



Energy Partnership
Energiepartnerschaft
South Africa - Deutschland



mineral resources & energy
Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

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FACTSHEET ON THE ENERGY MARKET SOUTH AFRICA

Overview

South Africa is a middle-income emerging market with an abundant supply of natural resources and well developed financial, legal, communications, energy and transport sectors.

Energy context

The South African energy sector is dominated by coal, which contributed around 74% to the country's total primary energy supply in 2018⁶. Coal also powers 87% of electricity generation in the country⁷. Imported crude oil contributes 14% of primary energy and is largely used to provide for automotive fuels. Apart from coal and oil, primary energy is sourced from biomass such as wood and dung, natural gas, hydropower, nuclear power, solar power and wind.

General indicators of South Africa's energy sector

Data current as of	2019
Population (million) ¹	58.6
GDP (PPP) ¹	US\$761.8 bn
GDP per capita (PPP) ¹	US\$13 009
Total primary energy demand ⁶ (Mtoe ²)	128.928
Electricity final consumption (TWh) ¹⁴	216.167 (not including exports)
Nominal ³ capacity (GW) ¹⁴	50.3
Percentage renewables nominal capacity (not including hydro) ¹⁴	10%
Energy intensity (ktoe/\$)	169 (calculated)
Per capita consumption of electricity (kWh / annum)	3691 (calculated)
Average consumption of electricity per household (kWh / HH / annum) ⁴	3319
Percentage of population supplied with electricity ⁵	88%

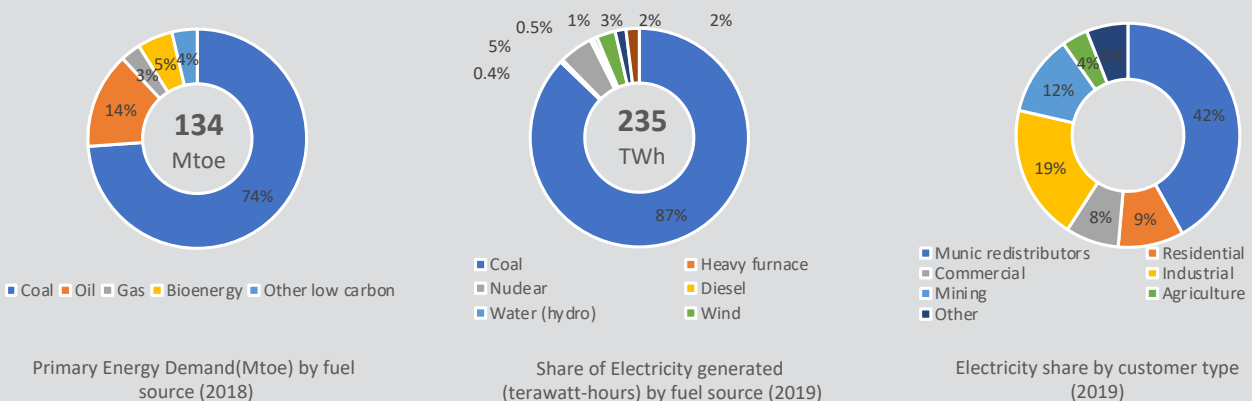


Figure 1. South African primary energy mix⁶, electricity generation by fuel source and electricity share by customer⁷

Policy context

A comprehensive policy and regulatory framework guides the energy sector in South Africa (Figure 2). The dominance of fossil fuels is set to change as the country gives effect to the policy decision to diversify the energy mix as articulated in the 1998 White Paper on Energy Policy. This diversification is already evident in the energy sources used for electricity production since 2013 (Figure 3).

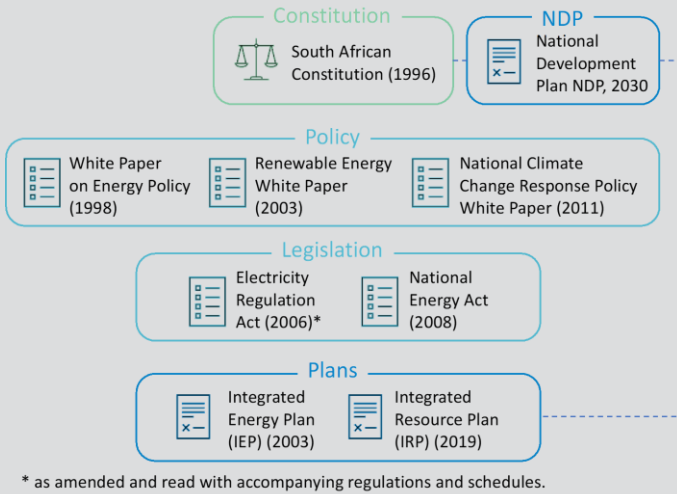


Figure 1. Energy policy in South Africa (own illustration)

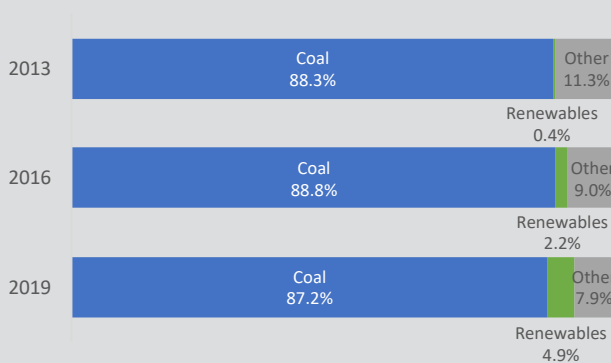


Figure 3. Changing electricity mix, 2013 - 2019⁷

Key role players in the energy sector

The Department of Mineral Resources and Energy (DMRE) is the custodian of all energy policies and energy security in South Africa. The National Energy Regulator of South Africa (NERSA) regulates the energy sector in the context of national policy and planning. NERSA is responsible for the licensing and registration of new energy infrastructure; the regulation of electricity and hydrocarbons infrastructure tariffs and pricing; promoting competition; and compliance monitoring and dispute resolution.

Eskom is the state-owned electricity utility. It owns most of the electricity generation, transmission, and distribution infrastructure. The utility remains the sole entity responsible for entering into power purchase agreements (PPAs) for the procurement of 12,000 MW of new generation capacity from independent power producers (IPPs), to be operational by 2027. Significant steps have, however, been taken since the end of 2020 to further open the electricity market, with amended regulations that allow municipalities to establish

new generation capacity (New Generation Regulations, amended 2021) and an increase in the licensing threshold for embedded generation from 1 MW to 100 MW (amendment to Schedule 2 of the Electricity Regulation Act).

The DMRE's Independent Power Producers Procurement Programme (IPPPP) was established at the end of 2010 to enhance South Africa's electrical power generation capacity and invite private sector investment in the sector. The IPP Office was established with the primary mandate to secure electricity from renewable and non-renewable energy sources from the private sector.

Plans guiding the energy sector

South Africa's National Development Plan 2030 envisages that adequate investment in energy infrastructure will promote economic growth and development. The Integrated Energy Plan (IEP 2003) provides a roadmap of the future energy landscape for South Africa, guiding future energy infrastructure investments and policy development for electrical power, gas and liquid fuels.

The Integrated Resource Plan (IRP) for electricity charts South Africa's long-term plan for electricity generation. It primarily aims to ensure security of electricity supply, minimize the cost of that supply, limit water usage and reduce greenhouse gas (GHG) emissions, while allowing for policy adjustment in support of broader socio-economic developmental imperatives.

Structure of the South African electricity sector

South Africa has a well-established electricity sector with a comprehensive power network that serves 88% of South African citizens⁸. The country has experienced severe supply constraints in recent years, requiring urgent additions to the installed generation capacity.

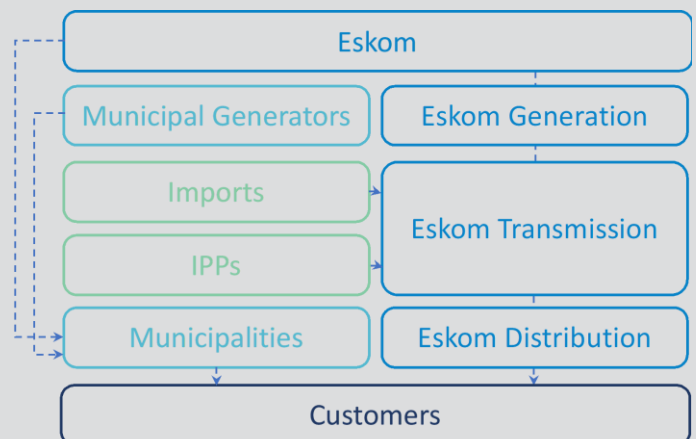


Figure 4. Structure of the electricity sector in South Africa⁹

Eskom, as the national power utility, is the dominant role player in the supply sector. Vertically integrated, it is responsible for approximately 90% of generation, all power transmission and approximately 60% of power distribution in the country. The balance of generation is sourced by Eskom from neighboring countries and independent power producers (IPPs), mostly producing from renewable resources. Municipalities (local government) are responsible for the remaining portion of electricity distribution in the country.

A process of unbundling Eskom into three entities – Generation, Transmission and Distribution – was initiated in 2019 and is anticipated to be completed by December 2022¹⁰.

Outlook for the South African electricity sector

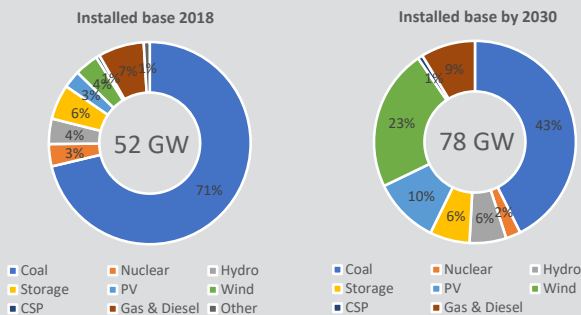


Figure 5. Projected electricity by source, 2030 (IRP 2019)¹¹

The IRP 2019 was promulgated in October 2019¹², replacing the IRP 2010 as the country's official electricity infrastructure plan. The IRP proposes an energy mix with which to meet the country's electricity needs until 2030, calling for:

- 37 GW of new and committed capacity to be added between 2019 and 2030 from a diverse mix of energy sources and technologies, as ageing coal plants are decommissioned¹³;
- A reduced share of electricity from coal – 43% of installed capacity – as the country transitions to a larger share of renewable energy;
- The addition of 22.8 GW of wind and solar by 2030 in relation to 2018, made up of 15.7 GW of wind, 6.8 GW of solar PV and 0.3 GW of concentrated solar power (CSP);
- Energy storage to contribute 5 GW, or 6%, to the installed capacity;
- Immediate supply constraints to be addressed by targeting the procurement of approximately 2 GW as a short-term measure to fill the supply gap until 2022; and
- Distributed or embedded generation for own use, anticipated to contribute 4 GW between 2023 and 2030.

As the country reduces its reliance on coal, the DMRE and Eskom are also developing a planning framework that will support a just transition¹⁴.

With the security and reliability of electricity supply being an imperative, the DMRE's strategic plan for 2020–2025 further notes the following priorities for the sector:

- Energy efficiency is critical for economic growth and reduced carbon emissions. Alongside embedded generation it is also key to alleviate the immediate energy supply constraints.
- Universal access to electricity is targeted by 2025.
- The complementary relationship between smart grid systems, energy efficiency, energy storage, and non-dispatchable renewable energy technologies based on wind and solar PV is recognized.

South Africa's potential for solar and wind energy

South Africa has favorable renewable resource conditions, in particular solar radiation and wind flows across the country and throughout the year.

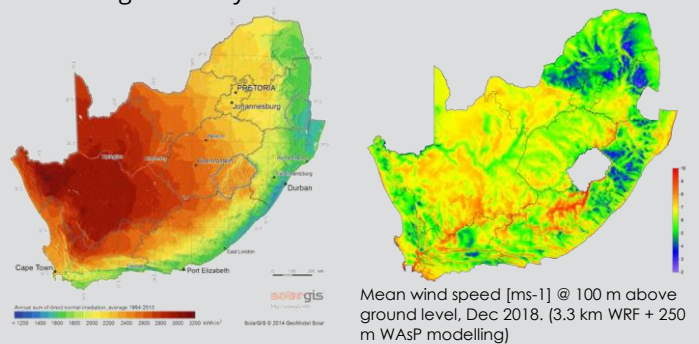


Figure 2. Solar map South Africa, Lesotho, and Swaziland, GeoModel Solar¹⁵ and Wind Atlas of South Africa, Large-Scale High-Resolution Wind Resource map¹⁷

In recognition of this potential, 6422 MW of electricity capacity had been procured by March 2021¹⁶ from 112 renewable energy IPPs through the IPPPP. Of this, 5078 MW had already been successfully completed and connected to the national power network.

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Footnotes: 1. The World Bank 2021, 'Historical Data Sets and Trends Data' ([Link](#)) | 2. Tonne of oil equivalent = unit of energy defined as the amount of energy released by burning one tonne of crude oil | 3. Available to the grid, including Eskom and IPPs. The difference between installed and nominal capacity reflects auxiliary power consumption and reduced capacity caused by the age of the plant | 4. IPP Office. IPPP Quarterly Report, 31 March 2021 | 5. Integrated National Electrification Programme (INEP) data ([Link](#)) | 6. IEA, South African primary energy demand and GDP in the Stated Policies Scenario, 2010-2040, IEA, Paris ([Link](#)) | 7. StatsSA, 2021. Electricity, gas and water supply industry, 2019 Report. Report no. 41-01-02 (2019). Released 2 September 2021 ([Link](#)) | 8. Integrated National Electrification Programme (INEP) data | 9. DMRE South African Energy Sector Report, 2019 | 10. Select Committee on Public Enterprises and Communications, 26 May 2021 ([Link](#)) | 11. 'Other' category included to force percentages to reflect as per IRP 2019 | 12. Published in Government Gazette No. 42784 vol. 652 of 18 October 2019 | 13. Coal-fired generation capacity of 11,017 MW planned for decommissioning by 2030 | 14. DMRE Strategic Plan, 2020 – 2025 and Eskom Holdings, Integrated Report, 31 March 2020 | 15. Developed in partnership between Centre for Renewable and Sustainable Energy Studies, University of Stellenbosch and Group for Solar Energy Thermodynamics (GSET) at UKZN (2014) ([Link](#)) | 16. IPP Office. IPPP Quarterly Report, 31 March 2021 | 17. <http://www.wasaproject.info/>.