Eskom contributes to its vision of "together building the powerbase for sustainable growth and development" through its core business focus on electricity generation, transportation, trading and retail. The following four strategic objectives are key to achieving this vision:

» ***Sustaining quality and continuity of supply:***
This requires effective management of total system capacity and reliability planning, focusing on primary energy availability, maintenance, refurbishment and energy efficiency. Stretch targets that ensure quality and continuity of supply need to be set, while maintaining rigorous occupational health and safety standards.

» ***Capacity expansion:***
Successful delivery on the capacity expansion programme is central to Eskom's vision and entails thorough environmental impact assessments, site selection and optimisation, procurement efficiency, project management and commitment to health and safety in the construction environment, while rigorously applying Eskom's climate change and air quality strategies. The challenge is to build new plant, on time and on budget, while running existing plant at optimal levels.

» ***Funding and resourcing:***
The build programme imposes significant funding and resourcing requirements. Appropriate skills and information management systems are also vital to ensure a sustainable business and delivery on the build programme. Other key factors include multi-year pricing determination, revenue management, efficiency initiatives and Eskom's skills acquisition and retention strategies.

» ***Leveraging business operations for developmental benefits:***
Sustainability shapes the way Eskom conducts business and provides the context for its developmental initiatives.

The magnitude of Eskom's current business procurement spend and the planned capacity expansion programme create opportunities for maximising the organisation's contribution to government's Accelerated and Shared Growth Initiative for South Africa (ASGI-SA). The mechanisms include the fostering of small and medium enterprises, black women-owned businesses and skills development, accelerated electrification and Eskom's corporate social investment

spend. Local content will be a core requirement when major contracts are awarded.

Over the last decade, South Africa has experienced a steady growth in the demand for electricity on the back of healthy economic growth. The continued growth in the economy has progressively reduced Eskom electricity reserves. It is expected that the reserve margin will continue on a downward trend for the next seven years until new base-load power plant is built (2014). In spite of new capacity coming on-line, which includes bringing back mothballed power stations and commissioning Open Cycle Gas Turbine plants, the electricity demand within the country is still higher than available capacity. Eskom is stepping up the implementation of this capacity expansion programme and will invest about R150 billion over the next five years in the upgrading of South Africa's power supply infrastructure. The biggest percentage of the expenditure will go towards improving generation capacity through, among others, the construction of new power stations.

The decision to expand Eskom's electricity generation capacity is based on **national policy** and informed by on-going strategic planning undertaken by the national Department of Minerals and Energy (DME), the National Energy Regulator of South Africa (NERSA) and Eskom. Strategic decisions regarding the electricity generation options to meet energy requirements within the country are made through this strategic planning process. The acceptability of options investigated at a project-specific level from a technical, economic and environmental perspective.

The hierarchy of policy and planning documentation is illustrated in Figure 2.1.

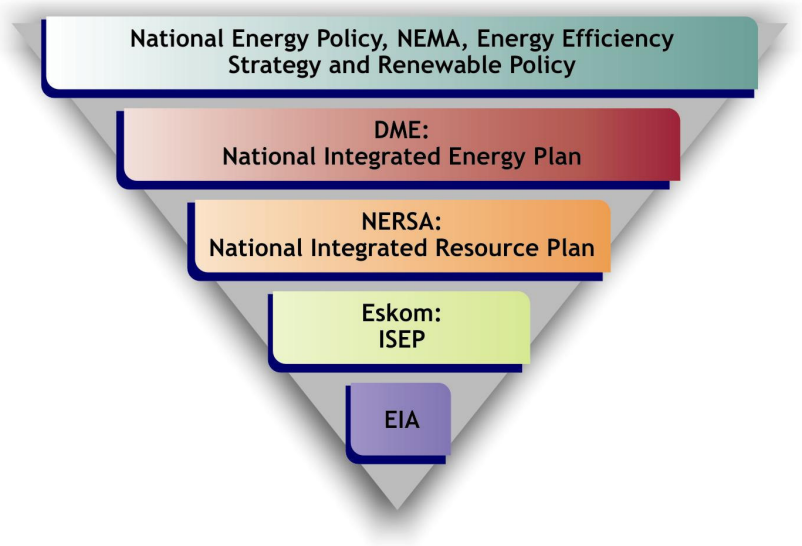

Figure 2.1: Hierarchy of electricity policy and planning documents

2.1. 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 a National Energy Policy (the National Energy Policy), published by DME in 1998. This White Paper identifies five key objectives for energy supply within South Africa, that is:

» Increasing access to affordable energy services
» Improving energy sector governance
» Stimulating economic development
» Managing energy-related environmental impacts
» Securing supply through diversity.

Furthermore, the National Energy Policy identifies the need to undertake an Integrated Energy Planning (IEP) process and the adoption of a National Integrated Resource Planning (NIRP) approach. Through these processes, the most likely future electricity demand based on long-term southern African economic scenarios can be forecasted, and provide the framework for South Africa (and Eskom) to investigate a whole range of supply and demand side options.

2.2. Integrated Energy Plan (IEP) - 2003

In response to the requirements of the National Energy Policy, the DME commissioned the Integrated Energy Plan (IEP) 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 between the energy demand and resource availability to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters.

The IEP projected that the additional demand in electricity would necessitate an increase in electricity generation capacity in South Africa by 2007. Furthermore, the IEP recognises:

- That South Africa is likely to be reliant on coal for at least the next 20 years as the predominant source of energy.
- That new electricity generation will remain predominantly coal-based, but with the potential for hydro, natural gas, and nuclear capacity.
- The need to diversify energy supply through increased use of natural gas and new and renewable energies.
- Continuing investigations into nuclear options as a future new energy source.
- The promotion of the use of energy efficiency management and technologies.
- The need to ensure environmental considerations in energy supply, transformation and end use.
- The promotion of universal access to clean and affordable energy, with the emphasis on household energy supply being co-ordinated with provincial and local integrated development programmes.
- The promotion of the use of energy efficiency management and technologies.
- The need to maximise load factors on electricity generation plants to lower levelised lifecycle costs.
- The need to lessen reliance on imported liquid fuels by exploring and developing oil and gas deposits.
- The need to increase existing oil refineries capacity where appropriate rather than greenfields development.
- The continuation of existing synfuel plants and supplement with natural gas as feedstock.
- The need to introduce policy, legislation and regulation for the promotion of renewable energy and energy efficiency measures and mandatory provision of energy data.
- The need to undertake integrated energy planning on an on-going basis

2.3. National Integrated Resource Plan (NIRP), 2003/2004

In response to the National Energy Policy's objective relating to affordable energy services, NERSA commissioned a National Integrated Resource Plan (NIRP) in order 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. The planning horizon for the study was from 2003 to 2022.

The objective of the NIRP is to determine the least-cost supply options for the country, provide information on the opportunities for investment into new power generating projects, and evaluate the security of supply. The NIRP also provides an assessment of the system reliability and serves as a benchmarking tool for market performance. It also examines specific public policies, including those on security of electricity supply and risks associated with the current system.

The national electricity demand forecast took a number of factors into account. These include:

» 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 electricity-intensive industries over the 20-year planning horizon.
» A reduction in the number of electricity consumers–NIRP anticipates people switching to the direct use of natural gas.
» The supply of electricity to large mining and industrial projects in Namibia and Mozambique.
» Typical demand profiles.

Various demand-side management and supply-side options are considered in the NIRP process, prior to identifying the least cost supply options for South Africa. The outcome of the process confirmed that coal-fired options are still required over the next 20 years, and that additional base load plants will be required from 2010.

The first NIRP (NIRP1) was carried out during 2001. The second NIRP was carried out under the auspices of the NER in the period 2003-2004, and shows vast improvements to NIRP1. It provides moderate and high electricity and demand forecasts, a complete database of the cost and performance of the generation plant considered in the optimisation, detailed output results, methodology applied in the planning process and risk and sensitivity analyses.

Other important changes from NIRP1 is the inclusion of risk and sensitivity analyses and scenarios to address risk factors and uncertainties that are associated with the long-term demand forecast; performance of existing generation plants; sustainability and delivery of demand-side management (DSM) options, including interruptible load supplies and changes in the electricity demand load shape. Further, NIRP2 takes into account transmission integration costs and credits for regional location of new capacity that were not considered in the previous national resource plan.

2.4. Integrated Strategic Electricity Planning (ISEP) in Eskom

Eskom uses a modelling tool called Integrated Strategic Electricity Planning (ISEP) to plan its future capacity strategy. By analysing usage patterns and growth trends in the economy, and matching these with the performance features of various generation technologies and demand side management options, ISEP identifies the timing, quantity and type (base load or peaking) of new capacity options required in the long-term. These options include the Return-to-Service of the three mothballed coal-fired Simunye Power Stations (i.e. Camden, Komati and Grootvlei), conventional pulverised fuel power plants (i.e. coal-based power), pumped storage schemes, gas-fired power plants, nuclear plants, greenfield fluidised bed combustion technologies, renewable energy technologies (mainly wind and solar projects), and import options within the Southern African Power Pool. As the older Eskom power plants reach the end of their design life from approximately 2025 onwards, the use of all available technologies will need to be exploited to replace these in order to supply the country's growing electricity demand.

Comment: Do we want to include something on the IPPs?

The ISEP process identifies the timing, quantity and type (e.g. base load or peaking) of new electricity generating capacity required over the next 20 years. The planning scenarios are based on an average 4% growth in demand for electricity over the 20-year period. This translates into a 6% growth in GDP. The most recently approved ISEP plan (ISEP11) identified the need for increased *peaking* electricity generating by *2007* and additional *baseload* capacity by approximately *2010*. An increase in peaking supply has since been achieved through the commissioning of new plant, including the OCGT units at the Ankerlig and Gourikwa Power Stations in the Western Cape. Figure 2.2 illustrates Eskom's "project funnel", which shows the range of supply options being considered by Eskom to meet the increasing demand for electricity in the country. There are many projects at various stages in the project funnel including research projects, transmission lines and generating options in South Africa and Southern Africa.

As is evident in Figure 2.2, the proposed Gourikwa Power Station conversion and transmission integration project is currently within the feasibility/business case phase (indicated by the yellow circle entitled 'OCGT Conversion'), i.e. this project is currently being investigated in terms of its economic, technical and environmental feasibility.

Comment: Do we need to explain why this is only for 400MW when the potential is to convert both power stations with a maximum additional capacity of 1120MW? Also, do we need to say that the project may not proceed if found to be technically, economically or environmentally not feasible?

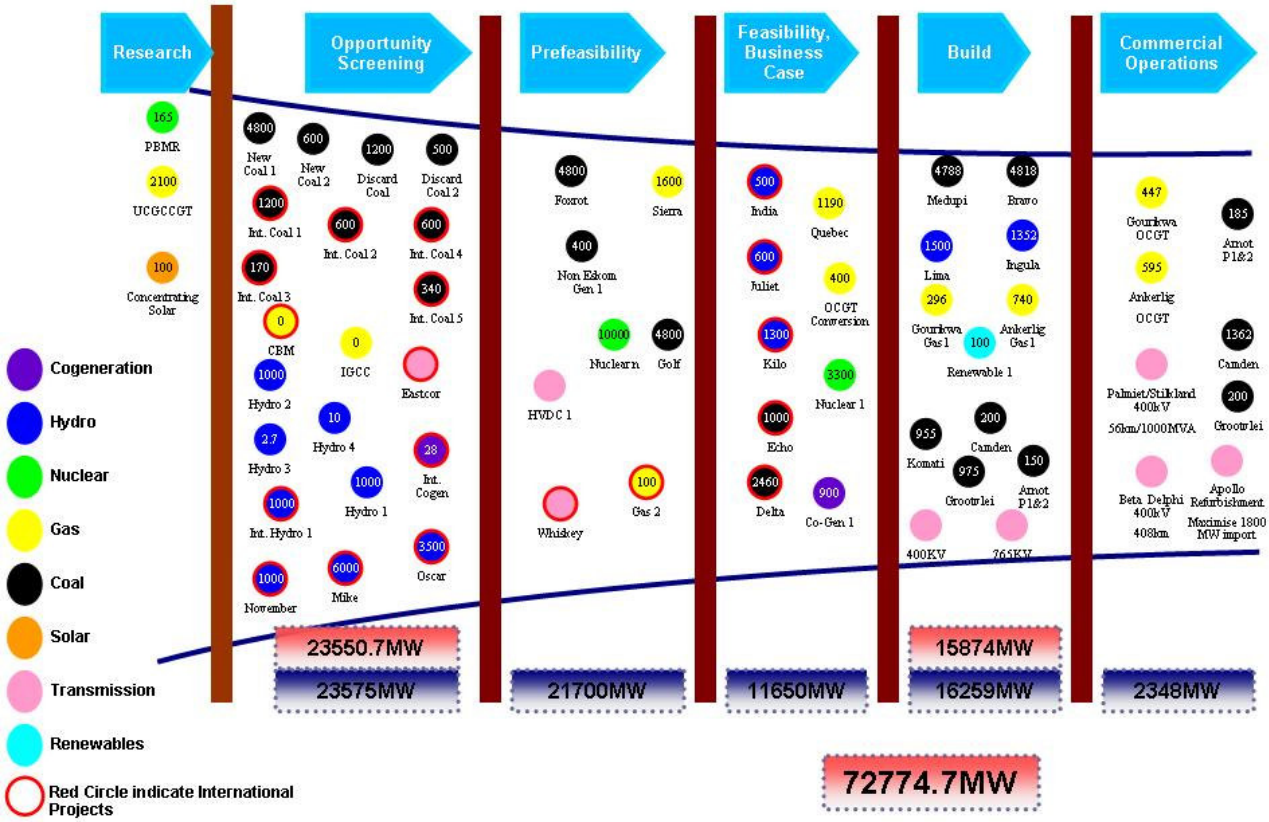

Figure 2.2: Eskom Capacity Projects Funnel illustrating the range of supply options being considered by Eskom to meet the increasing demand for electricity in the country

Comment: This is the one used in the Ankerlig report. Is there a newer version?

Eskom is currently conducting various energy-related projects in the Western Cape. The following list highlights some of the power generation and transmission projects which are currently in various stages of project development:

» Gourikwa Expansion (Gas 1)–under construction, to be completed early-2009

Comment: Please advise

» Ankerlig Expansion (Gas 1)–under construction, to be completed end-2008

Comment: Please advise

» Ankerlig Power Station conversion project - EIA process commenced in November 2007; Final EIA Report submitted to DEAT for review and decision-making

» Palmiet-Stikland 400 kV transmission line – Commissioned in August 2007

» Nuclear 1– Environmental Impact Assessment process has commenced on various identified alternative sites. Final Scoping Report is currently being reviewed by a DEAT-appointed review panel. DEAT response is expected end-September

Comment: Please advise on the status of this process

» Nuclear 1 transmission power lines – EIA process has commenced for the three sites identified for further investigation in the EIA process of the power station EIA
» Wind Energy Facility in the Vredendal area – Environmental Authorisation granted
» Pebble-bed Modular Reactor Demonstration facility - Final Scoping Report and Plan of Study for EIA approved by DEAT; EIA process underway

Comment: Please advise on the status of this process

2.5. Draft Western Cape Integrated Energy Strategy

The recent energy crisis in the Western Cape has highlighted the need to develop a plan for sustainable, secure energy provision in the Western Cape. Although various national efforts are underway to increase energy provision to the Western Cape, the Provincial Government believes that additional efforts need to be made to address the other energy challenges facing the Province, including the challenges of reducing the Province's carbon footprint and eradicating energy poverty.

The Western Cape currently relies heavily on coal-produced electricity and on petrochemicals for its energy supply. The strategy recognises that, in order to ensure that energy can be accessed from various sources in emergency situations, it is necessary to explore alternative sources of energy. The strategy lists the potential opportunities for increasing power supply to the Province. In this regard, the strategy states that the potential for gas-fired power generation is high, provided that sufficient resources of natural gas are discovered. However, supplies are currently not confirmed. Natural gas is a cleaner fossil fuel-based option than coal and can provide base load capacity.

The Strategy details various goals to which the Provincial Government of the Western Cape (PGWC) is committed and outlines a programme of action for implementation of the strategy framework (a copy of this Strategy can be obtained at http://www.capegateway.gov.za/eng/pubs/public_info/D/152704).

2.6. Project Planning and the site-specific Environmental Impact Assessment

Eskom Generation's planning process is based on anticipated electricity demand, rather than immediate load requirements in order to timeously supply the anticipated increased demand in the country. This is due to the long lead-time process of acquiring the necessary permissions to construct such infrastructure from DEAT and the National Energy Regulator of South Africa (NERSA), and negotiations with landowners, and power generation infrastructure purchase, delivery and ultimately construction.

In terms of the EIA Regulations under NEMA, a Scoping and EIA report (including a draft Environmental Management Plan (EMP)) are required to be compiled for this proposed project. The EIA is considered as an effective planning and decision-making tool in the planning process of a new power generation facility. It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed through project design and implementation. The level of detail at a site-specific level is refined through the process, and allows for resolution of potential issue(s) through dialogue with affected parties.

The relationship between project development and the environmental assessment and management process is depicted in the figure below.