Report No: [3907/400850]

ENVIRONMENTAL IMPACT ASSESSMENT: PROPOSED OPEN CYCLE GAS TURBINE POWER PLANT, FUEL SUPPLY PIPELINE, SUBSTATION AND TRANSMISSION LINES AT MOSSEL BAY

DRAFT SCOPING REPORT

Prepared by

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PROJECT DETAILS

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TITLE	Environmental Impact Assessment: Proposed Open Cycle Gas Turbine Power Plant, Fuel Supply Pipeline, Substation and Transmission Lines at Mossel Bay.
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CLIENT	Eskom Holdings Ltd (Eskom Transmission Division and Eskom Generation Division)
PROJECT NAME	Mossel Bay OCGT EIA
REPORT STATUS	Draft
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ABBREVIATIONS

BID	Background Information Document
DEA&DP	Department of Environmental Affairs and Development Planning (provincial)
DEAT	Department of Environmental Affairs and Tourism (national)
ECA	Environment Conservation Act (No. 73 of 1989)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EIR	Environmental Impact Report
GTL	Gas-to-liquid
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
IEP	Integrated Energy Plan
IEM	Integrated Environmental Management
ISEP	Integrated Strategic Electricity Planning
Km	Kilometer
kV	Kilovolts
m	Metres
m^3	Cubic metres
MW	Megawatt
NEMA	National Environmental Management Act (No. 107 of 1999)
NER	National Electricity Regulator
NIRP	National Integrated Resource Plan
NO_x	Oxides of nitrogen
OH	Open House
OCGT	Open Cycle Gas Turbine
ppm	Parts per million
RoD	Record of Decision
ToR	Terms of Reference
VIA	Visual Impact Assessment

SUMMARY

BACKGROUND AND INTRODUCTION

Eskom has commissioned an Environmental Impact Assessment (EIA) for a proposed Open Cycle Gas Turbine (OCGT) power plant and associated activities in the Mossel Bay area. The Draft Scoping Report serves as the documentation in support of the Scoping Phase of the EIA procedure being carried out. It will be followed by documentation that addresses the EIA Phase as the process unfolds.

The need to expand the electricity generation capacity in South Africa is essentially based on the following strategic documentation and policies:

- South Africa's White Paper on the Energy Policy - 1998
- Integrated Energy Plan - 2003
- National Integrated Resource Plan - 2003/2004
- Integrated Strategic Electricity Planning - 2003

As a consequence of the above-mentioned forward planning process, two OCGT power plants are proposed in the Western Cape, one in Atlantis north of Cape Town and the other adjacent to the PetroSA facility (previously known as Mossgas) near Mossel Bay. This EIA is being undertaken for the activities relating to the proposed OCGT power plant, fuel supply pipeline, substation and transmission lines at Mossel Bay. Ninham Shand Consulting Services is the lead consultant for the EIA, assisted by The Environmental Partnership.

The proposed OCGT power plant would be located approximately 13km west of the town of Mossel Bay and approximately 1km northwest of the PetroSA facility. A fuel supply pipeline would be required between PetroSA and the OCGT power plant. Two overhead transmission lines would also be needed to connect the OCGT power plant to the existing Proteus substation, which is located approximately 10km northwest of the proposed power plant site.

PROJECT DESCRIPTION

The proposed project comprises the following components:

- The OCGT power plant (made up of three or four gas turbines with an output of 150 to 250 MW each) adjacent to the existing PetroSA facility.
- A fuel supply pipeline to transport kerosene from the PetroSA facility to the OCGT power plant;
- A substation adjacent to the OCGT power plant, to distribute the generated electricity to the transmission lines;
- Two 400kV transmission lines to run from the OCGT substation to Proteus substation, thus feeding the generated electricity into the national grid;
- Upgrading of the Proteus substation within the boundaries of the substation; and
- An access road from the N2 National Road to the proposed OCGT power plant and substation site.

Open Cycle Gas Turbine Power Plant

The proposed project entails constructing an OCGT power plant, which produces electricity by means of hot gas driving a turbine that in turn powers a generator. It is envisaged that the OCGT power plant would operate for an average of two hours each morning and evening. This,

however, is dependent on electricity demand and system requirements. It could thus be necessary to operate for up to eight hours at a time. The objective of the OCGT power plant is to provide peaking power within a relatively short time after starting the plant. Peaking capacity refers to those periods in the mornings and evenings when electricity demand is at its greatest.

Open Cycle Gas Turbine Power Plant Extent and Layout

The proposed OCGT power plant and transmission substation site is approximately 250m by 350m in extent and will therefore occupy about 9ha. The highest structures of the plant are the emission stacks of about 30m. The intention is to install three or four turbines of 150 to 250MW each, with a maximum combined output of 1000MW. The fuel in this case would be kerosene supplied by PetroSA.

Emission Control Measures Relating to the OCGT Power Plant

Although the OCGT power plant is considered a 'clean' technology in comparison to coal-burning power stations, it produces emissions such as oxides of sulphur, oxides of nitrogen (NO_x) and greenhouse gasses e.g. carbon dioxide. The exhaust gasses of the OCGT power plant would be discharged to the atmosphere through the stacks at a height of 30m. It is our understanding that NO_x emissions are the important issue of concern related to air quality, as emission levels of oxides of sulphur and carbon would be well below DEAT guidelines.

Fuel Supply Pipeline

The intention is to source the fuel, in this case a form of kerosene, required to operate the OCGT power plant from PetroSA. In order to supply the power plant with the kerosene, a fuel pipeline of approximately 3 to 5km between PetroSA and the OCGT power plant would need to be constructed. The proposed pipeline would be installed above the ground as a safety precaution. Two alternative routes have been identified (see *Road Access to OCGT Power Plant* below).

Transmission Substation

A proposed transmission substation would occupy an area adjacent to the OCGT power plant within the identified 9ha area. The purpose of the transmission substation is to feed the generated electricity to the transmission lines and thence to the Proteus substation. The substation would consist of three 400kV transformers with their associated infrastructure and steelwork.

Transmission Powerlines

In order to connect the proposed OCGT power plant to the existing transmission network, two 400kV overhead powerlines would be required between the power plant and the existing Proteus substation.

Proposed Route Alignments

Three route alignments have been identified. For all the alternatives, the two transmission lines would run parallel to each other within the minimum required combined servitude. The servitude would be owned by Eskom, but would allow some activity to occur beneath the transmission lines. All the alternatives would have to enter the Proteus substation at its north-western side, since the only vacant space available for the purpose is located there.

Route Alignment - Alternative 1

The two transmission lines would exit the OCGT power plant on its northern side and run in a north-north-westerly direction towards the R327 for approximately 2km. Thereafter the proposed route runs adjacent to the R327 for the remaining 10km to where it ends at Proteus substation. This alternative crosses farmland before forming part of an existing utility corridor comprising a road, telephone lines and distribution powerlines. Total length ~12km.

Route Alignment - Alternative 2

The two powerlines would exit the OCGT power plant on its northern side and follow the alignment of the existing two 132kV transmission lines that run between PetroSA and Proteus substation. The proposal is to erect the two new transmission lines parallel and to the west of the existing transmission lines. The alignment would traverse a number of farms and cultivated land. Total length ~10km.

Route Alignment - Alternative 3

This route alignment exits the OCGT power plant on its northern side and runs parallel and to the north of the railway line in a westerly direction for approximately 4km to Kleinberg. The powerline would then follow a route of about 10km running northwards adjacent to an existing 66kV overhead powerline along a valley and thus approaching Proteus substation from the south. This alignment follows an existing utility corridor (railway line), and traverses cultivated land as well as less disturbed valleys. Total length ~14km.

Proposed Tower Configurations

Alternatives in tower structures have also been identified. Depending on the terrain and route chosen, one or a combination of tower designs might be used. Four different tower structure designs are being considered for the project. These are:

- Compact cross rope suspension towers;
- Cross rope suspension towers;
- Self supporting bend or strain towers; and
- Self supporting towers.

Road Access to OCGT Power Plant

It is proposed to provide road access to the OCGT power plant off the N2 National Road. There is an existing access road to the landfill site (west of PetroSA), from which point a new road would be required.

From the landfill site to the OCGT power plant site, two alternative access routes have been identified. The section of the road would run along the western boundary of PetroSA and would either continue along the alignment of the existing 132kV overhead transmission lines or along the railway line. The intention is to align the proposed fuel supply pipeline with the road access route, thereby optimising on a single utility corridor.

Road Access to Proposed Transmission Line Routes

Access would also be required to reach the various transmission line tower sites, in order to erect the structures. The access route would be used for maintenance purposes during the operational phase of the transmission line as well.

Water Supply

De-mineralised water would be required if proposed NO_x abatement measures are adopted that require the introduction of such water into the combustion proses. Options for acquiring de-mineralised water include Eskom installing a water treatment plant to de-mineralise the water themselves, or to purchase de-mineralised water from PetroSA.

Water is also required for turbine blade washing in the OCGT power plant itself. Blade washing would occur approximately once every six months and would require approximately 1 000 litres of water per turbine per wash. Effluent from blade washing would need to be disposed of appropriately. Fire prevention will also require access to a water source.

Storage Tank Farm

The proposed development would include the installation of a number of storage tanks within the boundary of the OCGT power plant site. The number and volumes of tanks required would be informed by the present investigation and would depend on the amount and type of water required for the operation of the OCGT power plant. Storage tanks may be required for the following liquids:

- Kerosene
- Demineralised water
- Raw water
- Neutralised water
- Acid
- Caustic
- Waste water

PUBLIC PARTICIPATION

A comprehensive public consultation process has been launched, which will underpin the entire EIA process. To date, this has comprised initial stakeholder consultation (landowners and authorities), the wide distribution of a Background Information Document, media notices and a public forum in the form of a combined stakeholder meeting, open house and public meeting.

Issues Identified

A number of environmental concerns were identified by interested and affected parties, relevant authorities, as well as the project team. The issues identified to date are as follows:

- Botanical issues;
- Avifaunal issues;
- Atmospheric emissions;
- Water consumption;
- Effluent management issues;
- Geology and drainage;
- Traffic and access;
- Existing infrastructure;
- Visual impact;
- Noise;
- Heritage resources impacts;
- Socio-economic impacts (including employment opportunities);
- Impact of adjacent activities;
- Construction phase impacts; and

- Operational phase impacts.

CONCLUSION AND WAY FORWARD

The Draft Scoping Report describes the background to the EIA for the OCGT power plant and associated infrastructure at Mossel Bay, as well as provides information on the process to be followed in carrying out the study and, most importantly, identifies the significant impacts (issues) likely to result from the project. With this understanding of the likely impacts, the subsequent EIA Phase will be able to address the environmental consequences of the proposed project in a substantive manner.

In the next phase of the environmental assessment, the following specialist input is being considered:

- Botanical;
- Avifaunal;
- Heritage;
- Visual;
- Air pollution and risk;
- Noise pollution; and
- Socio-economic.

These studies will assist in informing the subsequent EIA Phase, along with essential contributions from the other disciplines represented on the consulting team.

The Scoping Report is being released in draft form, to enable Interested and Affected Parties (I&APs) to comment on the project proposal and issues raised, and to ensure that their concerns have been captured and that they will be dealt with as the process unfolds. Registered I&APs will be kept informed throughout the EIA process and opportunities for participation will be provided.

You may therefore submit any comments that you may have on this Draft Scoping Report on or before 23 June 2005 to:

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1 BACKGROUND AND INTRODUCTION

1.1 BACKGROUND

This report serves as the documentation in support of the Scoping Phase of the Environmental Impact Assessment (EIA) process being carried out for a proposed Open Cycle Gas Turbine (OCGT) power plant, fuel supply pipeline, substation and transmission lines in the Mossel Bay area in the Western Cape.

The site of the proposed OCGT power plant is located approximately 13km west of the town of Mossel Bay and approximately 1km northwest of the PetroSA facility. A fuel supply pipeline is required between the PetroSA facility and the OCGT power plant. Two sets of overhead transmission lines are required between the OCGT power plant and the existing Proteus substation. The Proteus substation is located approximately 10km northwest of the proposed power plant.

Eskom is the primary supplier of electricity in South Africa, providing approximately 95% of the electricity used. An on-going challenge is meeting the increasing energy demands, whilst maintaining cost-effective electricity and minimising the impact on the environment.

The need to expand Eskom's electricity generation capacity in South Africa is to a large extent based on an on-going strategic planning exercise that is reflected in the following policy and planning documentation.

1.1.1 White Paper on the Energy Policy of the Republic of South Africa - 1998

Development within the energy sector in South Africa is governed by the White Paper on the Energy Policy of the Republic of South Africa, published by the Department of Minerals and Energy in 1998. This White Paper sets out five objectives for the further development of the energy sector. The five objectives are as follows:

- Increased access to affordable energy services;
- Improved energy governance;
- Stimulating economic development;
- Managing energy-related environmental and health impacts; and
- Securing supply through diversity.

Furthermore, the Energy Policy identified the need to undertake an Integrated Energy Planning (IEP) process in order to achieve a balance between the energy demand and resource availability, whilst taking into account the health, safety and environmental[1] parameters. In

[1] Environmental parameters include economic and social aspects.

addition, the policy identified the need for the adoption of a National Integrated Resource Planning (NIRP) approach to provide a long-term cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social and economic policies.

1.1.2 Integrated Energy Plan – 2003

The Department of Minerals and Energy commissioned the IEP, which was undertaken by the Energy Research Institute of the University of Cape Town. The purpose of the IEP is to provide a framework in which specific energy policies, development decisions and energy supply trade-offs can be made on a project by project basis. The framework is intended to create a balance in providing low cost electricity for social and economic development, ensuring a security of supply and minimising the associated environmental impacts.

The IEP projected that the additional demand in electricity would necessitate an increase in electricity generation capacity in South Africa by 2007. According to the IEP report, peaking capacity[2] is of particular concern, as projections indicate that South Africa would be short of peaking capacity by approximately 2006.

1.1.3 National Integrated Resource Plan (NIRP) – 2003/2004

In response to the White Paper's objective relating to affordable energy services, the National Electricity Regulator commissioned a NIRP. The objective of the NIRP is to determine the least-cost supply option to the country, provide information on the opportunities for investment into new power stations and evaluate the security of supply.

The national electricity demand forecast took a number of factors into account. They are:

- a 2.8% average annual economic growth;
- the development and expansion of a number of large energy-intensive industrial projects;
- electrification needs;
- a reduction in energy intensity over the 20 year planning horizon;
- a reduction in electricity consumers who will switch to the direct use of natural gas;
- the supply of electricity to large mining and industrial projects in Namibia and Mozambique; and
- typical demand profiles.

The outcome of the NIRP determined that while the coal-fired option of generating electricity would still be required over the next 20 years, additional energy generation facilities would be required by 2007.

[2] Peaking capacity refers to the period in the morning and evening when demand for electricity is higher than at other times during the day.

1.1.4 Eskom Integrated Strategic Electricity Planning – 2003

Eskom applies an Integrated Strategic Electricity Planning (ISEP) process to identify long-term options regarding both the supply and demand sides of electricity provision in South Africa.

In the most recently approved ISEP plan (June 2003), the need for increased electricity supply by about 2006/7 was identified. This is to meet the gradual annual growth of approximately 3% in electricity demand, coupled with moderate generating reserves. Reinstating power stations that have been mothballed[3] is an option identified as a priority in the ISEP, while various other options, ranging from plants using coal and nuclear fuels to renewable energy sources (mainly wind and solar projects), are being investigated.

Another technology identified for generating electricity in the short term is using Open Cycle Gas Turbines (OCGTs). This method is considered as effective and appropriate for providing a supply of electricity in the short term during peak demand periods. Peak demand periods refer to those times in the mornings and evenings when electricity demand is greatest. OCGT are a favoured means of meeting peak demand for two reasons. Firstly, they can be constructed within a relatively short space of time and secondly, one constructed they can begin to generate electricity within 30 minutes of starting the power plant.

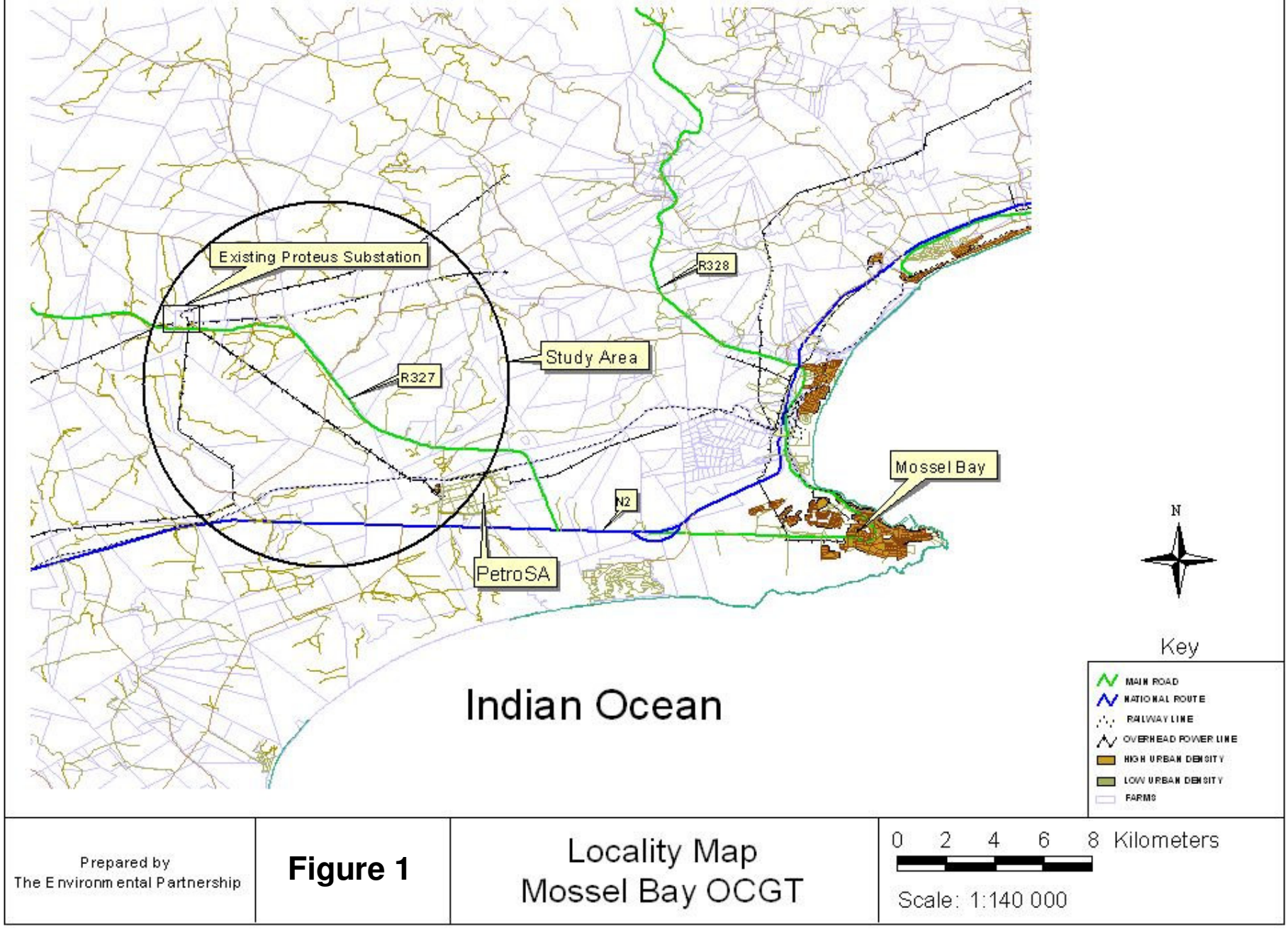
1.2 INTRODUCTION

As a consequence of the above-mentioned forward planning process, two OCGT power plants are proposed in the Western Cape, one in Atlantis near to Cape Town and the other adjacent to the PetroSA facility (previously known as Mossgas) near Mossel Bay. This environmental impact assessment is being undertaken for the activities relating to the proposed OCGT power plant, fuel supply pipeline, substation and transmission lines at Mossel Bay (see locality map, Figure 1). Note that an access road to the proposed power plant site is also needed.

An important consideration in the decision to use the OCGT method of generating electricity is that the power station could be commissioned over a short period of time. As the need for additional electricity capacity is imminent (2006/7), from a technical perspective, this technology would be appropriate. A screening study (Annexure 1) undertaken by Eskom discusses the selection of OCGT technology in greater detail. This screening study and the findings thereof provide the point of departure for this EIA process.

The Mossel Bay OCGT power plant would be fuelled with kerosene from the adjacent PetroSA gas-to-liquid (GTL) facility. A substation is required to allow for two transmission lines of 400kV capacity each to link in with the existing transmission national grid.

[3] Deactivating the power station for an indefinite period.



Prepared by
The Environmental Partnership

Figure 1

Locality Map
Mossel Bay OCGT

The sequence of documents produced thus far for this EIA are the Department of Environmental Affairs and Development Planning (DEA&DP) Application Form and Scoping Checklist, providing the formal application for the project, a Plan of Study for Scoping which described the proposed scoping process, and this Scoping Report which is being released in draft form for review by interested and affected parties (I&APs). The Scoping Phase will be followed by the Environmental Impact Report (EIR) Phase, which will culminate in an EIR. The EIA process and sequence of documents are illustrated in Figure 2 below.

1.3 LEGAL REQUIREMENTS

In order to protect the environment and ensure that this development is undertaken in an environmentally responsible manner, there are three significant pieces of environmental legislation which focus this assessment. They are as follows:

a) Section 21 of the Environment Conservation Act [ECA] (No. 73 of 1989), per Government Notice R1182 of September 1997, as amended, contains a schedule of activities that may have a substantial detrimental effect on the environment and will require an EIA. The nature of the proposed development includes activities listed in this schedule. These activities are:

   - 1(a) "*The construction, erection and upgrading of facilities for commercial electricity generation with an output of at least 10 megawatts and infrastructure for bulk supply*"

   and (with regard to any substance which is dangerous or hazardous and is controlled by national legislation)

   - 1(c)(i) and (ii) *'The construction, erection and upgrading of:*
     Infrastructure, …, for the transportation of any such substance; and
     Manufacturing, storage, handling, treatment or processing facilities for any such substance".

   Accordingly, the proposed OCGT power plant and associated infrastructure require authorisation from the competent environmental authority via the EIA process outlined in Regulation 1182.

The proposed project may entail various other actions that would also be considered as scheduled activities in terms of Regulation 1182, as amended. These include:

- 1(d) *"the construction, erection and upgrading of roads*"; and

- 2(c) and (e) "*the change of land use from:*
  agricultural or zoned undetermined use or an equivalent zoning to any other land use; and
  use for nature conservation or zoned open space to any other land use".

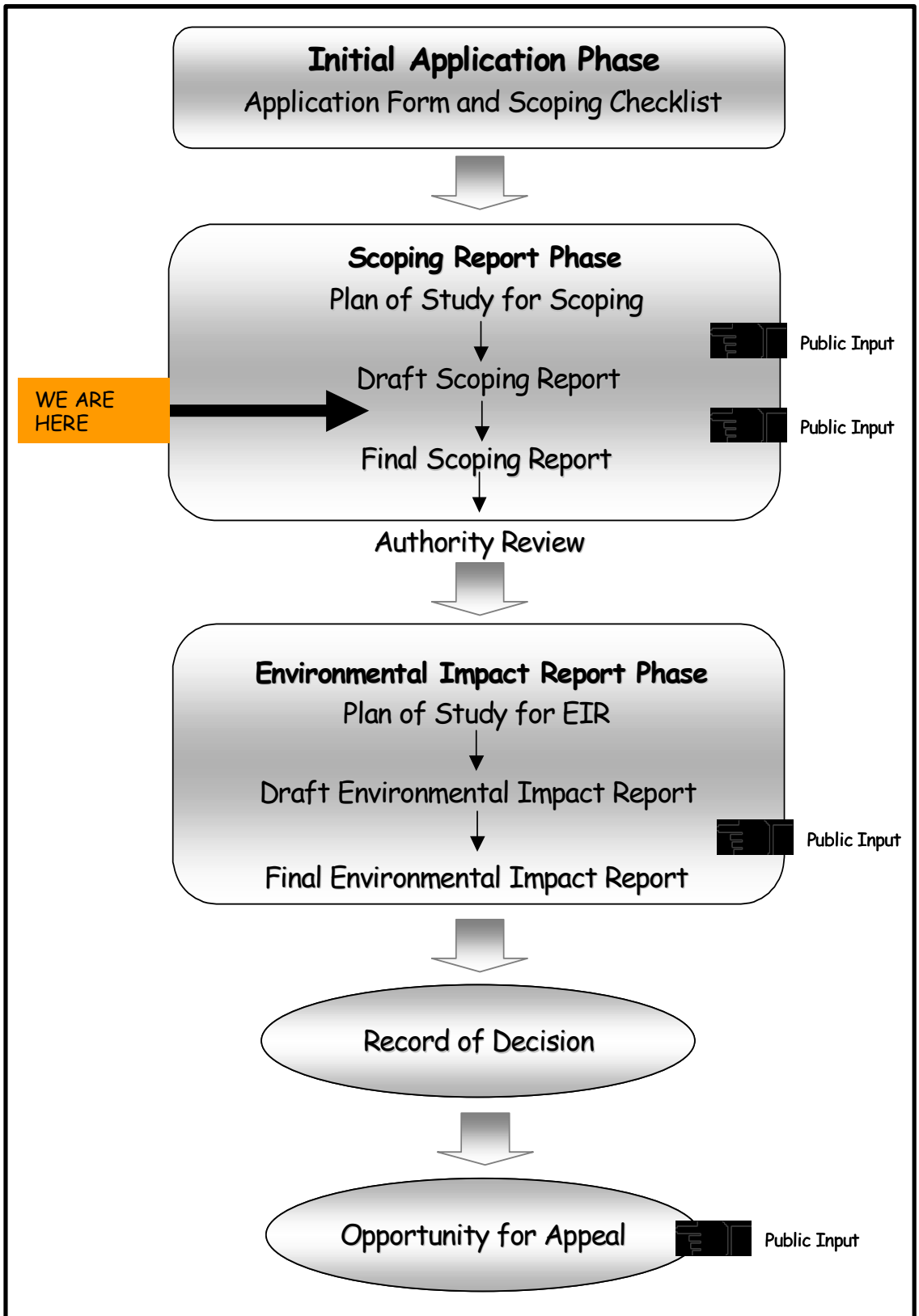


Figure 2 **Environmental Impact Assessment process**

This report describes the Scoping Phase of the EIA process and is to be submitted to the DEA&DP who apply the above Act[4]. While there are various approvals required for this development, construction can only proceed if an environmental approval is granted according to the ECA. This study is therefore in accordance with Sections 21, 22 and 26 of the Act.

b) The Constitution of South Africa (No. 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development.

c) The National Environmental Management Act (No. 107 of 1998) also states that principles of Integrated Environmental Management (IEM) should be adhered to in order to ensure sustainable development. A vital underpinning of the IEM procedure is accountability to the various parties that may be interested in or affected by a proposed development. Public participation in the formulation of development proposals is a requirement of the IEM procedure, in terms of the identification of truly significant environmental impacts (scoping) by I&APs. The IEM procedure is designed to ensure that the environmental consequences of development proposals are understood and adequately considered during the conceptual design process, allowing negative aspects to be resolved or mitigated and positive aspects to be enhanced. It is thus a code of practice for ensuring that environmental considerations are fully integrated into all stages of development, by providing a procedural and regulatory mechanism for EIAs.

In addition to the ECA and NEMA, the following Acts may have bearing on the proposed activities:

- The National Heritage Resources Act (No. 25 of 1999): The requirements of the National Heritage Resources Act will be addressed as an element of this study. The South African Heritage Resources Agency will be provided with all relevant documentation, since they have a statutory role to play in the decision-making process.
- The National Water Act (No 36 of 1998): Comment will be sought from the Department of Water Affairs and Forestry, which will then be forwarded to DEA&DP to consider during their decision-making process.
- The Minerals and Petroleum Resources Development Act (No 28 of 2002): Comment will be sought from the Department of Minerals and Energy, which will then be forwarded to DEA&DP to consider during their decision-making process.
- The Air Pollution Prevention Act (No. 45 of 1965): As the proposed activities would entail emissions to the atmosphere, a permit application would need to be submitted to the Chief Air Pollution Control Officer by Eskom.

[4] Note that while the Department of Environmental Affairs and Tourism (DEAT) is the primary responsible authority at the national level, they have delegated authority to the provincial department, viz. DEA&DP.

1.4 PROJECT TEAM

Ninham Shand has been appointed to conduct the EIA. The professional team that has been assembled by Ninham Shand is as follows:

Ninham Shand (Lead Consultant)	EIA facilitation & co-ordinator Avifaunal specialist
The Environmental Partnership	EIA process and reporting
AirShed Planning Professionals	Air quality specialist
Jongens Keet Associates	Acoustic specialist
CNdV Africa	Visual impact specialist
Nick Helme Botanical Surveys	Botanical specialist
Archaeology Contracts Office	Heritage specialist
Mark Wood Consultants	EIA Review

1.5 REPORT STRUCTURE

This report is structured as follows:

Chapter One	*Provides the introduction, policy and legislative requirements and background to the study*
Chapter Two	*Provides the methodology for the study*
Chapter Three	*Describes the study area*
Chapter Four	*Describes the project components*
Chapter Five	*Describes the public participation process*
Chapter Six	*Discusses the scoped issues*
Chapter Seven	*Concludes the report and describes the way forward*

2 THE BRIEF

2.1 TERMS OF REFERENCE

As the proponent of the proposed development, Eskom has appointed the independent consulting team to assess the environmental impacts of the proposed development. In addition, the appointment is to ensure that the proponent complies with the legislated requirements of the EIA mentioned in Section 1.2 above. As per the legislated EIA process, the independent environmental team would undertake the following:

- participate in proposal formulation;
- scope all environmental aspects that might have an impact;
- undertake assessment and evaluation,
- undertake a review phase, and
- submit the EIA report to the authority for decision.

A public participation programme is being undertaken throughout this study, to ensure that I&APs are given an opportunity to participate and to ensure that issues of importance to them are addressed. This is discussed in more detail in Chapter 5 of this report.

The actions described above are the standard procedures required by the ECA, specifically Sections 21, 22 and 26. An evaluation of the significance and magnitude of identified environmental impacts can result in additional attention being required in some cases, or in others being discounted through them not posing impacts that are significantly negative (see Chapter 6).

The purpose of this report is to identify the range of possible environmental impacts that may result from the proposed activities. These potential impacts will be assessed in detail during the subsequent EIR Phase.

2.2 STUDY APPROACH

To initiate the EIA process, pre-application meetings were held with DEA&DP and DEAT during which the environmental process to be followed was presented. Thereafter the DEA&DP Application Form and Scoping Checklist, as well as the Plan of Study for Scoping, were submitted. The submission of the Application Form and Scoping Checklist also served as the formal application for the project. Refer to Annexure 2 for the acceptance letter for the Plan of Study for Scoping from DEA&DP.

The scoping exercise then followed. This was aimed at determining which possible environmental impacts are truly significant and thus require particular attention. The Application

Form and Scoping Checklist mentioned above assisted in accurately identifying the environmental aspects that are likely to require attention.

The sequence of documents noted in Section 1.2 above is more clearly reflected in Figure 2.

2.3 ASSUMPTIONS

The selection of Mossel Bay as a location for the OCGT power plant, as well as the selection of the proposed site adjacent to PetroSA, do not form part of this EIA process. A comprehensive internal screening study was undertaken by Eskom, which investigated potential sites for the proposed OCGT power plants, i.e. both at Atlantis and Mossel Bay (refer to the Environmental Screening for Siting Open Cycle Turbines in the Western Cape in Annexure 1). The screening study also resulted in the site for the OCGT power plant at Mossel Bay being identified in the position reflected in the present EIA. The ratification of Eskom's screening study by the environmental team has been accepted by the environmental authorities as the point of departure in this EIA, since it provides the necessary strategic level context.

Alternative methods of generating electricity are identified in the IEP, NIRP and ISEP planning processes and do not form part of this EIA. The Eskom screening study mentioned above provides the rationale for the adoption of OCGT technology in this particular case.

While there is a requirement to examine the "no go" alternative, this option would amount to there being no changes in the regional biophysical and socio-economic situation, or in the national electricity generation situation. Consequently, without the proposed project, electricity shortfalls in South Africa can be expected by 2007. From a strategic, social and economic perspective this is considered to be unacceptable. As a result, the "no go" alternative is not being evaluated at the same level of comparative detail that the project alternatives reflected in this report are.

3 THE AFFECTED ENVIRONMENT

3.1 GENERAL DESCRIPTION OF THE AREA

The broader area is of a rural nature, with PetroSA providing an industrial node within a largely agricultural landscape. The terrain within the study area is characterised by a combination of relatively flat areas and undulating valleys. The predominant farming activity in the study area is the cultivation of wheat as well as farming with cattle and sheep.

The proposed OCGT power plant site lies 13km west of Mossel Bay[5], adjacent to the western boundary of the PetroSA facility. The Proteus substation is located approximately 10km northwest of the proposed power plant (see Figure 1).

3.2 GENERAL DESCRIPTION OF STUDY SITE

The proposed OCGT power plant and transmission substation site (see Figure 3) is located 1km northwest of the PetroSA facility, with its associated water purification plant, bulk storage facilities and waste landfill site. The N2 National Road is located approximately 1,5km south of the proposed site, with the R327 located approximately 3km north of the OCGT site. The Kleinberg-Mossdustria railway line lies immediately north of the plant.

PetroSA owns the proposed OCGT power plant and substation site and it is currently being leased as grazing pasture to the adjacent farmer. The site is disturbed by the existing grazing activities. The proposed fuel pipeline and access road routes also traverse fairly disturbed land owned by PetroSA.

The proposed alternative routes for the transmission lines traverse a number of farms and are routed between the proposed OCGT power plant and the existing Proteus substation (see Figure 4). The proposed alternative route alignments traverse, to a greater or lesser degree, a number of relatively undisturbed valleys, particularly within the vicinity of the Proteus substation.

3.3 FLORA

Mossel Bay is located within the Cape Floral Kingdom, which is considered the smallest yet most diverse plant kingdom in the world. The Cape Floral Kingdom lies in the South Western Cape and stretches from Van Rhynsdorp to Port Elizabeth. Of the 8600 plant types which are present in the Cape Floral Kingdom, approximately 65% are endemic to the area. There are five types of vegetation in the Cape Floral Kingdom, namely Fynbos, Renosterveld, Thicket, Succulent Karoo and Afromotane Forest. All five vegetation types are found within the greater Mossel bay area (http://www.gardenroute.net/mby/mbfynrout.htm).

[5] Characterised by a moderately sized fishing harbour and oil industry activities.

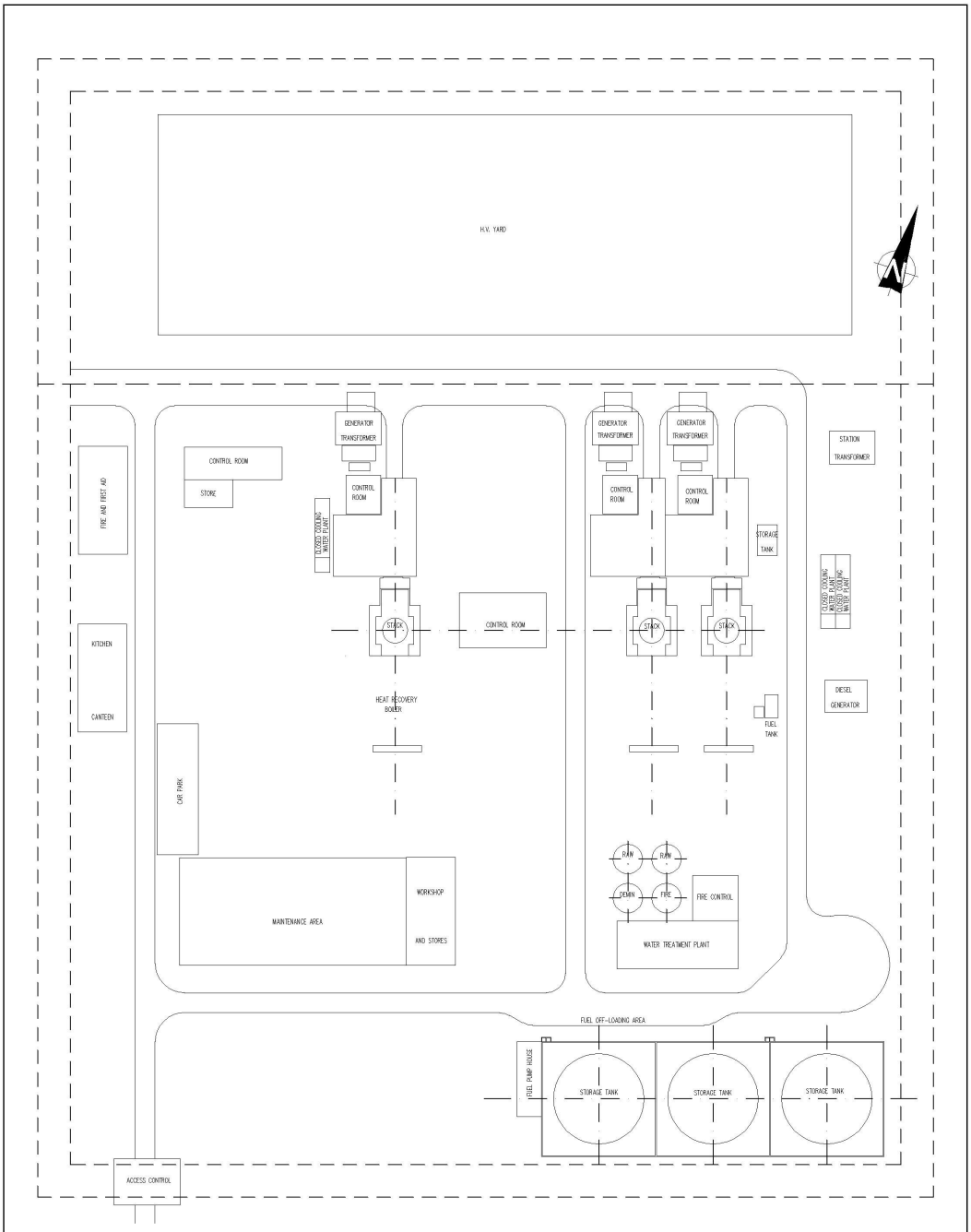
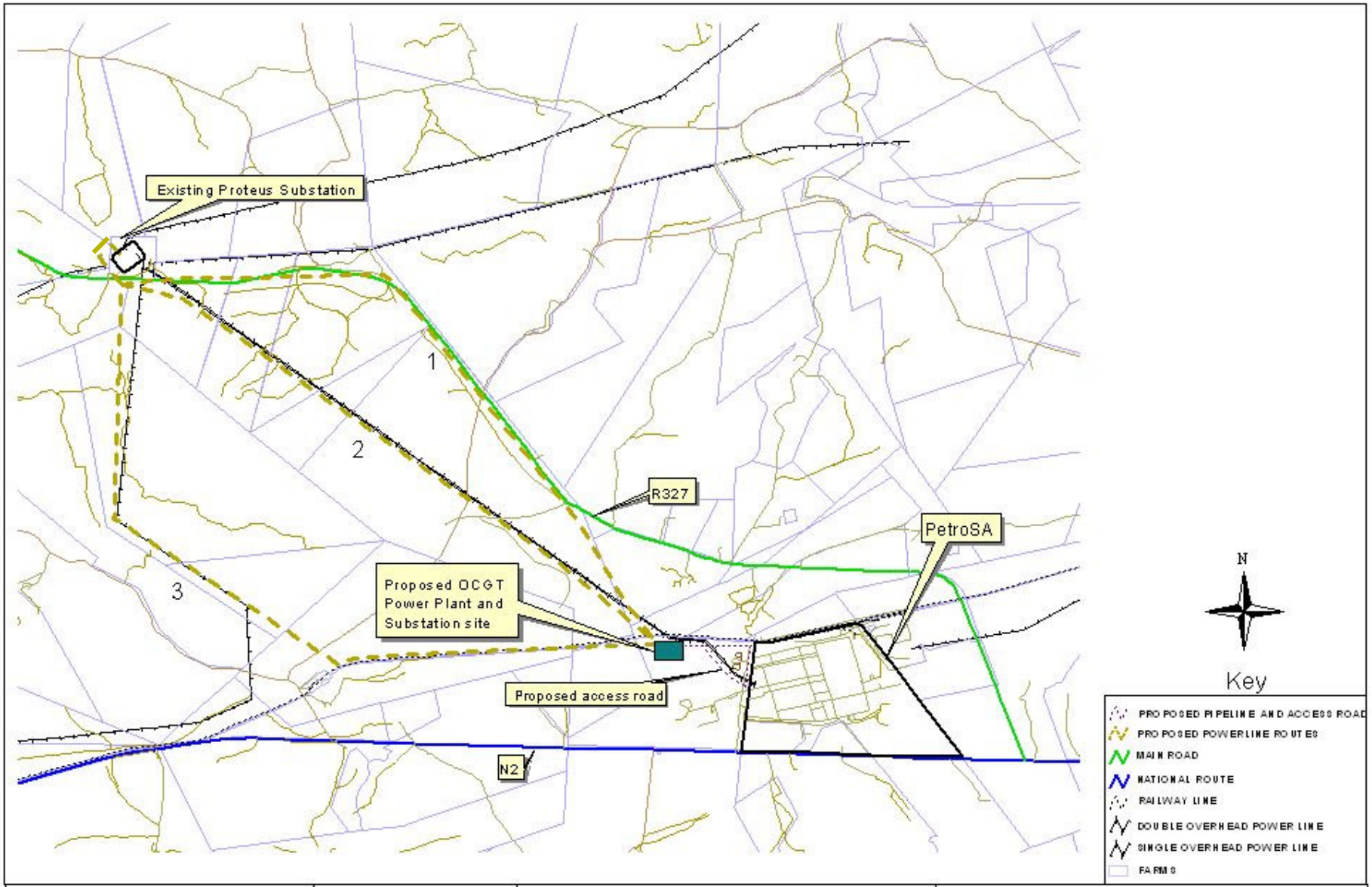


Figure 3 Notional Layout of OCGT Power Plant



Prepared by The Environmental Partnership	Figure 4	Proposed Alternatives Mossel Bay OCGT	0 1 2 3 4 Kilometers Scale: 1:60 000

Vegetation within the study area can be classified as Renosterveld and a category of mosaic Thicket. The vegetation associated with the Thicket Biome is evergreen, succulent trees, shrubs and vines. The Renosterveld falls within the Fynbos Biome and is localised in distribution. Renosterveld is characterised by a herb layer on the ground surface in which grasses dominate and deciduous geophytes and annuals are seasonally prominent. It is intended to commission a specialist botanical study to provide more detail relevant to the botanical implications of the proposed project (see Section 6.1).

3.4 AVIFAUNA

The greater Mossel Bay area is characterised by diverse bird life. The shoreline, which is subject to tidal action, sustains a variety of Waders, Terns, Gulls, Oystercatchers and Gannets. The waders are mostly migratory birds, breeding in the northern hemisphere and spending the summer in the southern hemisphere. Larger flocks of different species invade the Mossel Bay shoreline from September until April.

In addition, the Mossel Bay Fynbos area is associated with the sugarbird, of which there are only two species in Southern Africa. The area is also associated with the sunbirds and the orange breasted sunbird is endemic to the Cape Floral Kingdom.

The surrounding farmlands are associated with a number of raptors like eagles and buzzards, species of larks, the capped wheatear, the white stork as well as the blue crane. Most of the birds are endemic to the area and will breed in this vicinity (http://www. gardenroute.net/mby/mbbirds.htm). It is intended to commission a specialist avifaunal study to provide more detail relevant to the avifaunal implications of the proposed project (see Section 6.2).

3.5 FAUNA

Due to the farming activities within the study area, terrestrial fauna diversity is restricted. However, there is evidence of various small mammals such as rodents, porcupines, grysbok, and other small antelope within the study area. In addition, PetroSA's Nature Reserve is located adjacent to the refinery, between the southern security fence and the N2 National Road. Species found with the Nature Reserve include springbok, Burchell's Zebra, grysbok and Cape hares.

3.6 GEOLOGY AND DRAINAGE

The study area is underlain by sandstone and shale beds of the Table Mountain and Bokkeveld Groups. North of Mossel Bay, rocks of the Enon Formation and other similar younger deposits (of Cretaceous and Tertiary age) are found. These rocks are deposited in an east to west elongated trough and are considered to extend offshore.

The Kouga Formation is the principal aquifer in the study area and its recharge area lies north of the refinery.

A minor seasonal tributary of the Blinde River, which drains to the south, has its source approximately 1km to the south-south-west of the proposed OCGT power plant site. However, the site is particularly flat and as a consequence is not well drained. A shallow water table is likely to occur in an area approximately 800m to the east of the proposed site.

3.7 CLIMATE

The study area falls within a Mediterranean-type climate with hot summers and wet winters. The annual precipitation is approximately 400-600mm, peaking in spring and autumn. Winds are typically from the southeast during summer months, while winter frontal systems cause north and westerly winds. Strong winds with an average speed of 20km/h are experienced during winter, whilst the average wind speed in summer is approximately 15km/h (PetroSA, undated).

The average mean temperature in summer is approximately 25^0C and the average mean temperature in winter is approximately 14^0C.

3.8 EXISTING INFRASTRUCTURE

The N2 National Road is located approximately 1.5km south of the proposed OCGT power plant and substation site, whilst the R327 is located to the north of the proposed site. The Kleinberg-Mossdustria railway line is located immediately north of the site. The Proteus substation is located 10km northwest of the proposed power plant site and two 132kV transmission lines run in a northwesterly direction between the PetroSA facility and the Proteus substation.

3.9 CULTURAL RESOURCES

The study area has no known sites of archaeological importance. However, stone age tools have been reported from the waste disposal site located adjacent to the PetroSA facility.

Although somewhat removed from the study site, the town of Mossel Bay is associated with a number of culturally significant sites and buildings, including Cape St. Blaize Cave, the replica of the stone Padrao that Da Gama erected and the Munrohoek cottages. It is intended to commission a specialist heritage study to provide more detail relevant to the heritage implications of the proposed project (see Section 6.10).

3.10 PLANNING FRAMEWORK

The proposed OCGT power plant and transmission substation site is located within PetroSA's landholding and is thus zoned for industrial use, although it is presently used for agricultural

activities (pasturage and crops). The alternative alignments for the proposed transmission lines would traverse land zoned for agriculture.

A discrepancy in the delineation of the urban edge in the Mossel Bay Growth Management Framework should be noted, where it is indicated as running along the western security fence rather than along the extreme western boundary of PetroSA's landholding. The landfill site, evaporation ponds and construction village are all outside of the security fence. However, according to the Chief Planner for the Mossel Bay Municipality, this is incorrect as the urban edge should lie on the boundary of the PetroSA property. This discrepancy is in the process of being addressed. (Kruger, pers com).

4 PROJECT PROPOSAL

4.1 PROPOSED ACTIVITIES

The proposed project comprises the following components:

- The OCGT power plant (made up of three or four gas turbines with an output of 150 to 250 MW each) adjacent to the existing PetroSA facility.
- A fuel supply pipeline to transport kerosene from the PetroSA facility to the OCGT power plant;
- A substation adjacent to the OCGT power plant;
- Two 400kV transmission lines from the OCGT substation to Proteus substation.
- The upgrade of the Proteus substation within the boundaries of the substation; and
- An access route from the N2 National Road to the proposed OCGT power plant and substation site.

4.2 OPEN CYCLE GAS TURBINE POWER PLANT

The OCGT power plant would produce electricity by means of hot gas turning a turbine that powers a generator (see Figure 5). The OCGT power plant is based on the Brayton cycle which describes what happens to air as it passes through the system and specifies the relationship between volume of air in the system and the pressure it is under (Eskom: Resources and Strategy Research Division, 2004).

According to the Brayton cycle, air is initially compressed, increasing its pressure as the volume of space it occupies is reduced. This compressed air is then heated at a constant pressure. Heat is added by injecting fuel into the combustor and igniting it on a continuous basis. The hot compressed air is then allowed to expand reducing the pressure and temperature and increasing its volume. This expansion takes place within the turbine, where the expansion of the hot gasses against the turbine blades turns a shaft. This shaft extends into a generator, which produces electricity. The Brayton cycle is completed by a process where the volume of air is decreased (that is, the temperature decreases) as heat is absorbed into the atmosphere.

It is envisaged that the OCGT power plant would operate for an average of two hours each morning and evening. This, however, is dependent on electricity demand and system requirements. It could thus be necessary to operate for up to eight hours per at a time. The objective of the OCGT power plant is to provide peaking power within a relatively short time after starting the plant.

The operation of the gas turbine may result in airborne particles being deposited on the compressor blades. Because soiling of the compressor results in the reduction of the thermal efficiency of the gas, the compressor blades would require regular cleaning. The cleaning may occur while the plant is off-line or on-line. The cleaning is undertaken using a hydrocarbon

based solvent, which will be mixed with water to form an emulsion. Effluent produced by the off-line cleaning would be drained from the compressor using a controlled process which passes through an oil separator and thereafter would be pumped to the PetroSA waste disposal site.

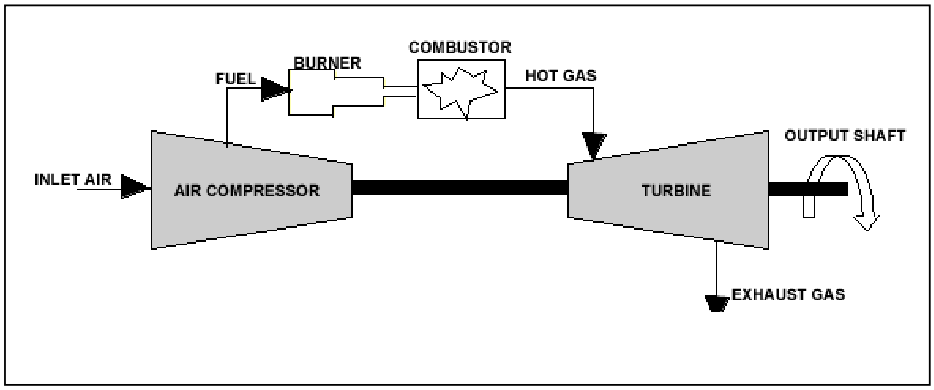


Figure 5: A typical gas turbine

4.2.1 OCGT Power Plant Extent and Layout

Alternatives in site layout will be formulated so as to ensure that the appropriate configuration is achieved from an environmental and technical perspective. This would be within the boundary of the site allowed for the OCGT power plant and adjacent substation. The OCGT power plant and transmission substation would occupy an area of approximately 250m by 350m in extent (~9ha) and the highest point of the plant would be the emissions stack, which would be approximately 30m high.

The intention is to install three to four turbines with maximum combined output of 1000MW. The proposed turbine size varies from 120 – 250MW, depending on the technology and supplier. As indicated previously, hot gas is produced by introducing fuel to compressed air in a combustion chamber. The fuel in this case would be a form of kerosene acquired from PetroSA.

4.2.2 Emission Control Measures Relating to the OCGT Power Plant

Although the OCGT power plant is considered a 'clean' technology in comparison to coal-burning power stations, it produces emissions such as oxides of sulphur, oxides of nitrogen (NO_x) and greenhouse gasses e.g. carbon dioxide. The exhaust gasses of the OCGT power plant would be discharged to the atmosphere through the stacks at a height of 30m. It is our understanding that NO_x emissions are the important issue of concern related to air quality, as emission levels of oxides of sulphur and carbon would be well below DEAT guidelines. The impacts of all emissions would be addressed by means of the intended air quality specialist study (see Section 6.3).

In South Africa, NO_x emission levels are regulated by guidelines from DEAT. The amount of NO_x emitted from the proposed OCGT power plant would depend on which manufacturer Eskom selects to provide the turbines. In all cases, the NO_x emissions would, as a minimum, meet DEAT guidelines. However, depending on the turbine manufacturer selected, abatement of NO_x

emission levels may be required in order to meet DEAT guidelines. Two possible NO_x abatement measures are being investigated for possible implementation:

a) Dry NO_x Abatement Measures

Most gas turbine manufacturers offer low NO_x burners in their gas turbines. These burners limit the formation of thermal NO_x through lean and staged combustion of the fuel. When burning natural gas, these systems can achieve NO_x levels as low as 25ppm. These systems are called dry low NO_x systems because they do not require water for NO_x abatement.

b) Wet NO_x Abatement Measures

Wet abatement refers to the injection of water or steam into the combustor to quench the flame temperature and thereby limit the formation of thermal NO_x. While all major suppliers have dry low NO_x systems for natural gas fuels, they have had varying success with dry low NO_x systems for liquid fuels such as diesel or kerosene. Therefore wet NO_x abatement is usually specified for liquid fuels.

It is estimated that approximately 547 000 kilo litres[6] of de-mineralised water per year would be required should wet NO_x abatement measures be implemented.

4.3 FUEL SUPPLY PIPELINE

PetroSA would supply the fuel for the proposed OCGT power plant via a pipeline of between 3 and 5km in length. Approximately 350 000 tons (437 500 kilo litres)[6] of kerosene would be required per year in order to operate the power plant for approximately eight hours per week. The proposed pipeline would be installed above the ground for safety reasons. Two alternative routes have been identified. See Figure 4.

4.3.1 Fuel pipeline alignment - Alternative 1

This alternative entails the fuel pipeline exiting the PetroSA refinery on its western boundary. Thereafter, it would run along the existing 132kV transmission lines route, terminating at the OCGT power plant.

4.3.2 Fuel pipeline alignment - Alternative 2

This alternative entails the fuel pipeline exiting the PetroSA refinery at its north-western boundary corner. The pipeline would then run adjacent to the railway line and terminate at the OCGT power plant.

[6] Based on maximum expected operating time; likely to be considerably less.

4.4 TRANSMISSION SUBSTATION

A proposed transmission substation is to occupy an area adjacent to the OCGT power plant, within the 9ha area. The purpose of the transmission substation is to feed the generated electricity to the transmission lines and thence to the Proteus substation. The substation would consist of three 400kV transformers with their associated infrastructure and steelwork (see Figure 3).

4.5 TRANSMISSION LINES

In order to connect the proposed OCGT power plant to the existing transmission network, two 400kV transmission lines would be required between the power plant and the existing Proteus substation. The towers would be erected approximately 400m apart within a confined servitude width of 55m for each line. Two sets of transmission lines are required in order to secure a constant and reliable supply to the Proteus substation in the event of one of the lines requiring maintenance or experiencing faults.

4.5.1 Proposed Route Alignments

Three route alignments between the OCGT power plant site and the Proteus substation have been identified (see Figure 4). A description of each proposed alternative route follows. For all the alternatives, the two transmission lines would run parallel to each other within the minimum required combined servitude. In addition, for all alternatives, the transmission lines would pas south of the Proteus substation and then around to enter the substation at its north-western side, since the vacant space allocated for the purpose is located there (see Figure 4). The servitude rights will be acquired by Eskom and certain constraints would be imposed on the types of activities that could be permitted within the servitude.

a) Route Alignment - Alternative 1

The two transmission lines would exit the OCGT power plant on its north-western side, cross over the railway line, run in a north-north-westerly direction for approximately 2km along a farm boundary, towards the R327. Thereafter the proposed route runs adjacent to the R327 for the remaining 10km to Proteus substation. This alternative crosses farmland before forming part of an existing utility corridor comprising a road, telephone lines and distribution lines. The total length would be approximately 12km.

b) Route Alignment - Alternative 2

The two transmission lines would exit the OCGT power plant on its north-western side and follow the alignment of the existing two 132kV transmission lines that run between PetroSA and Proteus substation. The proposal is to erect the two new transmission lines parallel and to the west of the existing transmission lines. The alignment would traverse a number of farms, a secondary road and cultivated land. The total length would be approximately 10km.

c) Route Alignment - Alternative 3

This route alignment exits the OCGT power plant on its western side and runs parallel and to the north of the railway line in a westerly direction for approximately 4km to Kleinberg. The transmission lines would cross over an existing secondary road to run parallel to an existing 66 kV distribution line. The transmission lines would then follow a route of about 10km running northwards along a valley to the Proteus substation. This alignment follows an existing utility corridor (railway line), and traverses cultivated land as well as less disturbed valleys. The total length would be approximately 14km.

4.5.2 Proposed Tower Configurations

Alternatives in tower structures have also been identified. Tower structures that are being considered for the project are:

- Compact cross rope suspension towers;
- Cross rope suspension towers;
- Self supporting bend or strain towers; and
- Self supporting towers.

To a large degree, the choice of tower design would depend on the terrain and route alignment. A combination of the following tower designs would be used:

a) Compact cross rope suspension towers

The compact cross rope suspension tower (including stays wires) is approximately 49m wide and 38m high (see Figure 6). The conductors are suspended in a triangular configuration and the tower resembles a V-type structure with the top width being 19m wide.

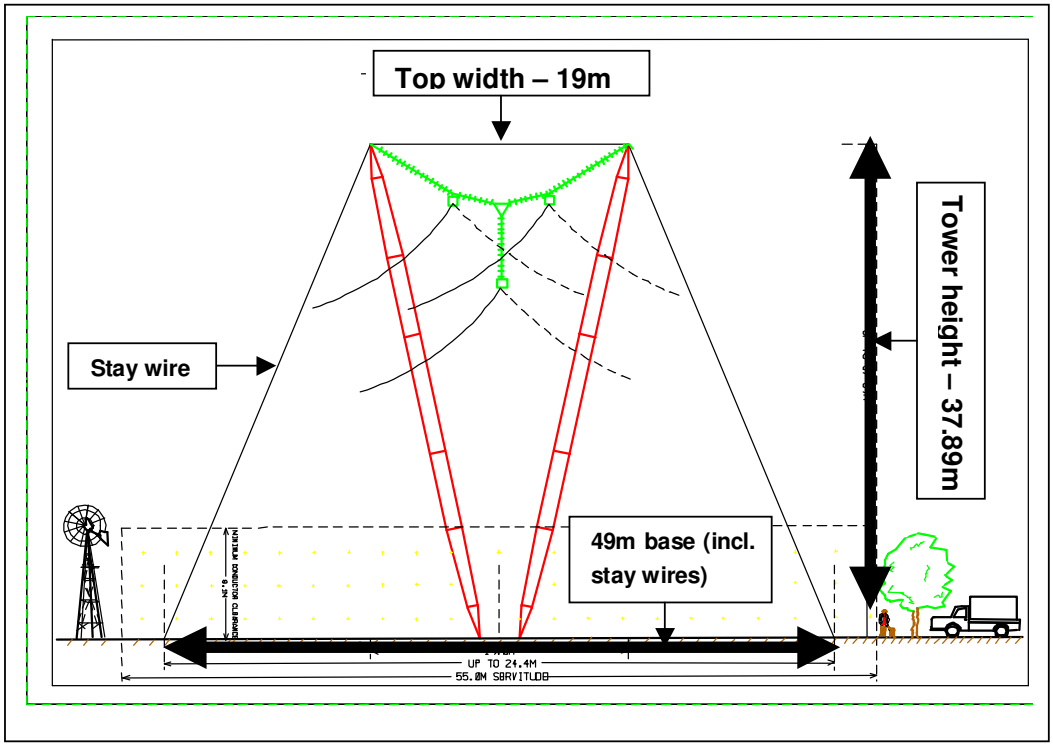


Figure 6: Diagrammatic representation of the compact cross-rope suspension tower configuration

b) Cross rope suspension tower

A larger version of the compact cross-rope tower, these structures are characterised by two steel vertical legs and a cross-rope forming the horizontal arm from which the conductors are suspended. Stay wires are used to securely anchor the structure (see Figure 7). The tower configuration is approximately 38m high and 21m wide (excluding the anchors). The distance between the anchors at the base of the structure can be up to 80m.

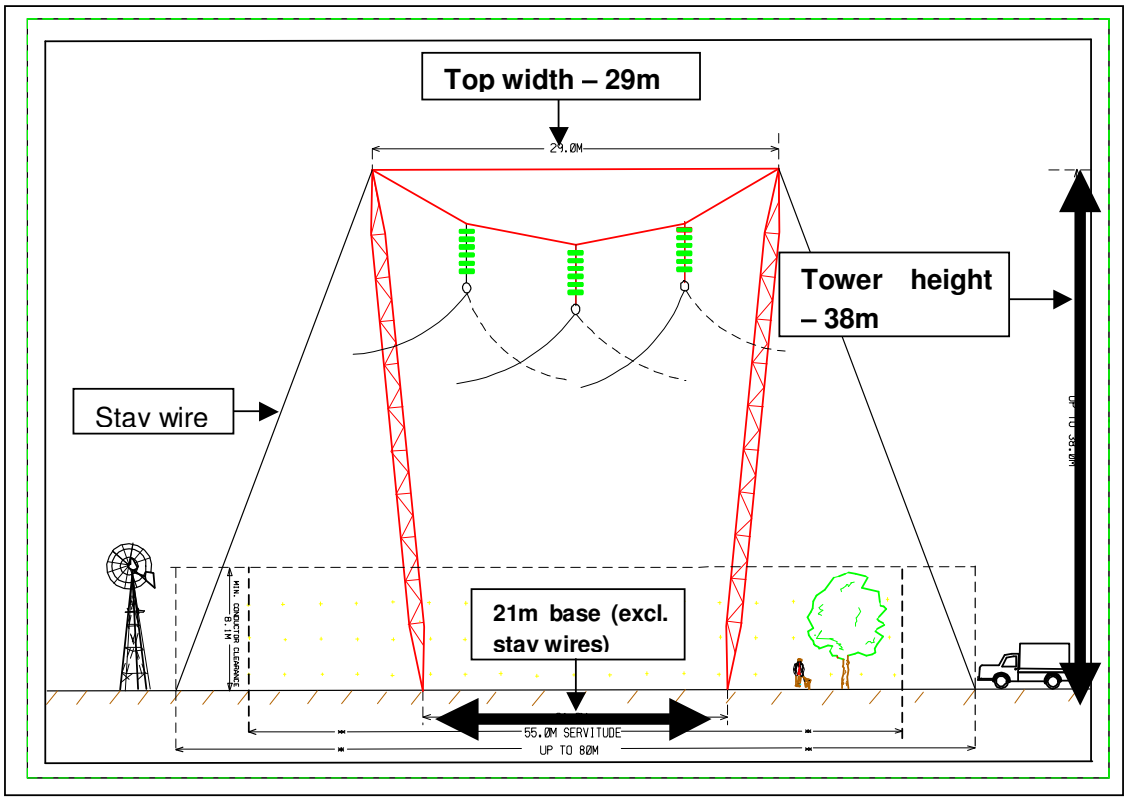


Figure 7: Diagrammatic representation of the cross-rope suspension tower Configuration

c) Self supporting bend or strain towers

These suspension towers consist of a number of steel components that are joined together to form a steel-intensive structure. The tower is approximately 30m high and 22.5m wide (see Figure 8). These types of structures are typically used at bend point on a transmission line alignment.

d) Self supporting tower

The self-supporting towers consist of a number of steel components that are joined together to form a steel-intensive structure (see Figure 9). The tower is approximately 30m high and 20m wide at the apex. The base of the tower is approximately 8.8m wide.

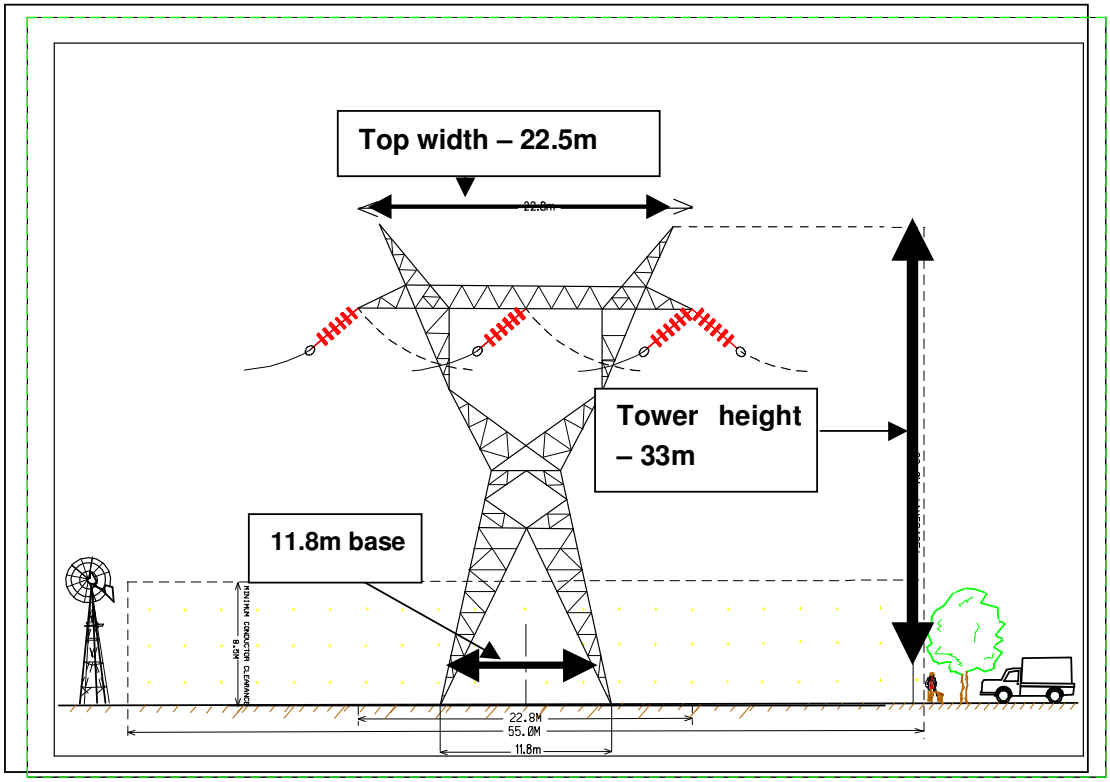


Figure 8: Diagrammatic representation of the self supporting strain tower configuration

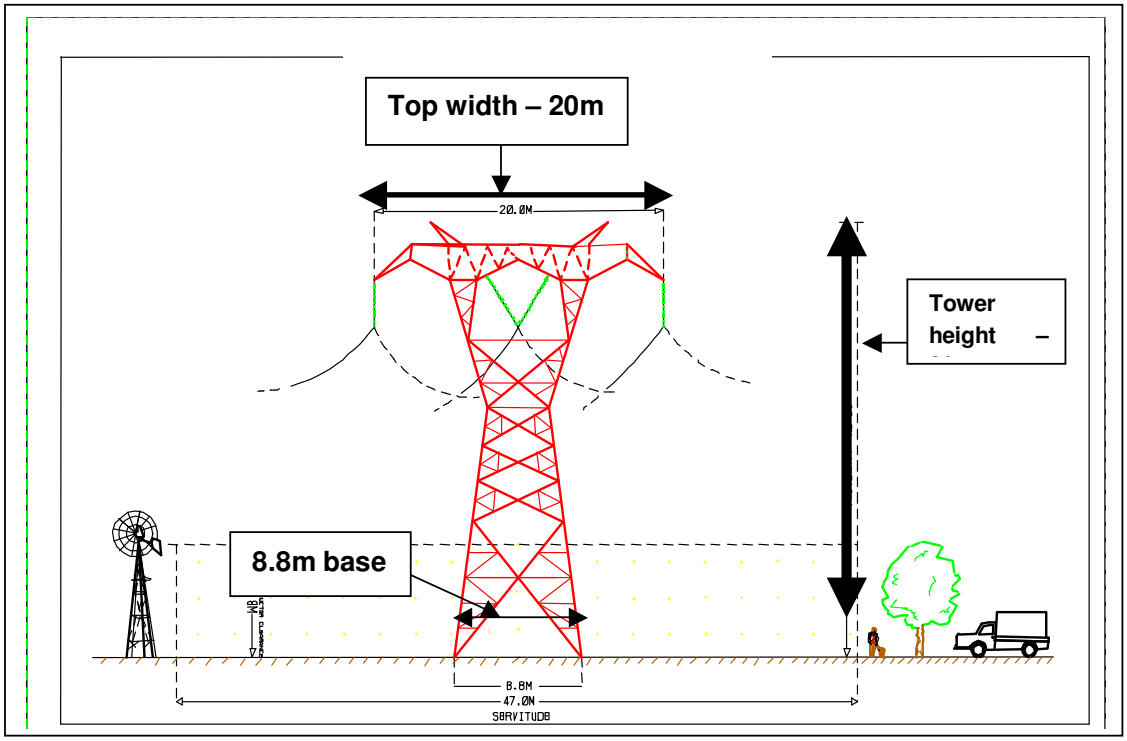


Figure 9: Diagrammatic representation of the self supporting tower configuration

4.6 ACCESS

4.6.1 Road Access to OCGT Power Plant

It is proposed to provide road access to the OCGT power plant off the N2 National Road. There is an existing access road to the landfill site (west of PetroSA), from which point a new road would be required.

From the landfill site to the OCGT power plant site, two alternative access routes (see Figure 4) have been identified. The section of the road would run along the western boundary of PetroSA and would either continue along the alignment of the existing 132kV overhead transmission lines or along the railway line (see Figure 4). The intention is to align the proposed fuel supply pipeline discussed in Section 4.3 with the road access route, thereby optimising on a single utility corridor.

4.6.2 Road access to proposed transmission line routes

Access will also be required to reach the various transmission line towers in order to construct the overhead transmission lines. The access route would also be used for maintenance purposes during the operational phase of the transmission lines as well.

4.7 WATER SUPPLY

Water required for the operation of the OCGT power plant would be sourced from PetroSA who obtain their supply from the Wolwedans Dam inland from Hartenbos. Water supply and demand is a key issue in the greater Mossel Bay area. The implications of increased demand on this source by various users is an important factor in this study.

If the wet NO_x abatement measures, as discussed in Section 4.2.2, were to be implemented, approximately 547 000 kilo litres of water (which equates to 1½ parts water to 1 part fuel) would be required per year.

Options for acquiring de-mineralised water include Eskom building a water treatment plant and de-mineralising the water themselves or to purchase the de-mineralised water from PetroSA. Fifteen percent of the water that goes into the de-mineralisation process is also wasted as brine. This would be formally disposed of in the appropriate manner and the possibility of utilising the waste site adjacent to PetroSA will be pursued.

Water is also required for fire protection on site and for blade washing. Blade washing would occur approximately every six months and would require approximately 1 000 litres of water per turbine per wash. Effluent from blade washing would be disposed of appropriately. Fire prevention would also require access to a water source.

4.8 STORAGE TANK FARM

The proposed development includes the installation of a number of storage tanks within the boundary of the OCGT power plant site. The number and volumes of tanks required would be informed by the present investigation and would depend on the amount and type of water required for the operation of the OCGT power plant. Storage tanks may be required for the following liquids:

- Kerosene;
- Demineralised water;
- Raw water;
- Neutralised water;
- Acid;
- Caustic; and
- Waste water.

5 PUBLIC PARTICIPATION

Public participation forms an integral part of the EIA process and plays a crucial role in the scoping process. To ensure that all issues relevant to the project are identified, comprehensive public scoping has taken place.

A variety of methods were used and are discussed below.

5.1 MEDIA NOTICES

As part of the public participation process, media notices were used to inform the general public of the project and invite them to a public forum, which was held on 3 May 2005. There notices were published in national, regional and local newspapers (see Annexure 3). The notices also informed the public that a Background Information Document (BID) was available and contact details were provided. The notices were published in English and Afrikaans in the following newspapers:

National Newspapers	**Date**
Rapport	17 April 2005
Sunday Times	17 April 2005
Region Newspapers	
Die Burger	15 April 2005
Cape Times	15 April 2005
Local Community Newspapers	
Mossel Bay Advertiser	15 April 2005

5.2 BACKGROUND INFORMATION DOCUMENT

A BID (see Annexure 4) was compiled which briefly described the background to the project, the proposal in brief, the environmental impact assessment procedure, the initial array of scoped issues, the I&APs identified to date and included a commenting form with a self addressed envelope. An invitation to attend the public forum mentioned above was also included. This BID was made available on the Eskom website as well and was compiled in English and Afrikaans.

In addition, the BID was posted and faxed to the following key people and groups:

- Affected landowners
    - Patrysfontein
    - Leeuwin
    - Haelkraal
    - Bartelsfontein

  - Harterus
  - Buffelskloof
  - Zuurrug;
- PetroSA;
- Voelvlei Farmers Union;
- Ward Councillor;
- Municipal Planning Dept;
- Municipal Electrical Dept;
- Mossel Bay Environmental Partnership;
- WESSA, Southern Cape;
- Earthlife Africa;
- Cape Nature;
- Energy Research Centre;
- Telkom;
- Dept of Trade & Industry;
- Dept of Minerals & Energy;
- Civil Aviation Authority;
- Spoornet; and
- National Electricity Regulator.

5.3 MEETING WITH STAKEHOLDERS

Identified stakeholders such as the affected landowners and local authorities were contacted and consulted as part of the project initiation phase. This occurred on 24 February 2005.

5.4 PUBLIC FORUMS

A Public Forum, which comprised a Stakeholder Meeting (14h30 to 16h00), an Open House (16h00 to 19h00) and a Public Meeting (19h00 to 20h30), was held on 3 May 2005. This interaction with the public took place at the Mossel Bay Library Hall in Mossel Bay. The 'open house' method encourages discussion on a one to one basis between a member of the public and the relevant team member, depending on the concern they may have, whilst the public meetings allowed individuals to attend a formal meeting within a stipulated timeframe and listen to a formal presentation. The information presented at the Stakeholder and Public Meetings was also presented in the form of posters during the during Open House. Information relating to the project proposal in terms of the description, motivation and proposed environmental process were displayed and presented at each of the public engagement opportunities.

Members of the project team were available for the duration of the public forum to answer questions and discuss the available information. Comment forms were made available so that any issues identified could be recorded and addressed. Eight people attended the public forum and 12 written submissions in total were received (see Annexure 5). Copies of the attendance registers for the Stakeholder and Public Meetings are presented in Annexure 6. An Issues Trail

tabulating the comments received, and responses thereto, is included in Annexure 7. Annexure 8 lists all the I&APs registered during this Scoping Phase of the EIA process.

6 SCOPED ISSUES

As a result of the scoping process described in this report, the following issues had been identified and potential environmental impacts are noted and discussed.

6.1 BOTANICAL ISSUES

With reference to Section 3.3, the broader study area lies in the heart of the Cape Floral Kingdom and a number of endemic plant species are present within the Mossel Bay area and potentially within the study area. Possible impacts could be the destruction of botanical species of significance.

With reference to the transmission line, the fuel pipeline and access route alternatives presented in this report, the intention is to commission a botanical study that will examine and evaluate the proposed alternatives. Along with the evaluation, recommendations should be made with regard to the impact of each alternative on the botanically significant areas.

With reference to the OCGT power plant and transmission substation site it is recommended that the aforementioned botanical investigation assess and evaluate the botanical sensitivity of the proposed site. Where appropriate, recommendations or mitigation measures should be provided. This information will form part of the assessment phase of the EIA process. The draft Terms of Reference (ToR) for the botanical impact assessment is as follows:

- Attend a one-day site inspection.
- Source and review baseline information and participate in the finalisation of the ToR.
- Undertake a second site visit and compile a report which reflects the following[7]:
    - Broad description of the ecological characteristics of the site and surrounds;
    - Identification and description of biodiversity pattern at community and ecosystem level (main vegetation type, plant communities in vicinity and threatened/vulnerable ecosystems), species level (Red Data Book species) and in terms of significant landscape features (e.g. wetlands) and presence of alien species;
    - General comment on whether biodiversity processes would be affected;
    - Significance of potential impacts and recommendations to prevent or mitigate these;
    - Ranking in terms of flora impact severity of the transmission line route alternatives in particular; and

[7] Derived from the Botanical Society of SA Conservation Unit's *Recommended Terms of Reference for the Consideration of Biodiversity in Environmental Assessment and Decision-making*. March2005.

- Indicating the salient elements of the report on a map to be provided by Ninham Shand.

6.2 AVIFAUNAL ISSUES

Various bird species are attracted to areas that are cultivated with wheat as well as to the better vegetated valleys located south of the Proteus substation.

It is recommended that an avifaunal specialist be commissioned to determine whether the proposed alternative transmission line routes would pose particular risks to birds. In addition, bird habitat areas would need to be determined and mapped. The specialist will examine the proposed alternatives in the light of information acquired and determine the impact of the alternatives on avifauna. Where appropriate, recommendations or mitigation measures should be provided. This information will form part of the assessment phase of the EIA process. The draft ToR for the avifaunal impact is as follows:

- General description of the occurrence and status of birdlife in the study area;
- Description of avifaunal habitats likely to be affected;
- Identification of rare or endangered species occurring in the study area;
- Assessment of potential interactions between identified bird species per transmission line alternative and affected habitat; and
- Provide a report capturing the above and including recommendation to mitigate possible impacts on birdlife.

6.3 ATMOSPHERIC EMISSIONS

The proposed OCGT power plant will result in the release of gaseous and particulate emissions, viz. sulphur dioxide, NO_x and carbon dioxide. In addition, heat is emitted from the OCGT power plant via the hot exhaust gasses.

It is intended that the impact of the OCGT power plant on the ambient air quality and temperature be investigated and modelled and that appropriate recommendations or mitigation measures be provided.

In addition, the suitability and effectiveness of the proposed NO_x abatement alternatives need to be assessed in this investigation. This information will form part of the assessment phase of the EIA process. The draft ToR for the air quality impact assessment is as follows:

- The Establishment of the Baseline:
  - Description of the atmospheric dispersion potential of the area based on available meteorological data.
  - Characterisation of the existing status of air quality based on any available air quality monitoring data.

- Provide an overview of legislative and regulatory requirements pertaining to atmospheric emissions and ambient air quality, including local and international air quality guidelines and standards.

- Predicted Impacts Arising from the Proposed Plant:

  - The compilation of a comprehensive emissions inventory including process and fugitive emissions. The impact assessment would consider, as a minimum, airborne particulates (inhalable and total suspended particles), oxides of nitrogen, carbon monoxide, sulphur dioxide, unburnt organic compounds, carbon dioxide (greenhouse gas) and any odorous compounds. Where possible, engineering estimates would be used (based on similar installations). Alternatively, international emission factors would be employed which are based on gas (distillate) firing rates. Fugitive emissions include both gaseous (diffuse sources) and particulate compounds. Although only expected to be significant during the construction phase, fugitive dust emission sources include vehicle-entrained dust, earthworks, stockpiles, material transfer and general exposed areas.
  - Preparation of meteorological parameters suitable for the theoretical construction of a wind field and atmospheric dispersion. Hourly average wind speed, wind direction and ambient air temperatures for five years would be prepared for this purpose.
  - Atmospheric dispersion modelling of estimated emissions to determine resultant highest hourly, highest daily and annual average air pollutant concentrations in the vicinity of the proposed plant. The impact would be based on ground level predictions, including both air concentrations and deposition. Gas deposition would include both wet (fog) and dry. The following scenarios would be included:

    - Construction emissions;
    - Routine and upset emissions during normal operation;
    - Emissions during shutdowns; and
    - Effects of mitigation measures e.g. optimum stack height and other engineering options.

  - Impact assessment (incremental and cumulative) of the predicted air concentrations including:

    - Compliance checks with local ambient air requirements, including local authorities, DEAT and South African Standards.
    - Health risk assessment using internationally peer-reviewed risk criteria (typically, the World Health Organisation, US Environmental Protection Agency [IRIS], Agency for Toxic Substances and Disease Registry [ATSDR] and Health Canada).

- Emission compliance check with local and international requirements (e.g. World Bank).

    - Impact Assessment Rating in terms of Magnitude, Significance, Frequency of Occurrence, Duration and Probability.
    - Preparation of emission and ambient air monitoring programme.
    - Compilation of a comprehensive report in which the methodological approach and assumptions and uncertainties used are documented and the findings of the study presented.

Key deliverables from this specialist study would include recommendations regarding mitigation measures to reduce/ control emissions, as input into the technical design process, and guidance with respect to the development of an air monitoring protocol for inclusion in the EMP. The following general procedure would used to develop the EMP:

- Focus on Sources and Pollutants identified as significant in the EIA.
- Using emission limits and air quality guidelines, criteria and targets contained in the EIA, develop Key Performance Indicators for both air quality and emissions.
- All mitigation measures and good housekeeping measures to be associated with each source and pollutant.
- Develop a pro-forma monitoring programme, including procedures, responsibilities and reporting formats (both internal and external).
- Incorporate preliminary cost estimates

6.4 WATER CONSUMPTION

As indicated in Section 4.7, de-mineralised water would be required, should wet NO_x abatement measures be implemented. In addition, approximately 1 000 litres of water would be required for blade washing, domestic use and fire protection on site.

As the Western Cape currently has water restrictions due to prolonged drought, the quantity of water required for the proposed development could potentially impact on the available water resources. It is recommended that the potential to source water, and the volumes of water required, be investigated and confirmed. In addition, it is recommended that water reduction and reuse measures be investigated and implemented.

6.5 EFFLUENT MANAGEMENT ISSUES

As indicated previously in Section 4.7, 15% of the water that is required for the de-mineralisation process is wasted as brine. In addition, the blade cleaning process would result in effluent discharge containing cleaning solvent. Brine and other discharge would be disposed off in an appropriate manner, possibly at the waste site adjacent to PetroSA.

The recommendation is to determined whether the waste site can accommodate the effluent which would be created as a result of the de-mineralisation, as well as accepting the waste water from the blade cleaning process. The impact on the receiving environment needs to be determined.

6.6 GEOLOGY AND DRAINAGE

A geotechnical study has been commissioned by Eskom to address the founding conditions of the proposed OCGT power plant site. This information will be accessed during the compilation of the EIR. The findings of this study will have bearing on:

- founding conditions (capability of underlying geology to accommodate the foundations for the proposed structures);
- constructions phase impacts (e.g. exposed substrate and consequent erosion);
- the movement of surface or groundwater; and
- the quality of surface or groundwater.

6.7 TRAFFIC AND ACCESS

With the introduction of this development to the area, a possible impact would be the increased traffic to and from the power plant. However, because of the location of the site on the outskirts of the city, and a low level of vehicle traffic to the power plant once in operation, this should not be a concern. Increased traffic during the construction phase will need to be considered.

The recommendation is that the proposed access route be assessed to determine the impact on the affected environment, including existing infrastructure. The access road required for the transmission line route needs to be investigated to ensure that the access does not cause an impact on the activities adjacent to the powerline servitude. This would also be particularly relevant during the construction phase of the project.

Where appropriate, the traffic implications of the proposed project will be determined and assessed, and recommendations or mitigation measures developed accordingly. This information will form part of the assessment phase of the EIA process and implications during construction will be addressed by means of the EMP (see Section 6.13).

6.8 EXISTING INFRASTRUCTURE

With reference to the proposed site for the OCGT power plant, substation, fuel supply pipeline and access road, the following infrastructure already in place will need to be considered:

- Railway line;
- PetroSA western security fence;
- Smaller farm fences;

- Existing 132kV transmission lines;
- Landfill site and associated roads;
- Construction camp and associated roads; and
- Arrangement of roads and structures within PetroSA facility, in terms of routing of fuel supply pipeline.

As far as the transmission lines route alternatives are concerned, the following existing infrastructure will need to be considered:

- Railway line;
- Farm fences;
- Kleinberg silos;
- Public roads, including the R327 and Patrysfontein, Kleinberg, Rooikoppies and Vrede gravel roads;
- Farmsteads and related buildings, including Bartelsfontein, Patrysfontein, Kleinberg, Vrede Rooikoppies and Rooidrif; and
- Transmission and distribution lines, including 132kV PetroSA-Proteus, 11/22kV lines along R327, 66kV woodpole line to Proteus from Albertinia, and the variety of 400kV and 132kV lines entering and leaving the Proteus substation.

6.9 VISUAL IMPACT

The OCGT power plant and transmission substation could potentially be visible from the N2 National Road and the proposed transmission lines from the R327 as well as the N2 National Road. The visual impact of the proposed development on the surrounding area will need to be determined. How the proposed OCGT power plant, transmission substation and transmission lines are either absorbed by, or inserted into, the other elements that comprise the landscape are important.

How the internal components of the OCGT power plant are arranged, in terms of the visual elements of line, form, colour and texture, are also a consideration. Landscape design and layout of the various components will need to ensure that the visual appearance is not overly intrusive. The issue of light pollution will also need to be addressed.

The intention is that a visual impact assessment (VIA) be undertaken in the assessment phase of this EIA. The VIA will need to take cognisance of the above comments and provide recommendations to ensure a reduced visual impact. The draft ToR for the visual impact assessment is as follows:

- Describe the existing visual characteristics of the site and its surroundings including any geology/landform features that influence them.
- Describe the visual significance of the area in terms of its history and present utilisation.
- Fully describe the proposed development.

- Determine the potential visual risks and opportunities presented by the proposed development.
- Determine the entire area from which the various elements of the proposed development will be visible (i.e. the viewshed.)
- Determine the important viewpoints from which the development will be visible and determine the nature of the visual impacts at these points.
- Prepare graphics that will aid the process of the assessment, (e.g. simulations of the development superimposed, to scale, on photographs taken from important viewpoints.)
- Assess the significance of the visual impact of the proposed development in terms of its scale, type, and character, including services and any ancillary structures pertaining to the development etc.
- Propose possible mitigation measures to minimise visual impact including changes to the design, alternative finishes and visual screening.
- Propose monitoring and review measures that will ensure long-term maintenance of visual standards.

6.10 NOISE

An OCGT power plant would generate noise, which emanates from the intake of air into the gas turbines, the generators, transformers, the pumps' pneumatic controls and the ventilation system. The gas turbine air intake facility would generate the most noise as it is not enclosed.

The recommendation is that a noise impact assessment be undertaken in the assessment phase of this EIA. The noise assessment will need to take cognisance of the above comments as well as the legal requirements associated with noise pollution control. Where appropriate, recommendations or mitigation measures should be provided. This information will form part of the assessment phase of the EIA process. The draft ToR for the noise impact assessment is as follows:

- Determination of the land use zoning and identification of all potential noise sensitive sites that could be impacted upon by activities relating to operation of the proposed OCGT power plants at Atlantis and Mossel Bay;
- Identification of all noise sources relating to the activities of the OCGT power plants during construction and operation, and that could potentially result in a noise impact at the identified noise sensitive sites;
- Determination of the sound emission, operating cycle and nature of the sound emission from each of the identified noise sources. Representative sound measurements are required to be recorded in the vicinity of the proposed sites during different times of day and night. It is estimated that at least two and possibly three days will be needed – assuming acceptable weather conditions. Weather conditions play a deciding factor in the measurement of sound at outdoor sites since sound measurements can only be conducted when wind speeds do not exceed 5m/sec;
- Calculation of the combined sound power level due to the sound emissions of the individual noise sources;

- Calculation of the expected rating level of sound at the identified noise sensitive sites from the combined sound power level emanating from identified noise sources;
- Determination of the existing ambient levels of noise at identified noise sensitive sites by conducting representative sound measurements;
- Determination of the acceptable rating level for noise at the identified noise sensitive sites;
- Calculation of the noise impact at identified noise sensitive sites;
- Assessment of the noise impact at identified noise sensitive sites in terms of SANS 10328; the South African Noise Control Regulations; the World Health Organisation; the World Bank and the Environmental Protection Agency, United States of America;
- Investigation of alternative noise mitigation procedures, if required, in collaboration with the design engineers of the OCGT plants and estimation of the impact of noise upon implementation of such procedures;
- Preparation and submission of a noise assessment report containing the procedures and findings of the investigation; and
- Preparation and submission of recommended noise mitigation procedures as part of a separate environmental noise management and monitoring plan.

6.11 HERITAGE RESOURCES IMPACT

The proposed development could have an impact on heritage resources[8] within the study area. The proposed development would necessitate the excavation of foundations for the OCGT power plant and transmission substation, as well as for the foundations for the tower structures that make up the transmission lines.

It is intended that a heritage impact assessment be undertaken in order to determine whether the proposed OCGT power plant and transmission substation site as well as the proposed transmission lines route alignments impact on any heritage resources. Where appropriate, recommendations or mitigation measures should be provided. This information will form part of the assessment phase of the EIA process. The draft ToR for the heritage impact assessment is as follows:

- Attend a one-day site inspection.
- Review information and participate in the finalisation of the ToR.
- Undertake a heritage study that is reflected in a Heritage Statement.

The Heritage Statement will comprise the following:

- A problem statement, in terms of where, why and how heritage resources may be impacted on;
- A description of the affected environment;

[8] Including archaeological resources.

- Expected impacts related to the site and route selection in general; and
- A ranking in terms of heritage impact severity of the transmission line route alternatives in particular.

6.12 SOCIO-ECONOMIC IMPACTS

The proposed project would have implications for the socio-economic conditions, both at a local and regional scale. It is therefore intended that a socio-economic specialist would comment on the proposed site location in terms of the potential economic impacts and its suitability in terms of identified economic criteria.

The input will also involve a baseline study, which will comprise of a comparative analysis of the different identified routes for the transmission lines.

As part of this task, the specialist will develop a checklist of possible economic criteria. Examples of such criteria include the following:

- Creation of job opportunities
- The sterilization of agricultural land
- The impact of tourism activities
- Potential loss in income
- Potential socio-economic impacts

The specialist will develop an economic score card, which will rate the different routes according to the economic criteria determined as part of this task. The findings from the economic score card will provide a preferred route along which to develop the transmission lines based on economic principals.

It should be noted that the proposed development will not provide significant employment opportunities, since indications are that only eight to 10 permenent jobs will be created.

A macro-economic impact study of the proposed project has been commissioned by Eskom and this information will be accessed during the compilation of the EIR.

6.13 CONSTRAINTS IMPOSED ON THE PROPOSED PROJECT BY EXISTING ACTIVITIES

The constraints imposed on the proposed OCGT power plant and transmission lines by existing or planned human activities will need to be determined. This will include the activities of PetroSA as well as the adjacent farms. Issues of possible concern would be the compatibility of land uses, e.g. pivot irrigation in proximity to a transmission line, the implications for livestock of tower support stays etc.

6.14 CONSTRUCTION PHASE IMPACTS

The construction of the proposed development could have negative impacts on the receiving environment. It is recommended that the general impacts of the construction phase be identified and evaluated and recommendations made for mitigation. It should be noted that a comprehensive Environmental Management Plan (EMP), to regulate and minimise the impacts of the construction phase, would be a condition of authorisation and this has been factored into the EIA process underway. This EMP would be implemented in entirety for the OCGT power plant construction phase. The transmission line construction will be addressed by means of an existing proceduralised approach that Eskom will apply.

6.15 OPERATIONAL PHASE IMPACTS

The operational phase of the proposed development could have a negative impact on the receiving environment. The impacts of the operational phase of the OCGT power plant need to be identified and evaluated, and recommendations made for mitigation. In this regard, a generic operational phase EMP will be compiled to address these impacts.

A risk assessment that addresses issues relating to, *inter alia*, the transport, storage and use of hazardous materials, would inform the operational phase EMP (see Section 6.3). Such an assessment is intended to identify potential areas of risk and the types of contingencies that may be considered. A risk assessment of major hazardous materials/ installations has been commissioned by Eskom and this information will be accessed during the compilation of the EIR.

7 CONCLUSION AND WAY FORWARD

This Draft Scoping Report identifies the environmental issues and concerns raised during the Scoping Phase of the project, in response to the proposed development alternatives formulated to date. The issues and concerns were raised by I&APs, authorities, the project team as well as from initial specialist input.

As a result of the scoping process undertaken thus far, the following specialist studies, (as discussed in Chapter 6) have been identified:

- Botanical impact assessment;
- Avifaunal impact assessment;
- Heritage impact assessment;
- Visual impact assessment;
- Air quality impact assessment;
- Noise impact assessment; and
- Socio-economic impact assessment.

These studies will assist in informing the EIR Phase, along with essential contributions from the other components of the project team. Please refer to Annexure 9 for the draft Plan of Study for EIR (PoSEIR). The draft PoSEIR details how the EIR Phase will be undertaken and will need to be accepted by DEA&DP.

This Scoping Report is being released in draft form, to enable I&APs to comment on the project proposal, issues identified, the specialist's ToR and the draft PoSEIR. Comments received will be addressed and I&APs will have further opportunities to comment within the EIA process. Once the identified specialist studies have been completed, an opportunity will be provided for I&APs to comment on the Draft EIR, which will capture the entire EIA process.

You may therefore submit any comments that you may have on or before 23 June 2005 to:

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ANNEXURE 1: ESKOM SCREENING STUDY

ANNEXURE 2: ACCEPTANCE OF PLAN OF STUDY FOR SCOPING

ANNEXURE 3: MEDIA NOTICES

ANNEXURE 4: BACKGROUND INFORMATION DOCUMENT

ANNEXURE 5: COPIES OF COMMENTS RECEIVED

ANNEXURE 6: ATTENDANCE REGISTER – FIRST PUBLIC FORUM

ANNEXURE 7: ISSUES TRAIL

ANNEXURE 8: I&AP DATABASE

ANNEXURE 9: DRAFT PLAN OF STUDY FOR EIR

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