

4 NEED AND DESIRABILITY FOR THE PROPOSED DEVELOPMENT

4.1 Introduction

Electricity supply throughout the world is undergoing a revolution. At a global level this is being caused mainly, but not solely, by electricity utilities having to meet new pressures resulting from global markets, where national governments are open to foreign investors to help fund power sector expansion and development. As a result, utilities are having to act as businesses. South Africa is not immune to these forces, and will have to move broadly in line with developments taking place in the rest of the world, while also ensuring that the supply industry evolution meets South Africa's special requirements. At a local level, the main drivers for change in South Africa are potential economic efficiency gains and technological change - for example, different economies of scale in power plant construction, and new information and control technologies (White Paper on the Energy Policy of the Republic of South Africa, December 1998).

The South African Government is currently targeting a six percent economic growth rate, which is equivalent to an average increase of four percent in electricity demand. Eskom is currently experiencing increased demand in excess of four percent. Based on Eskom's projections, there is a requirement for more than 40 000 Megawatts (MW) of new electricity generating capacity over the next 20 years in South Africa. A number of new coal fired power stations are currently being considered, with two new base load power stations approved to come on-line between 2012 and 2016. However, these are not sufficient to meet the demand for electricity and additional power stations will be required.

The Eskom Conversion Act, 2001 (Act No. 13 of 2001) establishes Eskom Holdings Limited (Eskom) as a State Owned Enterprise (SOE), with the Government of South Africa as the only shareholder, represented by the Minister of Public Enterprises. The main objective of Eskom is to *provide energy and related services including the generation, transmission, distribution and supply of electricity, and to hold interests in other entities.*

4.2 Transmission demands and loads in the Western Cape

This section discusses the situation experienced in the Western Cape relative to the above national context; as this Province is relevant to this EIA. The electricity supply to the Western Cape is currently limited to the power transferred to this province via the Transmission Network, the power generated by the two Koeberg Units, as well as the power generated at various peaking power stations (refer to **Table 4.1**).

The base-load Koeberg power plant supplies only about 45% of the Western Cape power demand. During refueling and/or complete loss of Koeberg generation the Western Cape system relies heavily on the transmission network from the highveld generation pool for satisfactory levels of network security. This vulnerability in the supply system was the cause of the blackouts and load shedding that occurred during 2005 and 2006 (City of Cape Town State of the Energy Report, 2007).

The historical five-year average growth in the Cape is 3% per year. However, the Accelerated Shared Growth Initiative of South Africa (ASGISA), which government is adopting, is expected to result in a 4% electricity demand growth across the country. Given that certain areas would grow faster than others, load growth should be considered within a possible range rather as a single figure.

Table 4.1 indicates growth figures assumed for the Western (Western Cape) and Eastern (Eastern Cape) Grids .

Table 4.1: Load forecast for the Western and Eastern Cape provinces) (Source: Eskom)

AREA DESCRIPTION	2007	2008	2010	2012	2014	2017	2020	2025	2027
Southern Grid (12% average)	1508	1668	2536	3411	3718	4238	4455	5154	5245
Western Grid (3% average)	3991	4222	4467	4727	5002	5295	5605	5934	6283

NOTE: Table 4-2 is in MW

The forecast for the Western Grid is therefore based on assumption of constant growth of the existing load, plus some new development in certain areas. Growth in this region can be considered to fall within an envelope of 2% - 3% per year.

4.3 Proposed new power plants within the Western Cape

In line with Eskom's policy to diversify the fuel mix from the current high dependence on coal, as well as to reduce overall emissions, other types of generation are under consideration. This includes conventional nuclear power to meet the large scale base generation requirements. A major advantage of a nuclear power stations is that they are not dependant on the location of coal, but rather on the availability of water for cooling.

The establishment of a fleet of nuclear power stations on the Cape coast will significantly improve the security of the network and delay the need for new transmission lines between the Cape and the northern part of the country for a substantial period of time. There will also be a major savings in losses, as the power will be generated closer to the load instead of in the north of the country and then transported down to the Cape. This in turn reduces the amount of new generation required to meet the overall system loads.

As part of its assessment of a range of electricity supply options, Eskom Holdings Limited is investigating the feasibility of establishing a conventional nuclear power station ("Nuclear-1") at a site within the broader Cape region. The Environmental Impact Assessment (EIA) investigating three sites for nuclear power is currently being undertaken by Arcus GIBB (Pty) Ltd (Department of Environmental Affairs and Tourism (DEAT) Reference number 12/12/20/944). The Scoping Phase¹ for this EIA has been completed. The sites that will be investigated in the detailed assessment phase of the EIA process are:

¹ For further information, please visit the "Nuclear-1" project by following the link: http://www.eskom.co.za/live/content.php?Item_ID=4011

- Bantamsklip (Western Cape – 10 km south-east of Pearly Beach);
 - Duynefontein (Western Cape – Adjacent to the existing Koeberg Power Station, Cape Town); and
 - Thyspunt (Eastern Cape – West of Port Elizabeth near Cape St Francis).
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4.4 Proposed new power transmission lines within the Western Cape

All conventional nuclear power plants have to be integrated within a transmission network. As such, Eskom Transmission is investigating possible transmission power line routes from each of the three sites under investigation in terms of a maximum of 4000MW of generating capacity that is considered practical for each individual site.

The proposed transmission power lines are part of a broader network strengthening programme aimed at increasing available electricity capacity in specifically the Western grid. The overall purpose of the transmission lines is therefore to increase the reliability of power supply to the Western Cape. The transmission system aims to meet the expected future increases in load demand, maintain existing levels of reliability and quality of supply, minimise cost, and reduce potential negative environmental impacts.

4.5 Benefits of the proposed development

After the major 765 kV network reinforcement to the Cape, scheduled to be completed by 2015, the system will be secure until around 2018-2020, depending on the actual load growth.

The advantages of the newly proposed transmission lines include:

- Creation of a more flexible electrical network;
- Improvement in the overall reliability of the electrical systems, which will be of benefit to both Eskom and to all electricity users in the region;
- The availability of a reliable electricity supply of good quality is fundamental to investment and economic growth within Western Cape. The medium to long-term socio-economic benefits of this project are accordingly significant; and
- The proposed power station and the associated power lines will reduce the inherent risk profile of the national grid by augmenting the existing supply, resulting in less frequent power outages and an improved quality of electricity supply at a national level.