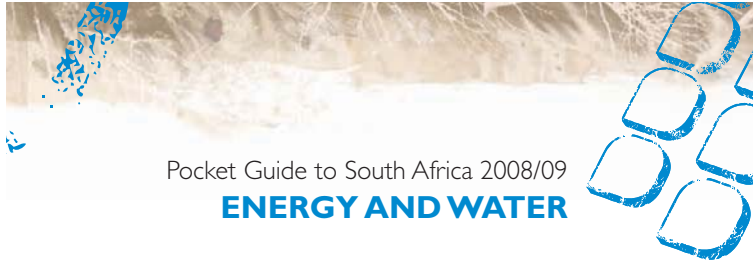


Putting clean and affordable water and energy within everyone's reach is a key national goal. At the same time, planning ensures that these key drivers of economic growth are delivered reliably and cost-effectively to industry, commerce and agriculture.



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

- attaining universal access to energy by 2012
- ensuring accessible, affordable and reliable energy, especially for the poor
- diversifying primary energy sources and reducing dependency on coal
- practising good governance, which must also facilitate and encourage private-sector investments in the energy sector
- providing environmentally responsible energy.

Estimates suggest that R107 billion is needed to meet the country's growing energy needs. Eskom will invest R150 billion over the next five years. Some R23 billion is reserved for independent power-producer entrants.

The refurbishment of three power stations – Camden in Ermelo, Grootvlei in Balfour and Komati in Middelburg, in Mpumalanga – will add 3 800 megawatt (MW) to the system.

The Energy Security Strategy seeks to:

- secure adequate supplies of affordable energy for continued economic growth and development in the short term
- enable policy- and decision-makers to make informed decisions on these complex interdependent energy outcomes in the medium term
- ensure that strategic planning and subsequent growth and development are sustainable in the long term.

Phase one of the strategy focuses on liquid-fuels' issues, an energy security framework and the proposed energy-planning approach. Phase two will address electricity-related issues.

Key elements of the policy include:

- Implementing an integrated energy modelling and planning approach to ensure co-ordination and enhanced integration of planning in dealing with future energy policy in support of achieving energy security.
- Improving Transnet Freight Services' operational efficiencies in servicing the liquid-fuels sector, by focusing on routes that allow for block trains/loads, and allocating additional capacity to the Durban-Gauteng Corridor.



- Improving operational efficiencies at ports, especially during periods of increased demand for imported crude oil or refined products in South Africa. This includes ensuring that back-of-port facilities are not used as part of refining operations.
- Promoting local refining as far as possible, with a particular preference for production from local resources, including those from South Africa's neighbouring states.
- Developing Transnet Pipelines' new multiproducts pipeline between Durban and Gauteng, which is necessary to alleviate the identified capacity constraints in the petroleum supply chain by 2010.
- Promoting energy efficiency and other demand-side initiatives in all sectors of the economy. This should be complemented by measures aimed at effectively managing interaction with the natural environment.

Energy in South Africa

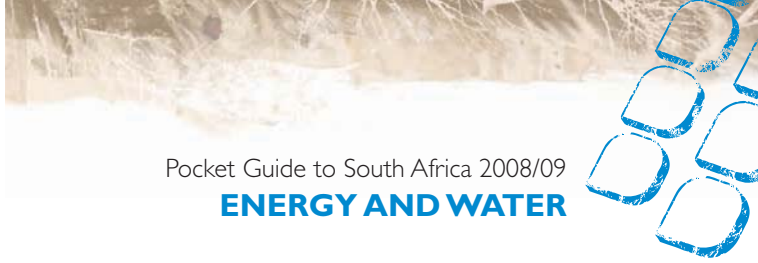
Energy comprises about 15% of South Africa's gross domestic product, creating employment for about 250 000 people. Eskom's total electricity sales grew to 218 120 gigawatt/hour by March 2007. High liquid-fuel sales' figures demonstrate the growth of the South African economy and the importance of energy as a key driver of the country's economy, especially the large-scale energy-intensive primary mineral beneficiation and mining industries that dominate the economy.

This energy intensity is above average, with only 10 other countries having higher commercial primary energy intensities.

Power sources Coal

About 46,5% of South African coal mining is conducted underground and about 53,5% is produced by opencast methods.

The coal-mining industry is highly concentrated, with five companies, namely Anglo Coal, BHP Billiton, Sasol Mining, Exxaro Coal, Kumba Coal and Xstrata Coal accounting for 90% of the saleable coal production. The eight largest mines account for 61% of the output.



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South African coal for local electricity production is among the cheapest in the world. The beneficiation of coal, particularly for export, results in more than 65 million tons (mt) of coal discards being produced annually.

Nuclear

Cabinet approved the Nuclear Energy Policy for South Africa in June 2008. The policy aims to increase the role of nuclear energy as part of the process of diversifying South Africa's primary energy sources to ensure energy security. The policy will ensure reducing the over-reliance on coal.

Eskom is investing up to 20 000 MW on new nuclear capacity by 2025.

Eskom's Koeberg Nuclear Power Station's two reactors outside Cape Town supply 1 800 MW to the national grid when both operate at full power, thus providing about 6,5% of South Africa's electricity.

The National Nuclear Regulator is the prime safety regulator and is responsible for protecting persons, property and the environment against nuclear damage by establishing safety standards and regulatory practices. It exercises safety-related regulatory control 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 reactor of its kind in the world with International Organisation for Standardisation 9001-accreditation. It earns South Africa foreign revenue worth millions of rands.



Pebble Bed Modular Reactor (Pty) Limited (PBMR) was established in 1999 with the intention to develop and market small-scale, high-temperature reactors both locally and internationally. The PBMR project team is based in Centurion, Pretoria.



The PBMR is a high temperature reactor (HTR) with a closed-cycle gas turbine power conversion system. Although it is not the only HTR currently being developed in the world, the South African project is on schedule to be the first commercial-scale HTR in the power-generation field.

The PBMR comprises a steel pressure vessel, which holds the enriched uranium dioxide fuel encapsulated in graphite spheres. The system is cooled with helium and heat is converted into electricity through a turbine.

From a small research and development company with about 100 employees at its inception in 1999, PBMR has grown into one of the largest nuclear reactor design teams in the world. In addition, more than 1 000 people at universities, private companies and research institutes are involved with the project.

PBMR is preparing for a project at Koeberg near Cape Town, where Africa's only nuclear power station is based, and a fuel plant at Pelindaba near Pretoria, where the pebble fuel will be manufactured.

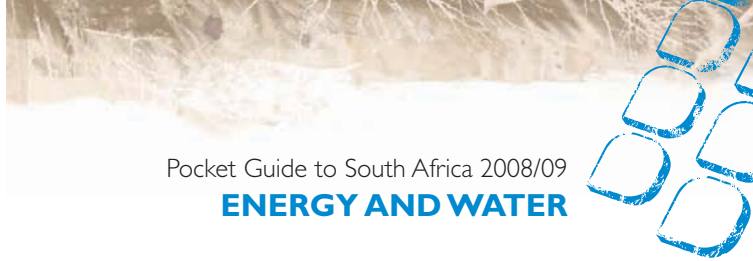
Liquid fuels

The South African Petroleum Industry Association announced strong growth in petroleum product sales in the first quarter of 2007.

Aggregate sales of major petroleum products showed a strong increase of 7,3% in the first quarter of 2007, compared with the first quarter of 2006. The most significant increases were in diesel (13,1%), bitumen (36,3%) and liquid petroleum gas (LPG) (15%).

Petrol sales grew by 4,4% and jet fuel sales by 4,6%. Sales of paraffin, a source of household energy, dropped by 13,4%.

In the first quarter, the percentage split of petrol sales between unleaded petrol (ULP) and lead-replacement petrol (LRP) was 64% and 36% respectively. This represented a significant increase in the penetration of ULP from the level of 43% that prevailed in May 2006 and indicated lower demand for LRP.



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The petrol price in South Africa is linked to certain international petrol markets in United States dollar. This means that supply and demand for petroleum products in the international markets, combined with the Rand-Dollar exchange rate, influence the domestic price.

The National Petroleum Gas and Oil Corporation of South Africa (PetroSA) is responsible for exploring and exploiting 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, about 400 km east of Cape Town.

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.

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

In 2008, out of R1,4 billion allocated for household electrification, a further R380 million was set aside for the building of 10 substations, with primary emphasis on the provinces with the least development, namely Limpopo, KwaZulu-Natal and the Eastern Cape.



In 2008/09, the Department of Minerals and Energy planned to electrify 150 000 households, 2 500 schools and improved the quality of electricity supply in preparation for 2010 and beyond. The department has eradicated the backlog of electrification of clinics and aims to achieve universal access to schools by the end of the 2009/10 financial year.

Out of 2008's electrification expenditure of R1,4 billion, R894 million was allocated for empowerment initiatives. Of this amount, 52% was allocated to Black Economic Empowerment companies. In 2007, a total of 5 594 jobs (479 women, 146 disabled and 3 661 youth) were created through the Integrated National Electrification Programme.



Oil and gas

South Africa has very limited oil reserves and imports from the Middle East and Africa (Saudi Arabia, Iran, Kuwait, the United Arab Emirates, Yemen, Qatar, Iraq, Nigeria, Egypt and Angola) meet about 95% of South Africa's crude oil requirements.

Refined petroleum products such as petrol, diesel, residual fuel oil, paraffin, jet fuel, aviation gasoline, LPG and refinery gas are produced by:

- refining crude oil (oil refineries)
- converting coal to liquid fuels and gas to liquid fuels (Sasol)
- turning natural gas into liquid fuels (PetroSA).

Another major role-player in South Africa's liquid fuels industry is the Central Energy Fund (CEF). Its mandate is to engage in acquiring, exploring, generating, manufacturing, marketing and distributing any energy form, especially oil and gas. It also engages in research relating to the energy sector. The CEF's diversified portfolio of activities is housed in the following active subsidiaries:

- The Strategic Fuel Fund Association, which was established to procure and store crude oil and manage strategic crude oil stocks for South Africa. It trades and leases spare storage ullage and is involved in oil-pollution control.
- PetroSA, which owns and operates the gas-to-liquids plant at Mossel Bay. PetroSA is also involved in oil and gas exploration and production, and its offshore production platform supplies gas and condensates by gas pipeline to its onshore plant for conversion into a range of environmentally friendly transportation fuels and associated products for the domestic and international markets.
- The Petroleum Agency South Africa, which promotes and markets exploration in South African territory (both offshore and onshore for oil and gas), negotiates and monitors concessions and licences on behalf of government, and is the custodian of geological and geophysical data.
- iGas, which is a state-owned entity for the development of gas infrastructure in South Africa. iGas partnered Sasol and ENH



of Mozambique in establishing the natural gas pipeline from Mozambique to South Africa.

The wholesale and retail markets for petroleum products in South Africa are subject to a set of government controls. Government regulates wholesale margins and controls the retail price of petrol. The industry has entered into product-exchange agreements to serve different markets. Together, these controls provide for access to fuel throughout the country and protect consumers, while providing a reasonable return on investment to the oil industry and enhancing opportunities for employment.

The refiners and wholesale marketers move products from the refineries by coastal barge, rail, truck and pipeline to roughly 200 depots. From these, about 4 600 service stations and 100 000 direct consumers (mostly farmers) are served.

Refineries and Sasol produce LPG and illuminating paraffin (kerosene). Most LPG is used by consumers and the rest is used in refineries as fuel and/or is exported to neighbouring countries.

Limited natural gas reserves exist around the South African coast. PetroSA exploits the reserves off the coast of Mossel Bay, where the gas is converted at the Mossgas plant into liquid fuels.

Although gas usage has increased in recent years, the importance of gas in the South African energy economy is still small compared to other countries. Industry remains the largest customer.

Electricity

Eskom generates about 95% of electricity in South Africa and about 45% in Africa. About 88% of South Africa's electricity is generated in coal-fired power stations. Koeberg, a large nuclear station near Cape Town, provides about 6,5% of capacity. A further 2,3% is provided by hydroelectric and pumped storage schemes.

South Africa supplies two thirds of Africa's electricity and is one of the cheapest electricity producers in the world.

In South Africa there are few, if any, new hydro sites that could be developed to deliver significant amounts of power, owing to water scarcity.



South African state-owned electricity company Eskom awarded Alstom and Hitachi Power Africa contracts worth more than R31 billion to equip a new 4 740-mega-watt coal-fired power station – dubbed “Project Bravo” – to be built in the Witbank area of Mpumalanga.

French company Alstom has secured an estimated R13-billion contract to supply turbines and related infrastructure, while Hitachi Power Africa – a venture between Germany-based Hitachi Power Europe and South African empowerment partners – has won an R18,5-billion contract to provide boilers for the new power station.



Energy and the environment

South Africa is among the top 20 emitters of greenhouse gases (GHGs) in the world and is the largest emitter in Africa, largely because of the economy’s dependence on fossil fuels. The National Climate Change Strategy, developed by the Department of Environmental Affairs and Tourism, requires that government departments collaborate in a co-ordinated manner to ensure that response measures to climate change are properly directed and carried out with a national focus. The Department of Minerals and Energy is expected to respond to and mitigate climate change.

South Africa is a developing country or a Non-Annex1 country. This means that within the international political and negotiation context, South Africa is not required to reduce its GHG emissions.

However, the South African economy depends greatly on fossil fuels for energy generation and consumption and therefore is a significant emitter due to relatively high values being derived from emissions’ intensity and emissions per capita.

South Africa must therefore proactively move the economy towards becoming less carbon-intensive, with the Department of Minerals and Energy playing a prominent role. The department has introduced systems to access investment through the Clean Development Mechanism of the Kyoto Protocol. It has developed the *White Paper on Renewable Energy and Clean Energy Development*, together with an energy-efficiency programme, to support diversification in pursuit of a less carbon-intensive energy economy.



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Eskom has signed an agreement with French development agency *Agence Française de Développement* for a R100-million loan over 20 years to help finance a new wind-farm project. The 100-megawatt wind farm will be built on the West Coast near the town of Koekenaap, east of Vredendal in the Western Cape and will be operational in early 2010.



The two companies concluded the deal in March 2008 during an official visit to South Africa by French President Nicolas Sarkozy.

Water

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

The available water supply is reduced by evaporation from dams, and by commercial afforestation and sugar-cane farming.

The total net abstraction of water from surface-water resources amounts to about 10 200 million m³ a year for the whole country, after allowing for the re-use of return flows. This represents about 20% of the total mean annual run-off of 49,2 billion m³ per year (all standardised to 98% assurance of supply).

A further 8% is 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.

| Major dams in South Africa | | |
|----------------------------|---|----------------|
| Dam | Full supply capacity (10 m 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



By 2008, about a million more people had access to both water and basic sanitation services, contributing to government's achievement of meeting the millennium development goals' target of halving the population of people without water and sanitation.



Households with access to water increased from 59% to 88% and basic sanitation from 48% to 73%. From 1994 to June 2008, the Department of Minerals and Energy served 18,7 million people with water and 10,9 million people with access to basic sanitation.

Water policy

The first edition of the National Water Resource Strategy (NWRS) was approved in September 2004. The NWRS 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. These documents are based 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.

