg-Aurora 400 kV Transmission lines will be turned in to the Atlantis site. Two feasible alternate Transmission line corridors have been identified for investigation within the EIA studies

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

A number of potential environmental impacts have been identified to be associated with the project. The potential impacts associated with the proposed maximum output of 1 000 MW will be considered within the EIA. As part of the EIA, these potential impacts will be assessed within the following specialist studies:

Specialist Study	Organisation
Geology, geohydrology and hydrology	CSIR: Environmentek (Stellenbosch)
Ecology and flora	Bohlweki Environmental
Terrestrial fauna	University of Pretoria: Zoology and Entomology Department
Avifauna	Endangered Wildlife Trust
Soils and agricultural potential	Agricultural Research Council: Institute for Soil, Climate and Water
Heritage resources and palaeontology	University of Cape Town: Archaeology Contracts Office
Air quality	CSIR: Air Quality Management Group
Noise	Jongens Keet and Associates
Social environment and land use	Mawatsan
Tourism potential	Grant Thornton
Visual aspects and aesthetics	MetroGIS
Traffic	Goba Moahloli Keeve Steyn

As part of the Scoping Study, desk-top specialist studies will identify potential issues which require further investigation within the EIA phase. 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.

WHY ARE ENVIRONMENTAL STUDIES NEEDED?

In terms of the Environmental Impact Assessment (EIA) Regulations, Eskom Holdings Limited require authorisation from the Western Cape Department of Environmental Affairs and Development Planning (WC D:EA&DP) for the undertaking of the proposed project. In order to obtain authorisation for all aspects of this project, comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations.

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

- Phase 1: Environmental Scoping Study
- Phase 2: Environmental Impact Assessment (EIA)

The Environmental Scoping Study will identify and evaluate potential environmental impacts associated with all aspects of the proposed project. In terms of the EIA Regulations, *feasible* alternatives will be considered. A technically feasible site for the establishment of the OCGT power station has been identified by Eskom within the Atlantis Industria area. No alternative sites which would be technically feasible have been identified for consideration in the environmental studies. Therefore, exemption from the consideration of alternatives for the siting of the OCGT power station has been requested from the environmental authorities. Two alternative Transmission line alignments have been evaluated for consideration (refer to attached map). A preferred alternative will be identified for more detailed investigation and recommendations regarding further studies required within the EIA phase of the project (for the OCGT power station, and the transmission substation and Transmission lines) will be made. Comments 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

STEP 2: Identify I&APs and key stakeholders and register these on the project database

STEP 3: Consultation with I&APs through public meetings/open days, focus group meetings and key stakeholder workshops

STEP 4: Record all comments, issues or concerns raised by I&APs within an issues trail, which will form an integral part on EIA Reports

STEP 5: Invite I&AP to comment on the draft scoping and EIA reports (30-day comment period)

HOW CAN YOU GET INVOLVED?

1. By responding to our invitation for your involvement which has been advertised in local and regional 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 public meeting dates will also be advertised in local and regional newspapers.
4. By telephonically contacting the 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, and about which you would like more information. Your input into this process forms a key element 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 are ensured that your comments, concerns or queries raised regarding the project will be noted. The public participation consultants will respond to all comments and queries received during the course of the project.

COMMENTS AND QUERIES

Direct all comments, queries or responses to:
Bohlweki Environmental
PO Box 11784, Vorna Valley, Midrand, 1686

Ingrid Snyman or **Mvuselelo Mathebula**
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Glossary of Terms

Combustion Chamber:	Chamber in which the primary energy (fuel) is added to the compressed air and ignited resulting in energy being delivered to the turbine.
Compressor:	A machine used to increase the pressure of the working fluid (in the case of an OCGT Plant the working fluid in atmospheric air)
Environmental Impact:	An impact is defined as the action of one object having a marked effect or influence on another object. Therefore, an environmental impact is the potential effect that an activity will have on the environment.
Peaking Capacity:	Refers to power station technology designed specifically to generate electricity during periods of very high demand for electricity, normally in the mornings around 07:00 to 09:00 and in the evenings around 18:00 to 20:00.
Thermal Efficiency:	The energy efficiency of a power station. It is essentially a measure of the overall fuel conversion efficiency for the electricity generation process.
Turbine:	A device that coverts mechanical energy stored in a fluid (liquid or gas) into rotational mechanical energy.