



OFFICIAL GUIDE TO SOUTH AFRICA 2019/20

**MINERAL  
RESOURCES AND ENERGY**

The Department of Mineral Resources and Energy (DMRE) is mandated to ensure the transparent and efficient regulation of South Africa's mineral resources and minerals industry, and the secure and sustainable provision of energy in support of socio-economic development).

A number of acts regulate the mining, minerals and energy sectors. Key among these are the:

- Mineral and Petroleum Resources Development Act of 2002, which provides the regulatory framework for equitable access to and the sustainable development of mineral resources and related matters.
- Mine Health and Safety Act of 1996, which governs mine health and safety.
- National Energy Act of 2008, which empowers the Minister to plan for and ensure the security of supply for the energy sector.
- Petroleum Products Act of 1977, which regulates the petroleum industry at the manufacturing, wholesale and retail levels.
- Electricity Regulation Act of 2006, which establishes a national regulatory framework for the electricity supply industry, including registration and licensing.

The National Development Plan envisages that by 2030, South Africa will have an adequate supply of electricity and liquid fuels to maintain economic activity and prevent economic disruptions, and a mining sector that prioritises the welfare of its human resources and the environment.

To give effect to this vision, over the medium term, the DMRE will focus on transforming mining and energy resources, rehabilitating mines and the environment, extending access to electricity, enhancing energy efficiency, and managing nuclear energy in accordance with international commitments. These focus areas contribute to Priority 1 (economic transformation and job creation) and Priority 5 (social cohesion and safe communities) of government's 2019-2024 Medium Term Strategic Framework.

## **Transforming mining and energy resources**

As the department works towards growing the economy and creating jobs, it will seek to accelerate transformation within the mining and energy sectors by monitoring and enforcing compliance with the newly approved mining charter, and monitoring adherence to social labour plans. It will also promote the exploration of onshore and offshore oil and gas resources and their optimal development, and investments in the mineral and upstream petroleum sectors.

## **Rehabilitating mines and the environment**

The department plans to intensify its efforts to rehabilitate dangerous, derelict and ownerless mining sites to promote the health and safety of mine employees and people in surrounding communities.

## **Extending access to electricity**

In support of government's policy to extend access to electricity to all South Africans, an additional 560 000 households are expected to be connected to the electricity grid over the medium term. To enable this, six new substations are set to be built and nine substations upgraded.

A further 15 000 households per year are expected to be provided with non-grid, mainly solar, electrification. The department's electrification master plan, which is intended to inform the roll-out of electrification connections for universal access, is expected to be finalised in 2020/21.

## Role players

- **Mine Health and Safety Council:** Researches and advises the Minister in terms of mine health and safety, as well as promotes a culture of health and safety in the mining industry.
- **Council for Mineral Technology Research (Mintek):** Provides research, development and technology that fosters the development of business in the mineral and mineral products industries. Mintek is working with industry and international researchers to develop a world-class smelter complex to exploit the Bushveld Complex deposits, which constitute the world's largest unexploited repository of iron, titanium and vanadium. This will entrench South Africa's position as the leading supplier of vanadium and titanium. The partnership between Pelchem and Mintek to revitalize the state-owned pharmaceutical company, "Ketlaphela" is bearing fruits with the business case and the partnership transactions approved by the Minister of Mineral Resources and Energy in April 2020.
- **Council for Geoscience (CGS):** Develops and publishes world-class geoscience knowledge products and provides geoscience-related services to the South African public and to industry. It has intensified the identification and drilling of selected mineral target areas for quantification of priority minerals deemed critical for development, including input to pharmaceutical applications, food security, industrialisation and energy security.
- **South African State Diamond and Precious Minerals Regulator:** Regulates the diamond, platinum and gold sectors.
- **State Diamond Trader:** Promotes equitable access to and beneficiation of diamond resources, addresses distortions in the diamond industry and corrects historical market failures to develop and grow South Africa's diamond-cutting and polishing industry.
- **Sasol:** The international integrated chemicals and energy company develops and commercialises technologies, and builds and operates world-scale facilities to produce a range of high-value product streams, including liquid fuels, chemicals and low-carbon electricity.
- **Eskom:** Generates about 95% of the electricity used in South Africa and about 45% of the electricity used in Africa. It generates, transmits and distributes electricity to industrial, mining, commercial, agricultural and residential customers.
- **iGas** is the official state agency for the development of the hydrocarbon gas industry in southern Africa.
- **PetroSA:** It is a government-owned oil and gas company.
- **Petroleum Agency South Africa (PASA):** Promotes exploration for onshore and offshore oil and gas resources, and their optimal development.
- **Petronet:** Owns, operates, manages and maintains a network of 3 000 km of high pressure petroleum and gas pipelines, on behalf of government.
- **National Energy Regulator of South Africa:** It is the regulatory authority for electricity, piped gas and petroleum pipelines.

- The **National Nuclear Regulator** is responsible for safety standards and regulatory practices for the protection of people, property and the environment against nuclear damage.
- The **Nuclear Energy Corporation of South Africa** is responsible for undertaking and promoting research and development in the field of nuclear energy and radiation sciences. It is also responsible for processing source material, including uranium enrichment, and cooperating with other institutions, locally and abroad, on nuclear and related matters.
- The **South African National Energy Development Institute** is mandated to stimulate innovation in energy research and development, transform the gender and race profile of researchers in the sector, and improve South Africa's competitiveness in energy research internationally.
- The **Central Energy Fund (CEF)** researches, finances, develops and exploits appropriate energy solutions across the spectrum of energy sources to meet South Africa's future energy needs. On 10 June 2020, Cabinet approved the request to merge three subsidiaries of the CEF. The decision paved the way for the formation of the National Petroleum Company (NPC) comprising iGas, Strategic Fuel Fund and PetroSA. The CEF Board was mandated to manage the process and ensure the establishment of the NPC within six months.
- The **National Radioactive Waste Disposal Institute** is mandated to manage the disposal of radioactive waste nationally.

## Mining Qualifications Authority (MQA)

The future of mining in the country depends largely on the successful implementation of skills development initiatives. Particular focus is placed on artisan and artisan aid as well as other technical skills.

The MQA was established as a sector education and training authority, and facilitates the development of appropriate knowledge and skills in the mining, minerals and jewellery sectors.

## Shale gas

The Shale gas research project in the Karoo, undertaken by the CGS and PASA, was moving towards ultra-deep drilling of a vertical borehole during the third quarter of the 2020/21 financial year. Shale gas is a natural gas that is occurring and can be extracted from Shale. The natural gas, which is imbedded in the Karoo Basin, can be used for energy production.

## Reserves

### Gold

The large-scale gold mines operating in South Africa include the record setting TauTona Gold Mine, which extends 3,9 km underground. TauTona means "great lion" in Setswana. The Witwatersrand Basin remains the world's largest gold resource. According to the Minerals Council South Africa, the country was responsible for 3.2% of global gold production in 2019.

## Coal

Government has emphasised the importance of ensuring a sustainable local coal supply for the country's energy requirements. This commodity currently plays a vital role in meeting South Africa's primary energy needs, as well as in the economy in general. It is recognised that coal contributes to the economy, not only to supply energy, but through the generation of export revenue, contributing to GDP and employment.

South Africa derives over 70% of its energy requirement (electricity and liquid fuels) from coal. According to the Minerals Council South Africa, the coal industry employed 94,297 people in 2019, representing about 20% of total employment in the mining sector.

Preliminary results in the Molteno-Indwe coalfields assessment in the Eastern Cape show an estimated economically exploitable coal tonnage of 320 million tonnes, with a value beneath the ground of R122 billion, using a conservative estimate of R350 per ton.

## Platinum group metals (PGMs)

Platinum, palladium, rhodium, osmium, ruthenium and iridium occur together in nature alongside nickel and copper. Platinum, palladium and rhodium, the most economically significant of the PGMs, are found in the largest quantities. Platinum is used in the medical sector while platinum and palladium, along with gold-silver-copper-zinc alloys, are used as dental restorative materials.

South Africa is the world's leading platinum and rhodium producer, and the second-largest palladium producer after Russia. South Africa's production is sourced entirely from the Bushveld Complex, the largest known PGM-resource in the world.

## Platinum

The Merensky Reef, stretching from southern Zimbabwe through to the Rustenburg and Pretoria regions, is the centre of platinum mining in South Africa, playing host to companies such as Rustenburg Platinum Mines and Bafokeng Rasimone Platinum Mines.

## Palladium

South Africa is the world's second-largest palladium producer. All of South Africa's production is sourced from the Bushveld Igneous Complex, which hosts the world's largest resource of PGMs. Palladium, together with platinum, is more abundant than any of the other PGMs.

## Chrome ore

According to the US Geological Survey of 2018, South Africa and Kazakhstan host 95% of the world's chromium reserves (shipping grade), at 200 000 tonnes and 230 000 tonnes, respectively. South Africa has 72% of the world's chrome resources.

## Copper

Palabora, a large copper mine, smelter and refinery complex managed by the Palabora Mining Company in Limpopo is South Africa's only producer of refined copper. Useful by-product metals and minerals include zirconium chemicals, magnetite and nickel sulphate as well as small quantities of gold, silver and platinum.

Substitutes for copper include aluminium which is used in power cables, electrical equipment, automobile radiators, and cooling and refrigeration tubing. Titanium and steel are also substitutes used in heat exchangers.



Optical fibre substitutes for copper are used in telecommunications applications, and plastics substitutes for copper are used in water pipe, drainpipe and plumbing fixtures.

The Ga-Ramokoka Carbonatite Complex in North West hosts numerous minerals that span an estimated tonnage of Rare Earth Elements at 470 thousand tonnes, phosphates at 300 thousand tonnes and copper 30 thousand tonnes. The potential value of a suite of minerals in the carbonatite is estimated at R1.4 billion.

## **Manganese**

South Africa hosts the largest known deposit of manganese and the country is a leading producer of manganese globally. According to the Minerals Council South Africa, the sector produced 17 million tonnes of manganese representing in 2019, a 14% increase on the prior year.

According to the Minerals Council South Africa, manganese prices have been under pressure because of a strong increase in supply coupled with subdued demand out of China which is the core market for South African producers.

## **Diamonds**

According to the Minerals Council South Africa, the country ranks among the top 10 diamond producers globally, producing 10% of the world's diamonds. In 2019, about 7.2 million carats of diamonds were produced locally.

## **Industrial minerals**

South Africa boasts a substantial industrial mineral endowment. This category of minerals generally does not get a lot of attention despite its notable size and potential. According to the Minerals Council South Africa, in 2019 industrial mineral sales amounted to R17.9 billion. Domestic sales of the minerals constituted 79% or R14.3 billion, while export sales contributed R3.5 billion or 19.5%.

## **Geology**

South Africa has a long and complex geological history dating back to many years. The preservation of so much Archaean geology, dating back more than 2 500 million years, has resulted in the Archaean Witwatersrand Basin, as well as several greenstone belts, being preserved.

## **Energy**

Guided by the National Energy Act of 2008, government's responsibility is to ensure that diverse energy resources are available in sustainable quantities and affordable prices to support economic growth.

Government is committed to extending access to electricity and enhancing energy efficiency, managing nuclear energy in terms of international commitments, and diversifying the energy generation mix.

The NDP proposes that gas and other renewable resources like wind, solar and hydro-electricity will be viable alternatives to coal and will supply at least 20 000 MW of the additional 29 000 MW of electricity needed by 2030.

Other recommendations in the NDP include diversifying power sources and ownership in the electricity sector, supporting cleaner coal technologies, and investing in human and physical capital in the 12 largest electricity distributors.

Goals beyond 2020 include contracting more than 20 000 megawatts (MW) of renewable energy, including an increasing share from regional hydro-electricity. South Africa has committed to attain substantial reductions in carbon dioxide emissions by 2025. The country supports research, technology development and special measures aimed at environmentally sustainable economic growth.

## **National Strategic Fuels Stock Policy**

The National Strategic Fuels Stock Policy sets out the framework for the storage of fuel stock by government and the industry. It aims to ensure uninterrupted supply of petroleum products throughout South Africa by providing adequate strategic stocks and infrastructure such as storage facilities and pipeline capacity.

Strategic stocks are to be used during declared emergencies. The Minister of Mineral Resources and Energy will have the power to decide when a shortage of fuel and oil is at such a level to warrant an emergency.

## **National Liquid Petroleum Gas (LPG) Strategy**

The LPG 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.

The strategy highlights strategic options that could be adopted for the orderly development of the LPG industry in South Africa to make LPG an energy carrier of choice for thermal applications. LPG.

As part of the gas industrialisation, the DMRE has embarked on the LPG Expansion Initiative. LPG is considered the safest, cleanest, sustainable and most efficient form of energy for cooking, space heating as well as water heating. The department planned to set a target to double consumption of LPG in South Africa over the next five years to alleviate pressure on the Eskom power supply.

## **National building standards**

Energy-efficient regulations for new buildings form part of the deliverables of South Africa's National Energy Strategy to strengthen standards and regulations for energy efficiency. The energy-efficient regulations apply to residential and commercial buildings, places of learning and worship, certain medical clinics and other categories of building.

The regulations make it compulsory for all new buildings to be designed and constructed to a standard that makes it possible for the user to minimise the energy required to meet the functional requirements.

This will save energy significantly, which will relieve pressure on the electricity supply grid. In addition to temperature regulations, all buildings will also have to be fitted with renewable-energy water-heating systems such as solar systems, which also have to comply with South African national standards.

## **Southern African Power Pool (SAPP)**

The SAPP was created with the primary aim to provide reliable and economical electricity supply to the consumers of each of the SAPP members, consistent with the reasonable use of natural resources and the effect on the environment. 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 Congo River (Inga Falls).

## **Electricity**

As part of the Integrated National Electrification Programme, which aims to extend access to electricity to all households across South Africa, about 590 000 households were expected to be connected to the electricity grid over the medium term.

A further 20 000 households per year over the same period would be provided with non-grid (mainly solar) electrification systems. Government planned to develop an electrification master plan to inform the roll-out of electrification connections for universal access.

## **Biofuel**

The biofuels industry in South Africa, the continent's biggest agricultural producer, has been held back by an inadequate regulatory regime and concerns that biofuels would hurt food security and affect food prices.

Canola, sunflower and soya are feedstock for biodiesel, while sugarcane and sugar beet are feedstock for ethanol. Maize, South Africa's staple food, will not be used in the production of biofuels to ensure food security and control high prices.

The biofuels sector has strong linkages to agriculture, manufacturing and distribution, and has the potential to create substantial numbers of labour-intensive jobs in the agriculture sector in particular. In addition, second-generation biofuel technology will also contribute to South Africa meeting its renewable energy targets sustainably.

## **Hydropower**

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 hydroelectricity stations and pumped-water storage schemes.

## **Solar power**

Most areas in South Africa average more than 2 500 hours of sunshine per year, and average daily solar-radiation levels range between 4,5 kWh/m<sup>2</sup> and 6,5 kWh/m<sup>2</sup> in one day. The southern African region, and in fact the whole of Africa, has sunshine all year round. The annual 24-hour global solar radiation average is about 220 W/m<sup>2</sup> for South Africa.

## **Wind power**

Wind energy, like solar energy, is a free and sustainable renewable energy source that is being used to generate electricity.



## Hybrid systems

Hybrid energy systems are a combination of two or more renewable energy sources such as photovoltaic, wind, microhydro, storage batteries and fuel-powered generator sets to provide a reliable off-grid supply.

## Nuclear

Government has committed, through the Nuclear Energy Policy and Integrated Resource Plan (IRP), to an energy mix consisting of coal, gas, hydro, nuclear, solar and wind. The nuclear new build programme will enable the country to create jobs, develop skills, create industries, and catapult the country into a knowledge economy.

The IRP 2010-2030 envisages 9 600 MW additional nuclear capacity by 2030. The IRP is a 20-year projection on electricity supply and demand.

Eskom operates the Koeberg Nuclear Power Station near Cape Town, the only nuclear power station in South Africa and the entire African continent, which supplies power to the national grid. The Koeberg Nuclear Power Plant units will reach the end of life in July 2024 and plans are underway to extend the life of this plant by an additional 20 years.

## Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

The REIPPPP, established in 2010, has become one of the world's most progressive and successful alternative energy programmes. Ever since the introduction of these renewable energy technology programmes (solar, wind, biomass, small hydro and landfill gas power), plants have been going up across the country, feeding additional, clean energy into the national grid.

The REIPPPP represents the country's most comprehensive strategy to date in achieving the transition to a greener economy. The programme has been designed to contribute to the development of a local green industry and the creation of green jobs.

The programme seeks to procure energy from small-scale Independent Power Producers (IPPs), with projects that generate between one MW and five MW of energy from solar, wind, biomass and landfill gas projects. Through the REIPPPP, government is targeting the procurement of 13 225 MW from IPPs by 2025.

## Working for Energy Programme

The Working for Energy Programme is a social programme mainly intended to provide energy services derived from renewable resources to rural and urban low income houses in a manner that facilitates job creation, skills development, community-based enterprise development and the emancipation of youth, women and people with disabilities thereby creating sustainable livelihoods. It is an integral part of the Expanded Public Works Programme.