

2019/20 SOUTH AFRICA YEARBOOK

Mineral Resources and Energy



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 industry, and the secure and sustainable provision of energy in support of socio-economic development. The strategic objective derives from the National Development Plan (NDP), which envisages that, by 2030, South Africa will have a mineral resources and energy sector that promotes economic growth and development, social equity and environmental sustainability.

The NDP 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 DMRE 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. Activities related to these initiatives are expected to lead to an increase in expenditure, from R399.2 million in 2019/20 to R468.1 million in 2022/23 at an average annual rate of 5.5%.

Rehabilitating mines and the environment

The DMRE 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. Over the medium term, the department aims to rehabilitate 129 mines, conduct 3 825 environmental inspections, and conduct 24 000 health inspections. As a result, allocations in the Mine Health and Safety Inspectorate programme are expected to increase from R224.8 million in 2019/20 to R261.5 million in 2022/23 at an average annual rate of 5.2%.

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.

Despite reductions over the Medium Term Expenditure Framework (MTEF) period of R1.2 billion in indirect grants to Eskom and R380.5 million in municipal grants, mainly in 2020/21 and 2021/22, spending in the Integrated National Electrification programme is expected to increase at an average annual rate of 5.1%, from R5.2 billion in 2019/20 to R6.1 billion in 2022/23. Transfers to Eskom are set to increase from R3.1 billion in 2019/20 to R3.7 billion in 2022/23 at an average annual rate of 5.7%, and transfers to municipalities are set to increase from R1.9 billion in 2019/20 to R2.1 billion in 2022/23 at an average annual rate of 4.4%. Transfers for non-grid connections are expected to increase from R212.9 million in 2019/20 to R238.5 million in 2022/23 at an average annual rate of 3.9%.

The DMRE's Electrification Master Plan, which is intended to inform the rollout of electrification connections for universal access, is expected to be finalised in 2020/21. The plan will provide a model for allocating resources based on data informed by factors such as backlogs and is allocated R17.2 million over a two-year period ending in 2020/21.

Enhancing energy efficiency

To realise a target of 1.5 terawatt hours of energy savings over the medium term, allocations to the Energy Efficiency and Demand-side Management Grant are expected to increase

from R227.1 million in 2019/20 to R243.3 million in 2022/23. This will enable municipalities to undertake initiatives to upgrade municipal infrastructure that is not energy efficient, such as replacing street and traffic lights with greener technology.

Managing nuclear energy

The Nuclear Energy Regulation and Management programme accounts for an estimated 11.6% of the DMRE's total expenditure over the medium term, mainly comprising transfers to entities. The South African Nuclear Energy Corporation (NECSA) is allocated R3 billion over the MTEF period, of which R2.3 billion is for operational costs and R635 million for the decontamination and decommissioning of old strategic nuclear facilities. The National Radioactive Waste Disposal Institute is set to receive R155 million over the period ahead for its operationalisation, while it finalises its application for a radioactive waste disposal licence from the National Nuclear Regulator (NNR).

Legislation

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

- the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), which provides the regulatory framework for equitable access to, and the sustainable development of mineral resources and related matters;
- the Mine Health and Safety Act, 1996 (Act 29 of 1996), which governs mine health and safety;
- the National Energy Act, 2008 (Act 34 of 2008), which empowers the Minister of Mineral Resources and Energy to plan for, and ensure the security of supply for the energy sector;
- the Petroleum Products Act, 1977 (Act 120 of 1977), which regulates the petroleum industry at manufacturing, wholesale and retail levels; and
- the Electricity Regulation Act, 2006 (Act 4 of 2006), which establishes a national regulatory framework for the electricity supply industry, including registration and licensing.

Budget

For the 2019/20 financial year, Mineral Resources was allocated R2 billion and Energy was allocated R7.2 billion. Transfers and subsidies to public entities and municipalities of R24 billion, over the MTEF period, account for an estimated 81.6% of the DMRE's planned spending. Total expenditure is expected to increase at an average annual rate of 4.8%, from R9.2 billion in 2019/20 to R10.6 billion in 2022/23.

Due to the labour-intensive nature of the DMRE's work, which requires inspections to be conducted to ensure that mining companies comply with legislative requirements, expenditure on the compensation of employees amounts to an estimated R3.6 billion over the medium term, 11.9% of total expenditure. To remain within the expenditure ceiling for compensation of employees, the number of personnel in the department is expected to decrease from 1 917 in 2019/20 to 1 882 in 2022/23.

This decrease is not expected to have an impact on service delivery as the affected posts are mainly administrative, and to avoid the duplication of functions following the merger of the departments of Mineral Resources and Energy through the national macro organisation of government.

Entities

Central Energy Fund (CEF)

The CEF is listed in Schedule 2 of the Public Finance Management Act (PFMA), 1999 (Act 1 of 1999), and is governed by the CEF Act, 1977 (Act 38 of 1977) and the Companies Act, 2008 (Act 71 of 2008). Its mandate is to research, finance, develop and exploit appropriate energy solutions to contribute to South Africa's security of energy supply.

Through its subsidiaries, the CEF is also mandated to finance and promote the acquisition of coal; exploit coal deposits; manufacture liquid fuel, oil and other products from coal; market these products; and acquire, generate, manufacture, market, distribute or research any other form of energy.

The fund's subsidiaries are the Petroleum Oil and Gas Corporation of South Africa (PetroSA); the South African Gas Development Company; the Petroleum Agency South Africa; Oil Pollution Control South Africa; the Strategic Fuel Fund; the

African Exploration Mining and Finance Corporation (AEMFC); Eta Energy Solutions and CCE Solutions.

Over the medium term, the fund will focus on sustaining and improving its liquidity and solvency in its efforts to return to commercial viability. Initiatives expected to improve profitability include new business development and expansions for revenue growth, and the optimisation of feedstock for the gas-to-liquid facility. The fund will also aim to reduce operating costs, improve liquidity through working capital management, and dispose of non-core assets.

Total expenditure is expected to increase from R15.7 billion in 2019/20 to R16.9 billion in 2022/23 at an average annual rate of 2.4%, mainly driven by the planned increase in production at the AEMFC and the PetroSA. Research and development costs and consulting fees are also expected to increase as the fund embarks on certain commercial projects.

The CEF generates revenue almost entirely through commercial activities. Total revenue is expected to increase from R16.9 billion in 2019/20 to R17.3 billion in 2022/23 at an average annual rate of 0.9%, driven mainly by the expected increase in sales for the PetroSA and the AEMFC, as well as increased income from dividends and interest.

South African Nuclear Energy Corporation

The NECSA is listed as a Schedule 2 public entity in terms of the PFMA of 1999. It derives its mandate from the Nuclear Energy Act, 1999 (Act 46 of 1999), the Nuclear Energy Policy (2008), and directives conferred on it by the Minister of Mineral Resources and Energy. The corporation's subsidiaries include international fluoro-chemical producer Pelchem; radiopharmaceutical and radioisotope producer NTP Radioisotopes; and Pelindaba Enterprises, which specialises in the manufacturing of power-generation components. It also operates the South Africa Fundamental Atomic Research Installation-1 nuclear reactor for research, technology development and the production of radioisotopes. The corporation is responsible for the decommissioning and decontamination of nuclear facilities and contributes to South Africa's obligations in terms of international nuclear treaties and agreements.

Over the medium term, the corporation will focus on increasing medical radioisotope production and radiation applications used locally and internationally for the diagnosis and treatment of cancer. This activity accounts for the bulk of the corporation's spending and is set to increase from R1.8 billion in 2019/20 to R2.1 billion in 2022/23 at an average annual rate of 5.5%. Other priorities include research and technology development for new products, specialised nuclear manufacturing, support for nuclear power generation, and the decommissioning and decontamination of disused nuclear facilities. The corporation's total expenditure is expected to be R11.2 billion over the medium term. The sale of nuclear technology products, chemical products and nuclear engineering services are expected to account for 61.9% (R7.6 billion) of the corporation's revenue over the medium term. The projected increase in sales is mostly attributed to NTP Radioisotopes operating at higher capacity, as well as improved market conditions. Transfers from the DMRE, amounting to a projected 38.1% (R3.9 billion) of total revenue over the medium term, will be used for operational requirements and activities such as the decommissioning of disused plants, radioactive waste management at all disused nuclear facilities, the production and conversion of low-enriched uranium fuel, and nuclear safety.

Other entities

Council for Geoscience

The council develops and publishes world-class geoscience knowledge products and provides geoscience-related services to the South African public and industry. The council's total budget for 2019/20 was R444.6 million.

Mine Health and Safety Council

The council advises the Minister of Mineral Resources and Energy on occupational health and safety at mines, develops legislation, conducts research, and liaises with other statutory bodies on matters relating to occupational health and safety at mines. The council's total budget for 2019/20 was R131.9 million.

Mintek

Mintek develops appropriate and innovative technology for transfer to the minerals industry, and provides the industry with test work, consultancy, and analytical and mineralogical services. The council's total budget for 2019/20 was R571.7 million.

National Energy Regulator of South Africa (NERSA)

The NERSA is the regulatory authority for electricity, piped gas and petroleum pipelines. The regulator's total budget for 2019/20 was R237.8 million.

National Nuclear Regulator

The NNR is responsible for safety standards and regulatory practices for the protection of people, property and the environment against nuclear damage. The regulator's total budget for 2019/20 was R237.8 million.

National Radioactive Waste Disposal Institute

The institute is responsible for the long-term care and disposal of radioactive waste at national level, in a manner that is safe, technically sound, socially acceptable, environmentally responsible and economically feasible. The institute's total budget for 2019/20 was R49 million.

South African Diamond and Precious Metals Regulator (SADPMR)

The SADPMR was established in terms of Section 3 of the Diamonds Act, 1986 (Act 26 of 1986), as amended. It is mandated to regulate control over the possession, purchase, sale, processing and export of diamonds, and the regulation of precious metals. The regulator's total budget for 2019/20 was R118.7 million.

South African National Energy Development Institute

The 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. The institute's total budget for 2019/20 was R232.4 million.

State Diamond Trader

The trader is mandated to buy and sell rough diamonds to promote equitable access to diamonds and the local beneficiation of diamond resources. It generates revenue by selling rough diamonds to clients, mainly diamond polishers and cutters. Its total budget for 2019/20 was R594.9 million.

Resources**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. It facilitates the development of appropriate knowledge and skills in the mining, minerals and jewellery sectors.

Shale gas

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. South Africa accounts for 10.5% of the world's gold reserves. The Witwatersrand Basin remains the world's largest gold resource.

Coal

The South African 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 the gross domestic product and employment.

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.

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

South Africa accounts for over 80% of known global reserves of the PGMs. 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.

Ferrous minerals

These are the largest new investment in the manganese industry in the country, and supports government's drive to increase the beneficiation in South Africa.

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, nickel sulphate and small quantities of gold, silver and platinum.

Manganese

South Africa has significant proven manganese reserves, but the exploitation of the mineral has not reflected its development potential.

Diamonds

According to the Minerals Council South Africa, in 2019 South Africa produced 7.2 million carats of diamonds. The total diamond sales were worth R13.3 billion and the diamond industry employed 15 728 people.

Industrial minerals

Of the hundreds of producers of industrial minerals in South Africa, almost half are in the sand and aggregate sector. There are producers of clays (brickmaking), limestone and dolomite, dimension stone, 28 salt and silica in South Africa. Bulk consumption of industrial minerals is realised in the domestic market, as most are low-priced commodities and sold in bulk, making their economic exploitation highly dependent on transport costs and distance to markets.

Geology

South Africa has a long and complex geological history. 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.

Mining production

Mining production increased by 1.8% year-on-year in December 2019. The largest positive contributors were:

- gold (24.9% and contributing 2.7% points);
- 'other' non-metallic minerals (24.1% and contributing 1.3% points);
- iron ore (9.8% and contributing 1.2% points); and
- chromium ore (26.6% and contributing a 0.9% point).

Total mining production was 1.3% lower in 2019 compared 2018. The 1.3% decrease in annual mining production followed a decrease of 2.1% in 2018 and an increase of 4.6% in 2017. Seasonally adjusted mining production decreased by 2.4% in

December 2019, compared with November 2019. This followed month-on-month changes of -1.8% in November 2019 and 1.7% in October 2019.

Seasonally adjusted mining production increased by 0.2% in the fourth quarter of 2019 compared with the third quarter of 2019. The two largest positive contributors were iron ore (7.4% and contributing a 0.8% point) and PGMs (.4% and contributing a 0.8% point). Coal (-5.6% and contributing -1.5% points) and manganese ore (-8.8% and contributing -0.6% points) were significant negative contributors.

Mineral sales decreased by 6.0% year-on-year in December 2019. The largest negative contributors were:

- coal (-20.1% and contributing -5.7% points);
- manganese ore (-49.0% and contributing -4.9% points); and
- 'other' non-metallic minerals (-26.5% and contributing -1.3% points).

Total mineral sales were 10.6% higher in 2019 compared to the previous year. The 10.6% increase in annual mineral sales followed increases of 5.2% in 2018 and 8.3% in 2017. Seasonally adjusted mineral sales at current prices decreased by 9.9% in December 2019 compared with November 2019. This followed month-on-month changes of 6.5% in November 2019 and -0.4% in October 2019.

In the fourth quarter of 2019, the seasonally adjusted value of mineral sales at current prices was 1.3% higher compared with the third quarter 2019.

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.

The 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 hydroelectricity will be viable alternatives to coal and will supply at least 20 000 megawatts (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 MW of renewable energy, including an increasing share from regional hydroelectricity.

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 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 is considered one of the safest, cleanest and most sustainable energy sources.

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 the Southern African Development Community (SADC) 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 are 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. The 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 can 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 kilowatt-hours per square metre (kWh/m²) and 6.5 kWh/m² 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/m² 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, micro-hydro, storage batteries and fuel-powered generator sets to provide a reliable off-grid supply.

Nuclear

The 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.

Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

The REIPPPP 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 with projects that generate between one MW and five MW of energy from solar, wind, biomass and landfill gas projects.

International cooperation

South Africa is a member of the International Energy Forum (IEF), which aims to foster greater mutual understanding and awareness of common energy interests among its members.

The 74-member countries of the forum are signatories to the IEF Charter, which outlines the framework of the global energy dialogue through this intergovernmental arrangement.

South Africa is a member state of the International Renewable Energy Agency (IRENA) which seeks to make an impact in the world of renewable energy by maintaining a clear and independent position, providing a range of reliable and well-understood services that complement those already offered by the renewable energy community and gather existing, but scattered, activities around a central hub.

The country has been a member of the International Atomic Energy Agency (IAEA) for decades and has been both a recipient and provider of services emanating from the agency.

As a member state of the IAEA, permanent member of the board of directors and actively participating in nuclear energy, safety, technology, security and disarmament, South Africa has contributed to efforts of ensuring that nuclear energy is used for peaceful purposes like power generation, as well as medical, industrial and agricultural initiatives.

Sustainable development in Africa

The Intergovernmental Memorandum of Understanding (MoU) on the Western Power Corridor Project is a flagship programme for the African Union Development Agency-New Partnership for Africa's Development. It intends to pilot the use of hydro-electric energy obtained from the Inga rapids site in the Democratic Republic of Congo (DRC) to ensure the security of supply in the SADC.

The participating utilities are those of Angola, Botswana, the DRC, Namibia and South Africa. A joint-venture company has been formed to initiate studies determining the viability of the project and to build, own and operate the infrastructure.

The main project outside South Africa's borders is Westcor. It entails a five-way intergovernmental MoU signed between the utilities of Angola, Botswana, the DRC, Namibia and South Africa. Westcor will tap into some of the potential in the DRC. Inga III, a 3 500-MW hydro plant on the Congo River, will be the first of these projects.

At the same time, the countries to the north could benefit through access to the coal-fired power resources in the south. Such an arrangement should stabilise the energy requirements of the region well into this century.

Exploitation of the vast hydropower resources would constitute a significant infusion of renewable-energy resources into the energy economy of the region over the medium to long term.

The Lesotho Highlands Water Project could contribute some 72 MW of hydroelectric power to the system in the short term.

Global pressures regarding the environmental impact and displacement of settlements by huge storage dams are likely to limit the exploitation of hydropower on a large scale.

Irrespective of the size of installation, any hydropower development will require authorisation in terms of the National Water Act, 1998 (Act 36 of 1998).

Joint Meeting of SADC Ministers of Energy and Water

The Ministers of energy and water from the SADC, met on 24 May 2019 in Windhoek, Namibia and reviewed progress made in the implementation of the energy and water programmes and projects. They also discussed the energy and water supply status to ensure food security and development in the SADC region.

The meeting was hosted by the government of Namibia and was attended by the SADC Ministers, or their representatives from Angola, Botswana, the DRC, Eswatini, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe.

The meeting was also attended by representatives from international and cooperating partners, United Nations (UN) agencies, implementing agencies, development partners, youth representatives, and was preceded by a three-day meeting of senior officials responsible for the two sectors.

Fourth Brazil, Russia, India, China and South Africa (BRICS) Meeting of Energy Ministers

The Ministers of energy and heads of delegation of the BRICS countries, held the fourth BRICS Ministers of Energy Meeting on 11 November 2019 in Brasilia. Building upon the invaluable outcomes of the previous presidencies and ministerial meetings, they reaffirmed the outcomes of previous BRICS Energy Ministers' meetings and leaders' summits, and renewed their commitment to strengthen cooperation in energy and maximise collaboration potential in order to facilitate the attainment of

Sustainable Development Goal 7 as a guiding principle for energy policy.

Cross-border gas trade agreements

To facilitate the movement of gas across international borders, South Africa has signed cross-border gas trade agreements with Mozambique and Namibia.

The South Africa-Namibia Gas Commission addresses harnessing the natural gas reserves in the Kudu Gas Field.

In 2017, Eskom signed a five-year electricity sales agreement with Namibia's national electricity utility, NamPower.

Eskom will supplement generation capacity for South Africa's neighbour with its surplus electricity, providing Namibia with energy security and allowing for economic development and growth.

NamPower has also concluded a number of projects to establish renewable energy projects in Namibia and to enhance its local production.

The same year, Eskom and Botswana Power Corporation signed a three-year firm power supply agreement – in line with Eskom's plan to increase its electricity exports to South Africa's neighbouring states.

Import and export of fuel products

The import of refined products is restricted to special cases where local producers cannot meet demand. It is subject to state control to promote local refinery usage.

When overproduction occurs, export permits are required and generally granted, provided that the needs of both South Africa and other Southern African Customs Union members are met. More diesel than petrol is exported, due to the balance of supply and demand of petrol and diesel relative to refinery configurations.

Although petrol and diesel make up 55% of total liquid-fuel exports, South Africa is also the main supplier of all other liquid fuels to Botswana, Lesotho, Namibia and Eswatini.

Energy and the global environment

South Africa is classified as a developing country or a non-Annex 1 country. This means that within the international political and

negotiation context, South Africa is not required to reduce its green-house gas (GHG) emissions.

South Africa is among the top 20 emitters of GHGs in the world and the largest emitter in Africa, largely because of the economy's dependence on fossil fuels. It emits more than 400 megatonnes of carbon dioxide per year.

The National Climate Change Strategy requires that government departments collaborate in a coordinated manner to ensure that response measures to climate change are properly directed and carried out with a national focus.

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

Therefore, South Africa is proactively moving the economy towards becoming less carbon-intensive, with the DMRE playing a prominent role. The department has introduced systems to access investment through the clean development mechanism of the Kyoto Protocol. It 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.

The South African Renewables Initiative secures international financing partnerships in investment in deploying renewable energy and develops renewable supply chains through securing a critical mass of renewable energy, without imposing undue burden on the fiscus or the South African consumer.

In line with this objective, the DMRE has signed a declaration of intent with Germany, the United Kingdom, Denmark, Norway and the European Investment Bank. The agreement will lead to the establishment of a fund to assist in the deployment of renewable energy.

Further, the DMRE participates in structures such as the:

- IRENA
- International Energy Forum
- International Partnership for Energy Efficiency Cooperation
- UN Industrial Development Organisation
- Clean Energy Ministerial
- African Union-European Union Energy Partnership.

Programmes

Minerals and Petroleum Regulation

The programme regulates the mining, minerals and petroleum sectors to promote economic growth, employment, transformation and sustainable development. The programme's objectives over the medium term include:

- Improving the participation of historically disadvantaged South Africans in the mining sector and contributing to its transformation by issuing mining rights and permits to 360 historically disadvantaged South Africans over the medium term, and monitoring and enforcing compliance with procurement requirements that relate to historically disadvantaged South Africans, as prescribed by the mining charter, on an ongoing basis.
- Monitoring and enforcing compliance with the statutory obligations of the Mineral and Petroleum Resources Development Act of 2002, and the Mining Charter by conducting 636 social and labour plan verification inspections, 1 275 mine economic verification audits and 3 825 environmental verification inspections over the medium term.
- Ensuring the development and transformation of the liquid fuels industry, and the security of supply of petroleum and petroleum products by monitoring and enforcing technical and economic compliance with legislation, specifications, standards and licence conditions.
- Facilitating the orderly operation of the petroleum sector through an analysis of fuel supply and the efficient adjudication of licences for manufacturing, wholesaling and retailing activities on an ongoing basis.
- Strengthening the regulatory framework in the liquid fuels petroleum industry by implementing the regulatory accounting system to introduce a transparent fuel pricing mechanism that will provide appropriate returns to investors in the liquid fuels sector across the value chain on an ongoing basis.
- Strengthening the regulatory framework in the liquid fuels petroleum industry by implementing the regulatory accounting system to introduce a transparent fuel pricing mechanism that will provide appropriate returns to investors in the liquid fuels sector across the value chain on an ongoing basis.

Mining, Minerals and Energy Policy Development

The programme formulates, maintains and implements integrated minerals and energy policies to promote and encourage investment in the mining and energy industry. The programme's objectives over the medium term include:

- Promoting investment in the mining, minerals and upstream petroleum sectors over the medium term, by hosting 138 promotional and awareness activities or events for local and foreign investors, participating in local and international mining and petroleum conferences and events, engaging with stakeholders in various forums, and leading the implementation of key government priorities, ensuring the full implementation of plans for developing the Oceans Economy for oil and gas exploration through Operation Phakisa, and ensuring the full implementation of the Shale Gas Action Plan through consultations, advocacy, research and promotional activities for shale gas exploration.
- Managing diplomatic imperatives and relations with foreign countries to benefit South Africa by establishing and implementing bilateral and multilateral partnerships for mining and upstream petroleum development on an ongoing basis.
- Promoting the sustainable use and management of mineral resources over the medium term, by participating in technical and strategic partnerships such as the intergovernmental forum on mining, minerals, metals and sustainable development; the Benguela Current Commission; and UN programmes.
- Improving energy security over the medium term by amending the Electricity Regulation Amendment Act, 2007 (Act 28 of 2007), the NERSA Amendment Act, 2004 (Act 40 of 2004) and the NNR Act, 1999 (Act 47 of 1999).

Mine Health and Safety Inspectorate

The inspectorate ensures the health and safety of employees in the mining sector. The programme's objectives over the medium term include:

- Promoting health and safety by reducing occupational fatalities by 20%, occupational injuries by 20% and occupational disease by 10%, implementing the Occupational Health and

Safety Strategy, and enforcing guidelines and conducting investigations, inspections and audits on an ongoing basis.

- Contributing to skills development in the mining sector by implementing, monitoring and evaluating the certificate of competency model on an ongoing basis.
- Improving health care in the mining sector on an ongoing basis by ensuring 80% adherence to prescribed timeframes for resolving medical appeals, 100% adherence to timelines for appeals to the chief inspector of mines, 100% adherence to timelines for applications in terms of the Mineral and Petroleum Resources Development Act of 2002.

Mineral Resources and Energy Projects

The programme manages, coordinates and monitors projects focused on access to mineral and energy resources. The programme's objectives over the medium term include:

- Increasing access to electricity by managing funding and monitoring of the implementation of the Integrated National Electrification Programme on an ongoing basis.
- Increasing public awareness on energy issues, while empowering disadvantaged and vulnerable groups by identifying, implementing, managing and coordinating upliftment programmes and projects on an ongoing basis.
- Ensuring the efficient management of electricity supply on an ongoing basis, by enhancing the application of business principles for project management to assist programme and project managers, coordinating, monitoring and reporting on the implementation of programmes and projects focused on the development, improvement and transformation of the energy generation, refinement, transmission and distribution industry and its infrastructure.
- Promoting the sustainable use and management of mineral and energy resources by rehabilitating 129 derelict and ownerless mines, providing marginal mines with subsidies for water management solutions, and managing the funding and monitoring of the Energy Efficiency and Demand-side Management Grant to municipalities.

Nuclear Energy Regulation and Management

The programme manages the South African nuclear energy industry and controls nuclear materials in terms of international obligations, nuclear legislation and policies to ensure the peaceful use of nuclear energy. The programme's objectives over the medium term include:

- Ensuring compliance with international nuclear obligations by applying the relevant statutory frameworks and following the guidelines of the IAEA for best international practices on an ongoing basis.
- Regulating the security of nuclear material, related equipment and facilities by developing and publishing appropriate regulations on an ongoing basis.
- Conducting awareness workshops and training courses, and participating in regional and international forums to enhance compliance with legislation and international obligations on an ongoing basis.

