



**ENERGY AND WATER**

*Energy*  
*and Water*

## Pocket Guide to South Africa 2012/13

# ENERGY AND WATER

## Energy

South Africa's steady economic growth, coupled with an increasing focus on industrialisation and a mass electrification programme to take power into deep rural areas, has seen a steep increase in the demand for energy.

The Department of Energy is responsible for ensuring secure and sustainable provision of energy for socio-economic development. With the cooperation of Eskom, the department has embarked on a massive programme to bring the electricity supply and distribution system into balance. At a cost of about R340 billion, Eskom is building new power stations, including Medupi in Limpopo, which is expected to make its first contribution to the energy grid by 2013/14, and Kusile, which will come on stream in mid-2014.

Government is also looking to support sustainable green-energy initiatives on a national scale through a diverse range of clean-energy options as envisaged in the Integrated Resource Plan (IRP). In terms of this plan, which is a 20-year projection on electricity demand and production, about 42% of electricity generated must come from renewable resources.

To this end, government has signed contracts to the value of R47 billion to invest in the renewable energy programme. This involves 28 projects in wind, solar and small hydro technologies, to be developed in the Eastern Cape, Western Cape, Northern Cape and in the Free State.

## Policies and strategies

### National Energy Efficiency Strategy

In November 2012, Cabinet approved South Africa's revised energy-efficiency strategy. The strategy includes Eskom's Demand Side Management. Municipalities are also implementing their own energy-efficiency strategies.

The Department of Energy, in collaboration with the Department of Public Works and Eskom, is retrofitting government buildings to make them more energy efficient. This contributes a saving of about R600 000 in electricity bills a year.

## National Strategic Fuels Stock Policy

The Energy Security Master Plan for Liquid Fuel identified a number of capacity constraints and challenges faced by the petroleum sector in meeting the energy demand.

In response to these, the National Strategic Fuels Stock Policy was finalised and published for comments early in 2013.

## National Liquid Petroleum Gas (LPG) Strategy

As part of the promotion of clean energy sources, an LPG Strategy was submitted to Cabinet in 2011/12. The strategy's main objectives are to provide access to safe, cleaner, efficient, portable, environmentally friendly and affordable thermal fuel for all households, and to switch low-income households away from the use of coal, paraffin and biomass to LPG.

## Role players

### Sasol

Sasol is an integrated energy and chemical company. It beneficiates coal, oil and gas into liquid fuels, fuel components and chemicals with the help of its proprietary Fischer-Tropsch processes.

### Eskom

Eskom generates, transmits and distributes electricity to industrial, mining, commercial, agricultural and residential customers and redistributors.

## National Nuclear Energy Executive Coordination Committee

In November 2012, Cabinet was briefed on the first meeting of the National Nuclear Energy Executive Coordination Committee, chaired by Deputy President Kgalema Motlanthe, to oversee any future nuclear procurement processes as well as the energy build programme.

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### The Southern African Power Pool (SAPP)

The SAPP allows the free trading of electricity between Southern African Development Community member countries, providing South Africa with access to the vast hydropower potential in the countries to the north, notably the significant potential in the Congo River (Inga Falls).

### Other role players

- iGas is the official state agency for the development of the hydrocarbon gas industry in southern Africa.
- PetroSA is a government-owned oil and gas company
- The Petroleum Agency of South Africa promotes the exploration and exploitation of natural oil and gas, both onshore and offshore
- Petronet owns, operates, manages and maintains a network of 3 000 km of high-pressure petroleum and gas pipelines, on behalf of the Government.
- National Energy Regulator of South Africa
- National Nuclear Regulator
- Nuclear Energy Corporation of South Africa
- South African National Energy Development Institute
- Central Energy Fund Integrated energy centres


### Energy resources

South Africa produces about 5% of its fuel needs from gas, about 35% from coal and about 50% from local crude oil refineries. About 10% is imported from refineries elsewhere in the world.

The country has a sizeable capital stock and management capacity to produce fuel from gas. The Department of Energy's Hydrocarbons and Energy Planning Branch is responsible for coal, gas, liquid fuels, energy efficiency, renewable energy and energy planning, including the energy database.

*The White Paper on the Promotion of Renewable Energy and Clean Energy Development (2002)* commits South Africa to producing 5% of the country's energy supply from renewable energy sources by 2013.

South Africa has limited oil reserves with about 60% of its



crude oil requirements being met by imports from the Middle East and Africa.

### **Alternative gas resources**

Experiments are underway to assess the potential for mining coal-bed methane gas, although the overall potential of this resource for producing electricity in South Africa is probably less than previously thought. Underground coal gassification technology is also being developed.

### **Renewable and alternative fuels**

*The White Paper on Renewable Energy (2003)* has set a target of 10 000 GWh of energy to be produced from renewable energy sources (mainly from biomass, wind, solar and small-scale hydro) by 2013.

### **Biofuel**

The biofuel sector has grown rapidly internationally. However, South Africa has remained only a peripheral participant in the sector's growth.

### **Hydro power**

Energy from water can be generated from waves, tides, waterfalls and rivers and will never be depleted as long as water is available. South Africa has a mix of small hydro-electricity stations and pumped-water storage schemes.

### **Solar power**

South Africa's solar-equipment industry is developing rapidly to meet demand with a number of companies manufacturing and installing solar water heaters.

Solar power is also used increasingly for water pumping through the rural water-provision and sanitation programme of the Department of Water Affairs.

### **Wind power**

Eskom's Klipheuwel wind-energy facility, just north of Cape Town, is the first large wind-turbine facility sub-Saharan Africa.

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The Darling Wind Farm in the Western Cape has four wind turbines, which can supply 5,2 MW. Construction on the first commercial wind farm at the Coega Industrial Development Zone, Port Elizabeth, in the Eastern Cape started in September 2012.

In November 2012, Ireland's Mainstream Renewable Power started construction on solar and wind power projects as part of a €500-million (about R5,5-billion) investment.

### **Hybrid systems**

There are two pilot hybrid systems in the Eastern Cape at the Hluleka nature reserve on the Wild Coast and at the neighbouring Lucingweni community.

### **Nuclear**

Nuclear energy is set to play a critical role in South Africa's IRP implementation process. South Africa is a member of the International Atomic Energy Agency and has signed up for stress tests to ascertain whether its reactors were vulnerable to natural causes like tsunamis.

## **Programmes and projects**

### **Renewable Energy Independent Power Producer Procurement Bidding Programme**

The flagship programme under the IRP is the REIPPP Bidding Programme for the provision of 3 625 MW of capacity from independent power producers. The 28 independent renewable power producers comprise 18 solar photovoltaic projects, eight onshore wind projects and two concentrated solar power projects. All projects must be generating power by mid-2014.

### **Integrated National Electrification Programme (Inep)**

By January 2012, Eskom and the municipalities had completed 220 000 connections. Eskom had 42 infrastructure projects funded, while the municipalities had 45 projects



funded. Eskom had been allocated R1,8 billion while the municipalities received R1,1 billion for the 2012/13 financial year.

### **Cleaner Fuels Programme**

To improve the quality of transport fuels, the department reviewed the fuel specifications and standards to reduce harmful emissions, and to align standards with global vehicle technology trends and environmental requirements.

### **Working for Energy Programme**

The programme focuses on two things: the provision of energy through renewable-energy technologies and the facilitation of energy management. Both use labour-intensive methodologies to stimulate sustainable job creation, local economic development, technology skills transfer and capacity development within a South African context.

### **Compact fluorescent lamp exchange**

In August 2012, Eskom embarked on the next phase of its energy efficient lighting campaign whereby the power utility hoped to encourage a shift to compact fluorescent lamps (CFLs) and light emitting diode lamps in homes and in the workplace.

## **Water affairs**

The Department of Water Affairs as the custodian of South Africa's water resources, leads the management of water resources, and is responsible for the formulation and implementation of policy governing this sector. The department also has an overriding responsibility for water services provided by local government. With its vision of being dynamic and people-centred, the department is strategically positioning itself to ensure that the whole value chain, from "source-to-tap" and "waste-to-source", functions effectively.

The department is also working closely with the agriculture, industrial and mining sectors to set water-use efficiency targets for their sub-sectors.

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National Water Week 2013 was marked by the unveiling of the Komati Water Scheme Augmentation Project (KWSAP) on 19 March. The R1,2 billion project, which was launched in Kriel in eMalahleni, was designed to resolve the water supply problems to Eskom's Duvha and Matla power stations in Mpumalanga. The KWSAP will be able to deliver an additional 57 million m<sup>3</sup> of water per year to the Komati Water Scheme.

## Policies and strategies

### National Water Resource Strategy (NWRS)

The NWRS provides a roadmap on how water should be used, protected, conserved, distributed and managed for the benefit of all South Africans.

### Water for Growth and Development (WfGD)

The WfGD framework sets the foundation and provides the necessary pointers for the review of the NWRS.

### Raw Water Pricing Strategy

The 2013 review of the Raw Water Pricing Strategy will address the issue of water scarcity and how best to use water pricing as a tool for driving improved water-use efficiency without having a negative impact on small-scale or under-resourced water users.

### National Groundwater Strategy

Groundwater is a strategic resource in many parts of South Africa, especially in rural areas. It also plays an important role in the supply of water to small towns and villages in the drier parts of the country.

### Rainwater harvesting

The Department of Water Affairs supports a national rainwater harvesting programme, which has a narrow but important focus on the construction of above- and below-ground rainwater storage tanks by rural households for food gardens and other productive water uses. Several municipalities are already using roof rainwater tanks for domestic purposes.



## Dams and water schemes

The country has more than 500 government-owned dams spread across all nine provinces. They range in storage capacity from a volume of 5 500 million m<sup>3</sup> of water down to 0,2 million m<sup>3</sup> of water.

South Africa uses about 10 200 million m<sup>3</sup> of water a year from its major dams. The majority of water consumption can be attributed to drinking, irrigation, electricity, mining processes and industrial processes.

The Department of Water Affairs follows an integrated approach to manage South Africa's water resources. Proposed new water schemes need to comply with the NWRS, requiring that water-demand management programmes be implemented before embarking on new infrastructure development.

Strict environmental impact assessments must also be performed in accordance with laws and regulations administered by the Department of Environmental Affairs, while the guidelines issued by the World Commission on Dams must also be followed.

Government has implemented key projects to augment South Africa's water resources.

- The Trans-Caledon Tunnel Authority has procured funding to implement the Mokolo and Crocodile River West Water Augmentation Project's first two phases with a cost of about R2 billion, to deliver water to Eskom's new Medupi power station and other industries in the area, as well as domestic water to the Lephalale Local Municipality. The first water delivery is expected in 2014.
- On the Mooi River in KwaZulu-Natal near Rosetta, a R2,2-billion contract was awarded for the construction of the 42 m-high Spring Grove Dam, with a storage capacity of 142 million m<sup>3</sup>.
- De Hoop Dam will deliver water for domestic and agricultural use in the Greater Sekhukhune, Waterberg and Capricorn district municipalities. The estimated cost of its construction is approximately R3,1 billion. This will deliver water to three million Limpopo residents.

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In addition to infrastructure projects underway in 2012/13, other dams and related infrastructure are also in progress. They include:

- completion of the water treatment works and bulk distribution system from Nandoni Dam in Limpopo
- construction of a pipeline from the Flag Boshielo Dam to Mokopane and nearby communities
- completion of feasibility studies and designs for the Umzimvubu and Foxwood dams in the Eastern Cape
- construction of the bulk distribution pipelines and reticulation networks from the Jozini Dam in KwaZulu-Natal and the Groot Letaba Augmentation Project, comprising raising the Tzaneen Dam

### **Programmes and initiatives**

Water-related programmes and initiatives include:

- Integrated Water Resources Management
- National Water Resources Infrastructure Programme
- Regional Bulk Infrastructure Grant Programme
- Strategic integrated projects
- Dam Safety Rehabilitation Programme
- Support for resource-poor farmers
- Rainwater harvesting
- River Health Programme and interventions
- Water Allocation Reform Accelerated Community Infrastructure Programme
- Women in Water
- Water Conservation and Demand Management
- Enhanced Local Government Support Approach
- Freshwater Programme
- Monitoring programmes
- National Aquatic Ecosystem Health Monitoring Programme
- National Chemical Monitoring Programme
- National Toxicity Monitoring Programme
- Education and awareness
- Youth development.