STRATEGIC PLAN
2020–2025

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& energy

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Mineral Resources and Energy
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ABBREVIATIONS

4IR	Fourth Industrial Revolution
AHTR	Advanced High-Temperature Reactor
AEMFC	African Exploration Mining and Finance Corporation
AMD	Acid Mine Drainage
B-BBEE	Broad-Based Black Economic Empowerment
BW	Bid Window
CCGE	Combined Cycle Gas Engine
CCGT	Combined Cycle Gas Turbine
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilisation and Storage
CEF	Central Energy Fund
CGS	Council for Geoscience
CHIETA	Chemical Industries Education and Training Authority
CIO	Chief Information Officer
COGTA	Cooperative Governance and Traditional Affairs
COP	Conference of the Parties
CPA	Communal Property Association
CRU	Communal Rental Units
CISF	Centralised Interim Storage Facility
CS	Corporate Services
DBSA	Development Bank of South Africa
DEA	Department of Environmental Affairs
DIRCO	Department of International Relations and Cooperation
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DPSA	Department of Public Service and Administration
DRC	Democratic Republic of Congo
dti	Department of Trade and Industry
dtic	Department of Trade, Industry and Competition
DWS	Department of Water and Sanitation
EMP	Environmental Management Plan
EPP	Electricity Pricing Policy
ETDP SETA	Education, Training and Development Practices SETA
EV	Electric Vehicle
EWSETA	The Energy and Water Sector Education Training Authority
EY	Ernst & Young
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GTL	Gas-to-Liquid
GTP	Geoscience Technical Programme
GUMP	Gas Utilisation Master Plan
GW	Gigawatt
GWe	Gigawatt Electrical
HDSA	Historically Disadvantaged South African
HELE	High Efficiency Low Emission
HR	Human Resources
IAEA	International Atomic Energy Agency
IDC	Industrial Development Corporation
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEA	International Energy Agency
IEP	Integrated Energy Plan
iGAS	South African Gas Development Company
IGR	Intergovernmental Relations Framework Act
IMF	International Monetary Fund
INEP	Integrated National Electrification Programme
IPCC	International Panel on Climate Change
IPP	Independent Power Producers
IRP	Integrated Resource Plan
Li-ion	Lithion-ion

LNG	Liquid Natural Gas
MES	Minimum Emission Standards
MHSC	Mine Health and Safety Council
MHSI	Mine Health and Safety Inspectorate
MMPD	Mining, Minerals and Energy Policy Development
MoU	Memorandum of Understanding
MPR	Mineral and Petroleum Regulation
MPRDA	Mineral and Petroleum Resources Development Act
MQA	Mining Qualifications Authority
Mt	Megaton
MTSAO	Medium Term Strategic Adequacy Outlook
MTSF	Medium Term Strategic Framework
MW	Megawatt
MYPD	Multi-Year Price Determination
NCOP	National Council of Provinces
NDP	National Development Plan
NEES	National Energy Efficiency Strategy
NEMA	National Environmental Management Act
NERSA	National Energy Regulator of South Africa
NMOG	National Macro Organisation of Government
NNR	National Nuclear Regulator
NRWDI	National Radioactive Waste Disposal Institute
NSP	National Strategic Plan
ODG	Office of the Director-General
PASA	Petroleum Agency of South Africa
PBMR	Pebble Bed Modular Reactor
PMI	Purchasing Managers' Index
POA	Programme of Action
PPP	Public Private Partnership
PSETA	Public Service Education and Training Authority
PV	Photovoltaic
PwC	Pricewaterhouse Coopers
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RR	Research Reactor
S&P	Standard & Poor's
SADC	Southern African Development Community
SADPMR	South African Diamond and Precious Metals Regulator
SANEDI	South African National Energy Development Institute
SAPS	South African Police Service
SARB	South African Reserve Bank
SARS	South African Revenue Service
SCA	Supreme Court of Appeal
SDT	State Diamond Trader
SEMAs	Specific Environmental Management Acts
SET	Science, Engineering and Technology
SFF	Strategic Fuel Fund
SHS	Solar Home Systems
SLP	Social and Labour Plan
SMME	Small, Medium and Micro Enterprises
SMR	Small Modular Reactors
SOE	State Owned Enterprise
SOP	Standard Operating Procedures
SSF	Strategic Stock Fuel
TWh	Terawatt-hours
WEF	World Economic Forum
WEO	World Economic Outlook
WiE	Women in Energy
WSP	Workplace Skills Plan

EXECUTIVE AUTHORITY'S STATEMENT

The existence of the Department of Mineral Resources and Energy (DMRE) is premised on its vision of becoming a leader in the transformation of South Africa's economic growth agenda through the sustainable development of the mining and energy sectors.

This vision will be operationalised by focusing on regulating, transforming and promoting the mining and energy sectors; providing affordable energy for growth and development; and ensuring that all South Africans derive sustainable benefit from the country's mineral wealth. For the execution of its mandate, and to enable the achievement of its vision, the DMRE is supported by various entities whose mandates and operating models culminate in the ability of the DMRE to make a sustainable contribution to the Medium Term Strategic Framework (MTSF) imperatives.

Energy forms an integral part of the economy and the energy sector is a key enabler for the attainment of national policy imperatives such as those expressed in the National Development Plan (NDP). South Africa needs to grow its energy supply to support economic expansion and, in so doing, alleviate supply bottlenecks and supply/demand deficits in energy-dependent industries such as mining and manufacturing. This will increase the contribution of industry sectors and enable them to create economic benefits for the country which are accelerated growth and job creation.

Energy security promotes economic growth, development, and social equity through expanded access to energy services that are sustainable and contribute to the reduction of pollution and mitigation of the effects of global climate change. The Integrated Resource Plan 2019 (IRP2019) is the leading policy framework for addressing the short- to long-term challenges that the country faces, and provides much needed policy certainty in the area of energy security and affordability. IRP2019 formulates specific interventions to address electricity infrastructure development, based on least-cost electricity supply and demand balance, taking into account security of supply and protection of the environment. IRP2019 identifies the preferred generation technologies required to meet expected demand growth up to 2030.

The DMRE has translated the provisions of IRP2019 into its responses to the challenges that the energy sector faces. Inadequate energy supply will be addressed in the short-term by accelerating energy efficiency rollouts. Generation capacity with short lead times and self-generation options will be enabled through systematic regulation.

For medium- and long-term outcomes, the various IRP2019 technologies will be implemented; while the updating and processing of the DMRE's regulatory frameworks will be accelerated to enable these interventions. This includes the enablement of industry to invest in the energy supply mix through self-generation. The IRP2019 decision indicates that the Nuclear New Build Programme must commence immediately, adding 2 500 MW to the grid, as this is a no-regret option in the long term. The DMRE will commence immediately with procurement processes to ensure the security of energy supply, and is considering Small Modular Reactors (SMRs) to take into account the pace and scale that the country can afford. Furthermore, the market will be tested for robust costing and funding options towards nuclear generation. The development of the roadmap for the 2 500 MW Nuclear New Build Programme will commence soon while an oversight monitoring plan for the Koeberg Life Extension Programme is being developed.

Cleaner coal technologies, including Carbon Capture, Utilisation and Storage (CCUS), will improve coal's sustainability as a primary energy source. Renewable energy will be explored beyond Bid Window (BW) 4 and buyer matters will be resolved through the creation of a state-owned, special-purpose vehicle.

The development of the gas market as an alternative source of energy will be pursued to meet limited and depleting gas supplies. Exploration for gas fields will be increased, and relationships will be forged with other

African countries for supply and market access. A just transition to a low carbon-emitting economy will be facilitated by integrating various work streams that relate to transitioning to a low carbon-emitting energy mix as per IRP2019.

The sustainability of the energy distribution industry will be improved by reviewing the regulatory framework and industry structure, as well as introducing regulations to improve the National Energy Regulator of South Africa's (NERSA) Regulatory oversight on infrastructure maintenance. The foremost outcome of the DMRE's initiatives will be increased availability of energy, and a wider electricity reserve margin. The actions will increase infrastructure investment, much of which relies on regulatory certainty and the sector's economic transformation. These actions collectively will boost employment and additional investment prospects, as well as meeting the requirements for lower carbon emissions, which will contribute to economic growth.

With regard to imported hydropower, South Africa has entered into a Treaty for the development of the Grand Inga Hydroelectric Project in the Democratic Republic of Congo (DRC), with some of the power intended for transmission to South Africa across DRC, Zambia, Zimbabwe and Botswana. This is in support of IRP2019 Policy Position 9 which states that South Africa must support strategic power projects in neighbouring countries, thereby supporting regional electricity interconnection, including hydropower. In addition to this generation option to provide clean energy, regional development drivers are compelling, especially given that currently there is very little energy trade between these countries due to lack of infrastructure. The potential for intra-SADC trade is huge as it could open up economic trade. Naturally, concerns have to be addressed about the risks associated with a project of this nature. South Africa does not intend to import power beyond its reserve margin from a single source, in order to de-risk dependency on this generation option.

The mining industry is critical for the economic growth, job creation and transformation objectives of the country. South Africa's Mining Charter is aimed at increasing investor certainty and distributing the industry's wealth more equitably. A lack of investment in mining, together with poor economic performance, has adverse implications along the mining and minerals value chain.

Research in mining is critical to support targeted outcomes, and the DMRE will pursue options to expand the mandates of the respective State Owned Enterprises (SOEs) to support this research. This will contribute to an increase in the competitiveness of the South African mining industry, enabling the country to be accessible to and compete in regional and global markets. Investment in research is also required to address the lack of innovation and the impact on mining beneficiation and skills development that could hinder progress to improve the country's manufacturing capability.

To create access to minerals for beneficiation, the necessary licensing conditions need to be created. Section 50 of the Mineral and Petroleum Resources Development Act (MPRDA) will be revisited to help increase domestic beneficiation. Licensing turnaround times will be addressed by reviewing and strengthening relevant legislation.

With regards to exploration activities, the Council for Geoscience (CGS) will fast-track the implementation of the Geoscience Technical Programme (GTP) by 2021, to catalyse investment in exploration. The goal is to ensure that long-term funding sustains the impact of the geosciences in South Africa.

Focusing on the concentration of petroleum and minerals, it will be necessary to encourage partnerships between emerging junior miners, and conduct a review of the Petroleum Bill to encourage inclusive, equitable and competitive exploration. The requirement for an optimal legislative framework for petroleum will be addressed by expediting the legislative processing framework, specifically the process involving the National Council of Provinces (NCOP) and the National Assembly.

Transformation will be addressed by enforcing compliance with relevant legislation. Once successful, this response will be evident in the minerals and petroleum sectors reflecting the country's demographics. The DMRE is committed to ensuring regulatory and legislative certainty through several channels, including the development of comprehensive legal guidelines aligned with the objectives of the MPRDA (e.g. optimal exploration, and substantial and meaningful participation by historically disadvantaged South Africans).

To create access to minerals for beneficiation, the necessary licensing conditions need to be created. Section 50 of the MPRDA will be revisited to increase domestic beneficiation. To reduce licensing application turnaround times, relevant legislation will be reviewed and strengthened. Capacity, in terms of human resources will be increased and licensing processes and timelines will be reviewed. These interventions are also aimed at increasing economic participation, ownership, access to resources and opportunities, and wage equality for women, youth and persons with disabilities.

With regards to mine health and safety, a review of legislation, and DMRE-led facilitation between the mines and communities, will reduce the negative impacts of mining on communities. Compliance with legislative frameworks will be enforced to address fatalities, injuries and diseases, while research will be intensified to improve health and safety in the mining sector. The security and safety of women in mining in relation to gender-based violence is a high priority, with a long-term timeline, and will be guided by the implementation of guidelines and directives to create a working environment conducive to women in mining.

Policy certainty is an ongoing request from investors and businesses and provides the most significant opportunity to attract investment to the country. Policy certainty creates a business environment which is conducive to commitment and investment in the country over the short- and the long-term periods. In recent years investment has been highest in capital-intensive sectors such as mining and quarrying, transport, storage, communication, electricity, gas, and water.

The DMRE will lead and facilitate enabling policy and regulatory interventions required to ensure that the energy and mining sectors make meaningful contributions to national objectives and MTSF targets.

The DMRE will continue to contribute to the development of a transformed, diversified and sustainable minerals and energy sector, contributing to economic growth by the enablement of energy security and affordability, and environmentally sustainable mining industries. The DMRE will promote transformation of the mining and energy sectors, pursue regulatory and structural reforms, as well as carry out policies and programmes to support the achievement of its contribution to the MTSF targets.

In conclusion, we have an abiding commitment to serve our people with diligence, as well as to manage the resources that have been placed at our disposal in a manner that genuinely serves their interests. The foundation has been laid for the DMRE to play its part in the implementation of the commitments made.

Executive Authority for the Department of Mineral Resources and Energy

ACCOUNTING OFFICER'S STATEMENT

Introduction

The Department of Mineral Resources and Energy (DMRE) was established in June 2019 through the merger of the Department of Mineral Resources and the Department of Energy (DoE) into a single department, the Department of Mineral Resources and Energy.

Subsequent to the merger, a start-up structure for the reconfigured DMRE, comprising six (6) programmes, was developed. These are in line with the objective to develop a mineral resources and energy sector that promotes economic growth and development, social equity and environmental sustainability.

The following table summarises the six departmental programmes as articulated in the start-up structure.

The purpose of the reconfigured start-up structure of the DMRE is to ensure the optimal utilisation and safe exploitation of mineral and energy resources through the execution of the following functions:

- Regulate the petroleum, mining and minerals industry
- Formulate, maintain and implement integrated minerals and energy policies to promote and encourage investment into the mining and energy industry
- Ensure the health and safety of employees in the mines
- Manage, co-ordinate and monitor programmes and projects focused on access to minerals and energy resources
- Manage the nuclear industry
- Ensure the Corporate Support function is rendered
- Provide internal audit services
- Ensure the implementation of risk and integrity management strategies and compliance with Acts and policies
- Co-ordinate the development of strategic management, monitoring and evaluation services
- Ensure sound financial management in the DMRE.

Programme	Programme purpose
Administration	Provide strategic support and management services to the Ministry and the DMRE
Mineral and Petroleum Regulation	Regulate the mining, minerals and petroleum industry
Mining, Minerals and Energy Policy Development	Formulate and maintain integrated minerals and energy policies to promote and encourage investment into the mining and energy industry
Mine Health and Safety Inspectorate	Ensure health and safety of employees in the mines
Programmes and Projects	Manage, co-ordinate and monitor programmes and projects focused on access to mineral and energy resources
Nuclear Energy	Manage the nuclear industry

Organisational Structure

The Minister of Public Service and Administration (MPSA) has instructed that the DMRE review the start-up organisational structure after finalisation of the DMRE Strategic Plan. In addition, the structure needs further unpacking at the programme level, as functions might have changed after the merger and the introduction of the Strategic Plan.

The DMRE will embark on the review in partnership with the Department of Public Service and Administration (DPSA) and, among others, undertake an in-depth analysis of the structure to ensure re-alignment with the mandate and strategic priorities of the DMRE. It is envisaged that this priority process will form the foundation of HR processes during the next five years.

Mining

In 2018, mining investments in the country totalled over R45 billion, resulting in the creation of about 4 000 jobs. Some of the investments made by the sector include R21.8 billion by Vedanta Resources in the Northern Cape, Sasol's R14 billion mine replacement programme at Shondoni and Impumelelo in Mpumalanga, and Exxaro's R3.3 billion mine investment in Belfast, Mpumalanga. Other investments came from the lead and zinc, coal, diamond, copper, heavy mineral sands and manganese sectors. These investments affirm the sector as a sunrise industry, with great potential in the future. For the period 2018 to 2020, an estimated 60 mining projects were in the pipeline in exploration, expansion, new mines and processing plants, with an estimated investment value of R110 billion and projected employment estimated at 32 000 employees. These attest to the fact that South Africa is still considered an attractive destination for mining investment.

The DMRE has, as a requirement of the National Environmental Management Act (NEMA) of 1998, developed, reviewed and gazetted the DMRE's Environmental Management Plan (EMP) in 2018/19.

The need to prioritise women, youth and people with disabilities remains a core mandate. The Mining Charter, gazetted in 2018 and being implemented, makes it possible for youth, women and people with disabilities to contribute meaningfully to the economy.

The 2018 financial year saw a total of 81 mining fatalities versus 90 in 2017. This translates into a 10% decrease year-on-year. The platinum sector recorded a commendable decrease of 59% in the number of fatalities reported. There was a 12% decrease in the number of injuries, from 2 669 in 2017 to 2 350 in 2018. In terms of occupational diseases, a decrease of 3% was recorded, from 4 632 cases in 2016 to 4 483 cases in 2017.

In response to government's priority of education, skills development and training, with more focus on initiatives to combat seismic and gravity-induced fall-of-ground accidents, the DMRE, in collaboration with the Mining Qualifications Authority (MQA), identified 40 learners (including the targeted unemployed youth and graduates) to be trained in the fields of rock engineering and seismology.

Mineral and Petroleum Regulation Programme

The DMRE, through the Mineral and Petroleum Regulation Programme, will continue to improve service delivery levels in the adjudication of licences and permits, in line with the Mineral and Petroleum Resources Development Act (MPRDA) and the Petroleum Products Amendment Act (PPA).

Most targets relating to this programme were achieved, except for the number of jobs created through mining. This is due to the mining sector's performance.

Conflicts between communities living in mining areas are symptomatic of communication limitations that exist between all concerned. The DMRE has subsequently established a Mine Communities and Stakeholder Engagement Unit to enhance and improve collaborations between mines, communities and other government institutions. A stakeholder engagement framework has been designed to assist companies in managing their stakeholder relations, especially in communities where they are mining. Engagements with communities will continue to create stability within the mining and energy industry.

Petroleum Regulation

100% of the planned target for fuel samples (1 080) was achieved. A total of 1 590 compliance inspections were conducted on retail sites, which exceeded the target by 90 compliance inspections.

Of the licences issued to entities, 89.18% were at least 50% owned and controlled by historically disadvantaged South Africans (HDSA).

Enforcement and Compliance

Illegal mining and illicit petroleum trade continue to be challenges, depriving South Africans of their benefits and impacting negatively on the growth of the country. The DMRE continues to work closely with the relevant stakeholders, including law enforcement agencies, to stem these trades. This process will raise compliance levels in all aspects of regulation.

Special Presidential Package

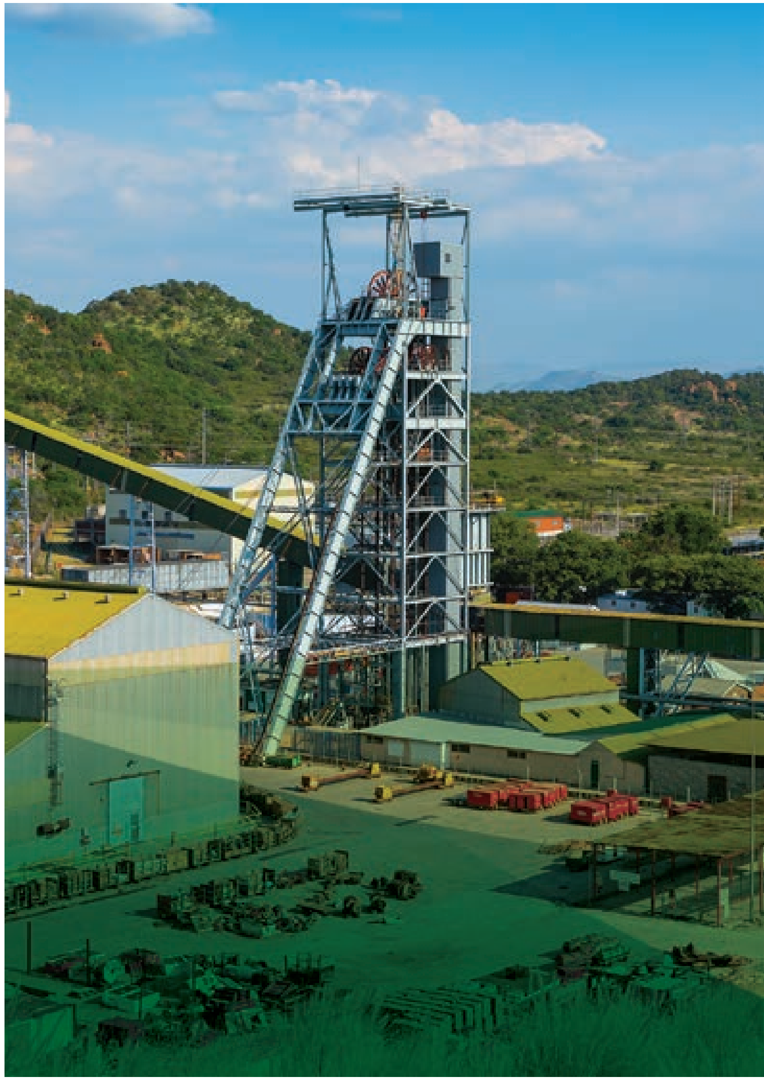
The DMRE will continue with the revitalisation of mining towns and labour-sending areas, including a programme aimed at reviving mining towns. The better plan for improving mining towns requires partnerships between the DMRE and mining companies. These will focus on the delivery of human settlements, and better alignment of Social Labour Plans (SLPs) with the Integrated Development Plans (IDPs) of municipalities. Collaborative efforts with mining companies and municipalities can improve the lives of communities.

Mining Regulatory Outlook

The mining regulatory outlook has improved tremendously following the finalisation of the Mining Charter and the withdrawal of the Mineral and Petroleum Resources Development Bill from Parliament. This has provided much-needed policy certainty to the mining industry. The promulgation of the Integrated Resource Plan (IRP2019) also provided certainty and has been well received by stakeholders. The regulatory framework for the DMRE continues to be strengthened with current work on amending both energy and mineral legislation instruments.

Transformation and Mineral Beneficiation

Transformation and mineral beneficiation are not at expected levels. South Africa continues to export minerals, and beneficiation remains at a minimum. This is an opportunity to develop internal value chains for better economic benefits. This would help mitigate another serious challenge – that the economy has been shedding jobs. Unemployment must be curbed as it is exacerbating the illegal mining situation.



Mining, Mineral and Energy Policy Development Programme

The following are key IRP Policy Positions that will be implemented by the DMRE according to the urgency required to mitigate specific risks:

- **Policy Position 1:** Immediately initiate a medium-term power purchase programme to assist with creating reserve capacity. This policy is required to complement Eskom's declining plant performance and to reduce the utilisation of diesel generators.
- **Policy Position 2:** The Koeberg Nuclear Power Plant's design life must be extended by another 20 years. The necessary technical and regulatory work must be undertaken immediately.
- **Policy Position 3:** Support Eskom financially and legally to comply with Minimum Emission Standards (MES) over time, taking into account the energy security imperative and the risk of adverse economic impacts.
- **Policy Position 4:** Convene a team to put together a 'just transition' plan within a year, in consultation with all social partners. This policy is to help avoid job losses, guide the modernisation of the energy sector, and appropriately exploit current resources.
- **Policy Position 5:** Retain the current annual build limits on renewables (wind and photovoltaic), pending the report on a just transition.
- **Policy Position 6:** South Africa should not sterilise the development of its coal resources for purposes of power generation. Instead, the planning framework for energy and environment must support a just transition.
- **Policy Position 7:** South Africa should support the development of gas infrastructure. All diesel-fired power plants (Peakers) should be converted to gas.
- **Policy Position 8:** The nuclear build programme must commence immediately, adding 2 500 MW at a pace and scale that the country can afford. It is a no-regret option in the long term.
- **Policy Position 9:** South Africa must support strategic power projects in neighbouring countries, thus supporting regional electricity interconnection. These include hydropower and gas, and will enable the development of cross-border transmission infrastructure needed for the regional power pool.

Security of Electricity Supply

The availability of energy is a clear and immediate challenge. Eskom remains the sole provider of electricity and prices are high in terms of affordability. Reliability and security of supply are not guaranteed, and load shedding is crippling the economy. Unmaintained distribution assets are also concerning. The clarification and review of the Electricity Pricing Policy (EPP) will provide some degree of direction for Eskom and the National Energy Regulator of South Africa (NERSA).

Transition to Clean Technologies

The energy industry's transition from coal to clean energy generation will negatively affect the coal industry in the near future, unless technology is developed to mine coal in an environmentally-friendly manner, offsetting negative emissions from its production. Renewable energy provides both opportunities and threats to the mining industry. Other than its threat to the coal industry, the emergence of electric vehicles will reduce demand for platinum, which is used for catalytic convertors in combustion engines.

Demand for battery minerals such as lithium, cobalt, platinum, vanadium and copper are opportunities. The manufactured batteries will power greener economies and transportation, leading to unparalleled opportunities for both local and international investors in the platinum industry and battery minerals commodities. These opportunities need to be managed in a way that will ensure the sustainability of the mining industry. It is also key to move from a raw export economy to a processing economy.

Energy from Gas

Gas is an alternate source of available energy, but there are no readily-available gas resources or infrastructure in South Africa. A review of the Gas Act is needed for inclusion of new technology and new modes for transportation.

There is also a need to strengthen bilateral engagements with SADC countries that are endowed with gas, such as Mozambique and Tanzania.

Nuclear Energy Programme

According to data from the International Atomic Energy Agency (IAEA), global energy produced by nuclear stands at 396 GW, but only 2 GW is produced in Africa – by South Africa. Egypt is developing 5 GW capacity and there are projects of unreported sizes in Kenya, Ghana and Nigeria. By 2050, global supply from nuclear could be as high as 750 GW, of which Africa could contribute 15 GW.

Nuclear and Greenhouse Gasses

Nuclear is rated as a clean energy and a solution to reducing greenhouse gas (GHG) emissions. The International Panel on Climate Change (IPCC) reports that in terms of grams of CO_2 per kWh, nuclear only produces 12 grams. This is lower than coal (820), natural gas (490), solar (27) or hydropower (24).

Nuclear can help meet the Paris Conference of the Parties (COP) agreement – COP 21 requirements. France operates 58 nuclear power plants and is already in compliance with the Paris Agreement. An increased share of nuclear in the energy mix will reduce carbon emissions significantly.

Small Modular Reactor

There is a move towards developing Small Modular Reactors (SMRs). Unlike traditional nuclear plants of 1 000 MW+, SMRs are less than 300 MW and can be shop-manufactured for site assembly. They can be combined in one plant (>6 units) to give higher power in a modular manner, and offer a lower plant capital investment cost per unit. SMRs are flexible – both in deployment and load following – and are suited for remote deployment in Africa. They also have lower grid requirements, which are again suited for African countries with small grids.

Currently there are more than 50 SMR designs under development, yet only three are being realised. Argentina's 25 MW CAREM, an integral light water reactor, is 70% constructed. China's 210 MW HTR-PM, a high temperature gas cooled reactor, is in the commissioning stage. Russia's 70 MW KLT40s, a floating reactor, is being tested and towed. South Africa was a world leader in SMR through its Pebble Bed Modular Reactor (PBMR) or Advanced High-Temperature Reactor (AHTR). Best case delivery of SMRs (according to vendor estimations) is 2025. Expected delivery for commercial availability of SMRs is post 2030.

Research Reactors

Research Reactors (RRs) are used for science, engineering, medicine, palaeontology, and numerous other applications.

South Africa has the SAFARI-1 Research Reactor, placing it among the largest producers of radioisotopes in the world. It also has strategic capability in the field of research reactor-based isotope production and nuclear medicine, the latter at Steve Biko Academic Hospital. At least 10 other countries are considering new RRs and Zambia and Nigeria already have firm plans for new RRs.

The demand for radioisotopes and other applications is increasing and demand currently outstrips supply. RRs are essential building blocks for a nuclear sector, including training and development, and scientific research. The replacement of the SAFARI-1 Research Reactor, which has demonstrated over 50 years of safe operation, is a key and strategic project.

Nuclear Waste

It is very important for South Africa to demonstrate sustainable nuclear waste management. Solutions for management of spent nuclear fuel vary. South Africa's approach is currently to use onsite wet storage, as well as a Transient Interim Storage Facility. A Centralised Interim Storage Facility has been commissioned and will be operational in 2025, and a Deep Geological Repository is planned for 2065.

Mine Health and Safety

Mining disasters have decreased over the past decade. A mining disaster is defined as an incident in which five (5) or more people die. Total occupational diseases in the mining sector have also declined and there has been a decrease in the overall fatality frequency rate, though platinum-related fatalities are up from a low in 2016.

South Africa has improved its safety level when compared to international peers, including Canada and the USA. South Africa's fatality rate improved by 75%, while Australia improved by 67% and the USA by 50%. Canada achieved 100%. But these markets have considerably less-complicated mining sectors than South Africa, which has some of the world's deepest mines. The DMRE is examining practices in markets such as Australia and the USA, towards achieving a zero harm goal.

Programmes and Projects Programme

Through the Programmes and Projects Programme, the DMRE has numerous challenges to contend with. Among these, the following are listed:

- Energy distribution infrastructure rehabilitation is required for effective delivery of the Integrated National Electrification Programme (INEP). Strategies in place include handling this through municipalities and Eskom.
- Inadequate energy supply is a top concern, prompting the pursuit of energy efficiency, embedded generation, and alternative energies.
- More will be done around sector transformation towards the youth, women, persons living with disabilities and small-scale mining.
- A just transition to low-emitting sources of energy is required, as is an investigation into the cost and benefits, in terms of resource sterilisation; environmental protection; and competing sectors. The Programme will provide supporting research for policy development and coexistence.

Integrated National Electrification Programme

Through the Integrated National Electrification Programme, the DMRE is responsible for assisting municipalities and Eskom with funding for implementation of electrification projects; to reach universal access to electricity by 2025.

Beyond reaching universal access to energy for all and addressing the electrification backlog, it is vital that policy guidelines are in place that will be adhered to when implementing electrification projects through the Integrated National Electrification Programme (INEP). The electrification policies are summarised below.

Suite of Supply Policy

The Suite of Supply Policy covers all project categories such as bulk infrastructure and household connections, which includes electrification of domestic households, informal settlements, farm dweller houses, Communal Property Association (CPA) and Communal Rental Units (CRU).

Farm Dweller Houses Policy

Other polices such as farm dweller and un-proclaimed areas are linked to the Suite of Supply Policy and bulk infrastructure. All these policies provide guidance in terms of how electrification projects should be funded by the DMRE through its implementing agencies such as Eskom and the municipalities.

Un-proclaimed Areas Policy

While the focus is on addressing the traditional backlog, the DMRE also has to ensure that funding for electrification of new households is made available. Due to various factors, there are a number of un-proclaimed and informal settlements which municipalities wish to electrify as part of the programme. The Un-Proclaimed Areas Policy looks at such areas and sets out guidelines with criteria to be followed in providing funding for them.

Non-grid Electrification Policy

The electrification programme is not able to ensure grid electrification to remote rural areas in the short or medium-term. Non-grid electrification is seen as an interim solution. The Non-Grid Electrification Programme is designed to temporarily give deep rural communities access to limited electricity until such time as grid connections are possible. Solar Home Systems (SHS) are given to households as part of the Non-Grid Electrification Programme.

Bulk Infrastructure Policy

Before an electrification project is implemented, it is crucial that there is bulk infrastructure to supply the area with electricity. Bulk infrastructure is one of the categories outlined in the Suite of Supply Policy. All bulk infrastructure projects such as the building of new substations, installation of new high and medium voltage lines, and upgrading and refurbishment of electrical networks must be outlined to ensure a reliable electrical infrastructure when implementing electrification projects.

Mixed Developments Policy

Mixed developments refer to a development where an area is developed and has a component of fully subsidised RDP houses, social housing (crus), or partially and fully bonded houses (Low Cost, GAP, BNG). Such developments are done by developers in partnership with government. Since these types of developments are increasing in number, this policy was created to address the types of such developments.

The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) was established by the DoE in conjunction with National Treasury and the Development Bank of Southern Africa (DBSA) at the end of 2010. The REIPPPP is one of the South African Government's urgent interventions to enhance the country's power generation capacity. Its main objective is to secure private sector investment for the development of new electricity generation capacity, thereby giving effect to the policy decision to diversify South Africa's energy mix, which was articulated in the 1998 White Paper on Energy Policy of South Africa.

The REIPPPP was also designed to contribute to broader national developmental objectives such as job creation, social upliftment and economic transformation, primarily through broadening of economic ownership. The IPP Office was established with a mandate to implement this programme and achieve its broader objectives.

Gas Utilisation Master Plan

The Gas Utilisation Master Plan (GUMP) covers the development of gas pipeline infrastructure for South Africa, to connect South Africa with African countries endowed with vast natural gas resources.

The GUMP is a roadmap for the development of a gas economy. It analyses the potential and opportunity for the development of South Africa's gas economy and sets out a plan of how this could be achieved. One of the key objectives of the GUMP is to enable the development of indigenous gas resources and to create the opportunity to stimulate the introduction of a portfolio of gas supply options. The demand from the Gas-to-Power Programme will provide a market for a potential supply of gas. It will also provide long-term gas demand sinks for future indigenous gas supplies.

Energy Efficiency Strategy

Energy efficiency has tremendous potential to boost economic growth and avoid greenhouse gas emissions, but the global rate of progress is slowing – a trend that has major implications for consumers, businesses and the environment. Energy Efficiency 2019 examines in detail the reasons for this recent deceleration in efficiency progress and also includes a special focus on the ways in which digitalisation is transforming energy efficiency and increasing its value.

The South African Government released the first National Energy Efficiency Strategy (NEES) in 2005. This strategy aimed to respond to the increasing demand for energy alongside a growing commitment to improve resource use and reduce South Africa's national environmental footprint. The NEES set an overall reduction target in energy intensity of 12% by 2015, and sectoral energy intensity improvements as follows: industry and mining (15%), power generation (15%), transport (9%), commercial and public building sector (15%), and residential (10%). The NEES derived its mandate from the White Paper on Energy Policy (1998) which was revised in 2011. A National Energy Efficiency Action Plan was developed in 2012 describing the implementation of the strategy.

The Energy Efficiency Target Monitoring System was established in 2014 to monitor progress made towards meeting the original targets (based on a year 2000 baseline). The results of the analysis, which relied to a large extent on existing data, confirmed that significant progress had been made between 2000 and 2015 in improving energy intensity, exceeding the targets for most sectors. The improvements in energy intensity reflect a combination of autonomous change, technological advancements, and deliberate interventions to improve energy efficiencies.

The post-2015 NEES aims to build on these achievements, stimulating further energy efficiency improvements through a combination of fiscal and financial incentives, a robust legal and regulatory framework, and enabling measures. The strategy has been framed to complement the policies and strategies of the Department of Environment, Fisheries and Forestry (DEFF), the Department of Public Works and Infrastructure (DPWI), the Department of Science and Innovation (DSI), the Department of Trade, Industry and Competition, the Department of Transport (DoT) and the National Treasury.

Conclusion

I wish to extend my sincere appreciation to the Minister, the Portfolio Committee on Mineral Resources and Energy, departmental entities and the broader mining and energy industries. Lastly I wish to thank Team DMRE and sector's many stakeholders for their ongoing engagement and support.

Accounting Officer for the Department of Mineral Resources and Energy

OFFICIAL SIGN-OFF

It is hereby certified that this Strategic Plan:

- Was developed by the Management of the Department of Mineral Resources and Energy under the guidance of Minister Gwede Mantashe
- Takes into account all the relevant policies, legislation and other mandates for which the Department of Mineral Resources and Energy is responsible
- Accurately reflects the impact, outcomes and outputs which the Department of Mineral Resources and Energy will endeavour to achieve between 2020 and 2025.

Branch: Corporate Services

Branch: Minerals and Petroleum Regulation

Branch: Programmes and Projects

Official Responsible for Planning

Approved by
Mr SG Mantashe, MP
Executive Authority

Branch: Corporate Services

Branch: Minerals and Petroleum Regulation

Branch: Nuclear

Official Responsible for Planning

Branch: Mine, Health and Safety Inspectorate

Branch: Mining, Minerals and Energy Policy Development

Chief Financial Officer

Accounting Officer

PART A
OUR MANDATE

1.1 CONSTITUTIONAL MANDATE

The Constitution of the Republic of South Africa, 1996 (the Constitution), along with the Bill of Rights, is the legal foundation of a democratic South Africa. It sets out the rights and duties of South African citizens and defines the structure of its government. All laws of the country must be consistent with the Constitution, which further requires that all spheres of government work together to address poverty, underdevelopment, marginalisation of individuals and communities and other legacies of apartheid and discrimination. In this light, all government institutions, entities and municipalities ultimately derive their mandate from the Constitution.

Primary Mandate

On 29 May 2019 the President announced the appointment of, amongst others, the Minister of Mineral Resources and Energy in terms of Chapter 5 (The President and National Executive), Section 91(2) and 93(1) of the Constitution. The appointment of the Minister of Mineral Resources and Energy necessitated the re-configuration of the Department of Mineral Resources and the Department of Energy into the new merged Department of Mineral Resources and Energy (DMRE).

The DMRE derives its primary mandate from the Constitution and in particular:

i) Part B of Schedule 4 of the Constitution, which specifies "electricity and gas reticulation" as functional areas of concurrent legislative competence. Chapter 7 (Local Government).
ii) Section 156(1), which specifies that a "municipality has executive authority in respect of, and has the right to administer the local government matters listed in Part B of Schedule 4 and Part B of Schedule 5."
iii) Section 155(7) in Chapter 7 (Local Government), which, specifies that "… national government has the legislative and executive authority to see to the effective performance by municipalities of their functions in respect of matters listed in Schedules 4 and 5, by regulating the exercise by municipalities of their executive authority referred to in Section 156(1)."
iv) Chapter 2 (Bill of Rights), Section 24.1, which specifies that "Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
v) Section 22, which enshrines freedom of trade, occupation and profession: "Every citizen has the right to choose their trade, occupation or profession freely. The practice of a trade, occupation or profession may be regulated by law."
vi) Section 217, which requires that: "When an organ of state contracts for goods and services, it must do so in accordance with a system which is fair, equitable, transparent, competitive and cost effective."

As we ensure the provision of various forms of minerals and energy and manage the utilisation thereof, we also have to ensure that people's right to an environment that is not harmful to their health or well-being, an environment protected for the benefit of the present and future generations through reasonable legislative and other measures, is observed.

1.2 LEGISLATIVE AND POLICY MANDATES

The following legislation regulates the mineral resources and energy sector and reflects the legislative measures that the DMRE has instituted to execute its obligation:

1.2.1 The National Energy Act, 2008 (Act No. 34 of 2008)

This Act is the enabling legislation that empowers the Minister to ensure that diverse energy resources are available in sustainable quantities and at affordable prices in the South African economy to support economic growth and poverty alleviation, while also taking into account environmental considerations. In addition, the Act provides for energy planning; for the increased generation and consumption of renewable energy; contingency energy supply; the holding of strategic energy feedstock and carriers; adequate investment in appropriate upkeep and access to energy infrastructure; measures for the furnishing of certain data and information regarding energy demand, supply and generation; the establishment of an institution to be responsible for the promotion of efficient generation and consumption of energy; and energy research and all matters connected therewith.

1.2.2 The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended

This Act establishes a national regulatory framework for the electricity supply industry and makes the National Energy Regulator of South Africa the custodian and enforcer of the national electricity regulatory framework. The Act provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The Minister, in terms of Section 34(1), is furthermore empowered to make determinations for the establishment of Independent Power Producers (IPP) for the purpose of greater competition in the electricity generation sector so as to increase the supply of electricity.

1.2.3 The Petroleum Products Act, 1977 (Act No. 120 of 1977), as amended

This Act provides for measures in the saving of petroleum products and an economy in the cost of distribution thereof, and for the maintenance of a price thereof; the furnishing of certain information regarding petroleum products; the rendering of services of a particular kind or standard in connection with petroleum products; the licensing of persons involved in the manufacturing, wholesaling and retailing of prescribed petroleum products; the transformation of the South African petroleum and liquid fuels industry; and the promulgation of regulations relating to such licences and matters incidental thereto.

1.2.4 The Central Energy Fund Act (Act No. 38 of 1977), as amended

This Act provides for the payment of certain moneys into the Central Energy Fund (CEF) and for the utilisation and investment thereof; the imposition of a levy on fuel and for the utilisation and investment thereof; the control of the affairs of the Central Energy Fund (Proprietary) Limited by a board of directors; for the keeping of records of all transactions entered into for account of the CEF or the Equalisation Fund and of certain other transactions; the investigation, examination and auditing of the books, accounts and statements kept and prepared in connection with the said transactions; and the submission of a report to Parliament relating to the said investigation, examination and auditing. It also provides for matters connected with the Act.

1.2.5 The Nuclear Energy Act, 1999 (Act No. 46 of 1999)

This Act provides for the establishment of the South African Nuclear Energy Corporation Limited (a public company wholly owned by the State); defines its functions, powers and financial and operational accountability, and its governance and management by a board of directors; stipulates the composition of the board and appointment of a chief executive officer; defines its responsibilities, including the implementation and application of the Safeguards Agreement and additional protocols entered into by South Africa and the International Atomic Energy Agency in support of the Nuclear Non-Proliferation Treaty acceded to by the country, regulation of the acquisition and possession of nuclear fuel and certain nuclear and related material and equipment, as well as the importation and exportation thereof, and certain other acts and activities relating to that fuel, material and equipment in order to comply with the international obligations of South Africa; and prescribes measures regarding the discarding of radioactive waste and the storage of irradiated nuclear fuel and other related matters.

1.2.6 The National Nuclear Regulator Act, 1999 (Act No. 47 of 1999)

This Act provides for the establishment of the National Nuclear Regulator to regulate nuclear activities. It prescribes its objectives and functions and the manner in which it is to be managed. It regulates staff matters, safety standards and regulatory practices, and the protection of persons, property and the environment against nuclear damage and matters connected therewith.

1.2.7 The National Radioactive Waste Disposal Institute Act, 2008 (Act No. 53 of 2008)

This Act provides for: the establishment of the National Radioactive Waste Disposal Institute to manage radioactive waste disposal on a national basis; its functions and the manner in which it is to be managed; regulation of staff; and matters connected therewith.

1.2.8 The Petroleum Pipelines Act, 2003 (Act No. 60 of 2003)

This Act provides for the establishment of a national regulatory framework for petroleum pipelines; a Petroleum Pipelines Regulatory Authority as the custodian and enforcer of the national regulatory framework; and matters connected therewith.

1.2.9 The Petroleum Pipelines Levies Act, 2004 (Act No. 28 of 2004)

This Act provides for imposition of levies by the Petroleum Pipelines Regulatory Authority and matters connected therewith.

1.2.10 The Gas Act, 2001 (Act No. 48 of 2001)

This Act provides for the orderly development of the piped gas industry; establishes a national regulatory framework and a National Gas Regulator as the custodian and enforcer of the national regulatory framework; and provides for matters connected therewith.

1.2.11 The Gas Regulator Levies Act, 2002 (Act No. 75 of 2002)

This Act provides for the imposition of levies by the National Gas Regulator and matters connected therewith.

1.2.12 The National Energy Regulator Act, 2004 (Act No. 40 of 2004)

The National Energy Regulator Act, 2004, provides for the establishment of a single regulator to regulate the electricity, piped-gas and petroleum pipeline industries and matters connected therewith.

1.2.13 The Abolition of the National Energy Council Act, 1991 (Act No. 95 of 1991)

This Act provided for the abolition of the National Energy Council; the transfer of powers, assets, liabilities, rights, duties, obligations and staff of the Council to the Minister; and for matters incidental thereto.

1.2.14 The Electricity Act, 1987 (Act No. 41 of 1987), as amended

This Act was repealed by the Electricity Regulation Act, 2006, with the exception of Section 5B that provides for the funds of the Energy Regulator for the purpose of regulation of the electricity industry.

1.2.15 The Liquid Fuel and Oil Repeal Act, 1993 (Act No. 20 of 1993)

This Act repealed the Liquid Fuel and Oil Act, 1947 (Act No. 49 of 1947) and the Liquid Fuel and Oil Amendment Act, 1960 (Act No. 17 of 1960).

1.2.16 The National Environmental Management Act, 1999 (Act No. 107 of 1999)

This Act has a direct impact on legislative and other measures to reduce carbon emissions, improve energy efficiency and mitigate the impact of generation/refinement and the use of energy on the environment.

1.2.17 The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)

This Act makes provision for access to and sustainable development of mineral and petroleum resources and matters connected therewith.

1.3 INSTITUTIONAL POLICIES AND STRATEGIES RELATED TO THE FIVE-YEAR PLANNING PERIOD

1.3.1 The Integrated Resource Plan

The Integrated Resource Plan (IRP) is a legal instrument for South Africa's energy generation. Contemplated under the Electricity Regulation Act, the IRP is designed to help meet the forecast annual peak and energy demand, with an established reserve margin. It achieves this through the management of supply-side and demand-side resources over a specified future period and is driven by a set of predetermined objectives:

- Ensure the security of South Africa's energy supply
- Minimise the cost of South Africa's energy supply
- Minimise water usage related to energy supply
- Reduce CO_2 emissions from power generation.

Of particular importance to the DMRE's strategic planning process, as stated previously, are the following Policy Positions, ranked according to the urgency required for mitigation:

- **Policy Position 1:** Immediately initiate a medium-term power purchase programme to assist with creating reserve capacity. This policy is needed to complement Eskom's declining plant performance and to reduce the utilisation of diesel generators.
- **Policy Position 2:** The Koeberg nuclear power plant's design life must be extended by another 20 years. The necessary technical and regulatory work must be undertaken immediately.
- **Policy Position 3:** Support Eskom financially and legally to comply with Minimum Emission Standards (MES) over time, taking into account the energy security imperative and the risk of adverse economic impacts.
- **Policy Position 4:** Convene a team to put together a 'just transition' plan within a year, in consultation with all social partners. This policy is to help avoid job losses, guide the modernisation of the energy sector, and appropriately exploit current resources.
- **Policy Position 5:** Retain the current annual build limits on renewables (wind and photovoltaic), pending the report on a just transition.
- **Policy Position 6:** South Africa should not sterilise the development of its coal resources for purposes of power generation. Instead, the planning framework for energy and environment must support a just transition.
- **Policy Position 7:** South Africa should support the development of gas infrastructure. All diesel-fired power plants (Peakers) should be converted to gas.
- **Policy Position 8:** The nuclear build programme must commence immediately, adding 2 500 MW at a pace and scale that the country can afford. It is a no-regret option in the long term.
- **Policy Position 9:** South Africa must support strategic power projects in neighbouring countries, thus supporting regional electricity interconnection. These include the INGA Hydropower Project in the Democratic Republic of Congo (DRC) and gas projects in Mozambique, and will enable the development of cross-border transmission infrastructure needed for the regional power pool.

Cabinet approved the Integrated Resource Plan 2019 – including its policy recommendations – in 2019. IRP2019's implementation is under way, in line with section 34 of the Electricity Regulation Act.

1.3.2 Integrated Energy Plan

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Mineral Resources and Energy is mandated to develop and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The IEP analyses current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this to project future energy requirements, based on different scenarios.

While the IEP focuses on demand for all energy forms across all the economic sectors at a high level, more detailed analysis of different demand growth profiles and supply-side options for the two main energy sub-sectors, namely: electricity generation and liquid fuel supply, are detailed in supporting sector plans. For the gas sub-sector, a draft framework which seeks to explore future possible options for the development of a gas market in South Africa is being developed. This approach has been undertaken to enable the differences in each of the sectors to be analysed in detail, taking into account the complexities and levels of maturity of each sub-sector.

The DMRE has published a draft report on the IEP and IRP Assumptions and the Base Case for comments. Supporting annexures, including a report on the detailed scenarios for liquid fuel supply are also available on the DMRE's website for comment.

The Draft Integrated Energy Planning Report was approved for publishing by Cabinet in November 2016. Subsequent to the approval, the IEP was widely consulted upon through public stakeholder workshops which were held in all nine provinces. Substantial input was obtained through the workshops and through written submissions. Extensive work has been done to address gaps identified in the Draft IEP Report and the final Integrated Energy Plan will be presented to Cabinet for approval.

1.3.3 Mining Charter

Against the backdrop of concerns around the pace of transformation in the mining and minerals industry, government published a new Mining Charter aimed at strengthening its effectiveness, while taking into account the realities facing the industry.

The Broad-Based Black Socio-Economic Empowerment Charter for the South African Mining and Minerals Industry, commonly known as the Mining Charter, was first developed in 2002, and amended in 2010. It served as an instrument through which the Minerals and Petroleum Resources Development Act (MPRDA) could fuel transformation in the industry. Following a further assessment on the effectiveness of the Charter, the most recent review was gazetted in draft on 15 June 2018 (the "2018 Charter"). This 2018 Mining Charter, alongside the MPRDA and SLP amendments offers an opportunity to improve regulatory and policy certainty, and subsequently investor perception.

Taking cognisance of prior drafts of the Mining Charter, the 2018 Charter brings with it mostly foreseen changes, introducing new targets and measurement criteria aimed at accelerating the transformation progress of the industry, and a degree of alignment with certain compliance measures and criteria used in the Broad-Based Black Economic Empowerment Codes of Good Practice (B-BBEE Codes). Increased compliance targets are lower and less challenging for right holders to comply with than in the previous draft and amended Charters. The revised Charter aims to take the next steps in driving value beyond compliance within the South African mining ecosystem, simultaneously continuing a journey of redressing historic inequalities.

1.3.4 Mineral Beneficiation

Government has committed to the promotion of local beneficiation through legislation. The Mineral and Petroleum Resources Development Act of 2002 includes provisions that will ensure that: (1) the Minister of Mineral Resources promotes the beneficiation of Minerals in the Republic; (2) If the Minister, acting on advice of the Board and after consultation with the Minister of Trade and Industry, finds that a particular mineral can be beneficiated economically in South Africa, the Minister may promote such beneficiation subject to terms and conditions as the Minister may determine; and (3) Any person who intends to beneficiate any mineral mined in or outside of South Africa may only do so after written notice and in consultation with the Minister.

The South African Mining Charter of 2004 specifically stipulates that mining companies will be able to offset the value of the level of beneficiation achieved by the company against its HDSA ownership commitments.

The Diamonds Act, 1986 (Act No. 56 of 1986) was amended through the Diamonds Amendment Acts, 2005 (Act No. 29 of 2005 and Act No. 30 of 2005). The rationale for the amendments was to increase access to rough diamonds for jewellery manufacturing in South Africa; maintain security of supply of rough diamonds; promote the beneficiation industry in South Africa thus creating jobs; and increase participation throughout the diamond value chain.

The Precious Metals Act 2005, Act No. 37 of 2005 provides for acquisition, possession, smelting, refining, beneficiation, use and disposal of precious metals. Precious metals include gold and the platinum group metals. Silver has been excluded from the definition of precious metals.

1.3.5 Shale Gas

The Council for Geoscience (CGS) is embarking on a shale gas research project aimed at unlocking the unknowns and assumptions about shale gas exploration in the country. The project also aims to build scientific skills in the area of shale gas exploration as this is a new concept to the country at large.

The programme is funded by the DMRE and will assist government in making well informed decisions about shale gas in South Africa.

The objectives of the programme are to collect and review new geological information on the Karoo Basin; define an environmental baseline; assess the amount of recoverable gas mainly from the Whitehill and Prince Albert Formations; cover various geo-environmental impact assessments such as ground water dynamics and possible contamination; and monitor potential seismic interference.

The CGS Shale Gas Project will serve as a baseline study for future shale gas research and play a vital role in the review of petroleum exploration and exploitation regulations. NEMA regulations will be utilised as a framework in identifying shortfalls of the environmental impacts of the shale gas.

1.4 RELEVANT COURT RULINGS

- The majority of judgments relate to Mineral and Petroleum licensing matters, given the volume of applications processed annually in these sectors in terms of the Mineral and Petroleum Resources Development Act 28 of 2002 and the Petroleum Products Act 20 of 1977.
- The Sabie and Resilient judgments, relating to bulk electricity disconnections by Eskom for non-payment by the Thaba Chweu and Emalahleni municipalities respectively, are subject to an application for leave to appeal. These matters are not opposed by the Minister and Department.
- The Coal Transporters Forum matter is subject to an application by the Forum for leave to appeal to the Supreme Court of Appeal (SCA). The matter is opposed by 33 respondent parties, including NERSA, Eskom and the IPPs.
- The Chamber of Mines matter, in which a declaratory order was handed down by the High Court in relation to the enforceability of the Mining Charter and the interpretation of the ownership element, has resulted in further litigation to establish legal certainty on government's regulatory authority to achieve transformation in the minerals and mining sector.
- The Baleni judgment, which is currently on appeal to the SCA, deals with the question of whether consent is required from traditional communities where mining rights have been granted by the Minister to land occupied by them.
- In the Treasure the Karoo and Another matter, the Regulations for Petroleum Exploration and Production was declared invalid and set aside by the SCA. Authorisation of shale gas exploration, which involves hydraulic fracturing, will only be possible once new regulations have been promulgated under NEMA.

PART B

OUR STRATEGIC FOCUS

2.1 VISION

A leader in the transformation of South Africa through economic growth and sustainable development in the mining and energy sectors.

2.2 MISSION

To regulate, transform and promote the minerals and energy sectors, providing sustainable and affordable energy for growth and development, and ensuring that all South Africans derive sustainable benefit from the country's mineral wealth.

2.3 VALUES

The service delivery approach of the DMRE is guided by its value system that is summarised in the table below:

Batho-Pele (Sotho for "People First")	Represents a DMRE that is service orientated, strives for excellence in service delivery, commits to continuous service delivery improvement for the achievement of a better life for all, and seeks to include all citizens through services and programmes.
Ethics	Represents our moral principles as reflected by the Code of Conduct for Public Servants, i.e. what we understand, know about and mean when we resolve what is right and what is wrong.
Honesty	Represents a facet of moral character and denotes positive, virtuous attributes such as integrity, truthfulness and straightforwardness along with the absence of lying, cheating or theft.
Integrity	Represents consistency of actions, values, methods, measures, principles, expectations and outcomes and is regarded as the honesty and truthfulness or accuracy of one's actions.
Accountability	Represents the acknowledgment and assumption of responsibility for our actions, decisions, policies, administration and governance.
Professionalism	Represents workers who enjoy considerable work autonomy and are commonly engaged in creative and intellectually challenging work that requires impressive competence in a particular activity.
Ubuntu	Represents our interconnectedness and our approach that is open, available and affirming of others.
My Public Servant – My Future (We belong, We care, We serve)	Represents public servants at the centre of delivering quality services to the citizens in line with the dictates of the Constitution of the Republic of South Africa.

2.4 SITUATIONAL ANALYSIS

The situational analysis is segmented into components that reflect developments in a Global, African, Sub-Saharan/SADC and South African context, in order to provide a holistic picture of the external economic and environmental factors that affect the DMRE. The analysis includes an external overview considering key elements of the PESTLE framework, as well as an internal analysis that reflects on past organisational performance.

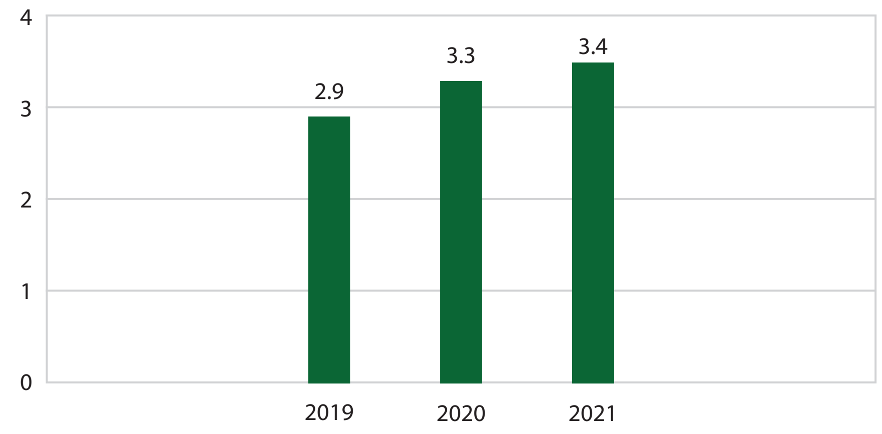
2.4.1 Analysis of the External Environment

Economic Context – Global

According to the Industrial Development Corporation (IDC) Economic Overview of Q3, 2019, the global economy is in a synchronised slowdown, with economies generally experiencing a moderation in their growth performances[1] (Figure 1).

The US Federal Reserve lowered its policy rate by 25 basis points each at its August, September and October meetings[2]. The European Central Bank, in turn, has limited room to utilise interest rates in support of growth and, therefore, announced the resumption of its quantitative easing programme for an indefinite period.

As a result, growth in global industrial production is stagnating, with contractions recorded in Europe. The situation has led to a sharp decline in sentiment levels among manufacturers in advanced economies, as can be seen in the Figures 2 and 3.



Global growth is projected to rise from an estimated 2.9% in 2019 to 3.3% in 2020 and 3.4% for 2021—a downward revision of 0.1% for 2019 and 2020 and 0.2% for 2021 compared to those in the October World Economic Outlook (WEO). The downward revision primarily reflects negative surprises to economic activity in a few emerging market economies, notably India, which led to a reassessment of growth prospects over the next two years. In a few cases, this reassessment reflects the impact of increased social unrest.

Several key economic variables are reflecting the deteriorating economic, trading, investment and risk environments. Relatively subdued inflationary pressures and moderate growth are underscoring the accommodative monetary policy stances being maintained by central banks around the globe.

Figure 1: Global growth projections[3]

1 IDC – Economic Overview 2019
2 https://www.imf.org/en/Publications/WEO/Issues/2019/07/18/WEOupdateJuly2019
3 World Economic Outlook 2020 (International Monetary Fund)

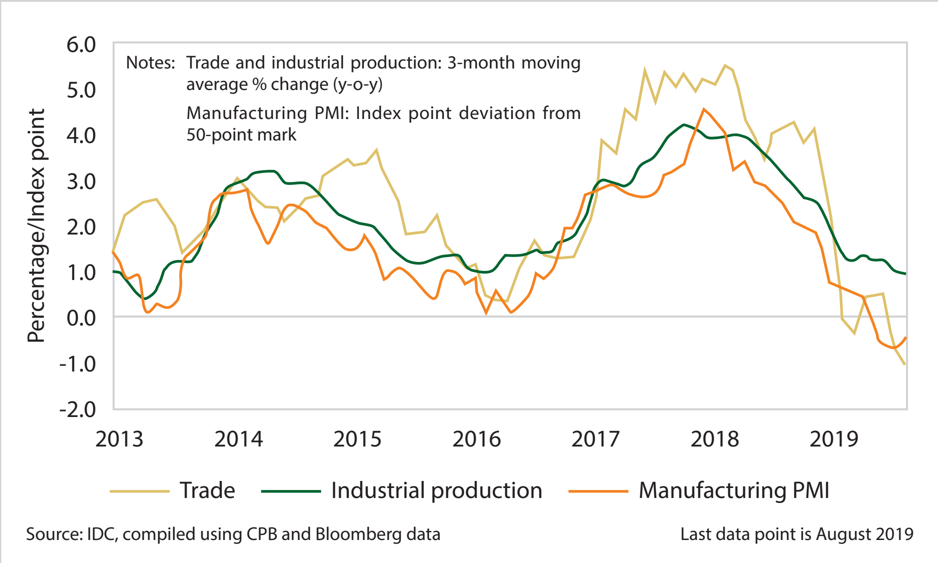


Figure 2: World trade, industrial production and the manufacturing PMI

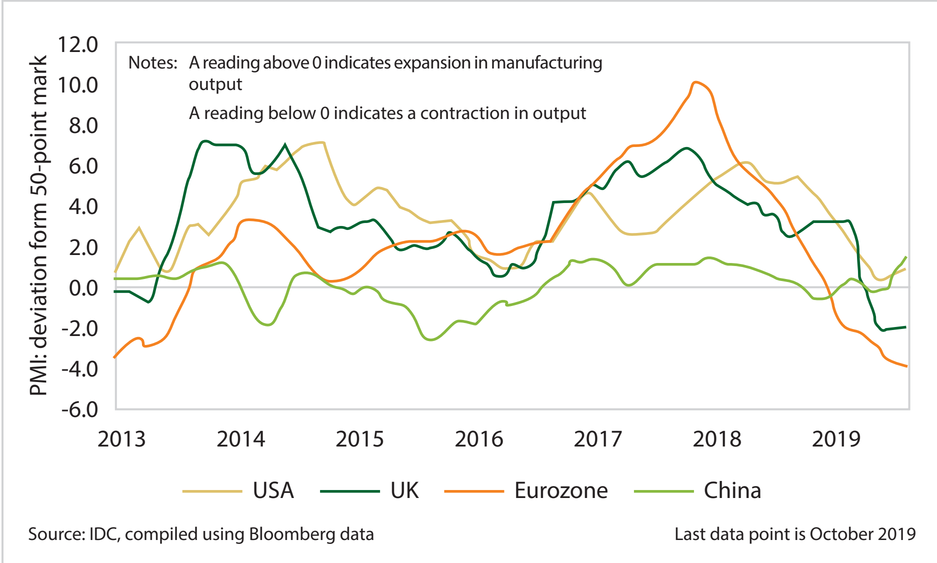
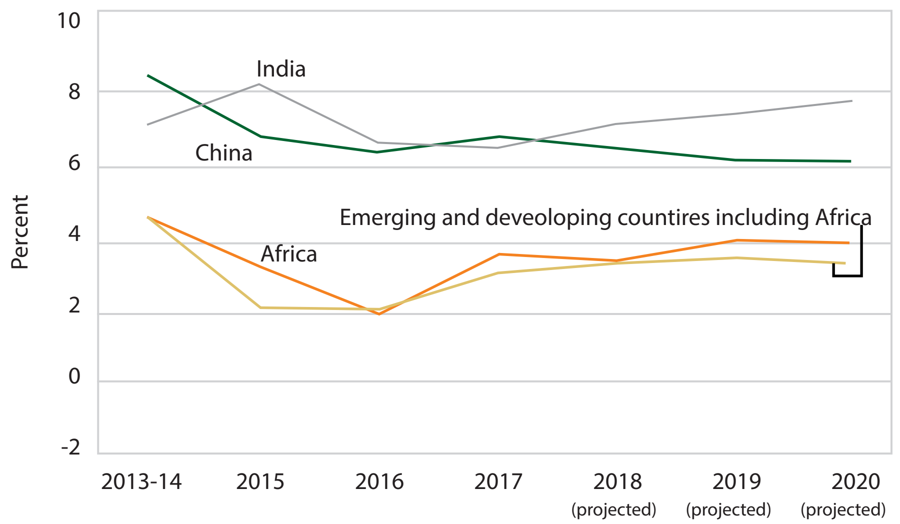


Figure 3: Manufacturing PMIs for select countries/region

Economic Context – Africa

The African Development Bank's African Economic Outlook for 2019 showed that the continent's general economic performance continues to improve. Gross domestic product reached an estimated 3.5% in 2018, about the same as in 2017 and up from 2.1% in 2016. Africa's GDP growth was projected to accelerate to 4.0% in 2019 and 4.1% in 2020 (Figure 4). But even this growth is not sufficient to address persistent fiscal and current account deficits and unsustainable debt. Dependency on a few export commodities to spur growth and vulnerability to volatility in commodity prices has impeded most African economies from sustaining high growth. Countries have to move to a higher growth path and increase the efficiency of growth in generating decent jobs.



Source: African Development Bank statistics and International Monetary Fund.

The 2019 Outlook shows that macroeconomic and employment outcomes are better when industry leads growth[4]. Key challenges faced by the African economy include: Unemployment and underemployment; Underinvestment in infrastructure; Fiscal crises; Political change; and Climate change.

Figure 4: Real GDP growth in Africa, 2020

Economic Context – Sub-Sahara and the SADC Region

Sub-Saharan Africa is facing a slight moderation of its growth prospects. Robust performances from several of its non-resource intensive economies should counterbalance the subdued growth outcomes of the larger economies, specifically South Africa, Nigeria and Angola[5]. The pace of economic expansion in the region is expected to gather momentum from 2020 onwards, but the downside risks are high due to an uncertain external backdrop that is impacting on commodity markets. Headwinds on the external front are weighing down on economic activity,[6] alongside the slow pace of reforms, severe weather-related shocks, Ebola epidemics, as well as rising security and political tensions in parts of the region.

The International Monetary Fund (IMF) lowered its growth estimates for Sub-Saharan Africa to 3.2% in 2019, from 3.4% previously. A moderate pick-up to 3.6% is projected for 2020 on the back of some improvement in the performance of the region's largest economies – namely Nigeria, South Africa and Angola - as well as a general strengthening in domestic demand. Investment activity is expected to gradually recover in various countries. However, the external environment is becoming less supportive of industrial commodity markets, both in price and volume terms. As such, it poses significant downside risks to the export performance of resource – intensive economies as well as future investment activity.

Amid rising fiscal constraints, debt vulnerabilities remain high in several Sub-Saharan Africa economies. The number of countries already in debt distress (such as Mozambique, Sudan, Zimbabwe) or at high risk of getting into such a position (such as Zambia, Ethiopia, Ghana) continues to expand, according to the latest World Bank estimates.

4 African Development Bank – 2019 African Economic Outlook
5 Sub-Saharan Africa Regional Economic Outlook: Recovery Amid Elevated Uncertainty
6 African Development Bank – 2019 African Economic Outlook (https://www.afdb.org/en/knowledge/publications/african-economic-outlook

Economic Context – South Africa

The South African economy finds itself under renewed pressure. Growth is estimated to have moderated in Q3 2019, based on preliminary data for several key economic variables. The output of the manufacturing and mining sectors has fallen, while retail trade sales are exhibiting modest growth. South African households remain under considerable strain, affected by high levels of indebtedness, an uncertain economic environment and poor employment prospects. Consumer confidence fell sharply to a reading of -7 points in Q3 2019, the lowest in about two years (Figures 5 and 6).

The drop in consumer sentiment was mirrored by a steep fall in confidence among retailers, to the weakest level in 20 years. Ratings agencies have become increasingly concerned with South Africa's worsening fiscal metrics and poor growth performance, as well as with the enormous risks posed by Eskom. Although Moody's kept the sovereign rating unchanged at Baa3 on 1 November 2019, as anticipated, it altered the outlook from "stable" to "negative". The agency has indicated that it requires more clarity on how government plans to address the widening budget deficit and the steep rise in debt. S&P Global, which had already placed the sovereign rating two notches into sub-investment territory in November 2017, issued a stark warning of a possible further downgrade at its ratings review meeting on 22 November 2019.[8]

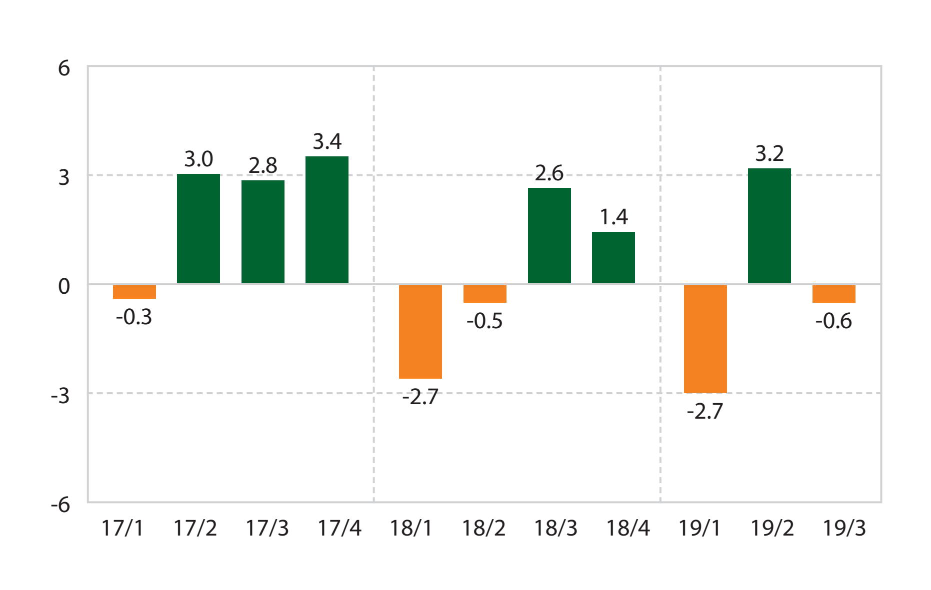


Figure 5: Contributors to negative growth in GDP in Q3[3]

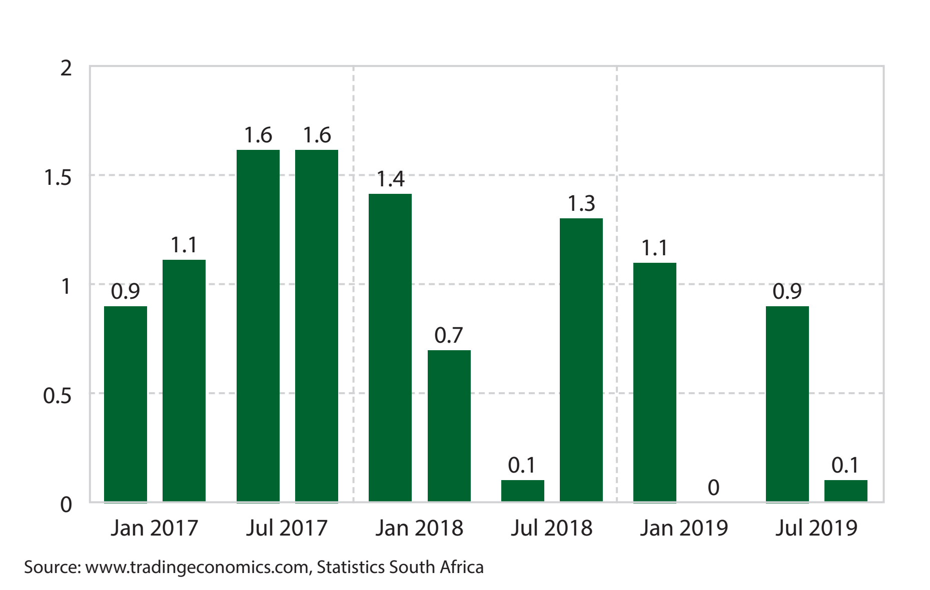
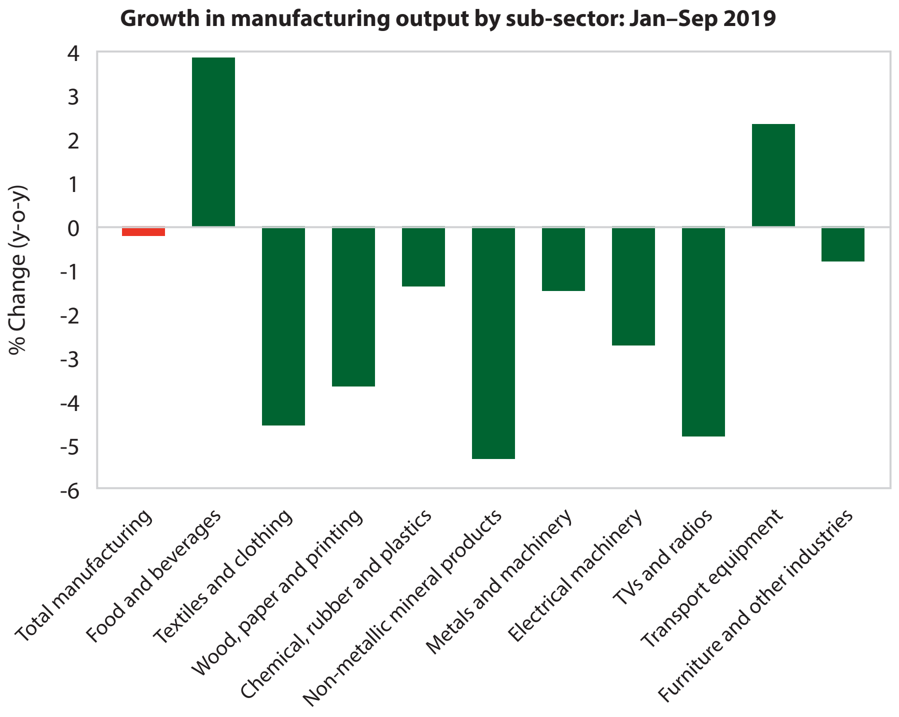


Figure 6: South Africa's annualised GDP growth in 2019

7 Source: Stats SA

8 IDC Economic Outlook 2019

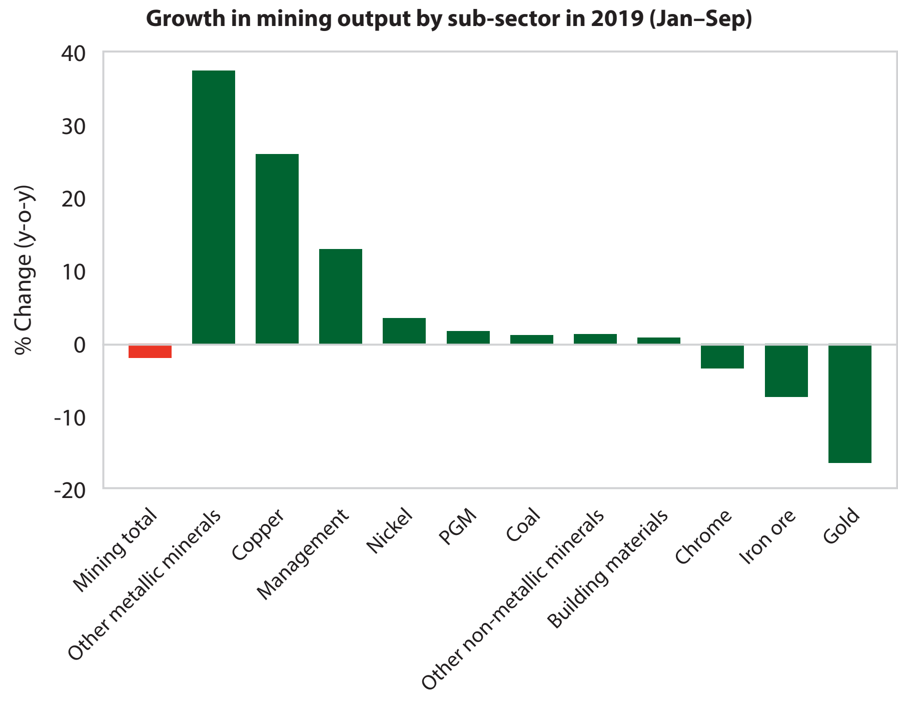
Manufacturing output dropped by 3.8% in Q3 2019 implying a contraction of 0.2% (year-on-year) for the period January to September 2019, as shown in Figure 7.



Source: IDC, compiled using Stats SA data

On the production front, lower output from mining and manufacturing bears testimony to the difficult operating and trading conditions facing these two important sectors of the economy. Weak demand conditions domestically and increasingly challenging global markets, accompanied by higher costs of doing business (due particularly to electricity tariffs,) and policy-related concerns, among others, have affected production activity.

Figure 7: Lower output recorded by most manufacturing sub-sectors



Source: IDC, compiled using Statistics South Africa data

Mining production fell by 1.7% (year-on-year) over the period January to September 2019, mainly due to sharply lower output in sub-sectors such as gold and iron ore mining. Excluding gold, the mining sector's performance was slightly better at +0.5% (Figure 8). The poor performance of the mining sector has considerable implications for many supplying and supporting industries across South Africa's economy.

Figure 8: Mining output

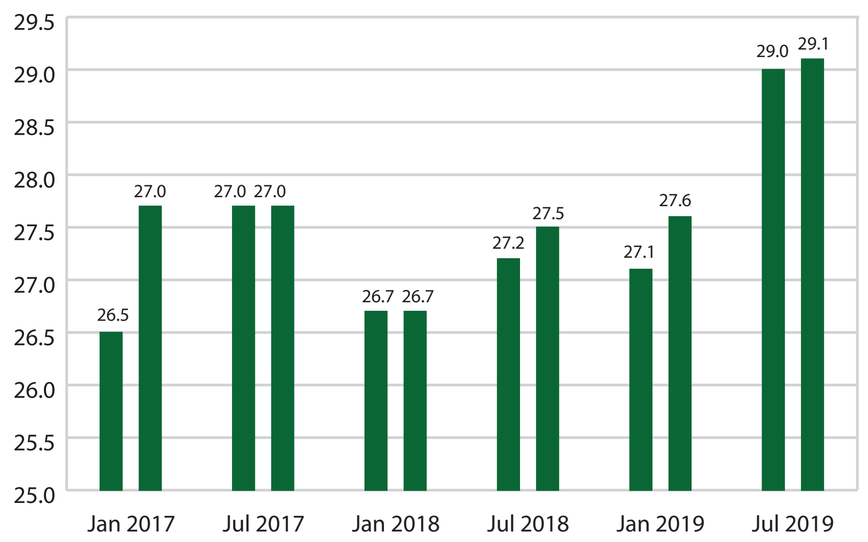
Operational challenges and financial constraints at Eskom, higher electricity tariffs and declining demand in a low-growth environment have affected the performance of the electricity sector.

Key challenges facing the South African economy include:

» Insufficient employment creation
» Substantially worse fiscal metrics
» Eskom remains the single-largest risk factor
» Sovereign ratings under considerable threat.

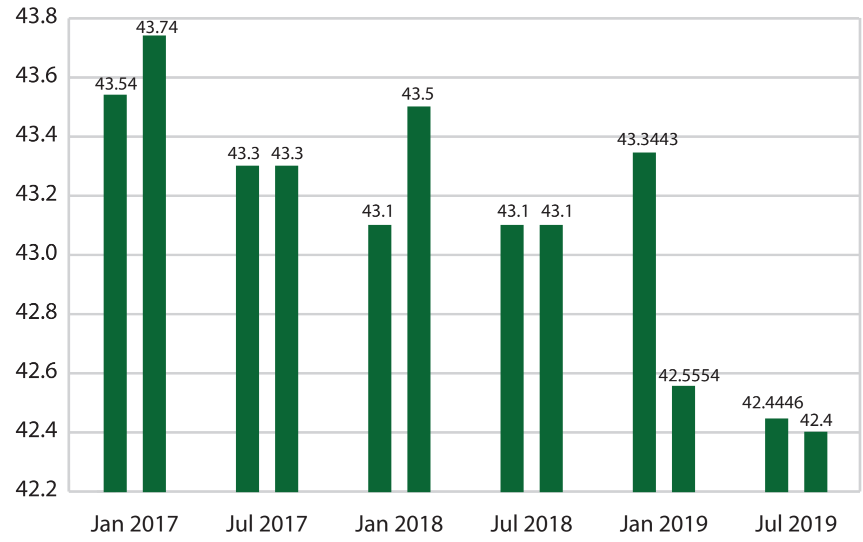
Economic pressure on South Africa exacerbates the unemployment challenge. An estimated 519 000 people entering the labour market in the 12 months to Q3 2019, and 5 000 jobs having been lost on a year-on-year basis, the unemployment rate rose to a new record high of 29.1%, with 6.7 million people unable to find work (Figure 9).

South Africa's employment rate continues to drop, with Stats SA's latest figures showing the employment rate at 42.4%. The official employment rate has been on a steady decline in the last three (3) years. The economy's labour absorption capacity is insufficient to accommodate all new entrants into the labour market, as can be seen in Figure 10.



Source: www.tradingeconomics.com, Statistics South Africa

Figure 9: Unemployment rate in South Africa



Source: www.tradingeconomics.com, Statistics South Africa

Figure 10: South African employment rate

Macro-Economic Outlook for South Africa

Structural challenges and subdued demand conditions domestically, along with a slowing global economy, are expected to weigh on South Africa's economic performance in the short to medium term. Real GDP was expected to increase by only 0.6% in 2019. The IDC view is that the pace of growth is likely to remain modest over the next three years. South Africa's worsening fiscal metrics and poor growth performance are of major concern. The enormous risks posed by Eskom, the widening budget deficit and the steep rise in debt have increased the risk for further downgrade by ratings agencies.

Rising State borrowing costs have the potential to affect key infrastructure investment and negatively impact on both domestic primary and secondary economic sector output. However, improvement in business and investor confidence is emerging, as evidenced by the commitments made by local and foreign entities at the Second South Africa Investment Conference, hosted by President Cyril Ramaphosa on 6 November 2019. Investment pledges of R371 billion were made, with the potential to create 412 000 direct employment opportunities over the next five (5) years in various sectors of the economy. The President has reiterated government's commitment to address key structural impediments to growth, and to create a more investor- and business-friendly economic environment. A summary of performance is reflected in Figure 11 below.

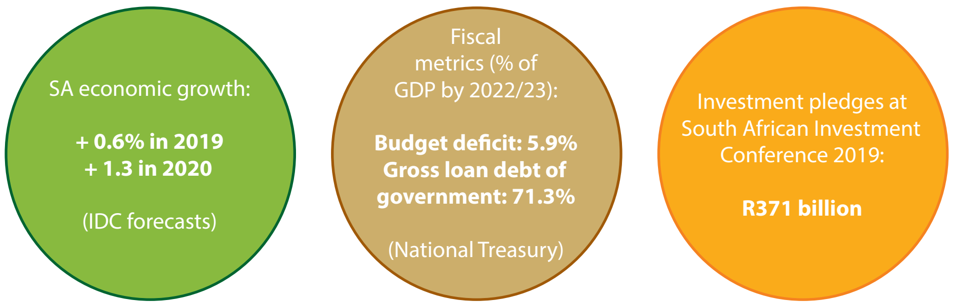


Figure 11: Summary of South Africa's Economic overview [9]

Mining Industry Analysis

The mining and metals industry is recovering from one of its most difficult periods in decades. Market volatility and a downturn in commodity prices have created a new normal, where cost cuts, automation and operational efficiency are vitally important. The analysis has been broken down into the Global, African, Sub-Saharan/SADC and South African contexts, in order to provide a holistic picture of the challenges that are linked to the mining industry.

Mining Context – Global

According to the World Economic Forum (WEF), the mining industry has been facing a number of sector-specific issues related to regulation, geopolitical risk, and legal limits on natural resource use. Shareholder activism and public scrutiny have created additional challenges[10]. According to the WEF the following trends will shape and determine the mining and metals sector in future:

1. **Transition to a low-carbon economy** – Countries must decarbonise their energy systems by the middle of this century. The transition from fossil fuel based energy systems to low emission energy provides a great opportunity for the mining sector.
2. **Access to new resources** – Automation and digitalisation will result in more targeted and efficient mining, which could further be enhanced through technological breakthroughs in areas such as in situ leaching. Mining jurisdictions with higher perceived risks may see increasing levels of interest from investors.
3. **New ways to finance mining** – As mining companies try to limit risk, novel financing and production models will become more common. Alternative financing solutions have been developed such as royalty and metal stream agreements that reduce the burden on mining companies' balance sheets. To spread the risk of new capital-intensive projects, these financing solutions are likely to continue to grow.
4. **A social contract for mining** – Creating real benefits for communities near mine sites will be key to the success of new projects. Obtaining the 'licence to operate' from local communities has been a challenge for the mining industry in recent years.

9 Source: IDC Economic Overview, November 2019
10 https://www.weforum.org/agenda/2019/03/seven-trends-shaping-the-future-of-the-mining-and-metals-sector/

5. **Big data and mining** – Data transparency to aid the mining industry's relations with stakeholders. Collecting and processing massive amounts of data will be essential for mining companies as they digitise and automate their operations.
6. **The geopolitics of mining** – Mining companies must navigate rising geopolitical risk and economic protectionism. A growing resistance to globalisation and free trade is altering politics, and directly affecting the mining and metals sector. Policymakers in mining jurisdictions are increasingly trying to enact local content laws and regulations which require minerals to be processed before they are exported.
7. **Modern mining workforces** – Maintaining an open dialogue will be essential as mining companies try to revamp their employee base. Constantly evolving technologies and business models will require mining company employees to develop new skills. The sector will have to increasingly compete with the IT sector to attract top talent from universities in order to drive its digitisation and automation processes.

Commodities of the Future

The demand for future mining commodities will be influenced by changes in industrial needs, driven by consumer choices and environmental concerns. But most importantly the changes driving technology will enable society to mitigate environmental challenges and transition to a green economy. Deloitte identified the commodities of the future, in its report, tracking the trends 2018: The top 10 issues shaping mining in the year ahead. Deloitte's list of commodities for the future is primarily those commodities used in the production of lithium-ion batteries.

The world is driving the reduction of carbon emissions in order to mitigate climate change by reducing dependence on fossil fuels. This has led to increased use of renewable energy sources in many sectors and other developments such as electric motors in automobiles rather than combustion engines. As a result, battery technology has become increasingly important, leading to a sharp increase in the production of batteries.

The following are listed as the mining commodities of the future:

» **Lithium**, it may be argued, is the most prominent mining commodity of the future, because it is the key component of lithium-ion (Li-ion) batteries. Commodity analysts predict global demand will double by 2030. Mining companies are searching for new mining projects in order to take advantage of the bullish future of lithium. Exploration budgets of mining companies in search of new mineral deposits will list lithium high on the exploration list and countries that have potential mineralisation of such a commodity will attract global exploration investment.

» **Graphite** is another commodity that has seen increased demand because it is used as anodes in batteries. Due to this surge in demand synthetic graphite electrodes have increased tenfold in price.

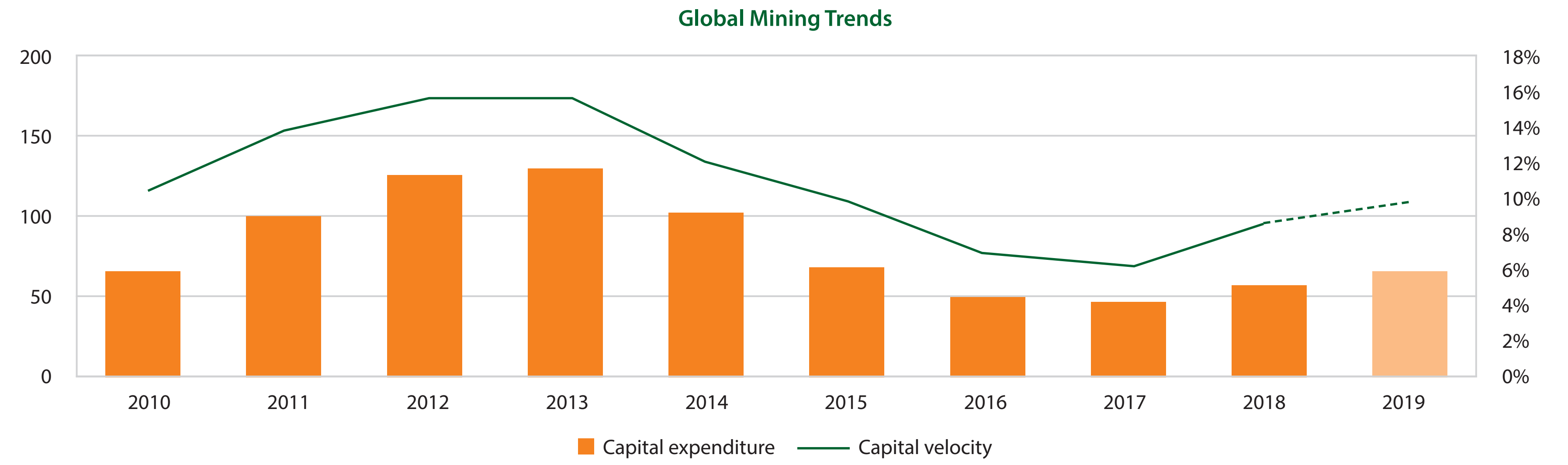
» **Cobalt** prices have quadrupled, creating a global supply deficit in 2018. 90% of cobalt is produced as a by-product, which makes it dependent on other minerals. But this reality makes cobalt deposits one of the most desirable mineral deposits in the world.

» **Nickel** is increasing in demand due to the large quantities required for Electric Vehicle (EV) batteries. Only high-grade nickel is used in EVs in order to keep the charge over long distances, but only around half of the world's supply of nickel is of the right grade for such use. Demand for nickel sulphides (battery-grade nickel) is expected to increase by 50% to three million metric tonnes by 2030 according to the Deloitte report. Experts predict that nickel in car batteries could increase to 80% from the current 33%.

» **Copper** demand will increase as the demand for electrification and hence the need for copper wiring increases. According to Mining Technology, around 28 million tonnes (Mt) of copper is used annually, 75% of which is used for wiring. Demand for copper is set to grow beyond current levels in the future, driven by EVs that contain four times as much copper as combustion engines cars. Furthermore, renewables such as photovoltaics are five times more copper-intensive than conventional power generation from thermal plants and nuclear.

While the future is bright for the above commodities, the reality is that other mining commodities will be replaced. Coal and iron are two of the mining commodities that will come under pressure and mining of these commodities is likely to reduce into the future:

- **Coal** is one of the commodities that drove the industrial revolution and its continued importance in many countries' fuel mixes is not in doubt. But the realities of climate change and the global response will negatively affect future demand. As the world commits to the reduction of fossil fuel energy sources, coal is most likely to become a commodity of the past. That may not be realised in the short term due to the continued importance of coal in current energy mix of the country. Its future may also be prolonged by adoption of cleaner technologies.
- **Iron ore** will also be impacted by the global drive to recycle, but due to its strength, steel is widely used and demand remains strong. The World Steel Association estimates that by 2030, 1.9 billion metric tonnes of steel will be needed to meet global demand. At the same time, recycling initiatives are expected to ramp up globally and iron ore demand will be negatively impacted by this. To drive this reality home, the US already produces around 70% of its steel from scrap metal, thereby reducing its demand for iron ore, according to the Deloitte Report.



Source: PwC analysis

*2019 Outlook

Using capital expenditure of the Top 40 global mining companies, PwC Mining Outlook demonstrated a five (5) year decline in mining capital expenditures before 2018 (Figure 12). In 2018 capital expenditure started to rise again, but from historically low levels. The modest increase in 2018 suggests that mining companies are continuing to proceed cautiously. The PwC analysis further indicates that 48% of spending by these Top 40 companies was on ongoing projects, with relatively few new projects approved or initiated in 2018.

Figure 12: Top 40 capital velocity (%) compared with capital expenditure (US$BN)

Global Exploration Budgets

The global exploration budget for nonferrous metals rose to an estimated US$10.1 billion in 2018, representing a 19% growth year-on- year, compared with US$8.5 billion in 2017 (Figure 13). While data shows that global drilling increased, budgets were still below levels at the peak of the super cycle and were not evenly spread across regions or minerals. S&P Global expected some volatility to persist in exploration in 2019 as uncertainty remained over the sustainability of economic growth between the U.S. and China (Figure 14). The industry, however, remains short of critical new discoveries, and metals such as copper will see widening deficits without additional investment in exploration for the mines of the future. As already stated, transition to a low-carbon economy provides opportunities, for example the solar industry will increase demand for aluminium, copper, lithium and cobalt multiple times in the next two (2) decades as a result of the need for increased battery storage capability and capacity. Therefore exploration activity and budgets will have to respond to this shift, to enable supply to meet demand.

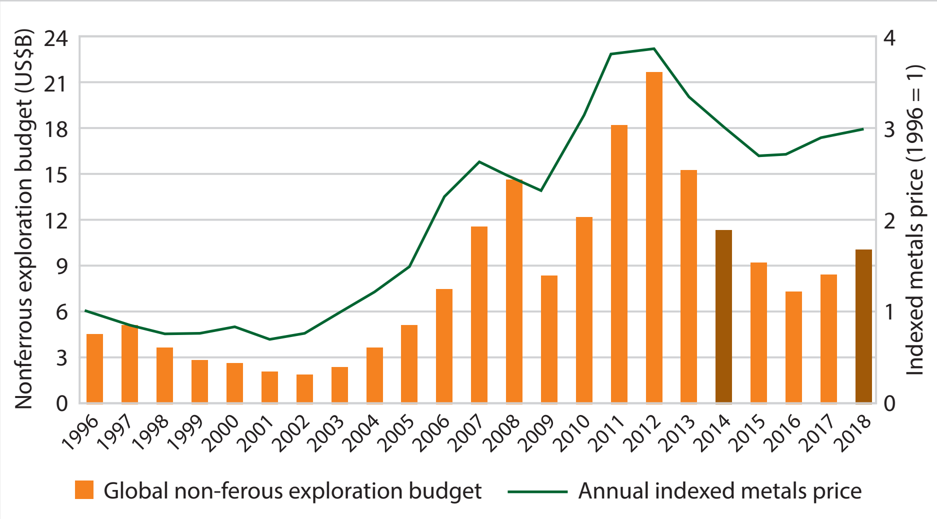


Figure 13: World exploration trends 2018 [11]

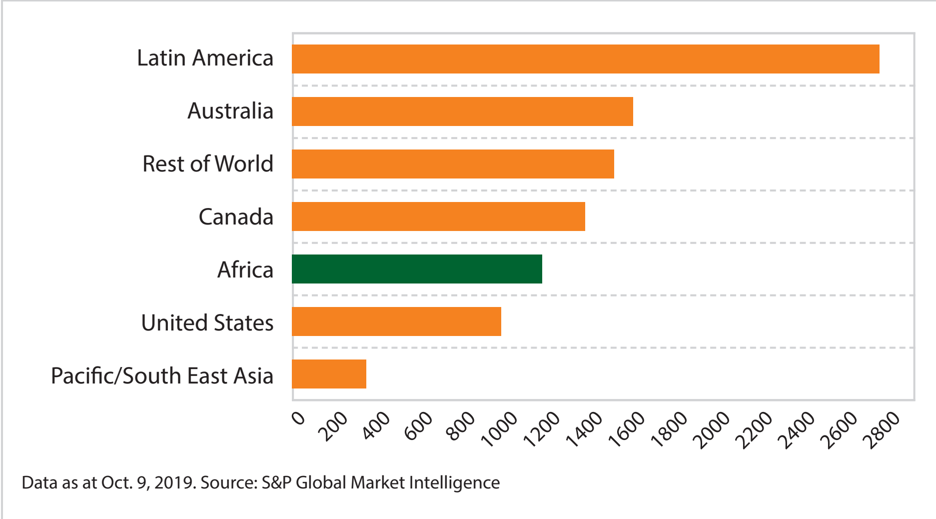


Figure 14: 2019 Annual exploration budgets by region (US$M)

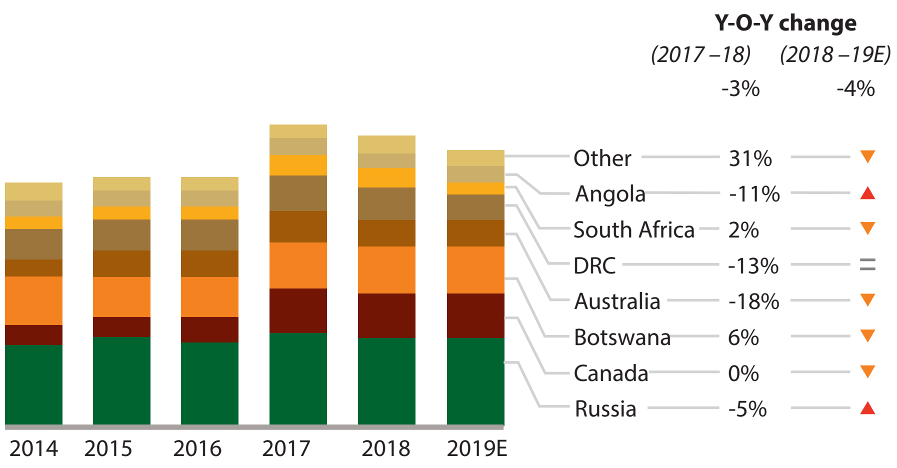
11 S&P Global Market Intelligence

Diamond Mining

Between 2010 and 2016, global production was consistently between 120 million and 130 million carats. In 2017, it jumped to roughly 152 million carats and then fell 3% to 147 million carats in 2018. The 26 million-carat production increase in 2017 was the largest single-year volume increase since 1986, and it created a surplus that affected the entire value chain. In 2019, production is expected to drop an additional 4% (Figure 15).

Additional contributors to the decrease are:

» Production is depleting at Argyle in Australia
» South Africa's, Venetia Mine is transitioning from open pit to underground mining
» Production levels were lowered at Orapa Mine in Botswana
» These changes will be partially offset by increased supply from several ALROSA mines in Russia and smaller players in Angola.



*estimated based on company production plans

Notes: Only diamonds tracked by Kimberly Process are included. 2019 data is a preliminary estimate and is to be updated with 2019 Kimberly data for 2017 and 2018 was adjusted in accordance with production of AGD diamonds (additional 1.4 million carats was accounted in 2017 instead of 2018 to reflect reported real production of 4.4 Mcts instead of 3 Mcts), and data for 2018 was adjusted in accordance with reported production of Debswana mines and Karowe mine (additional production of 0.12 Mcts for Botswana in 2018). DRC is Democratic Republic of the Congo.

Sources: Company data; Kimberly Process; expert interviews; publication analysis; Bain and Company

Figure 15: Annual diamond production – million carats

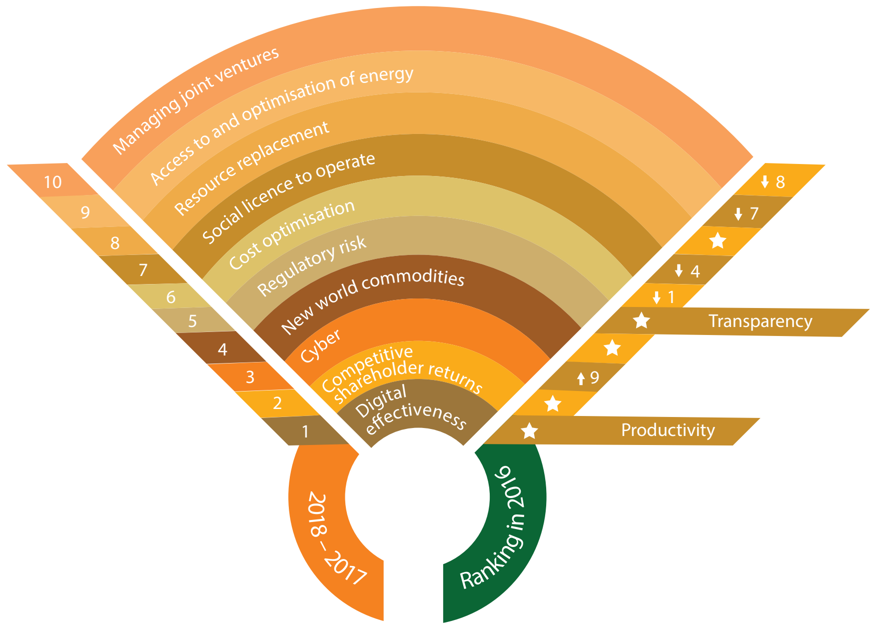
Investment Attractiveness Index

The Investment Attractiveness Index, reflected in the table below, is a composite index that combines both the Policy Perception Index (PPI) and the results of the Best Practices Mineral Potential Index. While it is useful to measure the attractiveness of a jurisdiction based on policy factors such as onerous regulations, taxation levels, the quality of infrastructure, and other policy-related questions that respondents answered, the Policy Perception Index alone does not recognise the fact that investment decisions are often sizably based on the pure mineral potential of a jurisdiction.

		Score					Rank				
		2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Africa	Botswane*	71.66	63.14	77.62	68.32	75.10	32/83	43/91	19/104	39/109	27/122
	Democratic Republic of Congo (DRC)*	54.92	61.51	72.80	59.37	58.38	67/83	51/91	29/104	60/109	67/122
	Ethiopia*	45.73	44.35	57.32	64.11	50.76	77/83	81/91	68/104	51/109	89/122
	Ghana*	54.91	72.13	75.56	71.27	67.17	68/83	22/91	22/104	31/109	44/122
	Mali	62.18	70.74	69.32	50.84	64.70	50/83	25/91	42/104	83/109	51/122
	Namibia	56.66	60.67	66.11	69.78	76.37	60/83	54/91	53/104	33/109	21/122
	South Africa	65.30	62.06	53.62	58.04	56.49	43/83	48/91	74/104	66/109	74/122
	Tanzania	55.04	46.79	60.45	57.46	63.82	66/83	79/91	64/104	69/109	52/122
	Zambia*	63.60	59.34	72.78	57.48	75.71	45/83	58/91	30/104	68/109	25/122
	Zimbabwe*	56.57	54.32	41.84	41.45	39.07	62/83	66/91	96/104	98/109	112/122
Argentina	Catamarca*	68.39	53.91	50.38	42.29	69.14	37/83	67/91	77/104	96/109	41/122
	Chubut*	54.83	30.54	31.47	37.75	49.94	69/83	88/91	101/104	104/109	92/122
	Jujuy*	52.61	58.57	24.83	49.57	58.92	72/83	59/91	104/104	86/109	65/122
	La Rioja*	48.70	46.06	33.94	28.86	41.96	75/83	80/91	99/104	109/109	107/122
	Mendoza*	50.15	29.29	35.51	38.51	38.09	73/83	89/91	98/104	101/109	114/122
	Neuquen*	31.77	60.00	26.13	45.17	52.02	82/83	57/91	103/104	93/109	86/122
	Salta*	54.09	62.51	69.25	56.69	73.71	70/83	45/91	43/104	71/109	32/122
	San Juan	55.90	63.21	63.69	54.97	72.78	64/83	42/91	58/104	75/109	35/122

Risks in Mining and Metals

The mining industry carries inherent business risks. Ernst & Young (EY) summarised the top ten (10) business risks linked to the mining and metals industry for the year 2017-2018,[12] as illustrated in Figure 16.



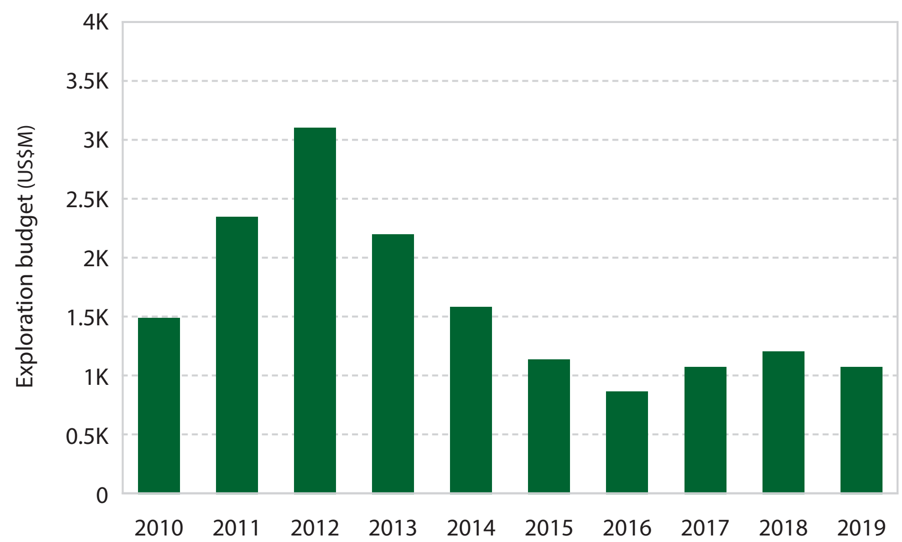
↑ Up from 2016 ↓ Down from 2016 – Same as 2016 ★ New to the radar

1	*Managing joint ventures*	6	*Regulatory risk*
2	*Access to and optimisation of energy*	7	*New world commodities*
3	*Resource replacement*	8	*Cyber*
4	*Social licence to operate*	9	*Competitive shareholder returns*
5	*Cost optimisation*	10	*Digital effectiveness*

Figure 16: Top 10 business risks in the mining and metals sector[13]

Mining Context – Africa

Maintaining an open dialogue will be critical, as mining companies try to revamp their employee base. Constantly evolving technologies and business models will require mining company employees to develop new skills. The sector will have to increasingly compete with the IT sector to attract top talent from universities in order to drive digitisation and automation processes[14].



Data as at Oct. 9, 2019. Source: S&P Global Market Intelligence

According to the 2020 S&P Global Market Intelligence, "Africa posted the second-largest exploration budget decrease among the regions in 2019, as budget was cut by US$156 million year over year. The bulk of the budget reduction is in the allocations for late-stage and feasibility exploration, largely due to the progress of some major projects toward production"[15] (Figure 17).

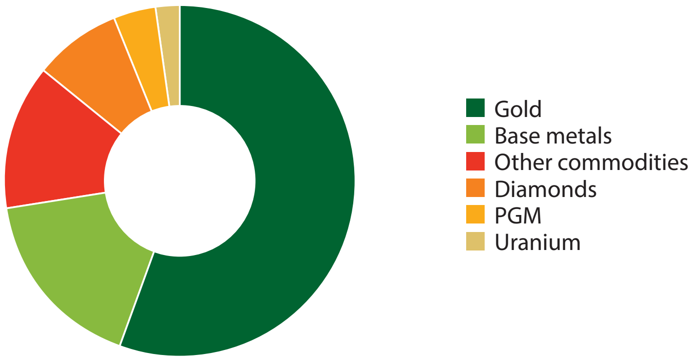
Figure 17: Annual budget trends

12 ey.com/miningmetals
13 Ernst and Young (2017–2018)
14 https://www.projectsiq.co.za/mining-in-africa.htm
15 2020 by S&P Global Market Intelligence, a division of S&P Global Inc.

Africa's base metals budgets have fallen the most year-on-year, decreasing by US$104 million to US$204 million as reflected in the table below.

Country	2019 budgets	2018 budgets	Change (%)
DRC	174.2	269.5	-35
Burkina Faso	134.2	149.1	-10
Ghana	100.3	102.9	-3
South Africa	97.4	97.8	-0.4
Mali	96.3	99.6	-3
Cote d'Ivoire	79.8	101.6	-21
Tanzania	55.2	38.4	44
Namibia	46.7	35.1	33
Angola	35.9	18.2	97
Zambia	33.3	40.0	-17

Data as at Oct 9, 2019. Source: S&P Global Market Intelligence



Source: S&P Global Market Intelligence

Data as at October 9, 2019

Allocations for diamond exploration increased for the first year since 2013, by US$26M year-on-year to US$85M. The Annual relative exploration budgets by commodity are summarised in Figure 18.

Figure 18: Annual exploration budgets by commodity (US$M)

Mining Context – SADC Region

The region continues to struggle with water shortages and energy constraints, and the fact is that water remains a critical resource for the industry. Often water scarcity is a major issue, although excess and flooding can also impact on mining production. In Africa, scarcity requires that miners need to drive up efficiency of use and use less of this precious commodity[16]. The same goes for power, where intermittency and accessibility can act as major barriers. These challenges are forcing mining operations to innovate, diversify their portfolios and plan for contingencies as they work towards reliability and resilience[17].

Mining Context – South Africa

South Africa has long been considered a regional and global mining powerhouse, with more than 90% of the platinum group metals (table on the next page). South Africa has been engulfed by a series of political shocks and economic underperformance that have taken a significant toll on its position as Southern Africa's leader in the extractives industry. Amid a backdrop of recession and accusations of corruption, South Africa also faces the challenges associated with an aging mining sector. Against the backdrop of concerns around the pace of transformation in the mining and minerals industry, government has published a new Mining Charter aimed at strengthening its effectiveness, while taking into account the realities facing the industry[18]. However South African mining industry remains critical to the economy of the country as demonstrated by statistics from the Minerals Council South Africa in the table and Figure 19 that follows.

16 https://www.fin24.com/Special-Reports/Mining-Indaba/complex-challenges-affecting-african-mining-industry-expert-20190208

17 Du Plessis, A., 2019. Water as a source of conflict and global risk. In Water as an inescapable risk (pp. 115-143). Springer, Cham.

18 Deloitte: 2018 Draft Mining Charter

South Africa's contribution to world mineral resources: 2017–2018

Commodity	Unit	South Africa reserves	World reserves	%
Antimony (metal)	kt	27	1 500 000	1.8
Chromium	Mt	200 000	500 000	40.0
Gold (metal)	t	6 000	57 000	10.5
Iron Ore	Mt	770	82 000	0.9
Manganese (metal)	kt	200 000	690 000	28.9
Nickel	Mt	3 700	78 000	4.7
Platinum Group Metals	t	63 000	67 000	94.0
Uranium (metal, up to $US80/kg U)	t	279 100	–	5.2
Zirconium minerals (metals)	kt	14 000	75 000	18.6

Mining matters to South Africa

Direct contribution of mining to GDP	**R350.8bn** (7%)	Direct employment created by mining	**456 000** people employed
Direct contribution to fixed investment	**R91.1bn** (15% of total private sector investment)	Indirect employment created by mining	For every job in mining at least **2 more jobs** are created up and downstream
Total primary mineral sales	**R498.7bn** (66% exported sales, 27% of SA's total exports)	Economic dependency	Each mining employee supports **5-10** dependants
Royalties paid	**R7.6bn**	Remuneration to mining employees	**R134bn**
Taxes paid	**R22.0bn**	PAYE paid by employees	**R21.0bn**

Source: Department of Mineral Resources and Energy, US Geological Survey

Figure 19: Contribution of mining to the South African economy

South African Mining Sector Analysis

The contribution of the mining sector dropped by 1.7% (year-on-year) over the 2019 period, with lower output in sub-sectors such as gold and iron ore mining being the main contributors. The mining sector's poor performance has adverse implications along supply chains according to the IDC. The Q4 2019 mining sector output was expected to remain negative due to load shedding and the impact of the low utilisation of iron and steel (Figure 20). In the long term, South Africa's mining production is projected to trend around 1.4% in 2021, according to Trading Economics global macro models and analysts' expectations[19].

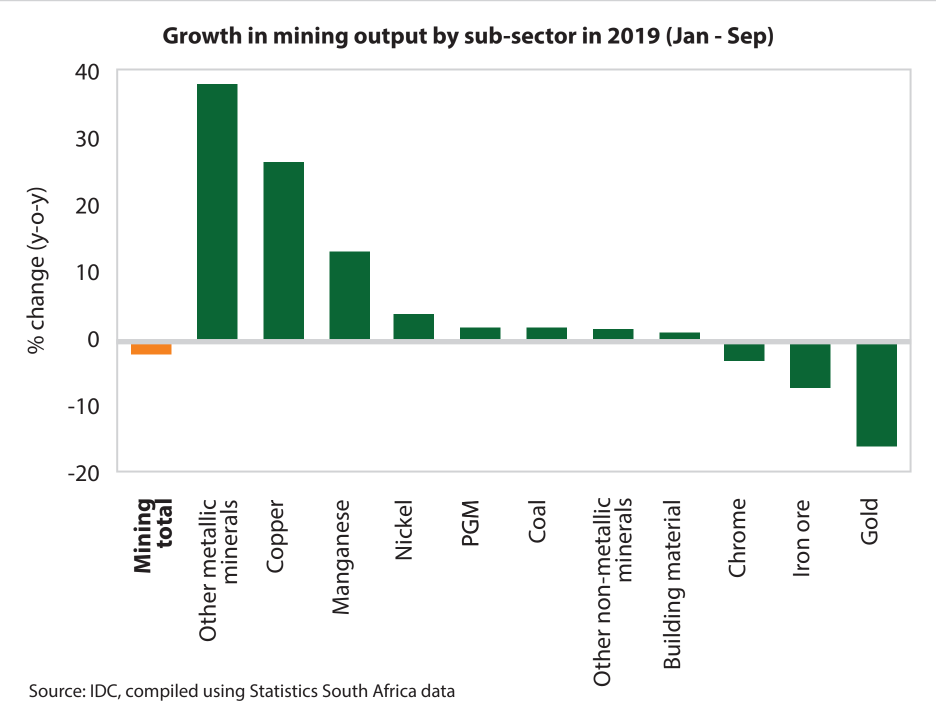


Figure 20: Growth in mining output by sub-sector in 2019

19 https://tradingeconomics.com/south-africa/mining-production

Exploration Activity and Expenditure

Mining companies accept that there is inherent risk involved in the South African exploration and mining industry and accommodate this risk in their business decisions. According to the Mineral Council SA, in 2017 South Africa accounted for only 1% of total global exploration expenditure while 14% was enjoyed by Canada, 14% by Australia and 13% by the rest of Africa (Figure 21).

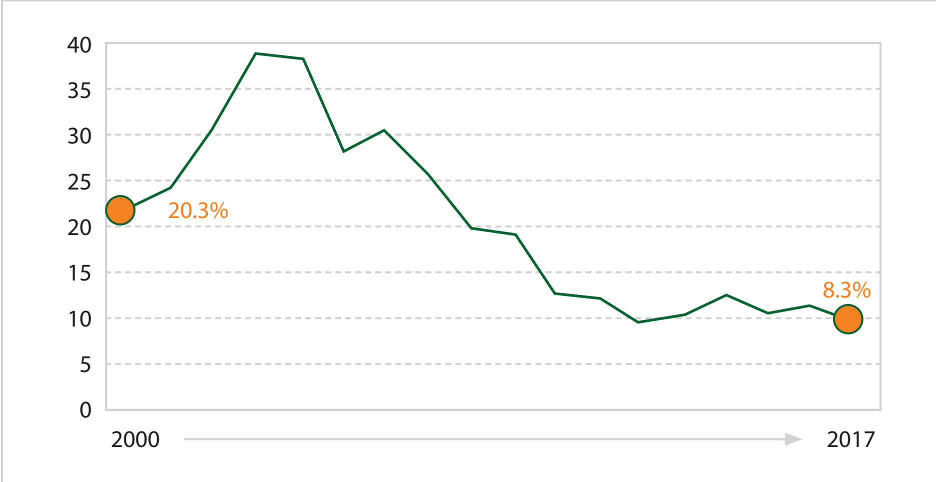


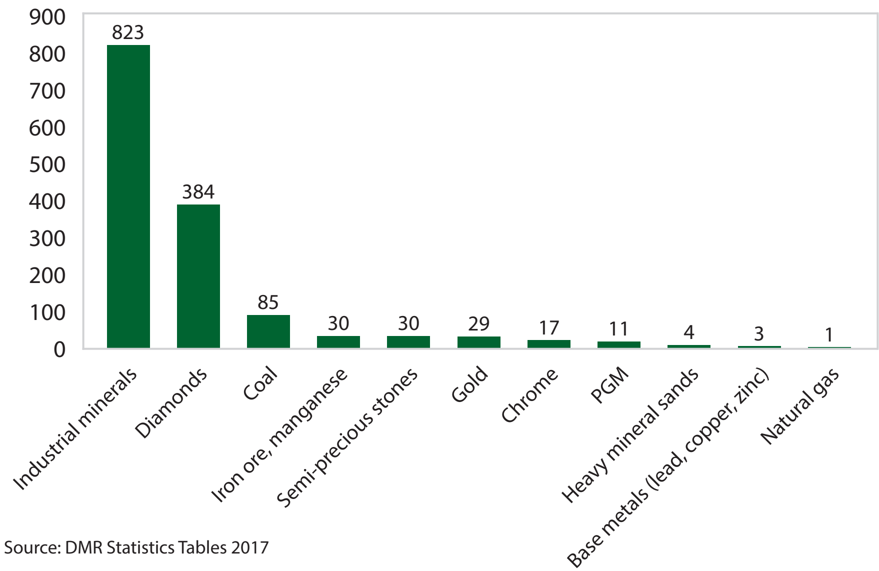
Figure 21: South Africa's share of African exploration budgets 2000–2017

Without a stable framework within which exploration and mining companies can obtain prospecting and mining rights and the related environmental authorisations, and exercise those rights within an environment (which at the very least gives a sense of security that their significant investments will be protected and will, for the duration of the right be certain) investors are extremely cautious when making investment decisions.

The challenges being faced by the South African exploration and mining industry are generally summarised into eight (8) key challenges, namely[20]:

- The global financial crisis and trade tensions and the impact that this has had on global demand
- Infrastructure, ports, rails, water, roads and electricity
- Labour uncertainty
- Health and safety
- Environmental compliance requirements
- Illegal mining operations
- Community activism.

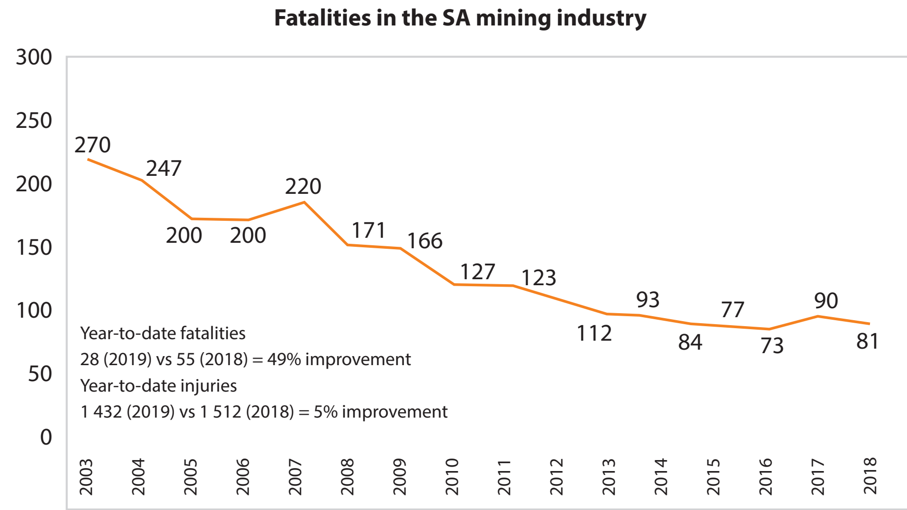
Health and Safety



Source: DMR Statistics Tables 2017

The Minerals Council estimated that the junior mining sector could contribute 230 000 jobs. (Figure 22). The junior mining sector can significantly contribute to government's transformation goals and the black industrialist programme. Greater collaboration between the sector and government is required to give necessary support to junior mining companies. Regulatory environment needs to encourage the development of junior mining.

Figure 22: Junior miner licences' in South Africa (2017)



The past ten years has seen significant improvements in health and safety for mine employees. This resulted in sustainable downward trends in occupational diseases, injuries and fatalities. As the Regulator of the sector, the implementation of the enforcement measures as contained in the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) remains a key priority. There is concern about seismic activities in deep-level mines in South Africa that cause falls of ground leading to mining fatalities and injuries (Figure 23).

Figure 23: Mining industry health and safety performance

20 https://www.miningreview.com/industry-insight/challenges-faced-by-the-south-african-exploration-and-mining-industry/

Energy Industry Analysis

Issues relating to energy are among the most important and difficult challenges confronting the world today. Providing sufficient energy to meet the requirements of a growing world population with rising living standards will require major advances in energy supply and efficiency.[21] Achieving this while mitigating the risks of climate disruption is an even more challenging undertaking. It will require a significant shift in the historic pattern of fossil-fuel use and a major transformation of the global energy system.[22] For developing countries, the choice of technology, policy, and economic levers that will be used to transform and expand their energy systems will have profound implications for their growth, international competitiveness, and economic security and prosperity.[23]

Energy Context – Global

According to the World Energy Outlook (2019), the gap continues to widen between: the promise of energy for all and the fact that almost one billion people still do not have access to electricity; the latest scientific evidence highlighting the need for evermore rapid cuts in global greenhouse gas emissions and the data showing that energy-related emissions hit another historic high in 2018; and expectations of fast, renewables-driven energy transitions and the reality of today's energy systems in which reliance on fossil fuels remains stubbornly high. The gap exists between the calm in well supplied oil markets and the lingering unease over geopolitical tensions and uncertainties.[24] A summary of the five categories of transition challenges follows, as outlined by the World Energy Council (2019):

1. Macroeconomic risks
2. Geopolitics
3. Business environment
4. Energy vision
5. Technology.

21 Muhanji, S., Muzhikyan, A. and Farid, A.M., 2019. Long-term challenges for future electricity markets with distributed energy resources. In Smart Grid Control (pp. 59-81). Springer, Cham.
22 http://blogs.worldbank.org/developmenttalk/the-global-energy-challenge
23 Kuzemko, C., Lawrence, A. and Watson, M., 2019. New directions in the international political economy of energy. Review of International Political Economy, 26(1), pp.1-24.
24 World Energy Outlook – 2019

World electricity generation by fuel, technology and scenario (TWh)

			Stated policies		Sustainable development		Change 2018–2040	
	2000	2018	2030	2040	2030	2040	STEPS	SDS
Coal	5 995	10 123	10 408	10 431	5 504	2 428	307	-7 695
Oil	1 207	808	622	490	355	197	-319	-611
Natural gas	2 760	6 118	7 529	8 899	7 043	5 584	2 781	-534
Nuclear	2 591	2 718	3 073	3 475	3 435	4 409	757	1 691
Hydro	2 613	4 203	5 255	6 098	5 685	6 934	1 895	2 731
Wind and solar PV	32	1 857	5 879	9 931	7 965	15 503	8 073	13 645
Other renewables	217	739	1 344	2 020	1 785	3 628	1 281	2 889
Total generation	**15 436**	**26 603**	**34 140**	**41 373**	**31 800**	**38 713**	**14 770**	**12 100**
Electricity demand	**13 152**	**23 031**	**29 939**	**36 453**	**28 090**	**34 562**	**13 422**	**11 531**

» Global electricity generation grows by around 55% (14 800 terawatt-hours [TWh]) between 2018 and 2040 in the Stated Policies Scenario.

» Growth is led by Asia: China alone constitutes 33% of growth followed by India at 20% and other developing countries in Asia at 13%.

» Wind and solar photovoltaics (PV) provide over half of additional power generation to 2040 in the Stated Policies Scenario; coal provides just 2% although this varies widely by region.

» The Sustainable Development Scenario sees an even more dramatic transformation. Low carbon technologies provide almost 85% of generation in 2040; 40% of generation comes from wind and solar PV.

Global Trends: Power Generation

- Electricity demand grows by 2.1% per year, resulting in over 13 000 TWh more demand in 2040 than today (Figure 24).
- Falling costs and increasing competitiveness of solar PV push its installed capacity beyond all other technologies (IEA outlook to 2040).
- Developing economies account for almost 90% of demand growth. About 530 million people gain access to electricity around the world by 2040, mainly in Africa and developing Asia.
- Nuclear power share decreases, but its output nevertheless rises in absolute terms, with growth in China and more than twenty other countries.
- The share of fossil fuels in electricity supply will fall below 50% in 2040. Coal remains the largest source of electricity, though its share of overall generation declines from 38% to 25%.
- Gas-fired generation grows steadily, maintaining roughly its current share of generation.

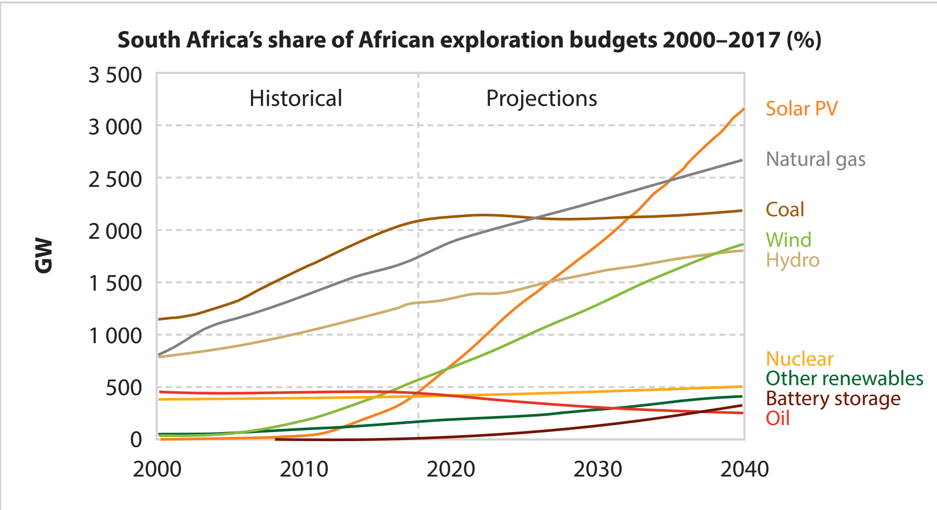
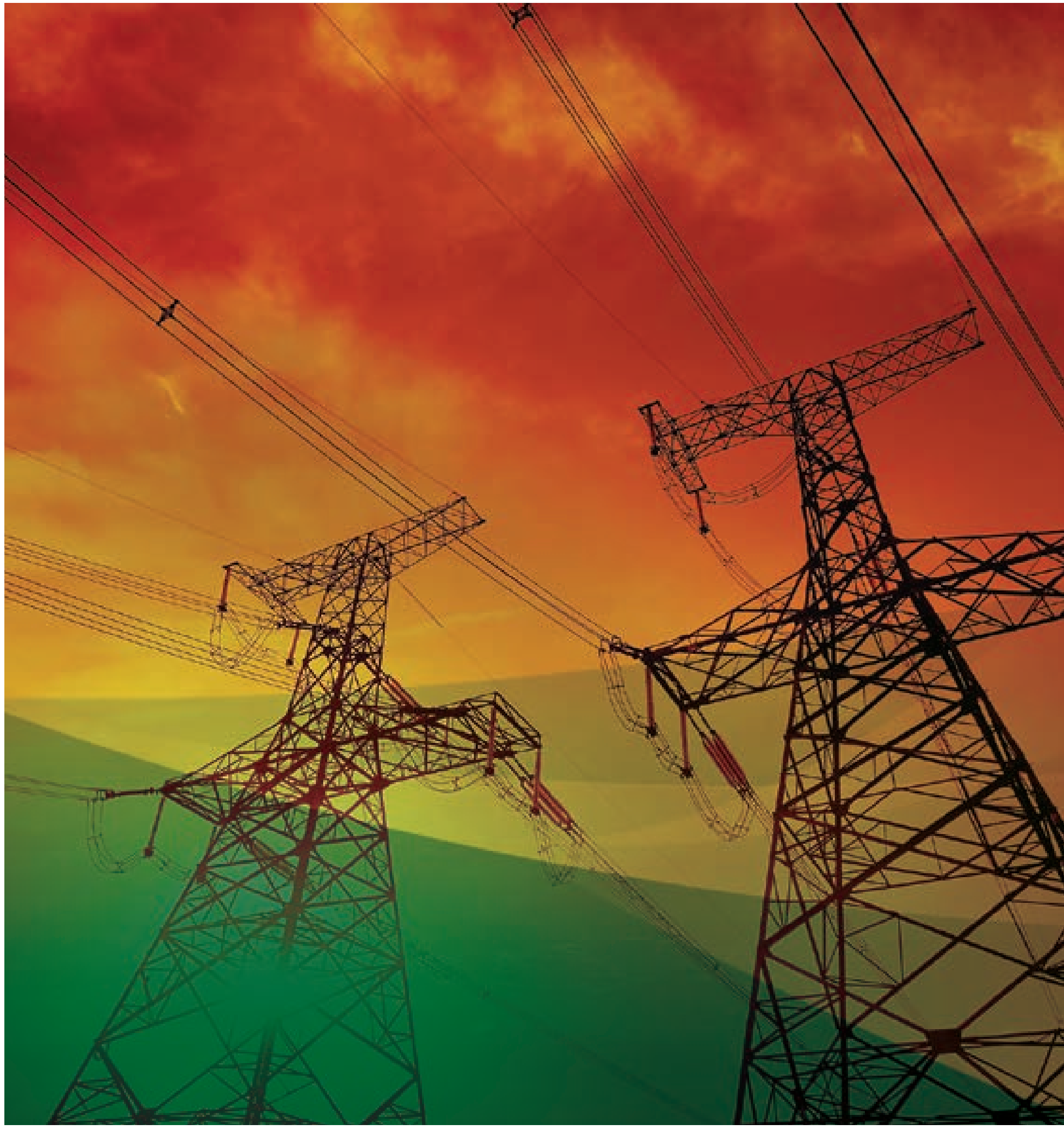


Figure 24: Global power capacity by source in the Stated Policies Scenario



Global Trends: Oil and Gas

- In the Stated Policies Scenario, China soon overtakes the European Union and cements its position as the world's largest net oil importer.
- India's net oil import requirements more than double between 2018 and 2040 and its level of import dependency reaches roughly 90%, one of the world's highest.
- The United States becomes a net oil exporter soon after 2020, thanks to the shale boom. However the United States also remains a major importer of oil given the configuration of its refineries.
- China overtook Japan to become the largest gas-importing country in 2018. In the Stated Policies Scenario, its imports reach the level of those of the European Union by 2040.
- China's net imports of coal peak in the next few years but will decline substantially towards 2040. China will be overtaken by India as the world's largest coal importer in the mid-2020s.

Net import (Shaded) and export shares by fuel, region and scenario (%)

	Oil			Natural gas			Gas			Total		
	2018	2040		2018	2040		2018	2040		2018	2040	
		STEPS	SDS		STEPS	SDS		STEPS	SDS		STEPS	SDS
North America	**1**	**30**	**43**	**3**	**10**	**12**	**15**	**13**	**31**	**4**	**15**	**11**
United States	20	17	39	2	13	14	14	10	17	3	10	7
C and S America	**11**	**30**	**11**	**5**	**10**	**11**	**44**	**20**	**51**	**21**	**24**	**18**
Brazil	16	42	27	29	23	17	90	89	99	18	30	26
Europe	**76**	**76**	**70**	**55**	**67**	**61**	**49**	**61**	**72**	**42**	**40**	**34**
European Union	87	91	89	76	90	85	49	66	72	50	47	39
Africa	**49**	**8**	**15**	**33**	**37**	**47**	**29**	**27**	**25**	**45**	**33**	**50**
Middle East	**77**	**70**	**73**	**20**	**21**	**23**	**74**	**88**	**76**	**61**	**51**	**47**
Eurasia	**71**	**64**	**55**	**34**	**40**	**39**	**45**	**53**	**42**	**49**	**47**	**34**
Asia Pacific	**78**	**86**	**87**	**26**	**43**	**42**	**1**	**5**	**2**	**17**	**27**	**30**
China	70	83	85	43	57	57	6	3	0	18	27	34
India	83	92	92	49	59	74	29	27	38	18	35	38
Japan	100	99	99	74	98	97	99	100	100	87	67	55
World	**45**	**44**	**45**	**20**	**24**	**26**	**21**	**20**	**20**	**25**	**24**	**21**

Global Energy Trends: Renewables

By 2018, most countries in the world had some form of renewable energy targets in place, and more than 150 countries had definite renewable energy targets in place. (Figure 25). In addition, 45 countries also had policies in place to support the use of biofuels. China's National Energy Administration raised the country's renewable portfolio standard in 2019 to 35% of electricity consumption by 2030. The European Union's revised Renewables Energy Directive (2018/2001) established a new binding renewable energy target of at least 32% for the United States by 2030. The increase in renewable capacity in 2018 came mainly as a result of onshore wind expansion. Renewable capacity expansion accelerated in the Middle East, North Africa and parts of Asia, reflecting declining wind and solar PV costs, strong policy support and commitments made under the Paris Agreement (IEA, 2019c).

Global Energy Trends: Nuclear

- Nuclear reactors generated a total of 2 563 TWh of electricity in 2018, up from 2 502 TWh in 2017. This was the sixth successive year that nuclear generation had risen.
- In 2018 the peak total net capacity of nuclear power in operation reached 402 GWe, up from 394 GWe in 2017. The end of year capacity for 2018 was 397 GWe, up from 393 GWe in 2017.
- Improved operational performance saw the USA's nuclear sector supply a record 808 TWh of clean, low-carbon electricity in 2018.

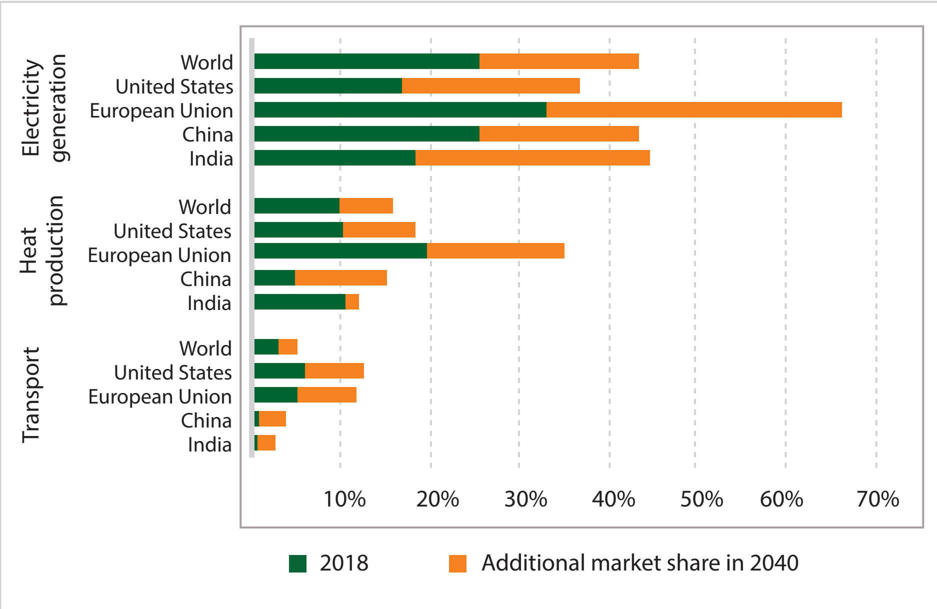


Figure 25: Renewable energy – total primary energy demand by category and region

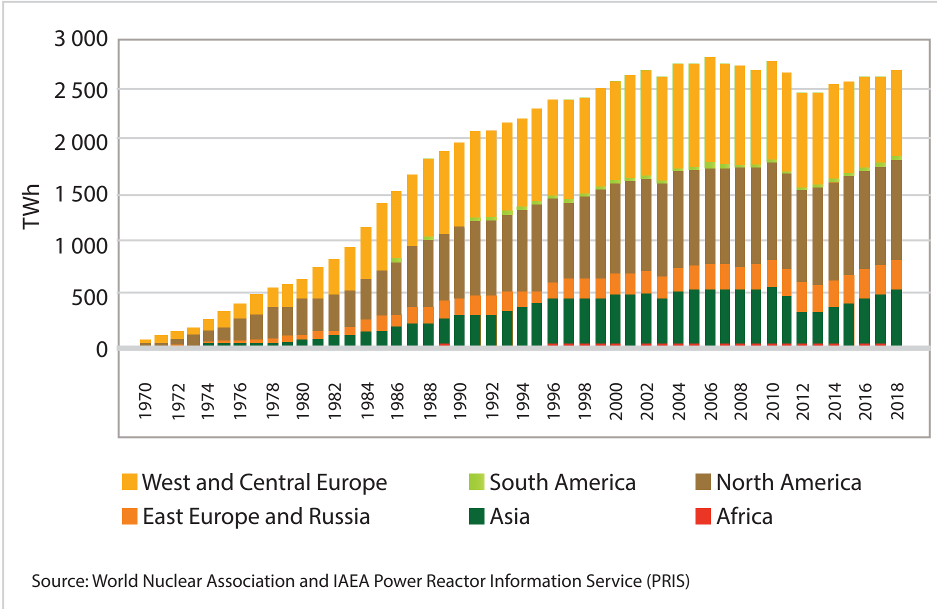


Figure 26: Nuclear energy production across the globe

Energy Context – Africa

The African continent will become increasingly influential in shaping global energy trends, as a result of the growing urban populations, and energy demand. According to Africa Energy Outlook 2019, there will be rapid growth in energy demand for industrial production, cooling and mobility[25].

Energy demand in Africa will grow twice as fast as the global average. With the growing appetite for modern and efficient energy sources, Africa will emerge as a major force in global oil and gas markets[26]. A critical task for policy makers is to address the persistent lack of access to electricity, and unreliability of electricity supply.

The above challenges negatively impact on the continent's development. An estimated 80% of sub-Saharan African companies suffered frequent electricity disruptions leading to economic losses. Increased electricity needs, especially in sub-Saharan Africa, require a major expansion of the power system. Africa has the richest solar resources in the world, but has installed only 5 gigawatt (GW) of solar PV, less than 1% of the global installed capacity[27]. Key Energy challenges in Africa are:

» Governance and policy frameworks
» Infrastructure and investment
» Demographics and urbanisation
» Economic growth and industrialisation
» Affordability: energy prices and fossil fuel subsidies.

African Energy Sector Trends

» +127% Growth in African energy consumption
» 6% Share of global energy consumption in 2040
» +54% Growth in African energy production 2040
» 7% Share of global energy production in 2040
» The share of renewables in the African fuel mix grows from 1% today to 16% by 2040
» Electricity demand almost triples, with renewables becoming the largest source of power generation by 2040
» African energy production as a share of consumption declines from 176% in 2017 to 119% by 2040 (Figure 27).

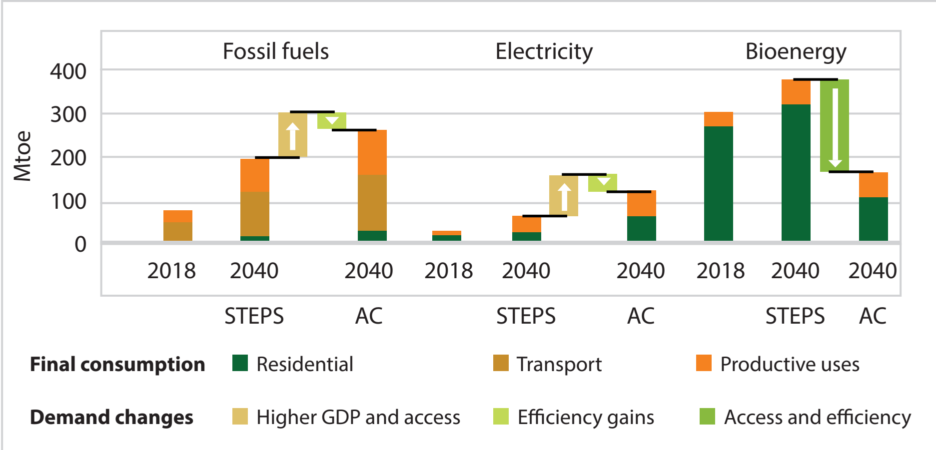
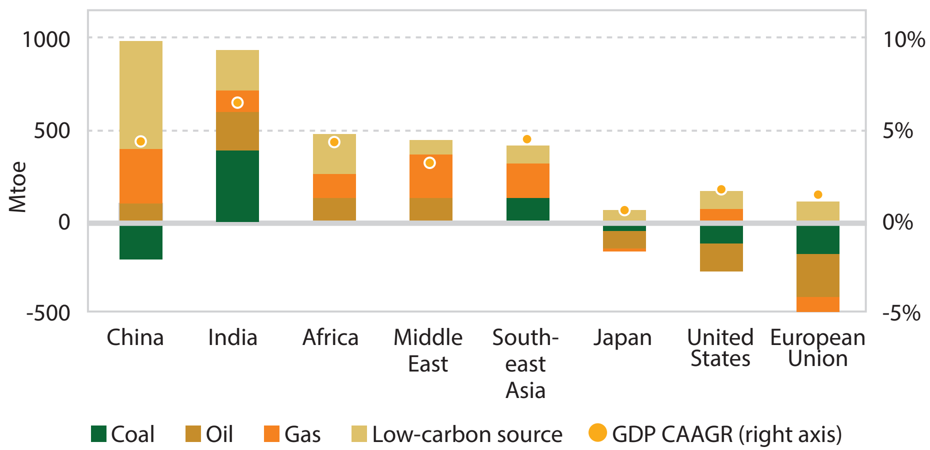


Figure 27: Final consumption by fuel, sector Sub-Saharan Africa (excl. South Africa)

25 Africa Energy Outlook 2019
26 https://www.iea.org/reports/africa-energy-outlook-2019
27 https://www.iea.org/reports/africa-energy-outlook-2019

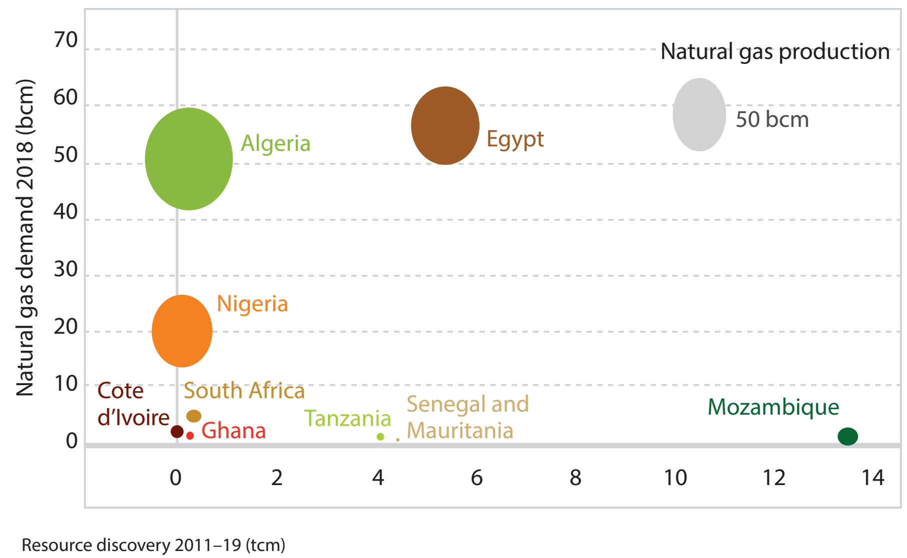
Developing countries led by Asia, are the main engines of global growth. India, where energy demand doubles, is the single largest source of demand growth. China remains the world's largest energy consumer in this scenario, where energy demand rises rapidly in the Middle East, and per capita consumption is already high today, spurred in part by increased demand for cooling and desalination (Figure 28). Rising incomes and population growth underpin strong growth in Africa.



Faster economic growth in developing economies is accompanied almost everywhere by rising demand for all fuels and technologies.

Figure 28: Change in energy demand and average annual GDP growth rate by region in the Stated Policies Scenario, 2018 –2040

African Oil and Gas Trends



With the exception of Egypt, recent gas discoveries in Africa have been in countries with very small gas markets. Following their recent major gas discoveries, Mozambique and Tanzania are at the forefront of this group, but it also includes Senegal and Mauritania (Figure 29). For these countries the first task is to turn discoveries into viable and successful commercial projects.

Figure 29: Natural gas resource discoveries, demand and production in selected countries in Africa

Energy Context – SADC Region

Energy is vital to development in Southern Africa. Beyond its use in daily life, fuel and electricity catalyse infrastructure projects that drive both regional integration and economic growth. As the SADC region industrialises on its path to improved human development, energy production and distribution can only increase in importance. The region still faces significant challenges in energy development and usage.

The Regional Infrastructure Development Master Plan highlights the following issues:

» Only 5% of rural areas in the region have any access to electricity

» Weak infrastructure and foreign commitments inhibit the use of the region's abundant petroleum and natural gas resources

» Pricing and infrastructure hurdles, such as grid connections, manufacturing, and quality testing, impede development of the region's renewable energy potential.

Energy Context – South Africa

Coal is South Africa's key energy source, representing over 90% of electricity generation. A portion of coal also goes to the coal-to-liquid industry to supply liquid fuels. The country's liquid fuel needs are met by imports of crude oil for local refining capacity and imports of oil-based fuels. Natural gas is very limited in the energy mix with PetroSA's gas deposit used to produce liquid fuels for the country via its gas-to-liquid (GTL) plant. The other gas source is imports from Mozambique and liquid natural gas (LNG) imports. The IPP programme provides the country's renewable energy. Nuclear energy is provided by Koeberg in the Western Cape (Figure 30).

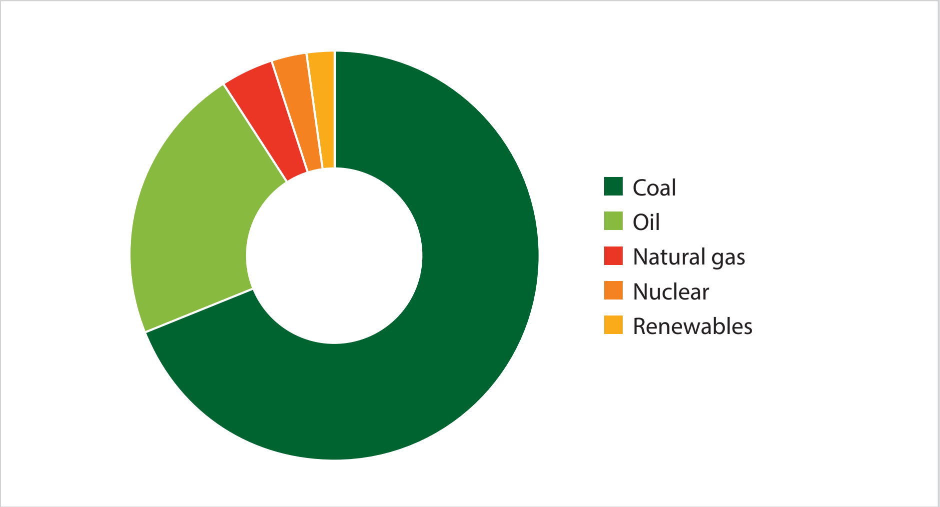


Figure 30: South African primary energy mix

Top 20 Energy Risks in South Africa

The South African Energy Risk Report – 2019 ranked the priority top 20 risks as outlined by energy experts. The risks are categorised into six (6) major risk categories, in alignment with the Institute of Risk Management South Africa's classification methodology, and highlight energy-specific risks as summarised in the table below.

Legend: Economics Environmental Geographical Societal Technological Energy industry

No.	Risk	Risk description
1	Activism and civil disobedience	Increasing activism and civil disobedience including strikes, leading to a negative impact on operations, security of supply and potentially costs.
2	Adequate and appropriate skills	The non-availability of the right skills in the right numbers leading to inability to take advantage of new opportunities and operate current plant as efficiently as possible.
3	Aligned funding models	The inability of financial institutions and other funders to shift towards a more agile and modular energy investment environment, leading to lack of appropriate investment in the sector, a negative impact on transformation, and misalignment with developmental government or project financing.
4	Appropriate policy	Unclear energy sector policy (including electricity structure and associated market rules) leading to investment uncertainty and a lack of flexibility and agility to respond to rapid change.
5	Changing customers of the future	The customer of the future will increasingly take charge of their energy supply, leading to a rise in prosumers, declining sales from central energy distribution systems, and the introduction of new players and competitors.
6	Economic recession	Economic slowdown or recession leading to a decreased demand for energy.
7	Energy affordability	Unaffordable energy, leading to a decline in energy for country competitiveness to drive economic growth and impacting on the poor and vulnerable sectors.
8	Energy data availability	Lack of a consistent, transparent energy data set for planning short- and long-term decision making, leading to poor decision-making and increased risk.
9	Energy transition readiness	The inability of the country to shift (including availability of investment and capital, effective regulation on political commitment, stable institutions and governance, supportive infrastructure and an innovative business environment, human capital, and the ability of the current energy system to accommodate change) leading to a decline in competitiveness and slower emissions decline.
10	Fiscal crisis	A fiscal crisis in the country leading to a downgrade of South Africa's sovereign rating.
11	Governance and leadership, including governance failures and corruption	Inadequate governance and leadership, resulting in poor decision making and corruption leading to sub-optimal or a complete lack of investment decisions, decreasing competitiveness and increasing cost.

Legend: Economics Environmental Geographical Societal Technological Energy industry

No.	Risk	Risk description
12	Innovative business models	Lack of innovative business models and agile responses to disruptive forces, leading to financial constraints and a risk of stranded assets.
13	Investments in and breakdown of infrastructure	Without adequate investment in energy and related infrastructure, increased breakdowns and decreased reliability of supply can be expected.
14	National Primary Energy Mix	Sub-optimal primary energy mix, leading to a decrease in the security of supply and increased prices.
15	Parochial interests	Decision makers and players in the market driving narrow interest and not acting in the best interest of the country, leading to an inability to reach consensus and sub-optimal compromises.
16	Political and social instability in the region	Profound political and social instability in South Africa leading to decreased business confidence and economic impact.
17	Price volatility and uncertainty	Significant and short-term changes in price leading to a loss of investor confidence and a decline in country competitiveness.
18	Regional energy planning	Lack of coherence in regional energy planning, leading to sub-optimal energy resource utilisation.
19	Regulatory coherence	Lack of timeous, coherent legislation, regulations, and market rules, leading to barriers to entry for new technologies and players and non-compliance with environmental legislation and/or increased prices.
20	Water quality and availability	Water crisis resulting in an inability to obtain water at the right volumes and quality needed for operations, leading to increased costs and negative operational constraints.

Environment Analysis

Change to the natural environment is fundamentally driven by population dynamics and economic development. Associated human activities such as agriculture, energy consumption and mining, amongst others, exert pressure on the earth[28]. It is important to understand the relationship between the drivers and pressures that impact on the environment. As the earth changes, it brings forth complex challenges that threaten multiple sectors of the economy, human livelihood and the integrity of natural capital. There is a profound need to become increasingly aware of the problems associated with these changes such as a massive increase in natural disasters, warming and cooling periods, different types of weather patterns, etc.[29] All stakeholders need to be aware of the types of environmental problems our planet is facing, the implications for the economy and potential mitigation measures. This analysis has been broken down into the Global, African, Sub-Saharan/SADC and South African contexts in order to provide a holistic picture of the challenges that are linked to the natural environment.

Global Context

Global environmental risks continue to dominate the results of the annual Global Risks Perception Survey, undertaken by the World Economic Forum. In 2020, environmental risks accounted for three of the top five risks by likelihood and four by impact. Globally, people are far more concerned about 'extreme weather' as a risk. According to the survey, respondents are increasingly worried about environmental policy failure. The need to minimise our carbon foot print is becoming increasingly clear from the increasing number of extreme weather incidents, such as severe drought and flooding. The top three environmental risks are listed below.[30]

i. **Climate change/Global warming** – Global warming leads to rising temperatures of the oceans and the earth's surface causing melting of polar ice caps, a rise in sea levels and unnatural patterns of precipitation such as flash floods, excessive snow or desertification.

ii. **Pollution** – Pollution of the air, water and soil require millions of years to recuperate. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastics are the primary toxins responsible for pollution.

iii. **Biodiversity loss** – Climate change is exacerbating biodiversity loss and the causality goes both ways as oceans and forests are important for absorbing carbon emissions. Increasingly fragile ecosystems hold risks for societal and economic stability. For example, storm surges and rising sea levels pose an enormous risk to the >200 million people who depend on the coastal mangrove ecosystems to protect their livelihoods and food security.

The above-listed challenges are among the leading environmental challenges that are linked to the mining and energy sectors globally and locally. The world is very far from the emissions reductions necessary to achieve the goals of the Paris Agreement. Efficiency gains and deployment of cleaner energy sources have not kept pace with rising energy demand in the immediate past according to the IEA Global Energy Report.

African Context

The African continent has a growing population, rich natural capital and weak institutions. As a result the continent is subject to some serious environmental challenges, including deforestation; water pollution; coal mining pollution; nuclear waste; overfishing; and industrial agriculture etc.[31] At the same time Africa still faces significant challenges with regards to access to electricity and clean cooking for all, leading to unsustainable harvesting of fuelwood. The transition away from the inefficient combustion of biomass for cooking in the continent needs to be achieved. In 2015, the Heads of State and Governments of the African Union adopted Agenda 2063. The Agenda sets out a vision for "an integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the international arena." This is closely linked to the United Nations' Sustainable Development Goals.

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28 Scoville-Simonds, M., Jamali, H. and Hufty, M., 2020. The hazards of mainstreaming: Climate change adaptation politics in three dimensions. World Development, 125, p. 104683.

29 Lo, A.Y., Liu, S., Cheung, L.T. and Chan, F.K., 2020. Contested transformations: Sustainable economic development and capacity for adapting to climate change. Annals of the American Association of Geographers, 110(1), pp. 223-241.

30 World Economic Forum – Global Risks Report 2020

31 Nalule, V.R., 2020. Mining and the Law in Africa: Exploring the social and environmental impacts. Springer Nature.

African governments face several challenges in implementing environmental protection mechanisms. Africa's development challenges are rooted in past policies and strategies. Heavy dependence on natural resources led to resource depletion and environmental degradation and worsened the exposure of weaker economies to external shocks, thereby increasing poverty and reversing social development. It has to be stated, though, that Africa has been a minor contributor to global greenhouse gas emissions, and this remains the case to date. According to the IEA, energy-related carbon dioxide (CO_2) emissions in Africa represented around 2% of cumulative global emissions. But Africa is in the front line when it comes to the effects of a changing climate. Africa's ecosystems already suffer disproportionately from climate change and the associated risks to food, health and economic security. All the African country signatories to the Paris Agreement, through their nationally determined contributions, committed to contribute to the global effort to mitigate GHG emissions (IPCC, 2019).

SADC Region

According to Green Peace, "Sub-Saharan Africa alone could die because of climate change by the end of the century. Unpredictable rainfall patterns, lower crop yields, soaring food prices and dwindling natural resources are already causing increased human migration, tension and conflict."[33] Total energy-related CO_2 emissions in North African countries in 2018 were around 490 Mt or 40% of Africa's energy-related CO_2 emissions (1 215 Mt CO_2). South Africa's energy sector emitted 420 Mt CO_2 with its coal-fired power fleet responsible for more than half of the country's energy-related CO_2 emissions and more than three-quarters of the sub-Saharan region's power sector emissions.

South Africa

The South African economy depends greatly on the growth and development of its extractive mining sector. As already stated, currently an estimated 93% of South Africa's electricity comes from coal. South Africa is also a water scarce country, yet every step in the chain of using coal to produce electricity pollutes and consumes vast amounts of water. Together with coal mining, burning coal for electricity generation has several serious implications for both water quantity and quality. The overreliance on coal contributes massively to greenhouse emissions. The mining industry plays a vital role in South Africa's growth and development. But if mining is not strategically planned and carefully implemented, it has significant negative impacts on biodiversity and ecosystems, in particular on the catchments, rivers and wetlands that deliver water-related services to people.

2.4.2 Analysis of the Internal Environment

Organisational Structure

The DMRE was established on 29 May 2019 through the merging of the Department of Minerals and Energy and the Department of Mineral Resources. The intention was to better equip and capacitate the DMRE to respond to the strategic objectives derived from the NDP, as they relate to the regulation and transformation of the energy and mining sectors in the following manner:

- Provisioning of secure, sustainable and affordable energy
- The promotion and regulation of minerals and mining.

These are in line with the objective to develop a mineral resources and energy sector that promotes economic growth and development, social equity and environmental sustainability.

Furthermore, the intention was to align the integrated mandate of the DMRE with the strategic priorities of the DMRE identified in the MTSF. The structure is depicted in Figure 31.

32 Simon, C.A., 2020. Alternative energy: political, economic, and social feasibility. Rowman and Littlefield Publishers.
33 https://www.greenpeace.org/archive-africa/en/campaigns/Climate-change/

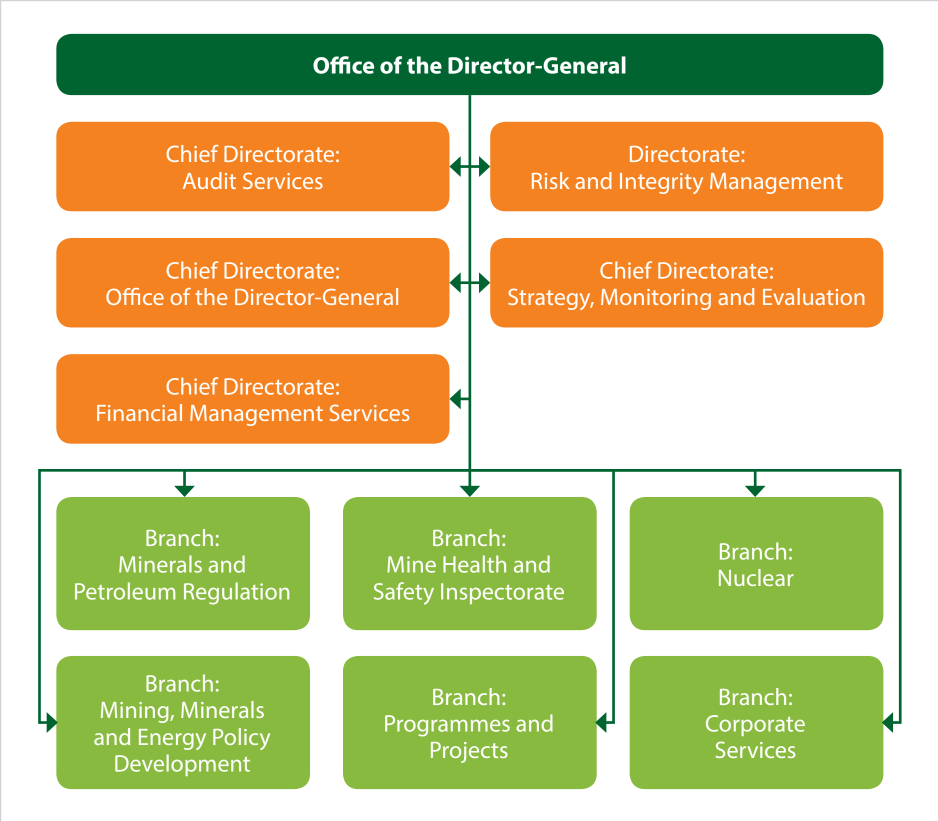


Figure 31: DMRE organisational structure

The purpose of the reconfigured start-up structure of the DMRE is to ensure the optimal utilisation and safe exploitation of mineral and energy resources.

The approved start-up structure will be reviewed and aligned with the approved strategic plan to ensure the capacity to deliver on the mandate of the DMRE. In the interim, the DMRE has continued to explore and embark on various interventions to improve the efficiency and effectiveness of the organisation within its baseline allocations and has creatively and innovatively implemented key aspects of an approved Integrated Human Resources Plan to improve its human resources (HR) capacity and capabilities. The following table summarises the six departmental programmes and their purpose:

Programme	Programme Purpose
Administration	Provide strategic support and management services to the Ministry and the DMRE
Minerals and Petroleum Regulation	Regulate the mining, minerals and petroleum industry
Mining, Mineral and Energy Policy Development	Formulate, maintain and implement integrated minerals and energy policies to promote and encourage investment into the mining and energy industry
Mine Health and Safety Inspectorate	Ensure healthy and safety of employees in the mines
Programmes and Projects	Manage, co-ordinate and monitor programmes and projects focused on access to mineral and energy resources
Nuclear Energy	Manage nuclear industry

Funding of the DMRE programmes remains a key constraint. The budget allocated for these programmes is summarised in the table following.

Programme	Medium-term expenditure framework			
	2020/21	2021/22	2022/23	Total MTEF
	R'000	R'000	R'000	R'000
Administration	642 343	683 222	707 825	2 033 390
Minerals and Petroleum Regulation	574 713	608 694	632 728	1 816 135
Mining, Minerals and Energy Policy Development	993 104	892 571	952 166	2 837 841
Mine Health and Safety Inspectorate	232 694	251 998	261 474	746 166
Programmes and Projects	5 798 115	5 977 685	6 829 685	18 605 485
Nuclear Energy Regulation and Management	1 096 059	1 155 815	1 199 493	3 451 367
Total	**9 337 028**	**9 569 985**	**10 583 371**	**29 490 384**

The allocations are informed by the challenges identified in this Strategic Plan and considering the following interventions:

- Alignment of budget programme structure with Strategic Plan and Annual Performance Plan
- Reprioritisation of projects within all programmes (branches)
- Explore other funding mechanisms.

PART C

MEASURING OUR PERFORMANCE

3.1 STRATEGIC CONTEXT

The strategic context for the DMRE is premised on the problem definition tree concept which has been developed for each of the three clusters of the DMRE. The overarching problem statement for each of the clusters is informed by the numerous challenges and risks identified as part of the situational analysis, for which strategic responses will have to be articulated.

3.1.1 Energy Cluster

Problem Statement

The Energy Cluster is tasked with the responsibility for providing energy security to the people of South Africa and the economy. An appropriate level of security promotes economic growth, development, and social equity, through expanded access to energy services that are sustainable and contribute to the reduction of pollution and mitigation of the effects of global climate change as outlined in the National Development Plan (NDP).

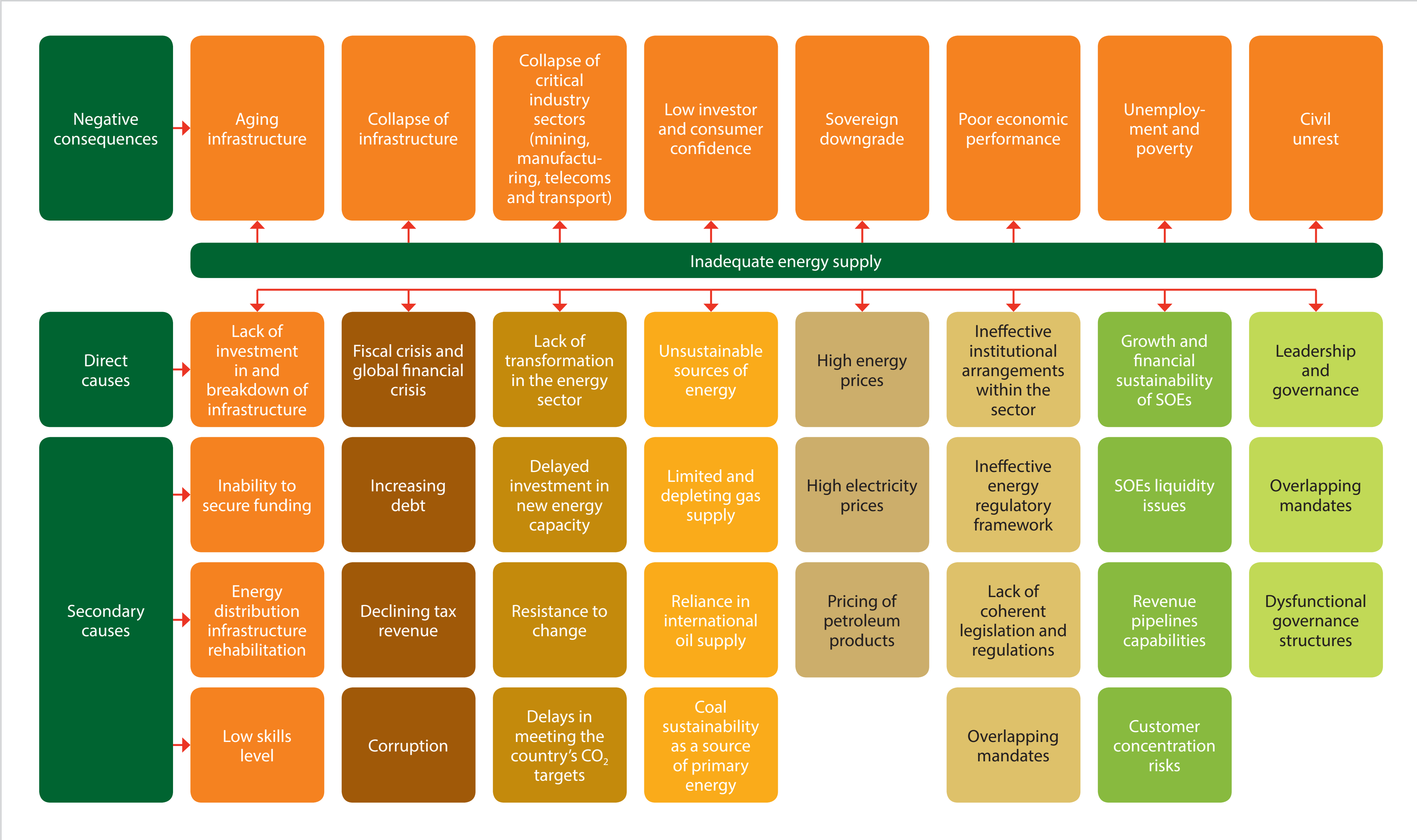
The country is challenged by inadequate energy supply as a key stumbling block to the achievement of the mandate of the DMRE, which requires that it provides energy security. This can be demonstrated by the occurrence of load shedding, and the ongoing resource constraints that the country's power utility, Eskom, has been facing.

Strategic Considerations

Inadequate energy supply has its roots in a number of contributory factors:

- **Lack of investment in and breakdown of infrastructure** – Without adequate investment in energy and related infrastructure, increased breakdowns and decreased reliability of energy supply have occurred.
- **Fiscal crisis and global financial crisis** – Ratings agencies have become increasingly concerned with South Africa's worsening fiscal metrics and poor growth performance, as well as with enormous risks posed by Eskom.
- **Lack of transformation in the energy sector** – The inability of the country to shift (due to lack of availability of investment and capital; effective regulation and political commitment; stable institutions and governance; supportive infrastructure and an innovative business environment; human capital; and the ability of the current energy system to accommodate change) leading to a decline in competitiveness and slower emissions decline.
- **Unsustainable sources of energy** – Energy is a key risk in South Africa due to its energy intensive nature and low readiness for energy transition. Energy transition readiness is an overall indication of the inability or ability of a country to shift the energy sector, including the availability of investment and capital; effective regulation and political commitment; stable institutions and governance; supportive infrastructure and an innovative business environment; human capital; and the ability of the current energy system to accommodate change.
- **High energy prices** – Significant and short-term changes in prices leading to a loss of investor confidence and a decline in country competitiveness. Energy-dependent industries become challenged and access to energy becomes unaffordable.
- **Ineffective institutional arrangements within the sector** – Lack of timeous, coherent legislation, regulations, and market rules leading to barriers to entry for new technologies and players; non-compliance with environmental legislation; and increased prices.
- **Growth and financial sustainability of SOEs** – The SOEs are generally experiencing depleting cash reserves, reduction in funding streams, and higher operating costs. The country's slow economic growth has weighed heavily on most SOEs resulting in a reduction in funding from the fiscus.
- **Leadership and governance** – Inadequate governance and leadership result in poor decision making and corruption, leading to sub-optimal or non-existent investment decisions.

Problem statement: Inadequate energy supply



Lack of investment in and the breakdown of energy infrastructure, is exacerbated by the challenges that Eskom is facing. Eskom's operational performance has seriously deteriorated, resulting in: (i) Costly periods of load-shedding with severe consequences for the economy; (ii) Significant deterioration of plant availability; and (iii) record levels of unplanned outages, leading to a cumulative decline in the capacity of power stations (excluding the new build stations) to the lowest levels yet. Although numerous efforts have been made to stabilise power supply, operational performance is far from adequate and a sustained effort is required to restore power station performance to acceptable levels and to clear the massive backlogs in maintenance. Eskom's long-term debt was R441 billion (as at March 2019), up from R255 billion in 2014,[34] placing further strain on the fiscus.

Ineffective institutional arrangements in the sector manifest in considerable legislative overlaps between different departments and entities. These cause much uncertainty, leading to a failure to meet mandates and develop additional revenue streams. A general sense of lack of strategic focus exists among the entities. As an example, the CEF Group indicated that overlapping mandates between CEF entities leads to competition between the entities, and discourages co-operation. Overlapping mandates have made the CEF's role less clear, for example its designation as state carrier for gas, oil and minerals exploration and production in the new Minerals and Petroleum Bill. The CEF also lacks collaboration and partnerships, as well as strategic focus. In the case of PetroSA, overlapping mandates have contributed to the entity's inability to secure funding for exploration projects, because the Council for Geoscience is also looking for funding for potential exploration projects.

Research-centred entities such as MINTEK are struggling to commercialise their research as a result of overlapping mandates. As a regulator, NERSA also has concurrent and overlapping regulatory mandates (with the DoE, NTP and PRASA) resulting in a regulatory burden for licencees in general, and especially for HDSAs, who must report to more than one entity. NERSA faces several further challenges in the regulatory and policy areas: the unbundling of Eskom requires more regulatory attention; the municipal right-to-supply is not adequately addressed in relevant legislation; and the regulator is concerned that the mandate on approval of gas distribution tariffs and adequacy of the Maximum Price Methodology will impact negatively on the industry.

Growth and financial sustainability of SOEs is threatened. Many of the SOEs have liquidity problems, often citing underfunding and poor performance as key reasons. Several are heavily dependent on their surplus cash. Customer concentration is a common concern and challenges, with Eskom in particular, are often cited. There are concerns about the development of local production and revenue pipeline capabilities.

The financial sustainability of the South African Nuclear Energy Corporation (Necsa) has been at risk. Necsa is focused on developing a turnaround strategy and a business operating model to ensure its sustainability. Its subsidiary, NTP Radioisotopes, suffered operational setbacks due to non-compliance with regulatory safety requirements. The resulting halt in operations at NTP affected the supply of medical radioisotopes globally. Working closely with the National Nuclear Regulator (NNR) to address the matter, NTP managed to return to full-scale operations.

For Pelchem, the fluorochemicals subsidiary of Necsa, there is both a customer concentration risk (Columbus Stainless) and a supplier concentration risk (VMC Mine). Lack of collaboration and partnerships and lack of a full Board of Directors remain challenges. Pelchem is also affected by the US-China Trade War, and the Rand-Dollar exchange rate.

In the case of PetroSA, the reduction in or lack of funding has directly resulted in the loss of exploration rights, due to a lack of funds to initiate the project in question. PetroSA is mandated to operate as a commercial entity that creates value for shareholders, and most importantly advances the nation's objectives in the petroleum industry. These mandates cannot be achieved without sustainable funding.

34 Roadmap for Eskom in a reformed electricity supply industry. DPE, 2019

In the case of National Radioactive Waste Disposal Institute (NRWDI), which is mandated to manage disposal of radioactive waste on a national basis, there is insufficient funding to develop waste management solutions. Based on international best practices, NRWDI needs to develop the Centralised Interim Storage Facility (CISF) to manage high-level waste. Failure to provide funding for this development would negatively impact all waste generators, including the Koeberg Nuclear Power Station.

The country's economic status in relation to the global economy has restricted financial security into utilising 'revolving credit' from the IDC. However, when an entity is in serious financial strain, revolving credit can make the situation worse due to the interest rate and payment period. Other SOEs in the cluster have been greatly affected by a decline in production, which is directly linked to the financial sustainability of the entity.

Entities in the Research and Regulatory Cluster, especially non-commercial entities that depend on the fiscus, are facing challenges that emanate from decreasing funding. NERSA, which is mandated to set and approve tariffs and prices, has experienced challenges stemming from Eskom's late application processes, and the growing debt of municipalities to Eskom. Funding and revenue diversification are the main challenges as can be seen in the Petroleum Agency of South Africa (PASA's) battle to unlock revenue from the fracking project, which could help improve its balance sheet.

The responses to the impacts on the entities that belong to this cluster vary dramatically. MINTEK is considering the revival of the declining ferroalloys sector as a way to increase revenue.

The CEF Group wants to resolve the numerous challenges it is currently facing. It is concerned about its depleting cash reserves, as well as depleting indigenous feedstock and litigation regarding the Strategic Fuel Fund's (SFF) strategic stock. Funding for fossil fuel projects is reducing, and there is an inability to become financially sustainable. Mozambique's gas supply will impact its subsidiary iGAS' financial sustainability. Gas feedstock for gas-to-liquids (GTLs) has depleted and the costs of (heavy) condensate have become unaffordable. There is a limited project pipeline for cash flow generation and a generally constrained fiscal environment.

There is still no long-term techno-economic solution for the Mossel Bay GTL. Coal is depleting in the current blocks and backwardation is impacting SFF's business. The CEF lacks an integrated execution model and culture. Its group portfolio is undiversified, and it faces a customer concentration risk due to Eskom, Transnet and Chevron.

Leadership and governance remain a concern for the entities in the DMRE. Communication and approval lags between SOEs, stakeholders and the Shareholder are common challenges stemming from dysfunctional leadership structures. In order for an entity to achieve its mandates, it is important to have leadership stability. The leadership has to be accountable for setting a culture of accountability within the entity. There is a need to urgently appoint leaders within the entities and reduce the number of vacancies at executive level.

The DMRE entities face a challenge with regard to the growing culture of corruption. This is evident at the leadership level, and needs to be addressed urgently, particularly given that inadequate stakeholder management has been highlighted as one of the challenges within these entities. Inadequate adherence to corporate governance directly affects the achievement of planned outcomes. Lack of shareholder support has also been cited as a major challenge. There is a need to develop collaborative relationships with all stakeholders to ensure that mandates are realised. The general consensus is that governance and processes need to be strengthened.

Failure to address the above underlying causes linked to inadequate energy supply has begun to manifest in a number of realities for the country. Ageing and decaying infrastructure continues to affect South Africa's energy supply, as demonstrated by load shedding. Economists at the Efficient Group estimated that the impact of load shedding on South Africa's economy in 2019 reduced GDP growth by ~ 0.30% in, translating into R8.5 billion[35]. Ongoing underperformance by the sector continues to have an impact on

35 https://businesstech.co.za/news/energy/361772/how-much-money-eskom-load-shedding-has-wiped-off-the-economy/

South Africa's mining industry and other sectors exposed to heavy energy volatility, such as manufacturing. Insufficient energy places a restriction on mining and manufacturing growth due to production losses resulting from unpredictable supply. This exposure contributes directly to job losses and inadequate skills investment, which ultimately aggravate unemployment and poverty, stoking service delivery protests.

IRP2019 Resolutions

At a strategic level IRP2019 is the leading policy framework for addressing the short- to long-term challenges that the country faces. IRP2019 formulates specific interventions to address electricity infrastructure development based on least-cost electricity supply and demand balance, taking into account security of supply and the environment (minimising negative emissions and water usage). IRP2019 has identified the preferred generation technology required to meet expected demand growth up to 2030. The available options are summarised in the paragraphs below.

Coal: Beyond Medupi and Kusile, coal will continue to play a significant role in electricity generation in South Africa in the foreseeable future as it is the basis of the largest installed generation capacity which supplies the largest share of energy generated. Due to the design life of the existing coal fleet and the abundance of coal resources, new investments will need to be made in more efficient coal technologies (High efficiency low emission (HELE) coal technology, including supercritical and ultra-supercritical power plants with CCUS) to comply with climate and environmental requirements. The stance adopted by the Organisation for Economic Cooperation and Development and financial institutions in regard to financing coal power plants is a consideration upon which the support of HELE technology is predicated. This ensures that South African coal will still play an integral part in the energy mix. Given the significant investments required for carbon capture and storage (CCS) and CCUS technology, South Africa could benefit from establishing strategic partnerships with international organisations and countries that have made advancements in the development of CCS, CCUS and other HELE technologies.

Nuclear: Koeberg Power Station will reach its end of design life in 2024. To avoid the demise of nuclear power in the energy mix, South Africa has made a decision to extend its design life and expand the nuclear power programme into the future. In line with power system requirements, additional capacity from any technology deployed should be done at a scale and pace that flexibly responds to the economy and associated electricity demand, in a manner that avoids tariff shocks in particular. It is the user of electricity who ultimately pays. In this regard, as is the case with coal, small nuclear units will be a much more manageable investment when compared to the fleet approach. The development of such plants elsewhere in the world is therefore particularly interesting for South Africa, and upfront planning with regard to additional nuclear capacity is a requisite, given that a lead time of less than ten (10) years is available for timely decision making and implementation.

Natural Gas: Gas-to-power technologies in the form of combined cycle gas turbines (CCGT), combined cycle gas engine (CCGE) provide the flexibility required to complement renewable energy. While in the short term the opportunity is to pursue gas import options, local and regional gas resources will allow for scaling up within manageable risk levels. Exploration to assess the magnitude of local recoverable shale and coastal gas are being pursued and must be accelerated. There is enormous potential and opportunity in this respect and the Brulpadda gas resource discovery in the Outeniqua Basin of South Africa, piped natural gas from Mozambique (Rovuma Basin), indigenous gas like coal-bed methane and ultimately shale gas, could form a central part of the strategy for regional economic integration within SADC. Co-operation with neighbouring countries is being pursued and partnerships are being developed for joint exploitation and beneficiation of natural gas within the SADC region. SADC is developing a Gas Master Plan, to identify the short- and long-term infrastructure requirements to enable the uptake of a natural gas market. Availability of gas provides an opportunity to convert to CCGT and run open-cycle gas turbine plants at Ankerlig (Saldanha Bay), Gourikwa (Mossel Bay), Avon (outside Durban) and Dedisa (Coega IDZ).

Renewable Energy: Solar PV, wind and Concentrating Solar Power with storage, present an opportunity to diversify the electricity mix; to produce distributed generation; and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain. The Wind Atlas developed for South Africa provides a basis for the quantification of the potential that wind holds for power generation elsewhere in the country, over and above the prevalence of the wind resource around the coastal areas. To date, most wind projects have been developed in the Western Cape and Eastern Cape. The generation of electricity and heat through biomass and biogas, to be supplied for industrial processes, holds huge potential for South Africa, recognising that such projects range from small (kW) to larger (MW) scale and could be distributed across the industrial centres. Biomass from waste, paper, and pulp from the sugar industries could be used in co-generation plants and deliver electricity at a price-competitive level with minimal transmission and distribution infrastructure requirements. When deployed together, the nexus between the biomass and a government-backed biofuels programme could improve the economics of the initiatives and create job opportunities in rural and urban centres.

Energy Storage: There is a complementary relationship between Smart Grid systems, energy storage, and non-dispatchable renewable energy technologies based on wind and solar PV. This is highlighted in **Policy Position 5** where the requirement is that the current annual build limits on renewables (wind and photovoltaic) be retained, pending a report on a just transition. The traditional power delivery model is being disrupted by technological developments relating to energy storage, and more renewable energy can be harnessed despite the reality that the timing of its production might be during low-demand periods. Storage technologies including battery systems, compressed air energy storage, flywheel energy storage, hydrogen fuel cells etc. are developments that can address this issue, especially in the South African context where over 6 GW of renewable energy has been introduced, yet the power system does not have the requisite storage capacity or flexibility to deal with it.

Strategic Response

The strategic response of the energy cluster has been informed by challenges identified, and considers all elements in the energy value chain below as summarised below:

Energy value chain

Integrated energy planning seeks to consider all the key elements of the energy value chain

Primary energy/resources → Conversion technologies → Secondary energy carriers → End-use technologies → Demand for energy services

Primary energy/resources

Renewables
- Solar
- Wind
- Biomass
- Hydro

Fossil fuels
- Coal
- Crude oil
- Natural gas

Nuclear fuels
- Uranium
- Resources extraction and sourcing

Conversion technologies

Power generation
- Conventional coal plant
- Nuclear
- CCGT
- OCGT
- Solar
- Wind

Fuel processing
- Oil refineries
- GTL
- CTL

Regasification

Secondary energy carriers
- Electricity
- Heat
- Refined petroleum products

End-use technologies

Industry
- Steam boilers
- Furnace
- Machinery

Commerce
- Air conditioning
- Light bulbs

Households
- Space heaters
- Refrigerators
- Stoves
- Geysers

Agriculture
- Irrigation pumps

Transport
- Vehicles
- Aircraft
- Rail

Demand for energy services

Industrial sector
- Process steam
- Motive power

Commercial sector
- Electronic communication
- Cooling

Residential sector
- Space heat
- Refrigeration
- Cooking
- Hot water

Agricultural sector
- Water supply

Transport sector
- Person kms

Solution statement: Ensure the availability of resources for energy consumption and the rapid deployment of alternative energy; energy efficiency; and the technological diversification of energy sources that would result in significant energy security and economic development.

Positive effects

Increased energy availability factor	Additional megawatts commissioned	Increased electricity reserve margin	Increased infrastructure investment	Regulatory certainty and economic transformation of the energy sector	Increased investment into South Africa	Economic growth	Unemployment and poverty reduced	Low carbon emissions

Ensure the availability of resources for energy consumption and the rapid deployment of alternative energy; energy efficiency; and the technological diversification of energy sources that would result in significant energy security and economic development.

Interventions

Secure funding for energy infrastructure	Energy security of supply	Minimise the cost of energy	Increase access to energy	Diversify supply of energy sources	Minimise emissions from energy sector	Promote energy efficiency and water conservation	Promote localisation, technology transfer and job creation	Transforming the energy sector
National Treasury	Ministerial determination on all technologies in IRP2019	Renegotiate coal contracts	Commercial sector	Exploration of gas and oil fields	Pursue cleaner coal technology			Create an enabling regulatory and legislative environment
BRICS Bank	Bid window for new build, enable self-generation	Cheaper mode of transportation	Transport sector	Development of the gas market as an alternative source of energy	Renewable energy			Separation and unbundling of Eskom
IDC, DBSA, AfDB	Implementation of IRP2019	Renegotiate BW 3 review energy pricing	Mining sector	Forge relationships with other African countries	Carbon capture storage and underground coal gasification			Develop electricity generation capacity outside of Eskom
Private sector	Update regulations	Review energy pricing	Manufacturing	Convert diesel turbines to gas turbines	Electrification of the transport sector			Transition to a low carbon economy

There are several responses to South Africa's inadequate energy supply and to ensure the security of supply.

DMRE entities have translated the provisions of IRP2019 into their responses to the challenges that the energy sector is facing.

Inadequate energy supplies will be addressed in the short term by accelerating energy efficiency rollouts. LPG gas will be promoted as an alternative for heating and cooking. Generation capacity with short lead times and self-generation will be enabled through systematic regulations.

For medium- and long-term outcomes, the IRP2019 will be implemented, together with addressing procurement and establishing a bid window for a new build. The DMRE's processes to enable key short- to medium-term interventions will be accelerated. To enable industry to invest in the energy supply mix through self-generation, regulations governing self-supply will be updated and streamlined.

The market will be tested for robust costing and funding options towards nuclear generation. Cleaner coal technologies, including CCUS, will improve coal's sustainability as a primary energy source. To address the concentration risk with coal dependence and Eskom as the dominant customer, focus will be placed on the following strategies:

» Additional mining rights and acquisitions and ensuring sustained Eskom uptake and diversification of clients
» Identification of minerals that are in demand for both clean energy (to support the IRP2019) and other diversified minerals in general
» Applications for mineral rights and identification of key off-takers in collaboration with CGS and MINTEK and with DMRE support
» Development of a regional and continental strategy that provides opportunities and offtake for various minerals.

The decision on the Grand Inga Treaty requires a long-stop date. Renewable energy will be explored beyond BW 4. Buyer issues will be resolved through the creation of a state-owned special-purpose vehicle.

High electricity prices will be responded to by renegotiating coal contracts and revisiting the transportation of coal, including cheaper modes for the transport of coal. BWs 1–3 can also be renegotiated and existing diesel generators at facilities can be converted to natural gas. A review of the Electricity Pricing Policy (EPP) should also be done - the policy hasn't been adapted to reflect current market conditions.

A just transition to low carbon-emitting sources will be facilitated by integrating various workstreams, in so far as they relate to and impact on energy security. Interventions such as labour relations are not being integrated with other workstreams. This initiative is aligned with **Policy Position 4** of IRP2019 stating that a team will be convened to put together a 'just transition' plan within a year, in consultation with all social partners. In addition, **Policy Position 6** requires that the planning framework for energy (coal resources) and the environment must support a just transition. These policy positions will help avoid job losses, guide the modernisation of the energy sector, and appropriately exploit current resources.

The development of the gas market as an alternative source of energy will be pursued to meet limited and depleting gas supplies. Exploration of gas fields will be increased (**Policy Position 7 of IRP2019** – Support the development of gas infrastructure), and relationships will be forged with other African countries for supply and market access.

The Nuclear Programme will undertake the following activities to further contribute to the energy security challenge the country is facing:

» Develop and implement a roadmap for the 2 500 MW Nuclear New Build Programme. **Policy Position 8** of IRP2019 requires that the nuclear build programme commences immediately. This will be a no-regret option in the long term, particularly if the Grand Inga Hydroelectric Project does not materialise.
» Promulgate the Section 34 Ministerial determination for procurement of the Nuclear New Build Programme
» Develop a position paper to implement 2 500 MW Nuclear New Build Programme
» Revise the Feasibility Study for the 2 500MW Nuclear Build Programme to support procurement and actual procurement of the programme
» Develop a position paper for small modular reactors (SMRs)

- Exercise oversight of the Koeberg Plant Life Extension Programme. This initiative is in support of **Policy Position 2 of IRP2019**, which requires that the necessary technical and regulatory work be undertaken immediately to extend Koeberg's design life by another 20 years
- Establish a fully functional National Liaison Office within the Nuclear Branch of the DMRE to facilitate Technical Co-operation Projects and other IAEA related regional programmes.

Through the Programmes and Projects Branch, the DMRE will play a critical role in managing, co-ordinating and monitoring energy and minerals programmes and projects. Some of the key focus areas include:

- Overseeing the National Electrification Programme
- Overseeing programmes and projects focused on development, improvement and transformation of electricity generation, transmission and distribution e.g. the Solar Home System Programme, deployment of renewable energy projects and electricity infrastructure projects, amongst others
- Provide strategic guidance on environmental management and climate change
- Advance energy efficiency
- Ensure integration into mainstream energy supply in South Africa.

The reliance on international crude oil can be reduced by the electrification of the transportation sector. The lack of integrated approaches to the transport sector's transition will be addressed. Exploration for oil fields and a targeted source diversification strategy, focusing on Africa, will also reduce reliance. A biofuels framework will be implemented, as well as a strategic stock policy.

Responses to the **pricing of petroleum products** include finalising a review of the current pricing methodology, focused on the Basic Fuel Price, Magisterial District Zones and the Regulatory Accounting System. Energy Distribution Infrastructure Rehabilitation can be achieved by developing and implementing funding, as well as regulations to **improve NERSA's Regulatory oversight** on infrastructure maintenance.

The sustainability of the distribution industry can be improved by reviewing the regulatory framework and industry structure. Ineffective institutional arrangements can be addressed by reviewing the energy sector's institutional architecture.

To address the **lack of economic transformation** in the energy sector, electricity, oil and gas sector codes with target timelines must be developed and enforced. Partnerships with development finance institutions and other commercial financial institutions (Treasury, BRICS, World Bank) will accelerate industry transformation and access to affordable finance.

In response to the **financial challenges that are faced by the different entities**, there is an urgent need to diversify revenue streams to reduce over-reliance on grant funding, especially from non-commercial entities. Improving administration and finance will enable entities to effectively manage available resources to advance their mandates while remaining financially sustainable. This process will leverage financial strategic planning, a financial plan of action that highlights the projected expenditures and the entity's potential, to generate income which will cover these expenditures.

The foremost outcome will be increased availability of energy, and a wider electricity reserve margin. The actions will increase **infrastructure investment**, much of it supported through regulatory certainty and the sector's economic transformation. These actions collectively will boost employment and additional investment prospects, as well as meeting lower carbon emissions. Ultimately, these actions will contribute to economic growth.

3.1.2 Mining Cluster

Problem statement: Lack of investment in mining and poor economic performance has adverse implications along the mining and minerals value chain.

Negative consequences	Low investor and consumer confidence	Poor economic growth	Unemploy-ment and poverty	Lost global market share and competitive position	Migration of skilled labour	Sovereign downgrade	Rise in llegal mining activities and ownerless and derelict mines	Civil unrest
	Lack of investment in mining and poor economic performance has adverse implications along the mining and minerals value chain							
Direct causes	Regulatory and legislative certainty	Fiscal crisis and global financial crisis	Inadequate infrastructure and supply of enenrgy	Higher costs of doing business	Lack of transformation	Volatility of commodity prices	Growth and financial sustainability of SOEs	Leadership and governance
Secondary causes	Framework within which exploration and mining companies can obtain prospecting and mining rights and the relevant environmental authorisations	Increasing debt	Road, rail and ports	Cost of energy to mining houses	Labour uncertainty and community activism	Dependency on a few commodities	SOEs liquidity issues	Overlapping mandates
		Declining tax revenue	Water and electricity	Water scarcity	Illegal mining	Access to international markets	SOEs revenue pipelines capabilities	Dysfunctional governance structures
	Lack of access to exploration data	Decline in exploration funding	Aging mining infrastructure	Cost of regulatory compliance	Lack of coordination between mining and communities	Geo-political risks and slowdown of global economy	Customer concentration risks	

Mining in South Africa is under pressure from numerous factors. **A lack of investment and maintenance** has caused **inadequate transport infrastructure for ports and rail**, as well as inadequate water and electricity supply. Some of the mines' own infrastructure is also aging and in need of renewal. The lagging water and energy supply has two acute causes: the cost of energy to mining houses, caused by both rising prices and poor energy supply, and increasing water scarcity.

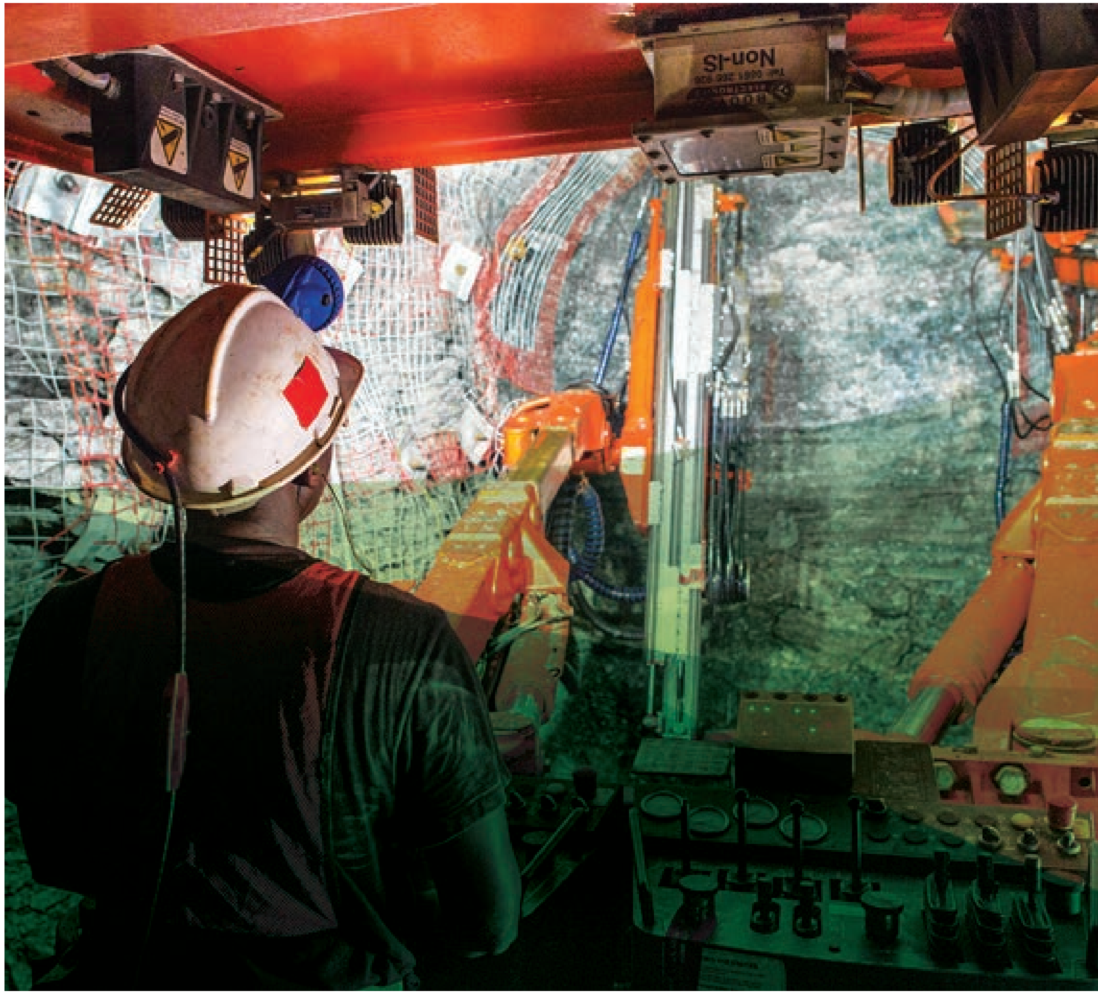
The mining sector, specifically exploration activities, faces several challenges. In terms of policy and mandate, an optimal framework around mining and petroleum is required. The concentration of petroleum is a concern, as are licensing turnaround times.

Resourcing and capacity challenges include funding, skills development and monitoring capacity. Access to land, including land constraints caused by trusts, chiefs and municipalities, poses a threat to the mining sector. Furthermore, there continues to be an overall lack of co-ordination between stakeholders.

The challenges and pressures on the mining sector are **increasing labour uncertainty**, which is evident in increased community activism, insufficient co-ordination between mines and communities, and rapidly growing concerns for safety and security, particularly of female employees in the mining industries. **Growing unemployment** contributes to an increase in **illegal mining activities**, and continues to plague the local industry. Illegal miners continue to pose a threat to the safety and security of mine employees. This is acute as the two groups often mingle, complicating situations such as fatality identifications. As a result, monitoring of health and safety, particularly related to accessing exploration sites, has been challenging.

Factors limiting the ability to explore and map South Africa's new prospective mineral resources, particularly by the Council for Geoscience, are cited as a barrier to investment. **Volatile commodity prices, increased energy costs** and slowing global growth are considered as depressing factors for the mining sector. **Energy costs** are a challenge for mines when processing minerals, leading to uncompetitive extraction costs. Infrastructure, policy and labour pressures are by far the most prominent problems facing the sector. These exacerbate the cost of production for mines with already tight margins in a sector under pressure to invest in upgrading and modernising its asset base.

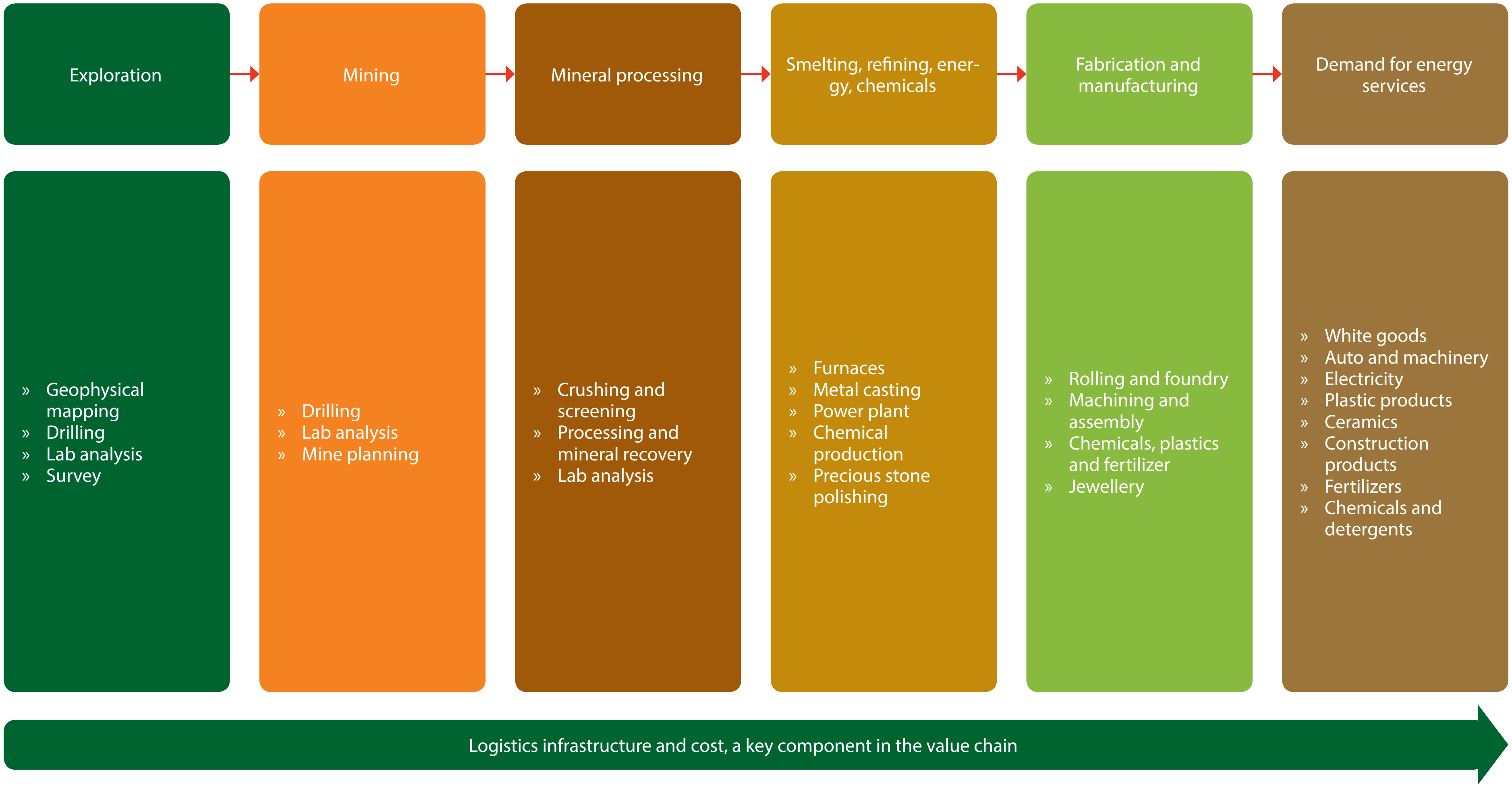
The results of not attending to these problems are bound to be catastrophic for an industry that has been on the decline in recent years. These challenges will result in low investor and consumer confidence. Such diminished support results in dwindling investments, weak economic growth and a brain drain of skilled labour, which inevitably contribute to growing unemployment and increased poverty levels. Civil unrest poses a long-term threat if the challenges in the mining sector are not addressed.



Strategic Response

The strategic response to mining sector challenges is segmented according to the different value chain elements of the mining sector, as illustrated below.

Industry value chain: Mining



Exploration (Mining and Petroleum)

To meet exploration **funding challenges**, one remedy is to look at prescribed assets, particularly related to miners and CGS. There should be engagement with National Treasury and, if necessary, the BRICS and World banks to source exploration funding, including the need for a 'farm-in and farm-out' funding model. This will aid in accommodating newcomers to the market.

Focusing on the **concentration of petroleum and minerals**, it will be necessary to encourage partnerships between emerging junior miners, and conduct a legislation review with regard to the petroleum bill to encourage inclusive, equitable and competitive exploration. The requirement for an optimal legislative framework for petroleum will be addressed by expediting the legislative processing framework.

Transformation will be addressed by enforcing compliance with relevant legislation. Once successful, this response will be evident, with the minerals and petroleum sectors reflecting the country's demographics. The DMRE is committed to ensuring regulatory and legislative certainty through several channels, including the development of comprehensive legal guidelines aligned with the objects of the MPRDA (i.e. optimal exploration and substantial and meaningful participation by HDSA's.

Access to land for exploration, as well as monitoring of compliance, will be achieved by engaging with respective landowners (including trusts, chiefs, and municipalities), as well as establishing a framework for engagements, exploration and monitoring.

To reduce **licensing turnaround times**, relevant legislation will be reviewed and strengthened. Capacity in terms of human resources will be strengthened, and the licensing process will be reviewed. Technology will be used as an enabler to track and unblock bottlenecks, as well as improve communication. Co-operation between the DMRE, Department of Water and Sanitation (DWS) and Department of Environmental Affairs (DEA) towards implementing one environmental system will be encouraged.

The strategic responses to the mining sector challenges will be enhanced by commitments from supporting SOEs and are summarised below.

The Council for Geoscience (CGS)

- The CGS has resolved to fast-track the implementation of the Geoscience Technical Programme (GTP) in the short term to catalyse investment in exploration. The goal is to ensure a long-term, sustainable funding model to sustain the impact of the geosciences in South Africa.
- The CGS has resolved to implement data policy guidelines, together with the installation of appropriate technological infrastructure, in line with the ICT governance framework and data architecture. Full implementation of the integrated and multidisciplinary geoscience mapping programme, annual recapitalisation plan, and job evaluation and exploration of a sustainable funding model will occur in the short term.
- The CGS wishes to become a streamlined government business and will conduct a detailed analysis of functional duplication of geosciences within the DMRE entities and streamline such activities to an entity with a legislated mandate for geosciences. This should significantly improve operational and cost efficiencies for the geosciences function, with optimal impact.
- To address its financial sustainability, the CGS will develop a long-term sustainable funding model that balances its mandate with commercial business. It will establish continuous engagement with National Treasury to advance the value proposition of investment in geosciences, as well as develop an aggressive commercial business development strategy in South Africa and abroad.
- The CGS will prioritise the mining commodities summarised in the table below in its geological mapping programme. Deloitte anticipates that these commodities will be used in future, driven by consumer choices and environmental concerns. The commodities are used in the production of lithium-ion batteries which are becoming increasingly important in the face of transitioning to a green economy.

Commodity	Description
Lithium	The most prominent mining commodity and a key component of Li-ion batteries. Commodity analysts predict global demand will double by 2030. Lithium is high on the exploration list of mining companies and countries that have potential mineralisation of such a commodity will attract global exploration investment.
Graphite	Has seen increased demand as a result of growing interest in battery technology. Due to the surge in demand, synthetic graphite electrodes have increased in price tenfold.
Cobalt	Cobalt deposits are one of the desirable mineral deposits in the world. Prices have quadrupled, creating a global supply deficit in 2018.
Nickel	Nickel is increasing in demand due to the large quantities required for EV batteries. Only high-grade nickel is used in EVs, but only around half of the world's supply of nickel is of the right grade for such use. Demand for nickel sulphides (battery-grade nickel) is expected to increase 50% by 2030, while the percent of nickel in car batteries could rise up to 80% from the current 33%.
Copper	As the demand for electrification increases; demand for copper wiring will also increase. Around 28 million tonnes (Mt) of copper is used annually of which 75% is used for wiring. Demand for copper is driven by EVs which contain four times as much copper as combustion engine cars. Renewables such as photovoltaics are five times more copper-intensive than conventional power generation from thermal plants and nuclear.
Coal	Coal drove the industrial revolution and its continued importance in many countries' fuel mixes is not in doubt. However the realities of climate change and the global response will negatively impact future demand. As the world commits to reduction of fossil fuel energy sources, coal is most likely to become a commodity of the past. The reality may not necessarily be realised in the short term due to the continued importance of coal in South Africa's current energy mix. Its future may also be prolonged by the adoption of cleaner technologies.
Iron ore	Future growth will be impacted by the global drive to recycle, but due to its strength, steel is widely used and demand remains strong. The world steel association estimates that by 2030 1.9 billion metric tonnes of steel will be needed to meet global demand. But at the same time recycling initiatives are expected to ramp up globally and iron ore demand will be negatively impacted by this. To drive this reality home, currently the US produces around 70% of its steel from scrap metal, reducing demand for iron ore, according to the Deloitte report.

Petroleum Agency of South Africa (PASA)

- PASA has resolved to increase its licensing and exploration fees, promote revenue sharing agreements, offer sign-on bonuses, and secure funding via a special MTEF allocation. Furthermore, it will focus on its financial efficiencies and revenue generation capability, as well as translate resources into economic value. As part of its 5-Year Strategic Plan, PASA will establish effective use of its resources and improve workforce productivity. Additionally, it will identify projects aligned with the NDP imperatives, and review its fee structure.
- In terms of its operating model, PASA will increase exploration and production activities in South Africa, as well as regulate the exploration and production environment. It will acquire, archive and enhance all petroleum exploration and production data, ensure a viable and sustainable Agency, and deliver national projects. Underpinning this is an effective and efficient operating model that is aligned with policy imperatives while realising the mandate. This will be enacted through its 5-Year Strategic Plan 2019–2024. Outcomes should include improved capacity, staff engagement, advocacy, brand awareness, business processes, and stakeholder management. The strategy should also diversify participation; increase exploration activity; improve resource efficiency; and increase revenue generation, stakeholder and customer satisfaction.
- Overlapping mandates will be addressed by resolving inefficiencies in SOEs and establishing PASA as an independent entity to regulate, promote and facilitate (this includes the storage of relevant data) the oil and gas industry. PASA has resolved to intensify its focus on oil and gas development. It requires closer collaboration with all stakeholders including CGS, the South African National Energy Development Institute (SANEDI) and NERSA in terms of the shale gas project; carbon capture project and streamlining the oil and gas regulatory value chain. Strategic relationships will be regulated by memorandums of understanding.
- Ensuring regulatory and legislative certainty will be met through several channels, including finalisation of the Upstream Oil and Gas Bill and development of comprehensive legal guidelines aligned with the objects of the MPRDA (i.e. optimal exploration and substantial and meaningful participation by HDSAs). PRASA has resolved to partition both onshore and offshore acreage into reasonably sized blocks to be informed by a benchmarking exercise. The development of an acreage maturation chart will be implemented. These interventions have been initiated with a view to increasing investment in South Africa.

Mining

Several responses that focus on mining have been proposed:

Licensing turnaround times will be addressed by reviewing and strengthening relevant legislation, strengthening capacity through more people (warm bodies), and reviewing the licensing process through technology to track and unblock bottlenecks. The DMRE, DWS and DEA will be encouraged to co-operate around one environmental system. These responses vary between high and low priority, ultimately resulting in an expedient licensing regime. The Mineral and Petroleum Branch is responsible for these interventions.

Infrastructure development, including energy, rail, water and other examples, is regarded as a high priority. The appropriate response includes engaging with all the relevant departments to co-ordinate efforts. This is a short- to long-term strategy, aimed at increasing the availability of support infrastructure for mining. The Policy and Planning Branch is best positioned to be responsible for this response.

To address concerns around the **cost of energy to mining houses**, the sector will be encouraged to generate its own energy, and it should be explored as to whether another entity can be established to assist in energy generation. More meaningful state participation in Eskom's coal supply will also improve energy costs for heavy users. This will contribute to delivering sustainable and affordable energy for mining.

Mining research is lagging due to a lack of support capacity. The expansion of the mandates of the respective entities is proposed to support research in mining and enhance their capacity. This should result in improved support for mining research and increase the competitiveness of the South African mining industry.

The **legislative framework will be revised to prevent illegal mining**. Small-scale mining should also be encouraged, to prevent illegal mining. Supporting artisanal miners will encourage legitimate mining, particularly if backed by a framework on how to support artisan miners – this framework will have to be developed.

A significant number of mines remain under care maintenance, requiring a framework to deal with these mines. Specifically, such mines should not be decommissioned without investigating their viability more extensively. This will encourage the optimal utilisation of South Africa's mineral resources.

African Exploration Mining and Finance Corporation (AEMFC)

The AEMFC has undertaken the following:

- Own and shareholder equity funding to be explored through strategic partnerships with other DMRE subsidiaries, FDIs and BRICS
- A phased approach to mine commissioning
- Lease vs Buy decisions in areas where this can be implemented
- Additional mining rights and acquisitions and ensuring sustained Eskom uptake and diversification of clients
- Closer collaboration with CGS regarding maps
- Identification of minerals that are in demand for both clean energy (to support IRP2019) and other diversified minerals in general
- Apply for mineral rights and identify key off-takers in collaboration with CGS, MINTEK and DMRE
- A regional and continental strategy – opportunities and offtake of various minerals.

MINTEK

- MINTEK has almost completed working on a strategic realignment that covers all the identified areas: from the alignment of the entire organisation with the mandate as articulated in the Mineral Technology Act, to engagements with customers and industry in particular. It also resolved to align its research and technology development operations to meet industry needs.
- MINTEK has developed a series of position papers focusing on reviving and stimulating specific sectors within the minerals and mining space, to make a meaningful contribution to the economy. The position papers cover several key topics: Reviving the ferroalloy industry; energy storage; the titanium industry; rare earth minerals; and coal as a strategic mineral.
- To manage overlapping mandates, MINTEK is already collaborating with CGS on specific projects of common interest, at a work-in-progress stage. MINTEK is also working with Necsa and Pelchem, regarding both Ketlaphela Pharmaceuticals and common interests concerning diagnostic test kits and medical products.
- MINTEK is addressing its leadership challenges. A Science, Engineering and Technology (SET) Human Development Programme is aimed primarily at developing skills, capacity and capabilities in science, engineering and technology, from junior level through to senior researcher levels.

Mineral Beneficiation

To create access to minerals for beneficiation, necessary licensing conditions need to be created. MPRDA Section 50 must be revisited to help increase domestic beneficiation.

The cost of beneficiation needs to improve, in order to deliver cost-effective products. Addressing import parity pricing will help deliver this outcome, as well as addressing the cost of energy.

Access for beneficiating products to international markets can be improved. This can be done by using bilateral and multilateral agreements to facilitate preferential access, which would increase exports of manufactured products.

To address the lack of innovation in mining beneficiation, investment in research and development will be increased. There will also be a focus on upskilling and increasing capacity, to diversify products and improve the country's manufacturing capability.

The South African Diamond and Precious Metals Regulator (SADPMR)

- The SADPMR has compiled proposed amendments to its empowering legislation.
- To manage overlaps, it is pursuing constant engagements through forums with the South African Revenue Service (SARS) and the South African Police Service (SAPS).
- To address alignment with legislation and local imperatives, the SADPMR has drafted proposed amendments for the DMRE's consideration. There will be an intense implementation of the Marketing and Communication Strategy, phased in over a five-year period.

The State Diamond Trader (SDT)

- A review of SDT's business model will create a better revenue picture. Interventions include the diversification of operations, such as the trade on polished diamonds. Alternative funding streams will be identified, and there will be a focus on selling to both beneficiation parties and dealers. The SDT will, with the Minister, explore the possibility of review regulations, particularly around buying and selling in the market.
- Overlaps will be addressed through roundtables with involved parties to ensure properly co-ordinated functions, and clarified roles and responsibilities.

Social Contract for Mining

- To address the lack of proper consultation between municipalities and communities co-operative governance between the three spheres of government will be encouraged.
- The lack of formalised community structures requires the development of a relevant framework, as well as inter-governmental forums led by the DMRE.
- The lack of co-ordination between the mines and municipalities is also concerning and will be remedied.

Mine Health and Safety

A review of legislation, and DMRE-led facilitation between the mines and communities, will reduce the negative impacts of mining on communities. Compliance with legislative frameworks will be enforced to address fatalities, injuries and diseases. Research will be conducted to improve health and safety, including the development of technologies for fall-of-ground accidents. The investigative skills and capacity of the inspectorate will be improved, particularly to reduce reliance on external parties. The inspectorate's capacity will be enhanced with additional human resources.

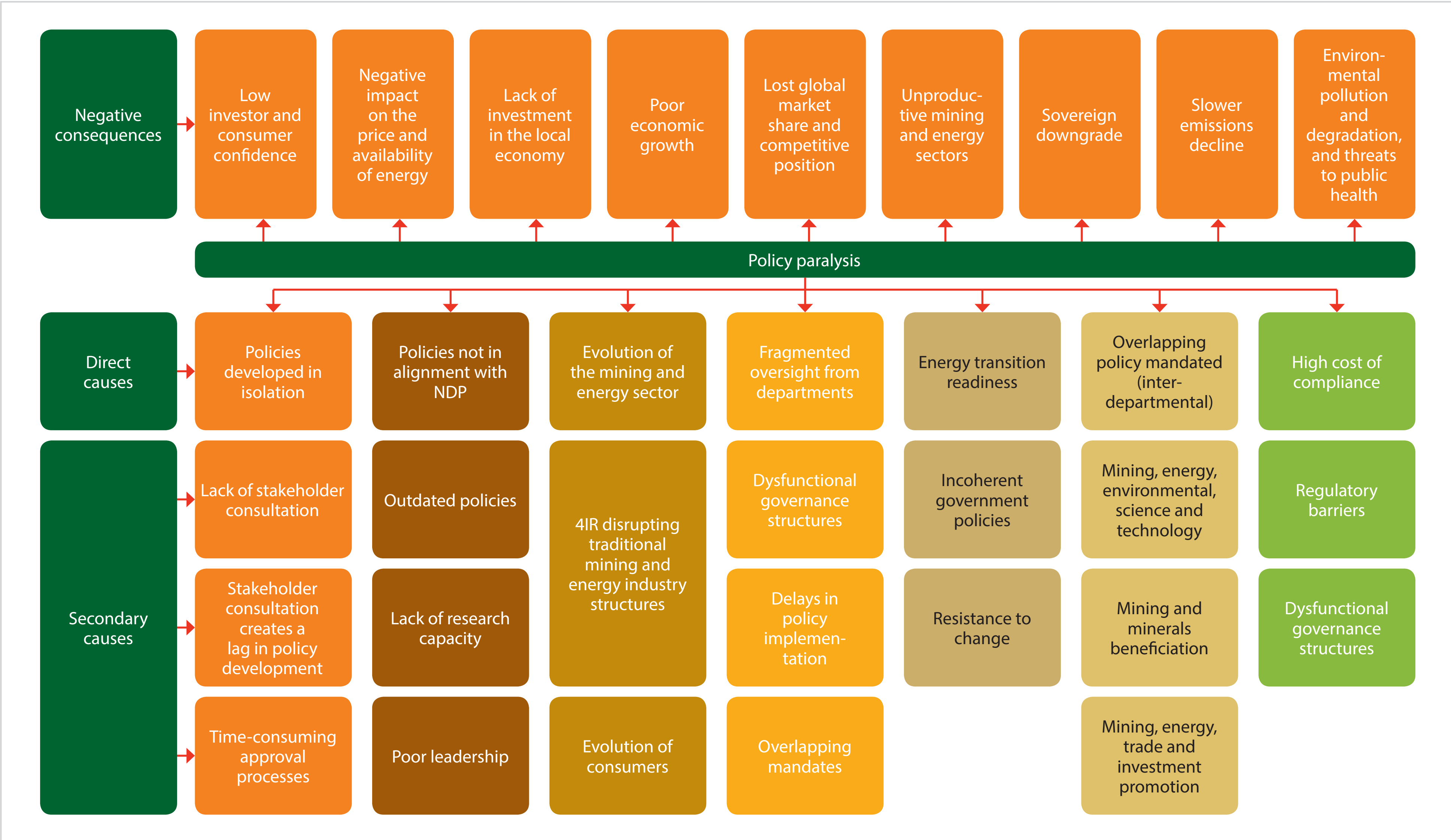
A review of legislation on health and safety relating to upstream petroleum and hydraulic fracturing will ensure zero harm to mine workers. The security and safety of women in mining in relation to gender-based violence is a high priority. The implementation of guidelines and directives will create a working environment that is conducive to women in mining. To address illegal mining, stakeholder forums will be formalised between mines, the DMRE and law enforcement agencies.

The Mine Health and Safety Council (MHSC)

- A Fourth Industrial Revolution (4IR) implementation strategy will be developed, taking into account the impact of technology on employees and reskilling requirements.
- The MHSC will implement its Promotion and Dissemination Strategy for target audiences, and build internal capacity within MHSC.

3.1.3 Policy and Regulation Cluster

Problem statement: Policy paralysis.



The introduction of more stringent environmental legislation and regulations, e.g. NEMA and Carbon Tax has made it challenging for entities to achieve their mandates. As a result, entities are of the view that the State should consider the relaxation of certain parts of the relevant regulatory framework (e.g. NEMA, Income Tax Act and SARB). In some cases, there is a need to form joint ventures. However, Section 54 sometimes makes the process slower. The turnaround time for regulatory approval is cited as a major challenge because it delays progress.

Entities have also raised specific challenges in this regard:

- NRWDI battles with long lead times to obtain approval for the establishment and operation of radioactive waste management and disposal infrastructure. This is a challenge because radioactive waste is constantly being generated. Higher volumes of radioactive waste are generated for disposal due to the increased application of nuclear science and technology.
- PASA is battling with the development of comprehensive legal guidelines aligned with the objects of the MPRDA (e.g. optimal exploration, substantial and meaningful participation by Historically Disadvantaged South Africans).
- Necsa is struggling with non-compliance with safeguard agreements and failure to maintain ASME and ISO certifications.
- CGS finds problems with partial compliance with regulatory requirements of the Geoscience Act.

During the strategic planning session it was realised that there are overlapping policy mandates within the departmental entities. Different entities share mandates around mining, oil and gas matters. Matters such as beneficiation, energy and the environment, and investment actions, are often caught up in rival policies that mandate different spheres of the state. These and other design problems in the policy space are forcing high costs of compliance and significant regulatory barriers.

Clarity around policy and regulation is particularly important due to pressures on the mining and energy sectors. There is a need for transition towards carbon-neutral energy, without damaging South Africa's current and future capacity to provide power, or impact employment negatively. There is resistance to change towards CO_2-efficient energy, and incoherent government policies are also creating barriers.

Overlapping mandates, as well as overlapping regulatory bodies, are partially responsible for fragmented oversight in the mining and energy sectors. Dysfunctional governance structures and delays in policy implementation are also contributing to this fragmentation. In terms the Occupational Health and Safety Act and the MHSA, the CEF Group indicated that compliance is low. This is a major challenge because people's lives are at risk.

Both the energy and mining sectors are undergoing significant evolutions. New players enter the sectors by leveraging innovation, as part of the current 4IR modernisation wave. Such modernisation is disrupting traditional mining and energy, but is not spontaneous – the evolution of consumers and citizens is motivated by policies relating to mining and energy which are not fully aligned with the NDP. There is a lack of communication with industry players, as well as a decrease in research capacity towards the NDP's goals, both often underpinned by poor leadership at different levels of engagement.

Policy paralysis contribute to an escalating series of adverse outcomes. Policy uncertainty often results in lower investor confidence. The resultant lack of investment in the local economy contributes to weak economic growth. An unproductive and uncompetitive economy translates into higher unemployment and poverty levels. The plight of citizens and industry worsens because uncertainty harms the price and availability of energy, due to the lack of investment in infrastructure and development. South Africa's obligations in terms of carbon emission targets are also compromised.

3.2 ALIGNMENT WITH THE 2019–2024 MEDIUM TERM STRATEGIC FRAMEWORK

The MTSF reflects the commitments made to the national priorities of government, including the commitment to implement the National Development Plan (NDP). The MTSF lays the foundations for all social partners to assist government in creating inclusive economies, reducing inequality and eliminating poverty while protecting women, the youth and those most vulnerable. The Seven Priorities derived from the 2019–2024 Medium Term Strategic Framework (MTEF) are:

Priority 1: A Capable, Ethical and Developmental State

A capable, ethical and developmental state underpins all seven priorities of the MTSF. It is a vision of strong leadership, a focus on people and improved implementation capability. Facilitating this vision into action will involve a transition to a more functional and integrated government that is capacitated with professional, responsive, embedded and meritocratic public servants to strengthen relations and efficiency. Intergovernmental and citizen engagements are key enablers to this priority to ensure programming across all departments and agencies and the joint pursuit of a capable state. A developmental state that is capable and ethical will provide conditions that grow the economy, create jobs and improve quality of life.

Priority 2: Economic Transformation and Job Creation

In order to improve South Africa's productive capacity, human capital and state capability, inclusivity needs to be encouraged through broad-based investments. Improving sustainable long-term growth is needed to significantly reduce unemployment. This requires both broad structural reforms as well as targeted interventions. The uncertain global environment and local constraints require the enabling arms of government to rebuild confidence and galvanise investment in the country.

Faster, inclusive growth is key to improving and sustaining higher living standards, and successfully reducing inequalities in the economy. Some key considerations for accelerating delivery are: overcoming challenges with State Owned Enterprises (SOEs); industrialisation; small business development; the minerals - energy complex; transformative innovation; the Fourth Industrial Revolution; and ensuring a supportive macroeconomic environment for investment. Specific priorities are also needed to broaden opportunity and employment for women, the youth and people with disabilities through dedicated economic inclusion, education and skills development.

Priority 3: Education, Skills and Health

To develop skilled individuals, the country must address structural barriers in tertiary institutions, whilst making dedicated investments to ensure labour activation. These need to happen in tandem with skills review processes to ensure appropriate improvements in learning and skills levels. South Africans also depend on improvements to the suboptimal health sector and substantial efforts are needed to strengthen management, financing and delivery in this sector.

Priority 4: Consolidating the Social Wage through Reliable and Quality Basic Services

A comprehensive, inclusive and responsive social protection system ensures the resilience of citizens. Social protection is critical for income security of citizens as well as the flexibility and competitiveness of the economy, particularly in an environment where change will accelerate because of climate and technological advances and traditional livelihoods will come under more pressure. A continuing, increased focus on social protection and notions around a basic citizen's income will become more urgent and requires an effective social security policy framework and accompanying accessible mechanisms (norms, standards and processes) to enable economic inclusion.

Priority 5: Spatial Integration, Human Settlements and Local Government

Spatial integration

The NDP identifies a direct link between inherited colonial and apartheid spatial patterns and the stubborn persistence of poverty, inequality and economic inefficiency. In order to address this historical spatially-grounded injustice, the NDP calls for the urgent, well planned and systematic pursuit of national spatial transformation, which takes account of the unique needs and the potential of different rural and urban areas.

Environmental Management and Change

South Africa has a rich endowment of natural resources and mineral deposits, which, if responsibly used, can fund the transition to a low-carbon future and a more diverse and inclusive economy. Developmental challenges must be addressed in a manner that ensures environmental sustainability. Developing countries are at particular risk due to a combination of geography, the intrinsic vulnerability of poor communities to environmental threats, and the pressures that economies based on resource extraction place on the environment. There are several opportunities for transitioning South Africa to a development path that actively pursues environmental sustainability as a core value. Targeted actions are needed to safeguard the country's unique natural resource base and mitigate risks such as climate change.

Priority 6: Social Cohesion and Safe Communities

A socially cohesive and safe South Africa requires a series of intersecting interventions that unite the country. This vision pivots on instilling a democratic culture of participation and equality, but also requires dedicated interventions to address actions that undermine these values. Achieving social cohesion and safe communities requires strengthening criminal justice platforms, police services and community participation in public policing. It also requires improving trust in the public sector and its institutions which underpin the above platforms.

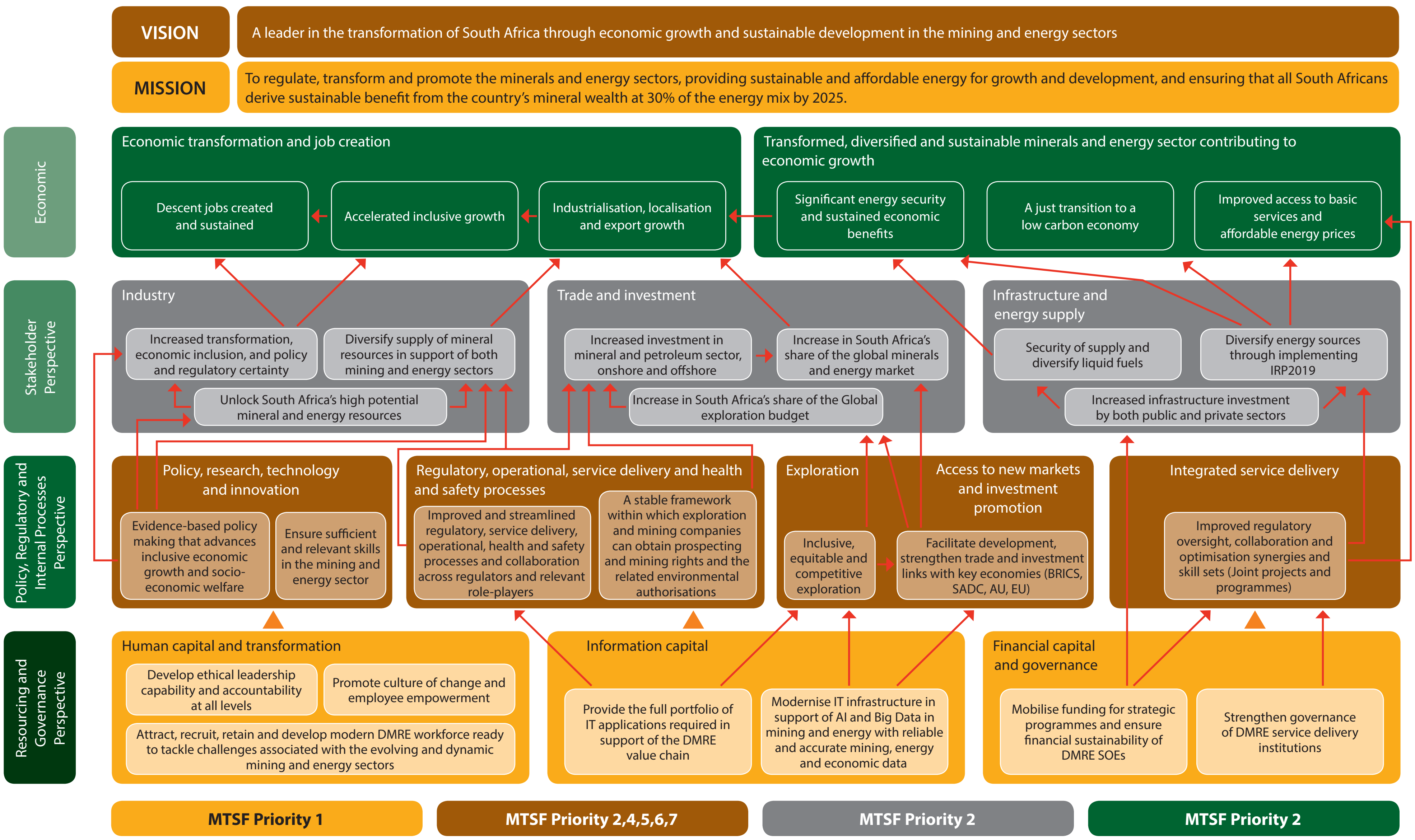
Priority 7: A Better Africa and a Better World

Government will continue international leadership, working towards global peace, people-centred development and prosperity for all. This will be done by capitalising on government's role in supporting multilateral frameworks to resolve global disputes and assist Africa in laying the foundations for a shared future. A key focus will be on increasing investment in opportunities for trade, economic development and a presence in global compacts.

Policy certainty is critical to ensure the country is influential, and is able to deepen integration and co-operation to increase investment and accelerate the pace of inward direct investment.

These seven priorities inform the interventions and programmes to achieve the NDP Vision 2030. The response of the DMRE to the MTSF priorities is reflected in its Strategy Articulation Map, which incorporates the relevant impact and outcome statements. The achievement of outcomes is linked to indicators and targets and supported by initiatives that demonstrate a focus on enabling the outcomes of the MTSF. These have been detailed in Annexures B to D in this document.

3.3 DMRE STRATEGY ARTICULATION MAP



The map articulates the strategic priorities of the DMRE in relation to the MTSF. The existence of the DMRE is premised on its vision of becoming a leader in the transformation of South Africa's economic growth agenda through the sustainable development of the mining and energy sectors. This vision will be operationalised by focusing on regulating, transforming and promoting the mining, minerals and energy sectors to provide sustainable and affordable energy for growth and development, thereby ensuring that all South Africans derive sustainable benefit from the country's mineral wealth. For the execution of its mandate and to enable the achievement of its vision, the DMRE is supported by various entities whose mandates and operating models culminate in the ability of the DMRE to make a sustainable contribution to the MTSF imperatives.

The **Resourcing and Governance Perspective** is moulded on the empowerment of the DMRE's workforce and the development of a pool of appropriately skilled, engaged, motivated and capacitated individuals to better support and enable the execution of the mandates of the DMRE and its entities. The DMRE is required to invest in the recruitment, development and retention of human resources and to develop leadership capability and accountability at all levels. In addition, it must create an environment conducive to empowering employees and promote a culture of change. Together with the development of ethical leadership capability and accountability, these are critical components to ensure that the DMRE is appropriately capacitated to meet the deliverables imposed in its mandate.

With the advent of 4IR, it is necessary that supporting processes and structures reflect the transitioning to more sophisticated IT applications to support the DMRE's value chain. The modernisation of IT Infrastructure in support of AI and Big Data in mining and energy will result in more reliable and accurate mining and energy data and other information that can be shared more transparently to regain confidence in the DMRE. The modernisation of systems and applications will provide the platform with streamlined and enhanced networks that will enable collaboration across regulation and between various role-players. Technology enablement will also contribute to improved and more competitive exploration processes and smooth the transitioning into new markets. This technological enablement will directly influence the achievement of improved and streamlined regulatory, service delivery, operational, and health and safety processes.

Improving the governance structures of DMRE's service delivery institutions is particularly relevant in the face of the challenges highlighted by the entities. Mobilising funding is key to the development and implementation of strategic programmes. The DMRE's strategy for mobilising financial resources will help government and the private sector to fund sustainable changes to the economic wellbeing of the country and to the environment. Access to funding also contributes to economic growth and employment. Strengthening the position of the DMRE in the above areas will influence the achievement of MTSF Priority 1 as it relates to "A Capable, Ethical and Developmental State."

From a **Policy, Regulatory and Internal Perspective**, the challenges have been well documented and much emphasis has been placed on interventions to create a streamlined policy and enabling regulatory environment. This will be enabled by evidence-based policy making that advances economic growth and socio-economic welfare. The latter is in line with MTSF Priority 5 which calls for the urgent, well planned and systematic pursuit of national spatial transformation. Another element of MTSF Priority 5 speaks to environmental management and climate change. A dynamic and more responsive policy environment will create an enabling platform to fast track efforts relating to the reduction of carbon emissions, industry transformation and the diversification of mineral resource supplies.

Improved regulatory processes and collaboration across regulators and relevant role players will provide stability in the areas of prospecting and mining rights and the related environmental authorisations, allowing for greater participation in the mining and energy industries. This will encourage more inclusive and equitable arrangements and enhance the competitiveness of particularly the mining industries.

A sound policy and regulatory environment will enable access to new markets as this will encourage and facilitate the development and strengthening of trade links and investment opportunities with key economies (BRICS, SADC, AU, and EU). This is in line with MTSF Priority 7 which calls for a better Africa and a better world. Broader collaboration and extended networks across borders and countries would further enable efforts to meet MTSF Priority 7. In addition, trade and investment opportunities will increase in the mineral and petroleum sectors, thereby growing South Africa's share of the global mining and energy markets, as well as its share of the global exploration market. Supporting and enabling policy and regulatory frameworks will contribute to improved growth and socio-economic welfare and open up opportunities for South Africa to unlock the country's high potential mineral resources.

The DMRE oversees a large portfolio of entities, which are responsible for various programmes and projects. This requires an appropriately structured planning and execution framework to enhance service delivery capacity and capability. This will enable greater collaboration and exploitation of synergies between the various entities and an opportunity for planning and execution of joint projects and programmes, eliminating potential duplication and funding requirements. Such arrangements will strengthen the DMRE's business case for the sourcing of infrastructure investment for the development and expansion of mining and energy infrastructure; as well as funding of the IRP2019 Programme aimed at increasing energy availability for the country and its dependent industries.

The Policy and Regulatory perspective also supports economic transformation and job creation, as well as the education, skills and health priorities contained in the MTSF.

The **Stakeholder perspective** comprises a large portion of the DMRE's strategy as the elements herein relate to its core mandate. South African industries are hugely dependent on the outputs of the portfolios that the department oversees. The reality of energy supply constraints demands that focus be placed on diversifying energy sources while green activists worldwide continue to lobby for reduced carbon emissions. A review of the structure of the energy and mining sectors is imperative to meet the DMRE's goals in support of broader national objectives in the form of accelerated transformation, economic inclusion and policy certainty. Infrastructure investment by the public and private sectors, as well as the development and maintenance of infrastructure, are core enablers for expanding the mining and energy sectors.

The **Economic perspective** reflects the outcomes of the DMRE effectively executing its mandate, thereby contributing to the MTSF objective of economic transformation and job creation. This is reflected in the DMRE's focus on expanding its human resource base, driving inclusive growth and promoting industrialisation, localisation and export growth. Furthermore, the department will contribute to the development of a transformed, diversified and sustainable minerals and energy sector contributing to economic growth through the enablement of improved access to basic services and affordable energy prices. The latter will be the result of interventions implemented through IRP2019, supported by an enabling regulatory environment.

An integrated approach, considering the interdependencies of the elements contained in the strategic articulation map, will translate into the DMRE achieving its vision and cementing its footprint in the South African economy.

3.4 INSTITUTIONAL PERFORMANCE INFORMATION

3.4.1 Measuring the Impact

Impact Statement	Harness the synergies of the energy and mining sectors to enable energy security that makes a positive contribution to the growth and competitiveness of mining and other energy-intensive sectors of the economy, thereby generating economic benefits for the country.

3.4.2 Measuring the Outcomes

Outcome	Outcome indicator	Baseline	Five-Year target	Interventions	Responsible
Investing in accelerated inclusive growth	Framework for a just transition to a low carbon economy developed and implemented	New indicator	Framework for a just transition to a low carbon economy developed and implemented by 2022	Ensure macroeconomic policy alignment and coherence	Mining, Minerals and Energy Policy Development
	Number of investment promotion events held to attract investment in the South African mining cluster	New indicator	50 investment promotion events	Accelerate delivery through transformative innovation – Operation Phakisa Mining Laboratory – galvanising growth, investment and employment creation along the mining and energy value chain and mining-related communities	Mining, Minerals and Energy Policy Development
	Number of direct jobs created per investment	New indicator	Increase the number of direct jobs created as per investment, with up to 34 000 additional jobs created over the MTSF		Mineral and Petroleum Regulation
Industrialisation, localisation and exports promoted	Masterplan developed	Automotive and CTLF Masterplans	Masterplans developed and implemented	Create a conducive environment to enable national priority sectors to support industrialisation and localisation, leading to increased exports, employment, and youth- and women-owned SMME participation	Programmes and Projects

Outcome	Outcome indicator	Baseline	Five-Year target	Interventions	Responsible
Secure supply of energy	Strategy and plan on liquid fuels reviewed and updated	Integrated Energy Plan (IEP)	Strategy and plan for liquid fuels updated by 2022	Secure supply and diversify liquid fuels	Mining, Minerals and Energy Policy Development
	Feasibility study on new oil refinery completed	Draft Feasibility study	Feasibility study on new oil refinery completed by 31 March 2021 and final investment decision made		Mining, Minerals and Energy Policy Development
	Additional 2 500 MW of nuclear energy procured	New indicator	2 500 MW of nuclear energy procured by 2024	Implement the Nuclear New Build Programme at a scale and pace that the country can afford, to ensure security of energy supply	Nuclear
	Koeberg Nuclear Power Plant life extension completed	New indicator	20-year extension of Koeberg Nuclear Power Plant's life completed by 2024	Koeberg Nuclear Power Plant's life extended to 2044	Nuclear
	Centralised Interim Radioactive Waste Storage Facility procured	New indicator	Centralised Interim Radioactive Waste Storage Facility procured by 2024	Establishment of the Centralised Interim Facility for sustainable management of radioactive waste	Nuclear
	New Multi-Purpose Reactor procured	New indicator	New Multi-Purpose Reactor procured by 2024	Replacement of SAFARI-1 Research Reactor by New Multi-Purpose Reactor	Nuclear
Green House Gas emissions (GHG) reduced	Percentage reduction in total GHG emissions by 2024	New indicator	42% reduction in total GHG emissions by 2024	Implement 4 Sector GHG Emission Reduction Plan (contribution from the largest emitters of GHG)	Mining, Minerals and Energy Policy Development

Outcome	Outcome indicator	Baseline	Five-Year target	Interventions	Responsible
State of geological infrastructure improved	Number of strategies developed for Acid Mine Drainage (AMD) mitigation	10 Ingress point measure projects to be implemented	1 strategy developed for AMD mitigation	Strategy developed for acid mine drainage mitigation	Mining, Minerals and Energy Policy Development Programmes and Projects
	Number of mine water/ wastewater management plans implemented	New indicator	3 mine water/ wastewater management plans implemented	Mine water/wastewater management plans implemented	Programmes and Projects
	Develop and roll out municipal electricity asset management framework	New indicator	Rollout of municipal electricity asset management framework developed	Develop and roll out municipal electricity asset management framework	Mining, Minerals and Energy Policy Development
Improved capacity to deliver basic services, quality infrastructure and integrated public transport to increase household access to basic services	Number of households electrified through grid connection	1.285 million connections between 2014–2019	1 million additional connections	Grid connections to households in terms of the National Electrification Plan	Programmes and Projects
	Number of households electrified through non-grid connection	85 993 connections between 2014–2019	75 000 additional connections	Non-Grid connections to households in terms of the National Electrification Plan	Programmes and Projects
	Percentage of municipalities where the framework has been rolled out	New indicator	50%	Develop and rollout municipal electricity asset management framework	Mining, Minerals and Energy Policy Development

Outcome	Outcome indicator	Baseline	Five-Year target	Interventions	Responsible
A functional, efficient and integrated government	Percentage elimination of wasteful and fruitless expenditure in public sector institutions	2018 baseline	100% elimination of wasteful and fruitless expenditure incrementally from baseline of 2018 by 2024	Measures taken to eliminate wasteful, fruitless and irregular expenditure in the public sector	Financial Management Services
	Percentage reduction of irregular expenditure in public sector institutions	2018 Baseline	100% reduction of irregular expenditure incrementally from baseline of 2018 by 2024		
	Percentage reduction of qualified audits in the public sector	2018 Baseline	100% reduction of qualified audits incrementally from baseline of 2018 by 2024		
	Percentage resolution of reported incidents of corruption in government	Trends from the anticorruption hotline and crime statistics	95% resolution of reported incidents of corruption by 2024 via disciplinary and criminal interventions	Programme to prevent and fight corruption in government	Risk and Integrity Management
	Ensure functionality of ethics structures and adequate capacity	New indicator	Establish ethics committees and adhere to terms of reference		
	Percentage participation in District Planning Forums (integrated plans)	New indicator	100% participation in District Planning Forums	Develop and implement district/metro development model (Contribute to the Khauweleza District Planning Model)	Mineral and Petroleum Regulation Programmes and Projects
	Enter into shareholder compact with schedule 2A SOEs Approval of SOEs Annual Performance Plans	New indicator	Enter into shareholder compact with schedule 2A SOEs Approval of SOEs Annual Performance Plans	Improved service delivery and attainment of positive audit outcome	Corporate Services

Outcome	Outcome indicator	Baseline	Five-Year target	Interventions	Responsible
A functional, efficient and integrated government	Approval of Strategic Plans and Annual Performance Plans	Approval of Strategic Plans and Annual Performance Plans	Approval of Strategic Plans and Annual Performance Plans	Improved service delivery and attainment of positive audit outcome	Strategy, Monitoring and Evaluation
	Progress reports which detail the implementation of the 2014-2019 MTSF	5 Annual progress reports which detail the implementation of the 2014-2019 MTSF	5 Annual progress reports which detail the implementation of the 2019–2024 MTSF	To broaden our focus and response beyond outcomes in the signed delivery agreements by the Minister	CD: ODG
Ensure effective and sound financial resource management	Percentage approved invoices paid within 30 days of receipt	100% approved invoices paid within 30 days of receipt	100% approved invoices paid within 30 days of receipt	Improved service delivery and attainment of positive audit outcome	Financial Management Services
Improved and streamlined regulatory, service delivery, operational, health and safety processes and collaboration across regulators and relevant role players	Percentage reduction in occupational fatalities	10%	10%	Transformed minerals sector	MHSI
	Percentage reduction in occupational injuries	5%	5%		
	Percentage reduction in occupational diseases (including TB)	10%	10%		
	Percentage of investigations completed (initiated vs completed)	80%	80%		
	Percentage of inquiries completed (initiated vs completed)	80%	80%		
	Number of qualitative inspections conducted (cumulative)	40 000	40 000		

Outcome	Outcome indicator	Baseline	Five-Year target	Interventions	Responsible
Strengthen the control of nuclear material and equipment	Percentage of authorisation applications processed within the 8-week time period	70% of authorisation applications processed within the 8-week time period	70% of authorisation applications processed within the 8-week time period	Thorough investigation of the implications of greater use of nuclear energy, including its potential costs, safety, environmental benefits, localisation and employment opportunities, uranium enrichment, fuel fabrication and the dangers of weapons proliferation	Nuclear
	Promulgated regulation on Physical Protective measures for nuclear material	N/A	Developed Regulation on Physical Protective measures for nuclear material		Nuclear

3.4.3 Explanation of planned performance over the five-year planning period

The IRP2019 programme aims to increase energy availability for the country and its dependent industries. The DMRE has translated the provisions in the IRP2019 in its responses to the challenges that the energy sector faces. Inadequate energy supply will be addressed in the short term by accelerating energy efficiency rollouts. Generation capacity with short lead times and self-generation options will be enabled through systematic regulations.

For medium- and long-term outcomes, the various IRP2019 technologies will be implemented while the DMRE's regulatory frameworks will be updated, and processes to enable these interventions will be accelerated. This includes the enablement of industry to invest in the energy supply mix through self-generation. Furthermore the market will be tested for robust costing and funding options towards nuclear generation. The development of the roadmap for the 2 500 MW Nuclear New Build Programme will be commencing soon, while oversight is exercised on the Koeberg Life Extension Programme.

Cleaner coal technologies, including Carbon Capture, Utilisation and Storage (CCUS), will improve coal's sustainability as a primary energy source. Renewable energy will be explored beyond Bid Window (BW) 4 and buyer matters will be resolved through the creation of a state-owned special-purpose vehicle.

Energy access and affordability will be responded to by pursuing alternative and renewable energy options such as gas. The development of the gas market as an alternative source of energy will be pursued to meet limited and depleting gas supplies. Exploration for gas fields will be increased, and relationships will be forged with other African countries for supply and market access. A just transition to a low carbon-emitting economy will be facilitated by integrating various workstreams that relate to transitioning to an energy mix as per IRP2019.

The sustainability of the energy distribution industry will be improved by reviewing the regulatory framework and industry structure, as well as regulations to improve NERSA's regulatory oversight on infrastructure maintenance. The foremost outcome of departments' initiatives will be increased availability of energy, and a wider electricity reserve margin. The actions will increase infrastructure investment, with much of it supported through regulatory certainty and the sector's economic transformation. These actions collectively will boost employment and additional investment prospects, as well as assist in meeting lower carbon emissions and will contribute to economic growth.

The mining industry is critical for the economic growth, job creation and transformation objectives of the country. South Africa's Mining Charter is aimed at increasing investor certainty and distributing the wealth the industry creates more equitably. A lack of investment in mining, and poor economic performance have adverse implications along the mining and minerals value chain.

Research in mining is critical to support targeted outcomes and the DMRE will pursue options to expand the mandates of the respective SOEs to support research in mining which will contribute to an increase in the competitiveness of the South African mining industry, enabling the country to be accessible to, and compete in regional and global markets. Investment in research is required to address the lack of innovation and the impact on mining beneficiation and skills development that could hinder progress to improve the country's manufacturing capability.

With regards to exploration activities, the CGS has resolved to fast-track the implementation of the Geoscience Technical Programme (GTP) by 2021 in the short term to catalyse investment in exploration. The goal is to ensure that long-term funding sustains the impact of the geosciences in South Africa.

Transformation will be addressed by enforcing compliance with relevant legislation. Once successful, this response will be evident, with the minerals and petroleum sectors reflecting the country's demographics. The DMRE is committed to ensuring regulatory and legislative certainty through several channels, including the development of comprehensive legal guidelines aligned with the objectives of the MPRDA (e.g. optimal exploration and substantial and meaningful participation by Historically Disadvantaged South Africans).

To create access to minerals for beneficiation, the necessary licensing conditions need to be created. MPRDA Section 50 will be revisited to increase domestic beneficiation. To reduce licensing turnaround times, relevant legislation will be reviewed and strengthened. Capacity in terms of human resources will be increased, and licensing processes and timelines will be reviewed. These interventions are also aimed at increasing economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities.

With regards to Mine Health and Safety, a review of legislation, and department-led facilitation between the mines and communities, will reduce the negative impacts of mining on communities. Compliance with legislative frameworks will be enforced to address fatalities, injuries and diseases, while research will be intensified to improve health and safety in the mining sector. The security and safety of women in mining in relation to gender-based violence is a high priority, with a long-term timeline and will be guided by the implementation of guidelines and directives to create a working environment that is conducive for women in mining. By engaging on an integrated government Programme of Action (POA) to address violence against women and children and persons with disabilities, the DMRE will commence with the gradual implementation of the NSP and will update and enforce compliance with legislative frameworks relating to mine health and safety to reduce the negative impact of mining on communities, eliminate harm to mine workers and create a working environment that is conducive for women in mining.

Policy certainty is an ongoing request from investors and businesses and provides the most significant opportunity to attract investment into the country. Policy certainty creates a business environment, which is conducive to commitment and investment in the country over the short and the long term. In recent years investment has been highest in capital-intensive sectors such as mining and quarrying, transport, storage, communication, electricity, gas and water. The DMRE will lead and facilitate enabling policy and the regulatory interventions required to ensure that the energy and mining sectors make meaningful contributions to national objectives and MTSF targets.

3.4.4 Key Risks and Mitigation Measures

Outcome	Key risks	Mitigation measures
Increase South Africa's share of the global exploration budget	» Inability to grow the country's share of the global exploration budget	» Source and secure exploration funding » Fast-track the implementation of the Geoscience Technical Programme
Inclusive, equitable and competitive exploration	» Not meeting transformation and growth targets	» Promote transformation of the energy and mining sectors » Pursue regulatory and structural reforms e.g. legislation review of the petroleum bill
	» Disputes arising from communities, municipalities, departments and holders of rights as a result of underdevelopment of socio-economic issues; disruption of mining activities; nonalignment of Social and Labour Plan (SLP) with the developmental plans of various stakeholders	» Workshops and meetings on the SLP » Participate in consultation/engagement sessions with municipalities and other relevant stakeholders on alignment of the SLP with developmental plans
A stable framework within which exploration and mining companies can obtain prospecting and mining rights and the related environmental authorisations	» Bottlenecks in licensing processes » Non-compliance with environmental protection regulation and policy	» Institute of Inter-governmental Forums » Reduce compliance costs for new entrants, and reduce regulatory barriers » IT
Improved and streamlined regulatory processes and collaboration across regulators and relevant role players	» Delays in regulatory decisions	» Review regulatory frameworks and make them more responsive to stakeholder needs » Institute inter-governmental forums led by the DMRE
Improved access to basic services and affordable energy prices	» Inability to reduce energy costs for the citizens of the country and dependent industries	» Implementation of IRP2019 » Diversification of energy sources – gas, liquid fuels, wind, solar, etc.
	» Energy pricing	» Amend the National Energy Regulator Act » Amend the Electricity Regulation Act
	» Energy Security (Supply and Demand dynamics)	» IRP, IEP, Demand Side Management
Evidence-based policy that advances economic growth and socio-economic welfare and prepares the economy for the external shock of 4IR demand and supply dynamics	» Reactiveness to significant industry, regulatory and technology developments » Missed opportunities to advance the DMRE's mandate	» Prioritise and fund relevant research areas

Outcome	Key risks	Mitigation measures
Strengthened trade and investment links with key economies (BRICS, SADC, AU, EU)	» Policy deterring investment in the energy and mining sectors	» Review regulatory structures and frameworks that enhance harmonisation and encourage co-operation across national and international borders
Increase in South Africa's share of the global minerals and energy market	» Inability to capture a larger share of the global minerals and energy market	» Bilateral agreements » Review regulatory frameworks to promote industrialisation
Increased transformation, economic inclusion, and policy certainty	» Non-compliance with the Draft Mining Charter	» Women in Energy (WiE) Business Directory » Legislative framework to accommodate small-scale mining
	» Transformation: Noncompliance with Mining Charter resulting in economic and political instability and failure to transform sustainably	» Workshops on the Mining Charter 2018 » Referral of cases of fronting to Companies and Intellectual Property Commission/B-BBEE Commission » Notices, directives, orders and instructions issued in terms of the MPRDA
	» Artisanal Mining	» Standalone legislation on artisanal and small-scale mining (ASSM)
	» Oversaturation of the market » Unutilised trading infrastructure » Retrenchment of employees » Unwarranted pressure on social security system » Failure to meet licensing objective targets	» Develop scientific analysis tool » Finalise Standard Operating Procedures (SOPs) » International benchmark » Alignment with macro-spatial framework (national, regional, etc. Spatial Development Framework)
	» Possible litigation » Unlawful operators » Increased non-compliance	» Make recommendations to the Policy and Planning Branch to amend legislative framework » Approval of SOPs
Diversify supply of mineral resources in support of both mining and energy sectors	» Lack of research to respond to industry dynamics thereby not capitalising on opportunities presented in the mining and energy value chains	» Source funding to increase resource capacity and capability

Outcome	Key risks	Mitigation measures
Injection of carbon enabled and emissions reduced	» Conflict between environmental and climate obligations and aspirations, and economic growth and poverty alleviation imperatives	» IRP2019 » Amendment of NEMA, Specific Environmental Management Acts (SEMAs)
	» Climate change	» Just transition to low carbon economy » IRP2019 and Socio-Economic Impact Assessment System » Implementation of strengthened stakeholder segmentation and targeting strategy, and diplomacy framework
	» Non-compliance with environmental legislation » Not meeting emissions targets	» Investment in cleaner technologies
	» Inability to respond to national climate change response measures	» Develop energy sector climate change strategy » Develop mitigation and adaptation plans for the energy sector » Allocation of additional funding
	» Limited Clean Development Mechanism (CDM) project uptake » Uncertainty about the form of the KYOTO Protocol commitments	» Lobby for bilateral trading with Japan and other EU members
	» South Africa not gaining maximum benefit from the KYOTO Protocol	» Lobby for bilateral trading with Japan and other EU members
	» Environment: Noncompliance with legislation (MPRDA, NEMA and WASTE Act) by holders of rights and permits resulting from Environmental Assessments and EMPs » Degradation and pollution of the environment, state liability, health hazards	» Workshops and meetings on NEMA » Mine Environmental Management Forum in place » Notices and directives issued in terms of NEMA » Notices, directives, orders and instructions issued in terms of provision of sections 6 and 29 of MPRDA

Outcome	Key risks	Mitigation measures
Diversified energy sources through implementation of IRP2019	» Insufficient energy supply to service the country's demand	» Alternative supply sources » Accelerate energy efficiency rollouts » Pursue alternative sources of energy » Secure investments for infrastructure renewal, expansion and maintenance » Implementation of IRP2019
	» Poor IEP – Inability to plan for future energy supply	» Develop SOPs for data collection and management processes » Develop a standard template for the collection of data » Liaise with local energy stakeholders to provide accurate and correct energy data » Establishment of energy data task teams for interpretation, analysis and classification of energy data across various energy commodities » Automation and streamlining of energy data » Increase capacity by employing permanent staff members or interns until the full functioning of the programme
Infrastructure investment by both public and private sector	» Lack of foreign direct investment	» Strengthen governance frameworks and structures » Pursue regulatory and structural reforms
Improved regulatory oversight	» Silo working, duplicate functions and investment funding not optimally deployed	» Develop an integrated service delivery model » Develop long-term sustainable funding model
	» Inconsistent implementation of agreements due to poor support from partners and line function	» Ensure synergy and alignment of minerals and energy projects to foster greater cohesion » Engage partners and work more closely with line function
	» Delay in the legislative process caused by external consultation	» Mobilise and strengthen stakeholder consultation during drafting stage of legislative process
	» Uncoordinated legislation and policy development within government	» Improve co-ordination and consultation throughout all levels of government
Funding mobilised for strategic programmes, and financial sustainability of departmental SOEs ensured	» Lack of funding for strategic programmes	» Develop long-term sustainable funding model » Expand mandates of DMRE entities
Strengthened governance of DMRE service delivery institutions	» Financial sustainability of entities reporting to the Minister	» Develop an integrated service delivery model » Diversify sources of revenue

Outcome	Key risks	Mitigation measures
Modernised IT infrastructure in support of AI and Big Data in mining and energy, ensuring availability of reliable and accurate mining, energy and economic data	» Lack of reliable economic data for decision-making	» Investment in IT Infrastructure
Full portfolio of IT applications in place to support the department value chain	» Lack of technology infrastructure and IT enabling platforms	» Implementation of integrated IT system
	» Unreliable IT » Fragmented system databases	» Provision of reliable IT » Improve compliance and quality of economic reports through use of other departmental resources (mine economics, SARS) » Integrate IT databases
	» Inability to verify statistics and data	» Improve compliance and quality of economic reports through use of other departmental resources (mine economics, SARS) » Capacitate the research unit » Conduct data verification inspections and random sampling
Culture of change management and employee empowerment promoted	» Low employee morale and productivity » Reduced capacity to execute mandates	» Finalise organisational structures » Implement culture programmes
Leadership capability and accountability at all levels developed	» Corruption » Delays in executive approvals of strategic decisions » Poor leadership and management capabilities	» Strengthen governance frameworks and structures » Fill critical executive vacancies » Implement management programmes for managers and other employees
Modern departmental workforce attracted, recruited, retained and developed	» Insufficient skills to execute mandates	» Finalise organisational structures » Implement training programmes for the workforce » Develop and implement the retention strategy

3.4.5 Public Entities

The Minister of Mineral Resources and Energy is responsible for overseeing a number of state-owned entities (SOEs) and their subsidiaries, which are classified as either Schedule 2 or Schedule 3A institutions according to the Public Finance Management Act, 1999 (Act No. 1 of 1999), as amended. The enabling legislation requires that the Minister appoints members of the boards of all SOEs reporting to him/her. Boards are ultimately accountable and responsible for the performance of their respective entities. Within their respective mandates, the boards give strategic direction in line with the DMRE's strategy, and implementation is undertaken by management.

Name of public entity	Mandate	Outcomes
NERSA	The mandate of NERSA, as contained in relevant legislation, is summarised as follows: » Issuing of licences and setting pertinent conditions » Setting and/or approving tariffs and prices » Monitoring and enforcing compliance with licence conditions » Dispute resolution including mediation, arbitration and the handling of complaints » Gathering, storing and disseminating industry information » Setting of rules, guidelines and codes for the regulation of the three industries » Determination of conditions of supply and applicable standards » Registration of import and production activities.	» Refer to NERSA's 2020–23 Corporate Plan for details regarding specific outcomes planned for the period
CEF	The mandate of the CEF is derived from the CEF Act (No. 38 of 1977) and Ministerial directives issued thereafter. The mandate is to contribute to the security of energy supply for the country.	» Refer to the CEF's 2020–23 Corporate Plan for details regarding specific outcomes planned for the period
AEMFC	African Exploration Mining and Finance Corporation (SOC) Ltd (AEMFC) is the state owned mining company, established to secure South Africa's energy supply primarily through the mining and supply of coal for the generation of electricity, as well as to secure other resources that will provide energy for the future, including key minerals for beneficiation in the energy and steel value chain.	» Refer to the AEMFC's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
PetroSA	PetroSA's mandate is to: » Operate as a commercial entity and create value for the shareholder (pay tax and dividends) » Advance national objectives in the petroleum industry, e.g. contribute to energy security of supply » Complement and promote government policy and strategic thrust (Energy Security Master Plan and NDP).	» Refer to PetroSA's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period

Name of public entity	Mandate	Outcomes
iGas	As per the Ministerial Directive of 2 October 2000, iGAS is mandated to act as the official State agency for the development of the hydrocarbon gas industry in Southern Africa. It is required to support the growth of the Southern African economy through active investments in Southern Africa for the provision of gas molecules and gas infrastructure.	» Refer to iGAS' 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
Strategic Stock Fuel (SSF)	According to Section 17(1) of Strategic Stock Policy The Minister may, for the purposes of ensuring security of supply, direct any state-owned entity to acquire, maintain, monitor and manage national strategic energy feed-stocks and carriers. SSF is mandated to provide the country with security of supply of hydrocarbons and related infrastructure in case of emergency.	» Refer to the SSF's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
PASA	The mandate of the Petroleum Agency of South Africa is to promote exploration for onshore and offshore oil and gas resources and their optimal development on behalf of government. The Agency also regulates exploration and production activities, and acts as the custodian of the national petroleum exploration and production database.	» Refer to PASA's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
SANEDI	The National Energy Act outlines SANEDI's direct mandate, driven by the DMRE, which requires SANEDI to direct, monitor, conduct and promote energy research and promote energy efficiency measures throughout the economy.	» Refer to SANEDI's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
MINTEK	The objects of MINTEK are: through research, development and technology transfer to promote mineral technology, and to foster the establishment and expansion of industries in the field of minerals and products derived therefrom.	» Work on a strategic realignment that covers all the identified areas: from the alignment of the entire organisation with the mandate as articulated in the Mineral Technology Act, to engagements with customers and industry in particular » Align research and technology development operations to meet industry needs » Finalise the medium- to long-term MINTEK Strategy, as well as launch the strategy and embark on a stakeholder engagement campaign to socialise them with the new strategic direction of the organisation » Conclude the operating model, as well as the macro organisational structure: in preparation for this develop a series of position papers focusing on reviving and stimulating specific sectors within the minerals and mining space, which will make a meaningful contribution to the economy » Monitor implementation of and reporting on the SET Human Development Programme, aimed primarily at developing skills, capacity and capabilities in science, engineering and technology, from junior level through to senior researcher levels

Name of public entity	Mandate	Outcomes
CGS	The Council for Geoscience (CGS) is one of the national science councils of South Africa and the legal successor of the Geological Survey of South Africa, which was formed in 1912 by the amalgamation of three former Surveys, the oldest of which - the Geological Commission of the Cape of Good Hope - was founded in 1895. The Geoscience Act, No. 100 of 1993, as amended, established the CGS in its present form, to undertake the following mandate: » Serve as the national custodian of ALL geoscientific information and prospecting information relating to the earth, the marine environment and geomagnetic space » The systematic onshore and offshore geoscientific mapping of South Africa » Basic geoscience research into the nature and origin of rocks » Collection and curation of all geoscience data and act as a National Geoscience Repository » The compilation and development of comprehensive and integrated geoscience knowledge and information, such as geology, geophysics, geochemistry, engineering geology, economic geology, geochronology, palaeontology, geohydrological aquifer systems, geotechnical investigations, marine geology, geomagnetism, seismology, geohazards, environmental geology and other related disciplines » Promote the search for, and exploitation of, any minerals in the Republic » Bring to the notice of the Minister any information in relation to the prospecting for and mining of mineral resources, which is likely to be of use or benefit to the Republic » Promote the search for and the exploitation of any minerals in the Republic » Study (i) the distribution and nature of mineral resources and (ii) geo-environmental aspects of past, current and future mineral exploitation » Study the use of the surface and the subsurface of the land and the seabed, and from a geoscientific viewpoint advise government institutions and the general public on the judicious and safe use thereof with a view to facilitate sustainable development » Develop and maintain the National Geoscientific Library, the National Geoscientific Information Centre, the National Borehole Core Depository, the National Geophysical And Geochemical Test Sites, the National Geoscience Museum, the National Seismological Network and the National Geoscience Analytical Facility » Conduct investigations and render prescribed specialised services to public and private institutions » Render geoscience knowledge services and advice to the State	» Develop a long-term sustainable funding model that balances the CGS' mandate with commercial business » Establish continuous engagement with National Treasury to advance the value proposition of investment in geosciences, as well as develop an aggressive commercial business development strategy in South Africa and abroad » Fast-track the implementation of the Geoscience Technical Programme (GTP) to catalyse investment in exploration; the goal is to ensure a long-term sustainable funding model that sustains the impact of the geosciences in South Africa » Full implementation of an Enterprise Resource Plan that integrates all business activities within the CGS; this includes developing an integrated operating model » Implement data policy guidelines, together with the installation of suited technological infrastructure, in line with the ICT governance framework and data architecture » Full implementation of the Integrated And Multidisciplinary Geoscience Mapping Programme, Annual Recapitalisation Plan, and job evaluation and exploration of a sustainable funding model » Become a streamlined government business – conduct a detailed analysis of functional duplication of geosciences within the DMRE entities and streamline such activities to an entity with a legislated mandated for geosciences » Pursue the full implementation of legislation provisions: Technical amendment of the Geoscience Act, finalisation of the Geoscience Act Regulations and implementation of the Geoscience Data-Sharing Model for PR and MR holders » Other resolutions include the full installation of governance structures, the appointment of the CGS Board, maintenance of a fully capacitated EXCO and implementation of a Leadership Talent Management Programme

Name of public entity	Mandate	Outcomes
Mine Health and Safety Council (MHSC)	» Advise the Minister on all occupational health and safety issues in the mining industry including legislation, research and promotion » Review and develop legislation for recommendation to the Minister (Focus on Regulations) » Oversee research in relation to health and safety in the mining industry » Liaise with other bodies concerned with health and safety issues (MQA, State Departments and various Stakeholders) » Promote a health and safety culture in the mining industry.	» Focus on revenue diversification by developing and implementing the revenue generation strategy, outlining diverse revenue streams » Develop a 4IR Implementation Strategy » Build capacity, including employees of the MHSC, members of Council and its Advisory Committees » Implement the promotion and dissemination strategy for target audiences, and build internal capacity within MHSC to improve turn-around times on MHSC processes, and research outcomes that incorporate changes in technology and development/enhancement of safety tools » Build awareness that will result in reduced health and safety-related incidents, and enhanced skills and internal capacity within the MHSC » Appoint the Social and Ethics Committee to focus on procurement and contract management improvements; create a dedicated Compliance Office and appointment a Compliance Officer; and improve review and monitoring efforts
Necsa	Necsa is established in terms of Section 3(1) of the Nuclear Energy Act, 1999 (Act No. 46 of 1999). The act provides for the commercialisation of nuclear and related products and services, and delegates specific responsibilities to the corporation, including the implementation and execution of national safeguards and other international obligations. The South African Nuclear Energy Policy of 2008 directs Necsa to (i) investigate the entire nuclear fuel cycle with the aim of re-establishing viable fuel cycle facilities and (ii) serve as the anchor for nuclear energy research, development and innovation in South Africa. NECSA is mandated to undertake and promote research and development in the field of nuclear energy and radiation sciences and technology. It also processes and enriches source material, special nuclear material and restricted material. Apart from protecting the South African environment from nuclear threats, it supplies the commercial application of nuclear and associated technology and fulfills the State's nuclear obligations. It is part of the Research and Regulation Cluster.	» Refer to Necsa's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
NRWDI	NRWDI is an SOE, dedicated to professional nuclear waste management and disposal services in terms of the National Radioactive Waste Disposal Institute Act, No. 53 2008.	» Refer to NRWDI's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period

Name of public entity	Mandate	Outcomes
NNR	The National Nuclear Regulator (NNR) is a public entity, established and governed in terms of Section 3 of the National Nuclear Regulator Act, (Act No. 47 of 1999) to provide for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory practices. It is responsible for granting nuclear authorisations and exercising regulatory control related to safety over: the siting, design, construction, operation, manufacture of component parts, and the decontamination, decommissioning and closure of nuclear installations; and vessels propelled by nuclear power or having radioactive material on board which is capable of causing nuclear damage.	» Refer to the NNR's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
Pelchem	Pelchem is the sole producer and supplier of fluorochemicals in the Southern Hemisphere including hydrofluoric acid, fluorine gas mixtures and a range of specialty perfluorocarbons and fluoromonomers for South African and international customers.	» Refer to Pelchem's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
NTP	NTP is a state-owned public company, and is a subsidiary of the South African Nuclear Energy Corporation (Necsa). Originally conceived in the early 1970s to supply the local South African market with commercial radiopharmaceuticals, NTP is now among the world's top producers and distributors of the key medical radioisotope molybdenum-99 (Mo-99), and radioisotope-based diagnostic imaging and therapy products including iodine-131 and lutetium-177. NTP currently supplies up to a third of global demand for Mo-99, which is the most widely used medical isotope. The daughter or decay product of Mo-99, technetium-99m (Tc-99m), is used in more than 40-million medical diagnostic imaging studies every year.	» Refer to NTP's 2020–23 Strategic Plan for details regarding specific outcomes planned for the period
SADPMR	Fulfills its mandate as stipulated in the Diamonds Act, 1986 as amended, the Precious Metals Act, 2005, the Diamond Export Levy (Administration) Act, 2007 and the Diamond Export Levy Act, 2007.	» Gain support from the DMRE to retain the surplus from 2018/2019 » Review finance model » Compile proposed amendments to empowering legislation » Pursue constant engagements through forums with SARS and SAPS » Draft proposed amendments for the DMRE's consideration to address alignment with legislation and local imperatives » Intense implementation of the Marketing and Communication strategy, phased in a five year period

Name of public entity	Mandate	Outcomes
State Diamond Trader (SDT)	SDT is an SOE, established in 2007 in terms of Section 14 of the Diamond Act, No. 56 of 1986, to: » Support and facilitate growth in local diamond beneficiation » Buy and sell rough diamonds for local beneficiation » Promote equitable access to and beneficiation of the country's diamond resources » Grow South Africa's diamond cutting and polishing industry by increasing HDSA for beneficiation » Address distortion created by excluding previously disadvantages groups from economic participation (transform diamond industry) » Purchase up to 10% of the run of mine from South African producers » Sell to registered customers through an application and approved process.	» Review the business model to create a better revenue picture through: – Diversification of operations, such as trade on polished diamonds: identify alternative funding streams, and focus on selling to both beneficiation parties and dealers. – Facilitate the changes by exploring the possibility of the Minister reviewing regulations, particularly around the SDT's capability to buy and sell in the market » Address overlaps to ensure properly co-ordinated functions, and clarified roles and responsibilities through roundtables with involved parties » Expedite the Board appointment process » Review organisational structures, including a new memorandum of understanding with the South African Diamond and Precious Metals Regulator (SADPMR) » Explore shared services with other entities

ANNEXURES

TO THE STRATEGIC PLAN

ANNEXURE A: DISTRICT DEVELOPMENT MODEL

The District Model Planning is led by the Department of Cooperative Governance and Traditional Affairs (COGTA). Annual Performance Plan service delivery projects, where applicable and when required by COGTA will be integrated into the District Model.

ANNEXURE B: ENERGY CLUSTER STRATEGIC RESPONSES TO MTSF

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Inadequate energy supply	» Ministerial determinations on all technologies in IRP2019 followed by procurement to ensure timeous implementation » Ensure capacity under construction is delivered as planned (Medupi and Kusile) » Update regulations to enable streamlined and expedited self-supply options » Bid window for new-build procurement (IRP2019) » Engage Mozambique in bilateral agreement on additional gas supply as a short-term solution » Procure generation capacity with short lead times » Accelerate DMRE Risk Mitigation Power Procurement Programme process » Enable self-generation in all customer segments through systematic regulations » Improve Energy Availability Factor to ensure constant supply of electricity » Increase Reserve Margin to counter load shedding	Medium term	» Increased energy availability factor » Increased electricity reserve margin » Additional megawatts commissioned
	» Nuclear – Test the market for robust costing and funding options » Coal – Cleaner coal technologies, including Carbon Capture, Utilisation and Storage (CCUS) » Grand Inga Treaty – decision on long-stop date » Renewable energy (beyond BW 4) » Buyer – Resolve buyer issues through creation of a state-owned special purpose vehicle » Explore embedded generation options to augment Eskom capacity » Increase production from Coega LNG and focus on Eskom's repowering	Medium term	» New generation capacity commissioned » Additional megawatts commissioned
High electricity prices	» Renegotiate coal contracts and relook at transportation of coal (investigate cheaper mode of transportation) » Renegotiate BWs 1–3 » Convert existing diesel generators to natural gas » Review Electricity Pricing Policy (EPP) » Review tariff methodology to align with restructuring initiative of government » Set municipal and private distributor tariffs to ensure adequate recovery of costs and appropriate return » Special pricing arrangements to protect vulnerable industries and sectors	Medium term	» Supply of energy secured

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Coal sustainability as a source of primary energy	» Pursue cleaner coal technologies	Medium term	» Supply of energy secured
Reliance on international crude oil	» Electrification of transportation sector » Lack of integrated approach to transport sector transition » Exploration for oil fields. » Targeted source diversification strategy focusing on Africa » Implement Biofuels Framework » Implementation of Strategic Stock Policy	Medium to long term	
Pricing of petroleum products	Finalise review of the current pricing methodology per » Basic Fuel Price » Magisterial District Zone » Regulatory Accounting System	Short term	
Energy distribution infrastructure rehabilitation	» Develop and implement funding » Develop regulations to improve NERSA's regulatory oversight on infrastructure maintenance	Short term	
Energy Efficiency Strategy not in place		Short term	
Sustainability of distribution industry	» Review the regulatory framework and industry structure » Separation and unbundling of Eskom to eliminate cross-subsidisation » Strengthen NERSA's regulatory oversight of Eskom and relevant municipalities	Short term	» Legislation for new generation model » Legislation for independent transmission company under Eskom Holdings established

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Ineffective institutional arrangements within the energy sector (including internal DMRE)	» Review the regulatory framework and industry structure » Assess the NERSA readiness to regulate an unbundled entity » Separation and unbundling of Eskom to eliminate cross-subsidisation » Enter into MoU with relevant regulatory entities to streamline and complement processes	Short to medium term	» Legislation for independent transmission company under Eskom Holdings established » Legislation for new generation model » Appropriate regulatory framework to effectively regulate the unbundled entity
Lack of economic transformation of the energy sector	» Develop and enforce electricity, oil and gas sector codes with target timelines » Accelerate industry transformation and access to affordable finance through partnership with development finance institutions and other commercial financial institutions » Create a conducive environment to enable national priority sectors to support industrialisation and localisation, leading to increased exports, employment, and youth and women owned SMMEs » Support localisation and industrialisation through government procurement » Mining and beneficiation renewables and green economy and oceans economy » Create jobs through Job Summit commitments, Operation Phakisa and other public sector employment programmes » Develop, implement, support and monitor programmes for equitable job creation, representation and ownership by women, youth and persons with disabilities	Medium to long term	» Increased infrastructure investment
Ineffective institutional arrangements within the energy sector (including internal DMRE)	» Review of the energy sector's institutional architecture	Short term	

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Limited and depleting gas supply	» Development of gas market as an alternative source of energy » Increase exploration of gas fields » Leverage strategic partnerships to extend gas production from known PetroSA discoveries » Forge relationships with other African countries » Source gas from the Brulpadda discovery – also consider acquiring equity interest in the block » Engage Mozambique in bilateral agreement on additional gas supply as a short-term solution	Medium term	» Supply of energy secured
Separation and unbundling of Eskom to eliminate cross-subsidisation	Amendment of the: » National Energy Regulator Act, No. 40 of 2004 » Gas Act, No. 48 of 2001 » Electricity Regulation Act, No. 4 of 2006 » Petroleum Pipelines Regulation Act, No. 60 of 2003	Short term	
Security of supply and diversified liquid fuels	» Feasibility study on new oil refinery completed by **31 March 2021** and final investment decision made	Short term	» Supply of energy secured
Growth and financial sustainability of SOEs	» Review the cost structure of SOEs » Diversify SOEs revenue streams » Dispose of non-core assets » Facilitate access to new markets » Develop a long-term sustainable funding model for SOEs	Short term	
Regulatory, policy and overlapping mandates	» Legislative Review and/or alignment of the SOE's mandates » Restructuring of the DMRE energy architecture	Short term	
Governance and leadership	» Functional governance structures to bequeath a capable State entity status to posterity	Short term	

ANNEXURE C: MINING CLUSTER STRATEGIC RESPONSES TO MTSF

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Exploration (Mining and Petroleum)			
Exploration funding	» Exploration funding (miners and CGS) – prescribed assets, engage National Treasury for exploration funding, engage BRICS Bank	Short term	» To capture 5% of the global exploration spend (budget)
Farm in and farm out funding model	» Engage BRICS and World Bank	Short term	
Concentration of petroleum and minerals	» Encourage partnerships between emerging junior miners » Legislation review of Petroleum Bill	Short term	» Inclusive, equitable and competitive exploration » Increased economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities
Optimal legislative framework	» Expediting the processing legislative framework (the processes of NCOP and National Assembly)	Medium to long term	» Provide an enabling legislative framework
Transformation	» Enforce compliance with the law (legislation)	Short term	» Minerals and petroleum sectors reflective of demographics of the country » Increased economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities
Access to land (exploration) and monitoring of compliance	» Engage respective landowners (trusts, chiefs, municipalities etc.)	Short term	» Accessibility to and availability of land for exploration
Licensing (turnaround times)	» Review the legislation to strengthen » Strengthen capacity (human resources) » Review the process (use technology to track/unlock bottlenecks) » Encourage co-operation between (DMRE, DWS and DEA) to implement one environmental system	Short term	» Expedient licensing regime » Increased economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Infrastructure development (energy, rail, water etc.)	» Engage the relevant departments	Short to long term	» Availability of supporting infrastructure for mining » Increased infrastructure investment by both public and private sectors
Cost of energy to the mining houses	» Encourage own energy generation » Another entity to assist generating energy » Meaningful state participation in coal supply to Eskom	Short term	» Sustainable and affordable energy for mining
Lack of capacity to support mining research	» Expand the mandate of the respective entities to support research in mining and enhance their capacity	Medium term	» Increase competitiveness of the South African mining industry
Illegal mining	» Revise the legislative framework to prevent illegal mining » Encourage legitimate mining by supporting and assisting artisanal miners » Framework on how to support artisanal miners » Develop a framework to prevent illegal mining	Short term	» Eradicate illegal mining
Small-scale mining	» Revise the legislative framework to prevent illegal mining » Encourage legitimate mining by supporting and assisting artisanal miners » Framework to support the artisan miners	Short term	» Develop small-scale mining sector » Promote and formalise small-scale miners
Significant number of mines that are under care maintenance	» Framework to deal with mines under care maintenance	Short term	» Optimal utilisation of mineral resources

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Mineral Beneficiation			
Access to minerals for beneficiation	» Necessary licensing conditions » MPRDA section 50	Short term	» Increased domestic beneficiation
Cost of beneficiation	» Address import parity pricing » Cost of energy	Short term	» Cost effective beneficiation » Percentage growth of exports in national priority sectors (mining and beneficiation, renewables, green economy, oceans economy)
Access to international market for beneficiated products	» Using bilateral and multilateral agreements to facilitate preferential access	Medium term	» Diversified product » Improved country manufacturing capability » Industrialisation, localisation and exports » More decent jobs created and sustained, with youth, women and persons with disabilities prioritised
Lack of innovation	» Increase investment research and development » Upskill and increase capacity	Short to medium term	» Diversified product » Improved country manufacturing capability » Industrialisation, localisation and exports
Social Contract for Mining			
No proper consultation between municipalities and community on IDP	» Encourage co-operative governance between three spheres of government	Short term	» Sustainable implementation of the social and labour plans » Increased economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities
Lack of formalised community structure	» Develop a framework » Facilitate of inter-governmental forums led by DMRE	Short term	» Sustainable implementation of the social and labour plans » Investing for accelerated inclusive growth » More decent jobs created and sustained, with youth, women and persons with disabilities prioritised

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Lack of co-ordination between the mines and the municipalities	» Facilitate co-operation between the mines and municipalities	Short term	» Increased economic participation, ownership, access to resources, opportunities and wage equality for women, youth and persons with disabilities » Investing for accelerated inclusive growth
Mine Health and Safety			
Mining in close proximity to community	» Review legislation » Facilitation between the mines and communities led by DMRE	Short term	» Reduce negative impact of mining to communities
Fatalities, injuries and diseases	» Enforce compliance with legislative framework » Implementation of mine and healthy safety milestones » Conduct research to improve health and safety » Develop technologies to prevent fall-of-ground » Enhance the investigative skills/capacity of the Inspectorate » Enhance capacity (human resources) of the Inspectorate » Review of the legislation on health and safety relating to upstream petroleum and hydraulic fracturing	Short term	» Zero harm to mine workers
Security and safety of women in mining in relation to gender based violence	» Implementation of the guidelines and directives	Short term	» Conducive working environment for women in mining
Threat to the security and safety of mine employees and public by the illegal miners	» Stakeholder forums between mines and DMRE and law enforcement agencies	Short term	» Eradication of illegal mining

ANNEXURE D: POLICY AND REGULATORY CLUSTER STRATEGIC RESPONSES TO MTSF

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Upstream Regulation			
Gas Masterplan	Gas Masterplan: include all sources of gas, including underground coal gas, and consider all upstream, midstream and downstream issues as well as relevant incentives and regulations	Short term	Increased investment in gas, and energy security
Research	All strategic pillars to develop priority research areas, for prioritisation and resourcing	Short term	Evidence-based policy making that advances economic growth, and socio-economic welfare, and prepares the economy for external shocks (4IR, demand and supply dynamics)
Environmental protection	Policy paper on the costs and benefits of environmental protection, and competing sectors, laws, strategies that lead to sterilisation of strategic mineral resources (must consider framework for co-existence)	Short term	Increased investment in mineral and petroleum sector, onshore and offshore, while balancing food security, environmental protection and advancing policy certainty
Policy and regulation on carbon capture	Policy and regulation on carbon capture, storage and utilisation (upstream focus on storage)	Short term	Enable injection of carbon and reduce emissions
Stakeholder management	Stakeholder Segmentation, Mapping and Targeting Strategy to be strengthened and implemented in a consistent manner (donors, NGOs, community groups, traditional leaders, political)	Short Term	Policy certainty, increased community security, reduced work and mining stoppages, increased investment
Process automation	Development of a portal for the submission of prospecting work reports	Short term	Rationalised submission process between the Mining Regulator, PASA and CGS and reduced resource requirements for the integrated mapping programme (costs cut, efficiency and investment increased)
Strategy on uranium and nuclear energy	Need clear and consistent strategy on uranium and nuclear energy	Medium term	Increased investment and energy security
Review and align of MPRDA and NEMA	Review and align MPRDA and NEMA and SEMAs in context of amalgamation of the DMR and DOE	Medium term	Policy certainty

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Amendments to the MPRDA	Review of non-petroleum amendments to the MPRDA	Medium term	Policy certainty, encouraging investment, small-scale mining and beneficiation increased
Access to private land	Technical amendment of CGS Act, to address access to private land	Short term	Strengthen access to land promote investment (geoscientific mapping programme) and sovereignty
Midstream Regulation			
Security of supply of coal	Position the AEMFC to address the cost and security of supply of coal for local energy supply	Short term	Increased energy security
Just Transition Framework	Just Transition Framework to move from labour-intensive deep level mining to 4IR efficient mining	Short term	Increased production, investment and reduced fatalities and job losses
Strategy for the decommissioning of mines	Strategy for the decommissioning of mines, treatment of mines under care and maintenance, business rescue and liquidation Review 10-Point Plan for mitigating job losses	Medium term	Reduce state liability and promote social cohesion, limit social, political and economic disruption, limit job losses, re-skill
Transformation across the DMRE value chain	Consistency in principles, indicators and objectives on transformation across the DMRE value chain (SOPs youth, women, community)	Short term	Increased transformation, economic inclusion, and policy certainty
Strengthen and capacitate Legal Services	Strengthen and capacitate Legal Services to appeal incorrect judgements and defend the letter and spirit of the law and policy	Short term	Increased policy and regulatory certainty, and administrative justice
Policy on resettlement and compensation of communities	Finalise policy on resettlement and compensation of communities	Short term	Social cohesion, and increased investment
Harmonise emissions standards and regulations	Harmonise emissions standards and regulations and their impact on Eskom and the mining industry at large (Climate Change Bill, Carbon Tax)	Medium term	Policy certainty, energy security, and investment
Reduce compliance costs for new entrants	Create a strategy to reduce compliance costs for new entrants, and reduce regulatory barriers	Short term	Increased investment, and transformation

Challenges and opportunities	Strategic interventions	Target completion date	MTSF outcome indicator
Monitoring and evaluation	Mineral regulation; capacity to monitor SLP, MWP, Mining Charter annual assessment; development of systems and tools for remote reporting	Short term	Increased investment, regulatory certainty, and social cohesion
Upgrading of the South African Mineral Resources Administration (SAMRAD) system	Upgrade SAMRAD to a fully-fledged cadastral system	Short term	Increased investment, transparency, administrative justice
Nuclear	NNR Board to urgently submit to DMRE a Regulation on Long Term Operations (LTO) for nuclear installations	Short term	Standardised regulations for nuclear power station LTO
Downstream Regulation			
Amendment and alignment of Acts	Amendment and alignment of Diamonds Act, Precious Metals act and Export Levy Act to harmonise legal framework	Short term	Reduction in illicit trade of diamonds and precious metals; promotion of beneficiation; increased transformation and SMME development
Reduction of administered costs	Acceleration of work on the reduction of administered costs to the downstream beneficiation sector	Short term	Increased Beneficiation
Cost plus mines	Review of policy around cost plus mines	Short term	Promote transformation, energy security, and beneficiation
African Regional Integration	Overarching regulatory agreement between the involved countries	Medium term	To ensure regulatory harmonisation of cross-border related issues
Regulatory model for Eskom	Develop ring-fenced Tx, Gx and Dx regulatory model for Eskom	Short term	Enable the economic regulation of the electricity sector for an unbundled model
Energy-climate issues	Negotiate a MoU under the Intergovernmental Relations Framework Act (IGR Act) with the DEA on energy-climate issues	Short term	Harmonised regulatory environment to resolve tension between energy security and environmental protection
Surcharges for tariffs	Develop a MoU with National Treasury under IGR Act pertaining to surcharges for tariffs	Short term	Improved regulation of administered electricity prices under the Electricity Regulation Act (tariffs) and the Municipal Fiscal Powers and Functions Act (surcharges)
BWs 1–3	Negotiate IPP contracts under BWs 1–3 and facilitate the reduction of the guarantee framework for these contracts	Medium term	Reduced electricity prices

ANNEXURE E: TECHNICAL INDICATOR DESCRIPTIONS (TIDs)

TIDs will be provided in a separate document.

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