Energy and water

Bringing clean and affordable water and energy within everyone's reach is a key national goal. At the same time, planning ensures that these key drivers of economic growth are delivered reliably and cost-effectively to industry, commerce and agriculture.

The Department of Minerals and Energy's Energy Policy is based on the following key objectives:

- attaining universal access to energy by 2014
- accessible, affordable and reliable energy, especially for the poor
- diversifying primary energy sources and reducing dependency on coal
- good governance, which must also facilitate and encourage private-sector investments in the energy sector
- environmentally responsible energy provision.

Current estimates suggest that R107 billion will be needed between 2005 and 2009 to meet the country's growing energy needs. Eskom will invest R84 billion over the next five years. The balance of R23 billion is reserved for independent power-producer entrants.

Energy in South Africa

- Electricity prices in South Africa are among the lowest in the world.
- The production and distribution of energy contributes 15% of gross domestic product (GDP), creating about 250 000 jobs.

South Africa has the world's 11th-highest commercial primary energy intensity, with large-scale, energy-intensive primary mineral beneficiation industries and mining industries being vast consumers of power.

Power sources

Coal

In 2004, South African mines produced 242,82 megatons (Mt) of coal, making it the fifth-largest coal-producing country in the world. Of this figure, 178,37 Mt was used locally, at a value of R13,6 billion, with export sales totalling 67,94 Mt, at a value of R14,47 billion.

South Africa has around 28,6 billion t of recoverable coal reserves, making it the seventh-largest holder of coal reserves in the world.

With South Africa's present production rate there should be more than 50 years of coal supply left.

As a result of new entrants to the industry, operating collieries were increased to 64 during 2004.

Nuclear

Eskom Koeberg Nuclear Power Station's two reactors outside Cape Town supply 1 800 megawatts to the national grid when both are operating at full power, contributing about 6% of South Africa's electricity.

The National Nuclear Regulator is the prime safety regulator and is responsible for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory

The refurbishment of three mothballed power stations – Camden in Ermelo (1 600 megawatts [mw]), Grootvlei in Balfour (1 200 mw) and Komati in Middleburg (1 000 mw) – will result in an additional 3 800 mw to the system. Eskom will spend about R12 billion (nominal rand) on the recommissioning of these three stations.

Implementation of the Kyoto Protocol came into effect on 16 February 2005. Government established a designated national authority (DNA) office in the Department of Minerals and Energy to handle clean development mechanism transactions. It opened its doors for business on 1 December 2004. The DNA office is receiving a number of project proposals for review from the private sector. These projects, when implemented, will reduce South Africa's carbon dioxide emissions and generate revenue of R618 million by the year 2012 from sales of certified emission reductions.

practices. It exercises regulatory control related to safety over the siting, design, construction and operation of nuclear installations and other actions.

The Nuclear Energy Corporation of South Africa (Necsa) undertakes and promotes research and development in the field of nuclear energy, radiation sciences and technology, medical isotope manufacturing, nuclear liabilities management, waste management and decommissioning. It is a public entity reporting to the Minister of Minerals and Energy.

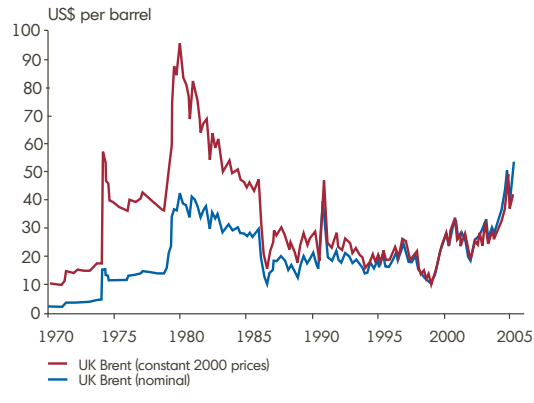
Necsa's reactor-produced radioisotopes are exported to more than 50 countries.

The research reactor at Pelindaba, SAFARI-1, is the most commercialised such reactor in the world with ISO 9001 accreditation. It is earning South Africa millions of rands worth of foreign revenue.

Liquid fuels

South Africa consumed 21 267 million litres (ML) of liquid-fuel products in 2002 and 25 338 ML in 2003. Thirty-six percent of the demand is met by synthetic fuels (synfuels) produced locally, largely from coal and a small amount from natural gas. The rest is met by products refined locally from imported crude oil. The petrol price in South Africa is linked to the petrol price in United States (US) dollars in certain international petrol markets. This means that the domestic price is influenced by supply and

Brent crude oil prices



Source: IMF, International Financial Statistics

demand for petroleum products in the international markets, combined with the Rand/Dollar exchange rate.

PetroSA is responsible for the exploration and exploitation of oil and natural gas, as well as producing and marketing synthetic fuels produced from offshore gas at the world's largest commercial gas-to-liquids plant in Mossel Bay.

Sasol

The Sasol group of companies comprises diversified fuel, chemical and related manufacturing and marketing operations, complemented by interests in technology development, oil and gas exploration, and production.

On 3 March 2005, Cabinet approved cleaner fuels for South Africa with effect from January 2006. This will see an end to lead being added to petrol and lower sulphur standards for diesel. This forms part of a process that will see newly formulated fuels being introduced, which will contribute to the improvement of urban air quality.

The Department of Minerals and Energy continues to support Black Economic Empowerment (BEE) suppliers in pursuance of the Liquid and Petroleum Charter. On 30 November 2004, the department and individual members of the South African Petroleum Industry Association signed a memorandum of understanding aimed at creating a supplier development agency. The agency opened its doors for trading on 1 April 2005.

The primary objectives of the agency are to source potential BEE suppliers to the industry, accredit the suppliers to combat fronting, develop suppliers to meet the performance levels of the industry and source opportunities for BEE suppliers from industry.

Its principal feedstocks are obtained from coal, which the company converts into value-added hydrocarbons through Fischer-Tropsch process technologies.

Indigenous oil, gas resources and production

The EM gasfield complex off Mossel Bay started production in the third quarter of 2000, and will ensure sufficient feedstock to PetroSA to maintain current liquid-fuel production levels at 36 000 barrels (bbls) of petroleum products a day until 2009.

PetroSA's gas-to-liquid plant supplies about 7% of South Africa's liquid-fuel needs.

PetroSA's new oilfield, Sable, situated about 150 km south off the coast of Mossel Bay, is expected to produce 17% of South Africa's oil needs.

The field, which came into operation in August 2003, was initially projected to produce 30 000 to 40 000 bbls of crude oil a day and 20 million to 25 million bbls in the next three years.

Eskom

Eskom generates about 95% of South Africa's electricity.

The utility is among the top 11 utilities in the world in terms of generation capacity and among the top seven in

The proposed wind farm in the Darling district of the Western Cape was approved in March 2005. This facility will consist of four Danish-designed wind turbines that will produce 1,3 megawatts (mw) of electricity each, bringing the total output of the wind farm to 5,2 mw.

This is the first renewable energy power-generating facility to be developed by a private company that will feed into the national power network. It will also be the first commercial wind farm in South Africa.

Klipheuwel, funded by Eskom, is the biggest wind farm in sub-Saharan Africa.

terms of sales. Eskom was incorporated as a public company on 1 July 2002.

Eskom does not have exclusive generation rights but does enjoy a practical monopoly on bulk electricity. It also operates the integrated national high-voltage transmission system and supplies electricity directly to large consumers and some residential consumers.

Restructuring of the electricity distribution industry

The Minister of Minerals and Energy, Ms Lindiwe Hendricks, launched South Africa's first regional electricity distributor (RED 1) on 4 July 2005 in Cape Town. RED 1 will pave the way for five other REDs, following the amalgamation of the distribution function of Eskom with that of 187 municipalities already distributing electricity in the country.

REDs will provide competitive electricity tariffs, and offer an efficient and reliable electricity service. These entities will in the long term enable access to electricity for all.

The REDs will consist of Eskom Distribution and the local authorities. They will buy electricity from power generators such as Eskom on wholesale prices determined by the National Energy Regulator.

Integrated National Electrification Programme (INEP)

Significant progress has been made towards universal access to electricity. By May 2005, the INEP had delivered 232 287 household connections at R582 million, 2 233 schools at R100 million and 50 clinics at R118 million. The programme focuses on creating bulk infrastructure, especially in areas where it has become impossible to connect new households to the network without reinforcement.

In April 2004, South Africa celebrated the electrification of 7,5 million households – an achievement of four million new electricity connections since 1994. By May 2005, access to electricity was at 71%.

Government gazetted the national Electricity Basic Services Support Tariff Policy in July 2003. The policy aims to bring relief, through government intervention, to low-income households and to ensure optimal socio-economic benefits from the INEP. Qualifying customers are eligible for 50 kWh of free electricity per month. By July 2005, 64% of South Africa's 284 municipalities were providing free basic electricity to 49% of the population.

Energy and the environment

South Africa's per capita production of greenhouse gases is well above global averages and that of other middle-income developing countries.

The economy is carbon intensive, producing only US$259 per ton of carbon dioxide emitted, as compared with US$1 131 for South Korea, US$484 for Mexico and US$418 for Brazil.

Coal is used by about 950 000 households countrywide, resulting in indoor air-pollution problems.

Fuel wood is the primary energy source of three million rural households. Studies have shown that fuel-wood users are exposed to even higher levels of particulate emissions than coal users.

To address this situation, the Department of Minerals and Energy is investigating improved woodstoves and other alternatives, such as solar cookers and biogas, as well as speeding up electrification.

Eskom is looking at harnessing biomass as a grid supply option, while also planning to pilot a new technology aimed at providing rural power in a remote area in the Eastern Cape. This technology, called a gasifier system, will use waste from a rural sawmill to provide electricity to power the creation of business ventures in the area. The system was expected to be installed in 2005.

Water

South Africa is largely a semi-arid, water-stressed country. The country's average rainfall is about 450 mm per year, well below the world average of about 860 mm per year. To overcome the problem of variable river flows, many large storage dams have been built.

Dams experience high evaporation rates, further reducing available water, as do commercial afforestation and sugar-cane farming.

The total net abstraction of water from surface water resources amounts to about 10 200 million m^3 per year for the whole of South Africa, after allowing for the re-use of return flows. This represents about 20% of the total mean annual run-off of 49 200 million m^3 per year (all standardised to 98% assurance of supply). A further 8% is

The Working for Water Programme is a labour-intensive initiative to clear invasive alien plants. It is a multidepartmental initiative led by the departments of water affairs and forestry, of environmental affairs and tourism, and of agriculture. It started in 1995 with a budget of R25 million and has grown into one of government's key poverty-relief programmes.

During 2004, R440 million was spent and the programme employed about 32 000 people.

Major dams in South Africa

Dam	Full supply capacity ($10m^3$)	River
Gariep	5 341	Orange
Vanderkloof	3 171	Orange
Sterkfontein	2 616	Nuwejaarspruit
Nuwejaarspruit Vaal	2 603	Vaal
Pongolapoort	2 445	Pongola

Source: Department of Water Affairs and Forestry

estimated to be lost through evaporation from storage and conveyance along rivers, and 6% through land-use activities. As a national average, about 66% of the natural river flow (mean annual run-off) therefore still remains in the country's rivers.

Free basic water (FBW)

The focus of the Department of Water Affairs and Forestry broadened in 2001 to include the provision of free basic services to all indigent people in the country. By March 2005, 162 of the 170 water-service authorities were providing FBW. The 2004/05 target that FBW should be accessible to 75% of the population served with water, was achieved. By February 2005, more than 31 million people were receiving FBW.

Water policy

Cabinet approved the first edition of the National Water Resource Strategy (NWRS) in September 2004. The NWRS

By the end of March 2005:
- 44,5 million people had access to an improved water supply
- basic water infrastructure had been supplied to 15 million people, over 10 million of this supplied by the Department of Water Affairs and Forestry.
- 31,9 million people (66,3%) had access to free basic water.

fact

In response to drought conditions seriously affecting many parts of the country since 2003, the Government allocated additional funds for emergency water supplies. In 2003/04, R295 million was made available through two allocations. About R203 million of this amount went to municipalities for emergency water provision at local authority level, while about R92 million was used by the Department of Water Affairs and Forestry to supplement regional water supplies. During 2004/05, an additional R280 million was allocated to municipalities for emergency water provision, via the Department of Provincial and Local Government, while an additional R50 million was allocated to the Department of Water Affairs and Forestry to strengthen national and regional water supplies.

describes how South Africa's water resources will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the National Water Policy, 1997 and the National Water Act, 1998, which are founded on government's vision of a transformed South African society in which every person has the opportunity to participate in productive economic activity and lead a dignified and healthy life.

One of the most ambitious binational water projects ever is the Lesotho Highlands Water Project between South Africa and Lesotho.

The first phase, which was completed in 1998, consisted of the construction of three dams, various tunnels and a hydroelectric plant.