Regulatory Review of the Electricity Market in South Africa:
Towards Crowding-in Private Sector Investment
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Towards Crowding-in Private Sector Investment
Acknowledgements

The regulatory review of the electricity market of South Africa is a result of a continental initiative to crowd-in private sector participation in Africa’s electricity market in collaboration with Member States, in this case the Republic of South Africa. This review process enjoyed cooperation from the Ministry of Mineral Resources and Energy which was very valuable. The initiative is a result of partnership between the UN Economic Commission for Africa (ECA), through its SDG 7 finance initiative spearheaded by Dr. Vera Songwe, United Nations Under-Secretary-General and Executive Secretary of ECA, and the RES4Africa Foundation, through its Missing Link initiative spearheaded by Mr. Roberto Vigotti, Secretary General of RES4Africa Foundation. The South Africa regulatory review, under the guidance and technical contribution of Mr. Robert Lisinge, Chief of Section for Energy, Infrastructure, and Services Section (EISS) of ECA, was led by Mr. Yohannes G. Hailu, energy policy expert at EISS of ECA, and by Mr. Andrea Renzulli, senior policy officer at RES4Africa, with technical and analytical contributions from Mr. Antonio Passero, Mr. Leonhard Braun, and Ms. Iarina Ciceu, and the participation of Ms. Cristiana Lisi from RES4Africa. The contribution of Mr. Anthony Monganeli (EISS), especially in reviewing and improving the draft report and participating in the validation process, is much appreciated.

The national policy and regulatory data necessary for objective regulatory review was assembled, and the draft country economic, energy sector, and regulatory context was ably developed by the national consultant, Ms. Ruse Moleshe. The regulatory analysis was based on a large national regulatory and policy database, which was validated by energy experts from the Ministry of Mineral Resources and Energy, the National Energy Regulator of South Africa, Eskom, and other institutions including the Southern African Power Pool. The following sector leaders and experts represented the institutions during validation: Ms. Hasha Tlhotlhalemaje, Mr. Abraham Mathem, Mr. Crystal Gradwell, Mr. Harrison Masiga, Mr. Leonardo Pittorino, Mr. Mathews Bantsijang, Ms. Ntombifuthi Ntuli, Mr. Sephiwe Khoza, Mr. Stanley Semelane, Mr. Sydney Kadikula Zimba, Mr. Veli Mahlangu, Mr. Mathews Bantsijang, Mr. William Lohrmann, Mr. Freddy Mbedzi, Mr. Frisky Domingues, Mr. Given Ntshani, Mr. Maloba Tshehla, Mr. Manqoba Ndandwe, Ms. Marianna Petrosillo, Ms. Nontsikelelo Khumalo, Ms. Ntombifuthi Ntuli, Ms. Olga Chauke, Mr. Sabelo Malaza, Mr. Sam Inno, Mr. Thilivhali Ntkhweni, Mr. Tshepo Mokwena, Ms. Moefi Moroeng, Mr. Mtheleleli Mapinda, Ms. Jean Madzongwe, Mr. Elijah Sichone, Mr. Tshepo Ramokoka, Mr. Rendani Mukhithi, Mr. Sebastian Khoza, and Ms. Vivian Ramathuba.

The initiative received support, including publication logistics, from ECA Sub-Regional Office for Eastern Africa, - in Rwanda. The technical and graphic design work by Epsilon Publishers Ltd, which has improved the quality of this publication, is acknowledged.
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Executive Summary

This report provides an analysis of South Africa’s electricity sector policies, laws, and regulations in relation to crowding-in private sector participation in developing national electricity infrastructure. The report is part of the United Nations Economic Commission for Africa and RES4Africa Foundation joint program on Regulatory Review of the Electricity Sector in Africa: Towards Crowding-in Private Sector Investment.

The electricity supply industry of South Africa is the largest in Sub-Saharan Africa, accounting for over 40 percent of the total installed capacity in the region. The country has been able to expand electricity access to about 94 percent of its population. The efforts to integrate the private sector in the electricity generation market, notably to support the development of a renewables industry, is proving to be successful. As of now, sixty-four renewable energy independent power producers (IPPs) are present in the market.

These good results have been achieved without a major transformation of the country’s electricity market structure. Indeed, the vertically integrated public utility, Eskom, remains the dominant player in South Africa electricity supply industry. Eskom generates a commanding share of the national electricity supply, owns and operates the entire transmission system, and 40 percent of electricity distribution to end-users, with the rest served by municipalities. South Africa has successfully attracted private capital to support the expansion of its generation capacity, yet little progress has been made in terms of market liberalisation and restructuring. Eskom stands as the single buyer at the wholesale level and it’s the nominated off-taker for public procured IPPs.

Since 2019, however, South Africa is facing an endemic electricity crisis, exposing it to the risk of blackouts. This has led to implementation of a vast national load-shedding program. As a consequence, a deep reduction in the national economic output is experienced, which brought the country into recession. This has underscored the importance of having a reliable and competitive electricity industry to fuel economic growth and social development.

The recent electricity crisis has highlighted the risks emanating from the high reliance of the South African electricity supply industry on Eskom. The South African government has reignited efforts for electricity market reforms, with a clear purpose of increasing private sector participation across the electricity value chain.

In line with this general objective, the purpose of this regulatory review is to pinpoint the main strengths and gaps of the policy and regulatory framework currently in force related to private sector participation in the entire electricity market. It further aims to offer concrete recommendations for regulatory improvement and reform towards attaining a competitive, resilient, and sustainable electricity market.

The regulatory analysis is undertaken following a comprehensive UNECA and RES4Africa regulatory review methodology, which was developed with the participation of African and international regulatory experts. The approach enables three broader assessments: the degree of openness of the electricity market to the private sector based on evaluation of the power sector structure and governance; the attractiveness of the market based on an assessment of sector economics, fair competition, and overall economic regulation; and the readiness of the market based on an assessment of technical regulations.
Main findings related to the Generation segment

Policy and regulatory frameworks governing the electricity generation market are effective in crowding-in private sector investments. Investors benefit from efficient and transparent market governance, a comprehensive energy strategy and planning for new generation capacities, and an open environment for private sector participation. The well-established public tender programs awarding bankable PPAs to winning bidders confirm the attractiveness of the generation market, while the availability of credit enhancement instruments augments the financial sustainability of business models. Well-defined network planning and technical regulation for grid access and connection, system operation, and authorization requirements ensure the effective integration of new generation assets into the national power system. However, the competition in the electricity market remains limited, due to the vertically integrated structure of the incumbent, Eskom. To increase the attractiveness of the electricity generation market, South Africa will benefit from reviewing the provision of direct and indirect incentives to private generators.

Main findings related to the Transmission segment

Private sector participation in the transmission segment remains restricted. Eskom is the sole licensed entity to function as a system operator and transmission asset manager for the national electricity supply industry. The South African Grid Code (SAGC) foresees the possibility of independent transmission service providers to obtain licenses for the provision of specific requirements, such as cross-border trade facilitations. However, it limits their role in the ownership and maintenance of transmission assets. Private players can, otherwise, participate in the construction of new transmission assets as EPC contractors. These limitations are combined with a lack of adequate regulation for the definition of the wheeling tariff for network users as well as the lack of credit enhancement mechanisms to support investments in new transmission infrastructure. Notwithstanding, the SAGC sets technical and operational standards of performance for the transmission service, provides the legal framework for open access to the transmission network, and defines connection rules for generators and bulk suppliers.

Main findings related to the Distribution segment

In the distribution segment of the market, the lack of a coordinated and single electrification policy in conjunction with the scattered governance for the expansion of the reticulation of the electricity distribution, currently managed by Eskom and the Municipalities, impede the effective governance of the national electrification initiatives. Private sector participation in the distribution segment remains restricted since Eskom and the municipalities are the only licensed distributors. Similar to the transmission system, the review has highlighted some gaps arising from the lack of standardized contract regulation to define the rights and obligations of electricity distributors. However, South Africa’s distribution grid code defines operation rules, metering services, safety, and technical requirements and ensures non-discriminatory grid access.
Executive Summary

Main findings related to the Off-grid segment

South Africa lacks dedicated legislation for the off-grid market. The national electrification policy is fragmented into several policy guidelines and the current system planning documents do not sufficiently consider the potential for off-grid solutions development. Private sector participation in the off-grid market is not restricted; however, is hampered by the lack of dedicated regulation, notably for mini-grids, and therefore pausing the challenge of regulatory clarity. The lack of dedicated regulation for electricity supply contracts for off-grid operators and tariff rules for off-grid services reduce the potential attractiveness of the South Africa off-grid market. Furthermore, the lack of technical standards for mini-grid integration with the main-grid and the definition of commercial options available for mini-grid operators and asset owners in case of main-grid arrival represents a high risk for potential private investors.

To enhance the Openness of the electricity market

1. Update South Africa’s strategic energy policy white papers, issued in 1998 and 2003, to reflect the drastic shift in the energy landscape over the past two decades and guide future transformations of the electricity sector.

2. Through the implementation of some of the outlined programs in the IRP-2019, adopt sub-sector policies, plans, and relevant regulations, as in the adoption of a Gas User Master Plan to provide regulatory certainty for the development of the gas-to-power program. Furthermore, define an integrated electrification master plan, including for a better consideration of the off-grid market for electricity service expansion.

3. Implement the reforms outlined in the Roadmap for Eskom document, starting with the unbundling and the creation of a national transmission company, to enhance the efficiency of the electricity industry, improve its governance and encourage private sector participation.

4. Tap into business models, such as the corporate PPAs market and the self-generation/consumption models, to develop decentralized solutions for industrial and commercial players. The development of these markets requires regulatory improvements such as:
   - Simplifying the market entry for embedded generators by reviewing the current limitations set by the IRP and easing the applications procedures for the authorizations and permits required;
   - Improving the wheeling regulation, particularly regarding the connection and use of system agreements;
   - Defining rules to allow the selling of the electricity surplus to the grid from private generators with a bilateral contract with a customer, and implementing a national regulation regarding net-metering options for self-generators.
   - Facilitating for large bulk consumers, including distributors, the possibility to freely procure their electricity from traders, retailers, and generators, as well as investing in their own generation facilities.

5. Review the potential and benefits of opening new segments of the electricity supply industry to private sector participation, from commercialization and retail to distribution
Towards Crowding-in Private Sector Investment

and transmission asset development, and adopt key regulations relevant to implement such policy decisions.

Pursue reform in the distribution market, particularly considering:

- The current governance structure and the challenges it poses to a coordinated approach to electrification expansion; and
- Clarity related to regulation for expanding the ability of distributors to procure energy directly from embedded generators, or invest in their generation infrastructure.

Implement the creation of an appeal mechanism to solve disputes among market operators to improve the governance of South Africa’s electricity market.

**To enhance the Attractiveness of the electricity market**

- Continue to pursue cost-reflectiveness of tariffs in the long term by the unbundling of the tariff system in view of the creation of an independent transmission company.
- Define and communicate a clear medium-term schedule for the new REIPPPP’s tender windows.
- Develop dedicated regulation for the definition of mini-grid tariffs to support the development of the off-grid market, and adopt a standard tariff calculation tool for mini-grids.
- Improve access to credit enhancement instruments, incentives and possibly government and/or multilateral guarantees for distribution and off-grid investors.

**To enhance the Readiness of the electricity market**

- Ease the procedures to obtain permits and authorizations through the implementation of a one-stop-shop for permits and authorizations request and issuance.
- Develop dedicated regulation for mini-grid system integration, including clear rules on commercial options for mini-grid business continuity and exit options in the case of main grid arrival, to realize South Africa’s mini-grid market potential.
- Develop and implement mandatory and optional grid-compatible standards for mini-grids to ensure the safety, stability, and reliability of the power system without imposing unnecessary burdens and costs on potential developers.

As South Africa takes further bold steps towards its energy sector regulatory reform, the UN Economic Commission for Africa and the RES4Africa Foundation remain committed to partner with South Africa in addressing any of the identified regulatory and policy gaps. They also commit to supporting regulatory capacity development, as well as any area of particular reform interest of South Africa towards greater openness, attractiveness, and readiness of the electricity market.
Introduction

Sandton, Johannesburg, South Africa

Photo credit: Arnold Petersen
1. Introduction

Recognition that energy plays a key role in facilitating socio-economic development, and that its insufficient provision impedes it, has brought energy to the forefront of national, regional, and global agenda. National sector development strategies in most of Africa reflect the need to expand energy access rapidly, facilitated through the implementation of Sustainable Development Goals (SDGs), particularly SDG7. African states have pursued the energy access agenda, devoted public finance for energy infrastructure and capacity expansion, and instituted measures to strengthen the energy sector.

Despite appreciable progress as a result of these measures, structural challenges remain within the electricity markets of Africa. Over 500 million people on the continent today lack access to electricity. Latest global SDG7 tracking reports warn that progress made so far is not on track to achieving universal access by 2030 and that nearly 90 percent of the population without access at the end of the decade will be residing in Africa, partly due to rapid population growth (IEA et al., 2020).

Financing energy development remains a key challenge. The cost of achieving the SDGs at large in the continent is estimated at about USD 1.3 trillion per year. Africa would require USD 32 billion per year through 2030 on universal electricity access-related investments (AfDB, 2019), with additional investment requirements on energy infrastructure. According to the Infrastructure Consortium for Africa, 37 percent of infrastructure investments in the continent was undertaken by African governments in 2018, with the private sector accounting for 11 percent (ICA, 2018). Given the major infrastructure investment gap and the limited investment role of the private sector so far, addressing the crowding-in of private sector investment in the electricity market is crucial.

Towards the goal of crowding-in the private sector, feasibility (bankability) of projects, country risks, profitability (viability), and the legal/regulatory environment are often identified as key barriers. Indeed, the regulatory framework is crucial for attracting private investments. The Regulatory Indicators for Sustainable Energy (ESMAP, 2020) indicate that more than half of the global population lacking access to electricity remained in countries with weak regulatory frameworks by 2019. These regulatory challenges remain to be addressed.

The South African electricity supply industry is the biggest electricity market in Sub-Saharan Africa, accounting for over 40 percent of the total installed capacity in the whole region. The country has been able to expand the electricity service to about 94 percent of its population, the highest electrification rate of the region, partly thanks to 64 Renewable Energy Independent Power Producers (REIPPs), at the time of writing this report. This has been achieved without a major transformation of the market structure, as the vertically integrated public utility, Eskom remains the dominant player of the South African electricity supply industry, generating the vast majority of the electricity in the country, owning and operating the transmission infrastructure, and distributing electricity to 40 percent of end-users, with the rest served by municipalities. However, slow sector liberalisation and the lack of unbundling leaves the sector reliant on Eskom and thus the public budget, which carries risks. This became evident in the recent electricity crisis that hit the country between 2019 and 2020 and left the economy exposed to prolonged black-out and load-shedding that endangered its socio-economic progress and pushed the national economy into a new recession period. The crisis shed the
light again on the importance of a reliable and competitive electricity supply to fuel economic and social growth and re-ignited electricity sector reforms intending to increase private sector participation in the development of the electricity infrastructure and restructuring Eskom.

This regulatory review examines these and additional issues in-depth concerning the crowding-in of private sector investment in the electricity market of South Africa, from generation to networks and off-grid market segments. The goal is, through regulatory improvement and expected increase in private sector participation, to promote the achievement of SDG7 goals and developing a resilient, competitive, diverse, and vibrant electricity market that will sustainably attract private capital to supplement public investment. This is particularly crucial in a post-COVID-19 environment where public resources are even more constrained due to priorities in public health and social protection, as well as economic recovery.
Country Overview
Towards Crowding-in Private Sector Investment

Country Overview

Electrical cables supported by pylons, carry power across the country. Rural South Africa
Photo credit: Richard van Zyl
2. Country Overview

South Africa is located on the southernmost tip of Africa, bordering Namibia, Botswana, Zimbabwe, Mozambique, Eswatini and Lesotho. After the legal ending of Apartheid in 1994, South Africa enjoys relative stability and a diverse economy from agriculture, abundant mineral resources, tourist attractions to advanced services sectors.

South Africa experienced rapid population growth until the end of the 20th century before its birth rate approached the world average at the beginning of the 21st century. Nonetheless, population growth and urbanization are proceeding at a rapid rate, further spurred by immigration from other African countries, namely Zimbabwe (Britannica, 2021).
2.1 Macroeconomic overview

Private sector investors who seek to enter the electricity sector of a host country, such as South Africa, typically face exposure to a country’s macroeconomic risks (GDP growth, inflation, interest rates, currency devaluation, difficulty in doing business, and the nature of treatment of foreign investors).

South Africa is one of the largest exporters of gold, platinum, and other natural resources, adding to its highly developed economy and infrastructure. It has well-established legal, financial, communications, energy, and transport sectors as well as the continent’s largest stock exchange (Heritage Foundation, 2020).

The South African economy slipped into recession several times over the past years as indicated in Figure 1. In 2019, transport and trade were the main drags on the overall economic activity as shown in Figure 2. Seven of the ten industry categories contracted in the fourth quarter, including utilities (electricity, gas, and water). Finance, mining, and personal services managed to avoid contraction; however, this was not sufficient to prevent the economy from sliding into its third recession since 1994 (Stats SA, 2020). Covid-19 also had a significant effect on South Africa’s Economy, resulting in an estimated 7 percent contraction of the economy in 2020 (World Bank, 2021).

Figure 1: GDP growth (%), 2010-2019


Figure 2: GDP per capita (USD), 2010-2019

Inflation and exchange rate stability

The Covid-19 pandemic has hit on South Africa’s economic growth, which has slowed down significantly. The statement of the Monetary Policy Committee (MPC) of March 2020 states that the currency has been the most affected. Due to global financial conditions and fears about the impact on emerging markets - South Africa had already been downgraded by the Moody’s rating agency (Naidoo, 2020) -, foreign investors sold off Rand-based bonds and equities, resulting in the Rand losing over 27 percent of its value to the dollar between January and April 2020, before rebounding to pre-Covid levels in 2021 (XE, n. d.).

The overall inflation outlook appears to be on the downside as shown in Figure 4. Although an aggressive currency depreciation puts upward pressure on inflation, it is expected to be muted as the pass-through is slow. Furthermore, global producer price inflation has decelerated, and lower domestic growth and oil prices also have a pull-down effect on inflation forecasts.

Business climate

South Africa is ranked 84th worldwide in the World Bank’s Ease of Doing Business 2020 index with an overall score of 67 (World Bank, 2020). The country ranked particularly well in the Topic “Protecting Minority Investors”, while the “Trading Across Borders” and “Starting a Business” leave the most room for improvement.

In 2020, South Africa was ranked 59 (down from 56 in 2019) by the Institute for Management Development World Competitiveness ranking 2020 (IMD, 2020), following a downward trend since 2007. This is mainly explained by increased youth unemployment, rising public debt and electricity supply problems, among others (Department of Employment and Labour South Africa, 2020).
2.2 Electricity sector overview

Electricity production in South Africa has decreased over the past decade despite an increase in production from renewable sources. The primary reason for the reduction has been a decrease in the amount of electricity generated by coal plants, due to the advanced age and generally poor state of existing coal plants. This condition of the plants requires frequent shutdowns for maintenance or due to non-compliance with environmental standards. Between 2011 and 2020, the Energy Availability Factor (EAF) of Eskom plants decreased from nearly 85 percent to less than 67 percent (Eskom, 2020).

Electricity consumption

The Integrated Resource Plan 2019 showed that electricity consumption has been declining on an annual basis as shown in Figure 5. The IRP-2019 shows that for the financial year ending March 2018, the actual total electricity consumed is about 30 percent less than what was projected in IRP-2010. This decline is attributed to the following reasons:

- Reduction in electricity intensity - in response to power outages and increasing Eskom tariff, large industrial users have implemented energy efficiency measures;
- Low economic growth projections; and
- Growing installations of solar PV systems in new housing developments.

Figure 5: Electricity consumption, total (GWh, 2014-2020)

![Figure 5: Electricity consumption, total (GWh, 2014-2020)](source: Stats SA, P4141 (April 2019), P4141 (March 2021))

Figure 6: Electricity consumption, per capita (kWh, 2014-2019)

![Figure 6: Electricity consumption, per capita (kWh, 2014-2019)](source: Stats SA, P4141 (April 2019), P4141 (March 2021), UNDESA (2019))
Electricity in South Africa is primarily generated by the public utility, Eskom, which produces over 90 percent of the power consumed in the country. It also exports electricity to the South African Development Community (SADC). Eskom also sources electricity from independent power producers (IPPs) and imports hydropower from Cahora Bassa, Mozambique. The National Energy Regulator of South Africa (NERSA) has licensed over 30 privately distributed generators that produce electricity for self-consumption. These plants cover a range of installed capacities (ranging from 1.5 MW to 670 MW) and fuels. Moreover, some municipalities such as the City of Cape Town, City of Tshwane, Nelson Mandela Bay Municipality, and Thaba Chweu also generate their own power.

Coal dominates South Africa’s generation mix, representing more than 70 percent of the total installed generation capacity (IRP, 2019). Most of these coal plants are old and approaching their designed end-of-life, and many are non-compliant with the minimum emissions standards outlined in the National Environmental Management Act, 2004 (Act 39, 2004) (ESI Africa, 2019). Nearly 9,000 MW of coal capacity is set to be decommissioned during the next decade according to the IRP 2019. In addition to coal, South Africa’s installed capacity features a nuclear plant, diesel, and gas peaking plants, as well as hydropower and variable renewable energy, with the latter primarily coming from IPPs. Figure 7 shows a breakdown of the total installed capacity in the country by technology.

In 2020, two ministerial determinations for power procurement were issued: the first was for 2,000 MW of emergency power to be operational by 2022; the second is for an additional 11,813 MW to be developed from 2022 onwards in line with the IRP-2019 procurement schedule.

Figure 7: Installed generation capacity (MW, 2019)
**Access to electricity**

The Integrated National Electrification Program (INEP) is an agent of the Department of Mineral Resources and Energy (DMRE), responsible for grid and off-grid electrification. Since 1994, the INEP has facilitated the connection of over 7.8 million additional households to the national grid, resulting in a total of 14.3 million connected households by 31 March 2019. On average, 240,000 new connections are achieved per year (RSA DoE, 2020). In June 2013, the Cabinet approved the implementation of a Households Electrification Strategy based on achieving universal access to electricity, defined as electrifying 97 percent of households. It was recognized that full electrification is unlikely to be achieved due to growth and delays in formalizing informal settlements. The Household Electrification Strategy called for the electrification of 90 percent of households through grid connection and the rest with high-quality off-grid solar home systems (SHS), or other cost-effective technologies. Eskom and municipalities are responsible for funding grid connections, and between 2011 and 2020, the number of customers serviced by the State utility Eskom grew by over 2 million, from under 4.7 to over 6.7 million (Eskom, 2020).

Electrification has increased significantly between 2010 and 2018, from 83 percent to over 91 percent (see Figure 9). However, according to the IRP-2019, there are still 3 million households that do not have access to electricity.

*Figure 9: Electrification rate (% 2010-2018)*

*Source: World Bank, accessed 2021*
Electricity service quality and reliability

Eskom registered transmission losses of 2 percent and distribution losses of 8.8 percent in the period 2019/2020 (Eskom, 2020). Generally, losses have been decreasing on the transmission network while they have been increasing in the distribution system. One of the explanations for such an increase in distribution losses is the connection of renewable IPPs directly to the distribution network, which have increased the load on these lines. The non-technical component of losses has also increased due to meter tampering, faulty or vandalized metering installations, and customers being connected incorrectly on the system (Eskom, 2020). A detailed overview of South Africa’s transmission and distribution losses evolution on the Eskom managed grid infrastructure is presented in Annex C.

However, the most significant challenge in terms of electricity service quality in South Africa has been the recurrent necessity for load-shedding in recent years due to insufficient generation capacity to satisfy national demand. Following a load-shedding challenge in 2007, South Africa faced again the necessity to implement vast national load-shedding programs in late 2019 and 2020. In 2019, stage 6 load shedding (6,000 MW) was introduced for the first time. In 2020, load shedding occurred for 859 hours, or 9.8 percent of the year (CSIR, 2020) the worst crisis on record. As a first step towards addressing this supply gap, the government concluded the Risk Mitigation IPP Procurement Program, procuring an additional 2,000 MW emergency capacity to be operational by mid-2022.

Off-grid electricity market

The off-grid electrification ensured through Solar Home Systems is funded through the public budget and donors and implemented by concessionaires, appointed through a competitive bidding process. South Africa lacked relevant initiatives in the off-grid segment. The high electrification rate in South Africa can, from one side, explain the low attention dedicated by policy-makers and regulators to the off-grid segment. On the other side, however, the off-grid segment potential remains high, with about 3 million people lacking access to electricity in South Africa. However, Eskom recently piloted the mini-grids project in the Free State Province to serve households that would take more than 3 years to access the grid. Policy decisions on mini-grids could be informed by Eskom’s successful pilot projects to support the development of such technologies in South Africa.

2.3 Electricity sector governance and market structure

Overview of electricity sector reforms

Structural reforms in South Africa’s electricity sector have long been discussed. As a result of its vertically integrated structure, the electricity supply industry is highly reliant on Eskom and on public resources to support its operations and expansion. This market structure has resulted in numerous challenges for the electricity sector, with Eskom facing several crises due to high debt obligations, liquidity constraints, arrears from non-paying customers, non-cost-reflective tariffs, and poor plant performance and breakdowns due to an ageing generation fleet. This has resulted in Eskom frequently operating at a substantial loss and having to rely on financial support from the government.
In 1998, the Government of South Africa published a White Paper on Energy Policy that set out the government’s ambition for the country’s energy system through a broad set of policy objectives, including restructuring and liberalization of the electricity supply industry. The vision of the government for restructuring Eskom was the creation of separate generation and transmission companies and the restructuring of the distribution industry into independent regional electricity distributors. However, such restructuring didn’t take place. Instead, the main policy focus became the opening of the generation market to private investors and operators. This goal was achieved a few years later with the approval of the Electricity Regulation Act, 2006 which opened the generation market to IPPs.

Electricity sector reforms have received further impetus in recent years. With the electricity crisis in 2019 resulting in the biggest load-shedding program ever experienced in the country, new commitment from the government for electricity reforms surged. In light of the challenges faced by Eskom, in February 2019, President Ramaphosa announced plans to transform the electricity market through the unbundling of generation, transmission, and distribution into wholly-owned subsidiaries of Eskom Holdings, governed by new independent Boards. The government’s immediate priority is the establishment of a subsidiary Transmission Entity to act as an independent system and market operator, buying power from both Eskom and non-Eskom generators (RSA DPE, 2019). The South African Parliament is also considering an Eskom Appropriation Bill to outline ways in which the utility can be supported to remain operational.

The creation of the new Transmission Entity would mitigate the generation concentration risk posed by an integrated Eskom, providing more certainty for IPPs. Credit enhancements, such as government or multilateral finance institution guarantees would also increase private sector confidence in the Transmission Entity as an off-taker, in contrast with the current financial challenges faced by the integrated Eskom holding. The Government’s vision is to facilitate competition in power generation, realize cost efficiencies, ensure optimal investment in infrastructure, improve operational performance, and provide reliable electricity to customers.

Institutions governing the electricity sector

The electricity market of South Africa is governed by the following institutions:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Description</th>
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<tbody>
<tr>
<td>Department of Mineral Resources and Energy (DMRE)</td>
<td>The DMRE, formed by the merging of the Department of Mineral Resources and the Department of Energy in 2019, oversees the electricity sector, governed through the Electricity Regulation Act, 2006 (4 of 2006). It is responsible for developing electricity policies and regulations, through ministerial determinations.</td>
</tr>
<tr>
<td>National Energy Regulator of South Africa (NERSA)</td>
<td>Issues licenses for the operation of generation, transmission, and distribution infrastructure. Regulates imports, exports, and the trading of electricity. Determines and approves electricity prices, tariffs, and the conditions under which electricity may be sold. Commissioners and Board members are appointed by the Minister of Mineral Resources and Energy. The main source of funding for NERSA is levy income from licensees in the three regulated industries, namely petroleum pipelines, piped gas, and electricity. The levies are proposed by the Energy Regulator and approved annually by the Minister of Energy in consultation with the Minister of Finance.</td>
</tr>
</tbody>
</table>
Country Overview

<table>
<thead>
<tr>
<th>National Nuclear Regulator (NNR)</th>
<th>Regulates the operation of nuclear power stations and all elements of the South African nuclear energy value chain. Protects people, property, and the environment against nuclear damage.</th>
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<tbody>
<tr>
<td>Department of Public Enterprises (DPE)</td>
<td>The Minister of Public Enterprise is an Eskom Shareholder representative on behalf of the Government with oversight responsibility for Eskom.</td>
</tr>
<tr>
<td>National Treasury (NT)</td>
<td>Responsible for financial and reporting oversight for Eskom. Provides government loans and guarantees in favor of Eskom.</td>
</tr>
<tr>
<td>Department of Water and Sanitation (DWS)</td>
<td>Oversees water allocation and ensures that there is adequate water supply infrastructure for the South African electricity sector.</td>
</tr>
<tr>
<td>Department of Environmental Affairs (DEA)</td>
<td>Ensures compliance with environmental regulations, and protection of rights relating to the prevention of pollution, ecological degradation, conservation, and securing ecologically sustainable development.</td>
</tr>
<tr>
<td>Independent Procurement Program (IPP) Office</td>
<td>Its primary mandate is to secure electricity from independent power producers (IPPs) through a fair and transparent process, under the guidance of the DMRE and NT. Its secondary mandate is to contribute to broader national development objectives.</td>
</tr>
</tbody>
</table>

**Market players**

National utility Eskom dominates the South African electricity sector. However, the country is also home to several municipal power companies and Africa’s biggest IPP market.

**Table 2: Market players**

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Eskom</strong></td>
<td>South Africa’s vertically integrated, state-owned national utility, which owns and operates over 90 percent of generation and all transmission assets. The company also distributes electricity to 40 percent of end-users in the country (RSA DPE, 2019).</td>
</tr>
<tr>
<td><strong>Municipalities</strong></td>
<td>In terms of Schedule 4(b) of the South African Constitution, municipalities are accountable for the reticulation of electricity within their boundaries. The ERA Amendment Act, No. 28 of 2007 amends the ERA to provide for electricity reticulation by municipalities. Currently, there are 188 municipalities licensed by NERSA to distribute electricity, which supply 60 percent of end-users in the country (RSA DPE, 2019).</td>
</tr>
<tr>
<td><strong>Independent Power Producers (IPPs)</strong></td>
<td>Through a series of successful power procurement programs, South Africa has attracted substantial private investment in electricity generation. Although the number of IPP projects is significant, they represent just under 10 percent of installed capacity, with the rest owned by Eskom.</td>
</tr>
</tbody>
</table>

**Electricity market model**

The South African electricity supply industry is dominated by the state-owned utility company, Eskom. It owns and operates over 90 percent of the national generation capacity, all the transmission assets, and distributes electricity to about 40 percent of South African
customers. Along with the Eskom distribution department, municipalities are responsible for electricity reticulation to about 60 percent of national customers. The electricity market works around a single-buyer model, with Eskom being the only authorized off-taker of electricity at the wholesale level, as well as ensuring system operation and transmission network management. Eskom buys electricity from independent power producers (IPPs) through long-term power purchase agreements (PPAs) and resells it at wholesale prices to municipalities that serve customers within their jurisdiction, and to its final customers. IPPs are integrated into the market through public procurement schemes for new generation assets, while large consumers and municipalities are allowed to produce for self-consumption. However, they must secure a license from the regulator for capacities above 1 MW, as per the ERA.¹

Figure 10: Structure of the electricity supply industry

2.4 Policies and regulations governing the electricity supply industry

The electricity market of South Africa is governed through numerous position papers, strategies, policy documents, and laws summarized in the next section (see Annex A for further information).

Table 3: Energy sector strategies, policies, and plans

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The National Development Plan (2030)</td>
<td>Identifies the need for South Africa to invest in a strong network of economic infrastructure, of which energy infrastructure is a critical component.</td>
</tr>
<tr>
<td>White Paper on Energy Policy (1998)</td>
<td>This policy paper sets out the government’s ambition for the country’s energy system through a broad set of policy objectives, including restructuring and liberalization of the electricity supply industry.</td>
</tr>
</tbody>
</table>

¹ At the end of 2020, the license application for self-generation facilities between 1 and 10 MW was simplified. Applicants are no longer required to prove compliance with IRP-2019. Furthermore, in 2021, President Ramaphosa announced that Schedule 2 of the ERA would be amended to increase the licensing threshold for embedded generation to unlock additional generation capacity to ease the impacts of load shedding.
2.4.1. Key laws and regulations for the electricity supply industry

**Foundational legislation**

The electricity supply industry of South Africa is governed by three main acts: the National Energy Regulator Act (Act No. 40 of 2004); the National Energy Act (Act No. 34 of 2008); and the Electricity Regulation Act (Act No. 4 of 2006).

The National Energy Regulator Act (NERA) establishes the National Energy Regulator of South Africa (NERSA), the single regulator for electricity, piped gas, and petroleum pipeline industries and related matters.

The National Energy Act (NEA) provides for energy planning in the country, ensuring that diverse energy resources are available in sustainable quantities and at affordable prices, and other matters pertaining to the energy sector. The Act foresees the annual publication of an Integrated Energy Plan (IEP) by the Minister of Energy, but as of yet, no IEP has been published (Ifri, 2020).

The Electricity Regulation Act (ERA) includes the following provisions:

- Establishing a national regulatory framework for the electricity supply industry;
- Making the National Energy Regulator the custodian and enforcer of national electricity regulatory framework;
- Providing for licenses and registration for generation, transmission, distribution, trading, and the import and export of electricity;
- Regulating private investment related to ownership and operation of generation assets, subject to licensing by NERSA, unless the generation capacity is equal to or less than 1MW; and
- Facilitating investment in the electricity supply industry.
The ERA is the basis of much of the subsequent regulation in the market. Under the Act, the Minister of Mineral Resources and Energy can make regulations for the electricity market, with the most notable regulations pertaining to new generation capacity and activities to be licensed or registered. The Electricity Regulations on New Generation Capacity (2011) regulates entry into PPAs by buyers and generators, sets minimum standards for PPAs, and provides the framework for implementation of an IPP program and relevant agreements.

**Grid Codes and technical regulations**

Electricity networks operation and development are regulated by national grid-codes, approved by NERSA. The transmission system is primarily regulated by the South African Grid Code (SAGC), which provides for non-discriminatory third-party access. It sets the conditions for connection to the national transmission system, the quality, frequency, and reliability supply standards, the general dispatch rules, and the objectives of, and procedures for, transmission service pricing. To account for intermittent renewable generation, the SAGC is supplemented by the Grid Connection Code for Renewable Power Plants. The SAGC is enforced through the licensing requirements of the transmission service providers and the registration of other participants.

The South African Distribution Grid Code (SADC) defines the conditions for access to and use of the distribution system, the quality, frequency, and reliability supply standards, and the procedures for distribution service pricing. Distribution is also regulated by Schedule 4(b) of the Constitution, which sets out that municipalities are responsible for the reticulation of electricity within their boundaries.

**Tariff regulation**

As per the ERA, the responsibility for regulating prices and tariffs falls upon NERSA. The Act establishes general electricity sector tariff principles, stating that the setting of tariffs and regulation of revenues must:

- Enable an efficient licensee to recover full costs and a reasonable return;
- Provide incentives for continued improvement of efficiency;
- Give end-users proper information regarding costs;
- Avoid undue discrimination between customer categories; and
- May permit the cross-subsidy of tariffs to certain classes of customers.

Under the ERA, NERSA may, in prescribed circumstances, approve a deviation from set tariffs. The Local Government Municipal Systems Act (Act No. 32 of 2000) also establishes tariff policy principles referring to the provision of municipal services, including electricity.

In 2008, the DMRE published the Electricity Pricing Policy (EPP) defining high-level national priorities for the formulation of electricity prices in South Africa and tariff structure guidelines for the different electrical services. The policy and the principles contained in the EPP must be reflected in the related NERSA’s rules and regulations concerning electricity tariffs.

The Multi-Year Price Determination (MYPD) is the regulatory methodology applied by NERSA to determine the allowed revenue for each of Eskom’s business activities (generation, transmission,
and distribution), in line with tariff principles listed above. The MYPD provides formulas for calculating the allowed revenue in each of the business units separately. Tariffs charged by municipal distributors are developed based on Eskom’s approved bulk price increase of electricity to municipalities and the increase in the municipalities’ cost structures. Therefore, the definition of municipal electricity tariff guidelines follows the determination of Eskom’s tariffs (NERSA, 2019). These guidelines are used by NERSA to evaluate municipal tariff applications.

### 2.4.2. Other regulation for private sector participation

**Private sector participation models**

Participation in the development of government-owned generation facilities in South Africa is based on a Public-Private Partnership (PPP) model, whereby the private investor is responsible for raising finance to develop, construct, and operate the generation facility on behalf of the government. The utility purchases power from the project and signs a 20-years take-or-pay PPA. Under such PPA, the utility agrees to pay a fixed cost for the capacity developed and an energy charge for electricity that is delivered to the grid. The government provides credit enhancements in the form of guarantees. The project company does not own the asset; however, it guarantees performance in terms of capacity and energy delivered to the grid. A tendering process, based on a Build, Own, Operate, and Transfer (BOOT) model is followed, where the facility will be transferred to the government after the PPA period. The government also plays the role of a licensing and approving authority for water, environmental, transmission/distribution and other agreements.

Private sector participation in the other market segments remains restricted and limited to the only engineering, construction and procurement role for grid infrastructures, while the operation of transmission and distribution service is the only competency of Eskom and municipalities. Private companies can actually operate in the trading of electricity through obtaining a license from NERSA.

**Procurement processes**

To procure additional electricity generation capacity, Section 34 of the ERA requires that the Minister of Mineral Resources and Energy, in consultation with NERSA, issue a ministerial determination setting out the amount and type of energy to be procured, as well as the method of procurement, with the Act providing for IPP procurement programs. Additionally, when issuing licenses to generators, NERSA must consider whether the additional capacity complies with the procurement schedule set out in the IRP. However, the ERA allows for deviation from the IRP upon ministerial approval.

The key elements of the procurement process are as follows:

- **RFP published with all required information and criteria to participate in the tender;**
- A team of independent evaluators is used to assess the bids to tender process governance, transparency, and fairness; and
- **Evaluation of Bid responses is conducted in two stages:**
  - **Stage 1:** All Bid Responses are assessed to determine whether they are Compliant...
Bids (a complete Bid Response is in line with guidelines and criteria set out in RFP and meets or exceeds the threshold requirement for every applicable Qualification Criterion).

- Stage 2: Compliant Bids will be evaluated on a comparative basis, per technology, in relation to Price and Economic Development.

- The award of Preferred Bidder status is a competitive process with strict qualification and evaluation criteria.

Recent changes in the sector have allowed for more flexibility regarding energy procurement. In October 2020, the Minister of Mineral Resources and Energy gazetted an amendment of Schedule 2 of the ERA, allowing municipalities to apply to the Minister for permission to procure new generation capacity outside of the existing procurement programs, provided they comply with certain requirements (Minister of Mineral Resources and Energy, 2020).

**Incentives**

In 2009, the government published a Renewable Energy Feed-in-Tariff (REFIT) policy and proposed tariffs. This was the first time that South Africa was committed to utility-scale REIPP partnerships, stimulating private sector interest (Anton Eberhard and Raine Naude, 2017). However, the implementation was unsuccessful. Within a few years, REFIT was abandoned in favor of a competitive public tendering system. The Department of Mineral Resources and Energy established the Independent Power Producer Procurement Program (IPPPP) at the end of 2010, and by June 2020, its largest components, the renewable energy IPPPP (REIPPPP), had procured 6,422 MW of electricity from 112 renewable energy IPPs in seven bid rounds (IPP Office, 2021). Over five years after the last round, in March 2021, the government launched the fifth bid window of the REIPPPP to procure an additional 2,600 MW renewable capacity.

South Africa makes available credit enhancement in the form of a guarantee scheme, whereby the National Treasury commits to upholding PPAs and making payments if Eskom fails to do so. This is aimed to encourage the participation of the private sector in the power generation market.
Towards Crowding-in Private Sector Investment

Country Overview

Western Cape Wind Turbine in the wine lands of the Western Cape
Photo credit: Rodger Shagam
3. Analysis of Electricity Market Policy and Regulatory Framework

UNECA and RES4Africa Foundation have developed a custom methodology to assess countries’ policy, legislative, and regulatory frameworks in their ability to encourage the participation of private sector investors. The approach encompasses the entire electricity supply industry value chain, covering the generation, transmission, distribution, and off-grid segments of the market.

3.1 UNECA and RES4Africa methodological approach

The methodology identifies three areas, referred to as Dimensions, under which policy, legislative, and regulatory elements are clustered. These Dimensions are as follows.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Openness</strong></td>
<td>or power sector structure and governance. This Dimension covers policies, laws, and regulations meant to define energy policy and strategy priorities, market-entry, infrastructure planning, sector governance, market structures, and related considerations. These instruments combined provide an overall view of the openness of the electricity market to investors.</td>
</tr>
<tr>
<td><strong>Attractiveness</strong></td>
<td>or sector economics. This Dimension assesses policies, laws, and regulations that ensure the economic viability of electricity infrastructure investments, as well as fair competition among market operators. A review of these instruments provides an overall synthesis of the attractiveness of the electricity market to private sector investors.</td>
</tr>
<tr>
<td><strong>Readiness</strong></td>
<td>or sector maturity. This Dimension investigates technical regulations designed to ensure the implementation into, and efficient integration and management of electricity infrastructure within the energy system. A review of these elements of the Dimension provides an overall picture of the readiness of the electricity market to investors along the value chain.</td>
</tr>
</tbody>
</table>
Figure 11: Overview of the Topics assessed within each Dimension

- **Openness**
  - Energy strategy
  - System planning
  - Power sector governance
  - Power sector framework
  - Power sector competition
  - Private sector participation model
  - Procurement process
  - Generation off-taking options

- **Attractiveness**
  - Contracts regulation
  - Economic regulation
  - Incentives
  - Credit enhancement
  - Authorization and permits
  - Grid code
  - Grid access
  - System quality and security standards
  - Access to data

- **Readiness**
  - Authorization and permits
  - System planning
  - Power sector framework
  - Grid code
  - Grid access
  - System quality and security standards
  - Access to data
  - Mini-grid integration
Each of these Dimensions is then disaggregated into three further levels, namely Topics, Indicators, and KPIs (key performance indicators).

- **Topics (1st Level)** define the main areas of policy and regulatory assessment (such as energy strategy, system planning, and grid code) specific to each of the Dimensions. Topics are composed of Indicators. See Annex B for an overview of the Topics assessed.

- **Indicators (2nd Level)** cover single policy or regulatory elements (such as energy policy, Electricity Act, public PPAs, retail tariff structure, and grid connection). Each Indicator is composed of a series of KPIs.

- **KPIs (3rd Level)** are single elements, or specific questions, that provide a detailed understanding of Indicators, which in turn inform Topics.

The methodology, cascading from the broader to the micro-level, enables proper assessment and understanding of the degree of **openness**, **attractiveness**, and **readiness** of electricity markets to private sector investors. This approach led to the formulation of a set of questionnaires – one for each segment of the electricity market, that is generation, transmission, distribution, and off-grid. Based on YES/NO questions, the approach enables the assessment of the policy, legal, and regulatory environment related to its fundamental attributes: clarity; predictability; transparency, and accountability.

The quantitative result from this methodological exercise is estimated by summing the positive (YES) answers to the detailed questions (KPIs). To reflect on the relative relevance of a particular KPI under a given Indicator, and to assess the impact that a particular Indicator has on its Topic, Indicators and KPIs are subjected to relative weights on a scale system. The weights were reviewed and validated by a panel of African and international experts, and reflect the average input of the experts.

To compute the necessary quantitative results based on data input from countries, UNECA and RES4Africa developed the **ROAR** (Regulatory review of the openness, attractiveness, and readiness) tool. The ROAR tool computes results by country based on country data inputs and a defined weighting methodology.
The quantitative results, therefore, are presented at the Topics level and use a scoring system based on a 0 to 3 point-scale, where 0 is the lowest score – indicating a lack of regulatory preparedness on the assessed Topic related to private sector investment participation – and 3 is the highest – indicating a full regulatory preparedness on the assessed Topic.

3.2 Main findings of the regulatory review

The section below presents the quantitative results of the performed assessment of South Africa’s electricity policy and regulatory framework related to the crowding-in of private investors to the electricity market.

3.2.1 Generation segment

In the majority of Topics that assess the policies, laws, and regulations in the electricity generation sub-sector, South Africa reaches a satisfactory level of effectiveness in responding to the private sector (Figure 13). Out of the 19 Topics evaluated, 5 received the maximum score, mostly related to readiness of the market, whereas only one Topic received the minimum score.

*Figure 13: Overview of the Generation segment*
Overall, South Africa reaches high scores in all the Topics considered by the openness Dimension for the generation segment with the only relevant exception of the power sector framework.

The foundation of South Africa’s energy strategy has been set by the White Paper on Energy Policy (1998), shortly followed by the Renewable Energy White Paper (2003). These policy instruments defined the high-level strategic priorities and targets related to access to affordable energy services, improvement of energy governance, energy security, and the country’s long-term vision for a sustainable, unsubsidized, privately-led renewable energy development. These high-level priorities for energy sector development were further strengthened by the release of the National Climate Response Policy White Paper, in 2011, which introduced a “peak, plateau, and decline” strategy for the management of GHG emissions. Being a party to the UNFCCC, South Africa also submitted their NDC under the Paris Agreement, committing to limit emissions to 398 Mt CO2-eq by 2025 and 614 Mt CO2-eq by 2030. These policies are behind the very good performances in the energy strategy Topic.

Thanks to the presence of the Integrated Resource Plan, issued by the DRME, South Africa scores also very well in the system planning Topic. The IRP acts as the generation development plan and provides a clear strategy for electricity generation expansion over a 20-year period. The IRP works as the blueprint for generation capacity expansion and is followed then by Ministerial Determinations that instruct the IPP Office in terms of new capacities to be procured; however,
the IRP is subject to potential changes and as such it doesn’t cover the role of a long-term investment plan that may complement such good practice in resource planning.

<table>
<thead>
<tr>
<th>Power sector governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa demonstrates clear and transparent power sector governance, defined through the NEA, 2008, and the ERA, 2006. The ERA defines the operating regimes of electricity market operators and mandates the regulatory authority NERSA as responsible for licensing economic and technical regulation. NERSA benefits from an acceptable level of autonomy, both at a political and financial level. Its regulatory decisions are transparent and are available on its website. Under the ERA, NERSA’s decisions are legally binding; however, Eskom has challenged NERSA’s decisions in court on several occasions, particularly in relation to tariffs, exposing limitations in the country’s dispute resolution processes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power sector framework</th>
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<tbody>
<tr>
<td>South Africa’s electricity market structure remains organized around the vertically integrated public utility Eskom. The lack of unbundling of Eskom’s generation, transmission, and distribution activities results in a lower performance related to the power sector framework Topic.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power sector competition</th>
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<tbody>
<tr>
<td>Competition is allowed in the generation segment, through the introduction of IPPs. Under the ERA, 2006, the DMRE gazetted the Electricity Regulations on New Generation Capacity in 2011, which established rules and guidelines for public procurement of generation assets. Eskom transmits power on behalf of other market participants and is paid through bilateral wheeling agreements. This, in conjunction with the fact that only Municipalities and Eskom are licensed distributors, negatively affected power sector competition. However, NERSA can issue trading licenses to generators and Municipalities are allowed to procure electricity directly from generators, effectively opening up the wholesale market to competition.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Private sector participation model</th>
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<tbody>
<tr>
<td>Private participation in the generation segment in South Africa can follow a variety of models such as concession agreements, merchant, and EPC contract models, offering diversified- private sector participation models. However, divestiture is currently not permitted, as Eskom remains a state-owned company.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procurement process</th>
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</thead>
<tbody>
<tr>
<td>The superb performance in the procurement process is due to the public-private partnership procurement policy, governed by the Treasury Regulation 16 issued to the Public Finance Management Act of 1999. The Government Technical Advisory Centre (GTAC), an agent of the National Treasury, provides transaction advisory services and training regarding PPPs which involve a contract, a public sector authority, and a private party. Currently, the public procurement for new generation assets is allowed only through solicited proposals with competitive tenders managed by the IPP Office. The rules for</td>
</tr>
</tbody>
</table>
the organization of public tenders are outlined in Regulation 16 of the Public Finance Management Act and criteria for the evaluation of bids are provided by the IPP Office.

The South African electricity market operates under a single-buyer model with Eskom as the single buyer at the wholesale level. However, multiple routes-to-market are currently available for private generators expanding off-taking options. Private PPAs, subject to regulatory approval by NERSA for generation capacities above 1MW, are possible. Rules that would allow the selling of surplus electricity to the grid are also under development. All grid-connected self-consumers above 1 MW require a license from NERSA, while those below 1 MW only need to register with NERSA. Wheeling is possible but rules regarding net-metering are still under development. Currently, some municipalities allow a limited amount of excess energy generated by solar systems to be offset against energy usage. Others allow bi-directional metering, billed at a predetermined rate, while energy fed back into the grid is reimbursed to the consumer at a separate energy rate. Furthermore, South Africa is part of the Southern African Power Pool, creating a common power market in the SADC region.

A deep dive into the Attractiveness dimension

Figure 15: A deep dive into the Attractiveness dimension for generation

The performance of South Africa in the attractiveness Dimension is variable, with some Topics, such as contracts regulation, credit enhancement and economic regulation being areas of high performance, while others require improvements.
South Africa has successfully attracted IPPs through public tenders, managed by the IPP Office, awarding standardized PPAs with the single buyer, Eskom. The PPAs respect international best practices to ensure the bankability of contracts. They consider take-or-pay clauses and prices indexed to inflation. All PPAs are denominated in the local currency but this has a low impact on contract bankability, as most of the project’s debt is also Rand-based. Thus, explaining the good performance in contracts regulation Topic.

As per the ERA, 2006, the responsibility for regulating prices and tariffs falls upon NERSA. Through the MYPD, NERSA regularly reviews and updates national electricity tariffs. The EPP, 2008, defines high-level national priorities for the formulation of electricity prices in South Africa and tariff structure guidelines for the different electrical services. These regulations explain the good score in the economic regulation Topic. However, tariffs remain bundled without clear separation among the components of the electricity service and cost-reflectiveness is contested by Eskom.

Renewables are incentivized through dedicated public tenders, organized under the REIPPPP program. There are no other supporting schemes available. The fairly low score in the incentives Topic is also related to the difficulties encountered by the REIPPPP program in the recent past, which resulted in a hiatus of about five years. The recent launch of round 5, in early 2021, signals the government’s willingness to reignite the market. A capacity payment component is included in standard PPAs.

The indirect incentives Topic scores low due to a lack of subsidies, and tax or import duty reliefs for private generators. However, the adoption of a Carbon Tax Act, 2019, supports the development of clean energy technologies.

Good efforts in the provision of credit enhancement instrument allow South Africa to achieve a good performance in this Topic. The National Treasury provides guarantees under the REIPPPP to supplement Eskom payments in the event of default. On a project-by-project basis, DFIs can also provide multilateral guarantees or concessional lending to generators.
With four out of six Topics scoring the maximum, and the remaining three performing just below the maximum, South Africa achieves very high results in the readiness Dimension related to the generation segment. This confirms the high level of regulatory preparedness in efficiently integrating new generation assets in the national electricity system.

**Authorizations and permits**

The *authorizations and permits* required for power generation projects, such as land and water rights, construction permits, and environmental approvals, as well as the procedures for their issuing are clearly defined. However, currently, no single organization acts as a one-stop-shop for applying and issuing the above-mentioned permits and approvals, preventing achieving the maximum score.

**System planning**

Network system planning in South Africa is the responsibility of the network operator and is regulated by the national grid codes, covering long, medium, and short timespans. The Strategic Grid Plan formulates long-term strategic transmission corridor requirements with a 20-year planning horizon and is updated every 2-3 years. The Transmission Development Plan (TDP) represents the transmission network infrastructure investment requirements over 10 years. It indicates the financial commitments required in the short to medium term and is annually updated. All these plans are integrated into the context of the assumptions and scenarios developed under the IRP. Thus, explaining *system planning* Topic outstanding performance.
Grid code

South Africa scores very well in grid code Topic thanks to the presence of a national transmission grid code (SAGC), issued by Eskom under NERSA approval. South Africa benefits from technical regulation indispensable to ensuring the stable and safe operation of the electricity networks, electricity dispatching, network expansion, and quality of supply. In compliance with international best practices, South Africa’s national grid codes are composed of sub-codes dedicated to governance, connection, system operations, information exchange, tariffs.

Grid access

The country reaches the maximum score on grid access Topic. As per the ERA, 2006, all users benefit from non-discriminatory access to the transmission network and connecting to the transmission network requires the signature of a connection, use-of-system, and operating agreement with Eskom to allow a connection and/or synchronization of a generator. The connection costs are published in Eskom’s Schedule of Standard Fees yearly.

System quality and standards

Section 7 of the SAGC specifies criteria and procedures to be applied in the planning and development of the transmission network to ensure system quality and security; thus, providing clarity on system quality and security standards regulation.

Access to data

South Africa also ensures the availability of its socio-economic and fundamental electricity market data through StatsSA and Eskom’s yearly reports. Eskom’s financial statements are also publicly available. This ensures transparency and accessibility to relevant data and explains the highest score in access to data Topic.
3.2.2 Transmission segment

*Figure 17: Overview of the transmission segment*

As in the case of the generation segment, South Africa performs very well in almost all the Topics considered in the *readiness* Dimension also for the transmission segment, confirming the good level of development of regulation related to network management and operations. Good performances are also found in the *contracts regulation* and *economic regulation* Topics related to the *attractiveness* Dimension. However, *power sector framework* and *private sector participation model* Topics reach low scores, as a result of the current restrictions on private participation in the transmission segment. As previously discussed, Eskom is the only entity licensed to operate the transmission system and private sector participation in the transmission segment remains confined to construct transmission assets on behalf of Eskom.
A deep dive into the Openness dimension

Figure 18: A deep dive into the Openness dimension for transmission

South Africa’s mitigated performance in the Topics covered by the openness Dimension related to the transmission segment reflects the current restrictions to private sector participation. This section focuses on those Topics that differ significantly from the scores achieved in the generation segment – more details on the energy strategy and power sector framework performances are presented in the Generation–Openness section.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System planning</td>
<td>South Africa confirms the high performances in the system planning Topic thanks to a comprehensive regulation dedicated to network development plans over the long, medium, and short timescales, including a detailed transmission investment plan over a 10-year timespan. As the transmission network operator, Eskom is responsible for formulating such plans, which are publicly available and regularly updated.</td>
</tr>
<tr>
<td>Private sector participation model</td>
<td>The operation of the transmission service is the sole responsibility of Eskom and private sector participation in the transmission segment remains limited to EPC role in building new assets on behalf of Eskom. As a result, South Africa achieves a low score in private sector participation models Topic related to the transmission segment, due to the unavailability of models that entail the operation of the transmission service.</td>
</tr>
<tr>
<td>Procurement process</td>
<td>The procurement process benefits from the existence of a general framework governing PPPs in South Africa. However, PPP agreements are not available for the electricity transmission segment.</td>
</tr>
</tbody>
</table>
A deep dive into the Attractiveness dimension

Figure 19: A deep dive into the Attractiveness dimension for transmission

Two of the three Topics covered under the attractiveness Dimension in the transmission segment received the maximum score with the exception of credit enhancement.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contracts regulation</td>
<td>The excellent performance in the contracts regulation is explained by the presence of a transmission license clearly defining the rights of the licensee in terms of exercising the transmission service and collecting fees related to its services, as well as its obligations in terms of ensuring the quality of the service, maintenance and expansion of the network, connecting new customers. The license does also specify relevant rules about the termination of the license, dispute resolution process and governance for modifications due to regulatory changes.</td>
</tr>
<tr>
<td>Economic regulation</td>
<td>South Africa achieves also excellent performance in the economic regulation Topic, thanks to the SAGC Tariff sub-code that details the objectives of the transmission tariff framework, defines the principles for the regulation of incomes and tariff review, and regulates the structure of transmission tariff.</td>
</tr>
<tr>
<td>Credit enhancement</td>
<td>The very low performance in the credit enhancement Topic is due to the unavailability of national and multilateral guarantees, as well as other financial support mechanisms dedicated to supporting private transmission investments.</td>
</tr>
</tbody>
</table>
A deep dive into the Readiness dimension

Figure 20: A deep dive into the Readiness dimension for transmission

The very good performances in all Topics covered by the readiness Dimension confirms the ability of the current regulations to ensure the appropriate management and operations of the transmission network and service.

| Authorizations and permits | Clear rules for accessing right-of-way authorizations, fundamental for the construction of surface network infrastructure, are available with competent authority defined to apply for such permits. This adds to the accessibility for relevant authorization and permits already mentioned in Generation – readiness section. However, the lack of a one-stop-shop for application and issuance of permits prevents South Africa from achieving the highest score in the authorizations and permits Topic. |
| Grid code | Power sector competition | As mentioned in the Generation – readiness, the SAGC covers the relevant aspects related to system operation, grid access, and connection agreement for both generators and demand points, as well as system quality and security standards for the safe operation and development of transmission network. There is, therefore, high performance related to the grid code, grid access, and system quality and security standards. |
| Grid access | Access to data | The availability of data related to the quality of transmission service, with data on losses and interruptions available in Eskom annual reports, explains the maximum score achieved in access to data Topic also in the transmission segment. |
3.2.3 Distribution segment

The policy and regulatory framework related to the distribution segment demonstrates significant strengths in the readiness Dimension, as compared to the openness and attractiveness ones. As for the previously analysed segments, the assessment confirms the good development of relevant regulation for access to data, grid code, grid access, system quality and security standards, as well for power sector governance, contracts regulation and economic regulation. On the opposite, the lower scores in power sector framework, private sector participation models and system planning are a direct consequence of the electricity market structure, organized around a vertically integrated utility, and the scattered governance of the electricity distribution service, where Eskom coexists with a variety of municipal distributors.
A deep dive into the Openness dimension

Figure 22: A deep dive into the Openness dimension for distribution

Equally to the electricity transmission service, private sector participation in the distribution service is fairly restricted. Eskom and municipalities remain the only licensed electricity distributors. In addition to the observations made in the previous sections (Generation – Openness, Transmission – Openness), the following is to be noted with regards to policies and regulations related to the distribution segment:

Energy strategy

The performance in the energy strategy Topic, lower than the ones obtained in the other segments, is explained by the absence of national targets in terms of electrification expansion for both on-grid and off-grid customers. Electrification priorities and guidelines are set by six Electrification Policy Guidelines (non-grid, bulk infrastructure, suite of supply, farm dweller houses, informal settlement, mixed developments, and developer projects) developed by INEP. However, INEP stands as a separate policy and its targets are not included in the overarching electricity policy considerations.

System planning

The low performance of system planning is related to the absence of a national electrification plan, as well as a detailed investment plan for electrification solutions. All these aspects are dealt with by the INEP (Integrated National Electrification Program) through the Policy Guidelines developed; however, they are not part of a national coordinated approach for electricity system development plan.
Private operators are currently not in the position to obtain licenses to operate electricity distribution services, as Eskom and municipalities remain the only licensed distributors. Private operators could act as distributors to final users on behalf of licensed distributors, and having been authorized by them, under certain circumstances. Private operators could access electricity trading licenses through NERSA.

Private sector participation models in the distribution service are limited to shared ownership in distribution companies, as well as EPC contracts.

Related to the procurement process, PPP agreements are not available for investments in distribution assets.

A deep dive into the Attractiveness dimension

Figure 23: A deep dive into the Attractiveness dimension for distribution

Two of three Topics covered under the attractiveness Dimension in the distribution segment receive the maximum score with the exception of credit enhancement, mirroring the results of the assessment for the transmission segment (Transmission – Attractiveness).
The excellent performance in the contracts regulation is explained by the presence of distribution licenses defining the rights of the licensees in terms of exercising the distribution service and collecting fees related to its services, as well as its obligations in terms of ensuring quality the service, maintenance and expansion of the distribution network, and connecting new customers. The licenses do also specify relevant rules about the termination of the license, dispute resolution process and governance for modifications due to regulatory changes.

South Africa reaches also the maximum score in the economic regulation for the distribution segment thanks to the presence of a SADC’s Tariff sub-code. The sub-code sets the pricing structure objectives for the distribution service and retailing, it applies to all regulated tariff structures and negotiated pricing agreements under the jurisdiction of NERSA, it regulates energy charges, network charges, customer service charges and connection charges and provides principles for tariff design and allocation of costs.

The very low performance in the credit enhancement Topic is due to the unavailability of national and multilateral guarantees, as well as other financial support mechanisms dedicated to supporting private distribution investments.

As for the previously discussed segments, South Africa achieves outstanding performances in the Topics considered by the readiness Dimension related to the distribution segment. In addition to the observations already made (Generation – Readiness and Transmission – Readiness), it should be noted that:
South Africa national Distribution Grid Code (SADC) covering all the most relevant aspects for the safe operation and development of the distribution networks; thus, explaining the maximum score in grid access Topic. The grid code, as for international best practices, is composed of several sub-codes covering: governance rules, network technical rules and connection conditions, system operation rules, distribution tariff rules, and metering services.

The SADC provides for non-discriminatory access to the system for users and specifies safety and reliability, and technical requirements for connection and network development. For distributors to allow connection and use of the system, a connection, use-of-system, and operating agreement must be signed. Therefore, grid access and system quality and security standards Topics also reach the maximum score.

The availability of data related to the quality of transmission service, with data on losses and interruptions available in Eskom annual reports, explains the maximum score achieved in access to data Topic also in the transmission segment.

3.2.4 Off-grid segment

Figure 25: Overview of the off-grid segment
Among all the four segments covered by the assessment, the off-grid segment faces the lowest level of policy and regulatory preparedness to crowd-in private investors. This is mainly due to the lack of dedicated regulation for mini-grid development in South Africa. Private sector participation in electrification expansion is foreseen only in remote areas through concession agreements for the provision of solar home systems (SHS). The regulatory gaps in most of the Topics confirm the lack of dedicated policies and regulations to support the openness, attractiveness, and readiness of the off-grid segment for potential private investors.

**A deep dive into the Openness dimension**

*Figure 26: A deep dive into the Openness dimension for off-grid*

Most of the Topics covered by the openness Dimension related to the off-grid segment achieve a medium score, with the exception of system planning, power sector framework and private sector participation models whose scores are relatively low. In addition to the elements already addressed in previous sections (Generation – Openness) the following comments can be added:

**Energy strategy**

The good performance in the energy strategy Topic is explained by the presence of the INEP, adopted as a national program since 2001 and housed within the DMRE. The program considers as implementing agencies: Eskom, municipalities and non-grid service providers. It sets the target, reviewed in 2014, for achieving universal electricity access by 2025, and specifies detailed targets for grid-connected customer expansion and non-grid expansion. Targets do not seem binding but there are plans to enhance political overseeing for
implementation of the plans. The INEP has been detailed through 6 policy guidelines documents, all publicly available, but only one policy guideline, the Non-Grid Policy Guideline (NGPG), refers to off-grid solutions, targeting SHS.

| System planning | The challenges related to system planning is a direct consequence of the lack of integrated national electrification and related investment plans, meant to ensure national coordination of the on-grid and off-grid electricity infrastructures expansion, as well as long-term visibility to off-grid service providers about grid expansion plans. |
| Private sector participation model | The NGPG refer to the provision of electricity service through off-grid solutions only with the use of solar home systems. This is envisaged through a concession regime providing exclusivity rights to private service providers, selected through a tender process, within a defined area. There is no mention of the availability of other business models for private sector participation in the off-grid space. |
| Power sector governance | South Africa lacks of a dedicated license regime for off-grid operators. Off-grid operators selected in the framework of the INEP are awarded concessions to supply SHS, and related maintenance, above one area through competitive tenders. While Eskom is testing mini-grid technologies in pilot projects, it remains unclear what type of license would be required to obtain potential mini-grid operators. The country lacks also a dedicated Electrification Agency. The score in the power sector governance reflects these gaps that present consequent challenges in the governance of the off-grid sector development. |
| Procurement process | As stated by the NGPG and in line with the Public Finance Management Act, off-grid concessionaires are selected among private suppliers through a competitive tendering process. This results in the awarding of exclusive concession rights for SHS provision over a defined area. In this regard, South Africa demonstrates good performance in the procurement process Topic. |
Unlike in the previous segments, the attractiveness for the off-grid segment shows significant gaps across all four Topics assessed. These results could be mainly attributed to the lack of dedicated legislation for off-grid, notably for mini-grids, beyond the NGPG.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contracts regulation</td>
<td>The lack of a blueprint for retail contracts for off-grid operators explains the minimum score in contracts regulation. The NGPG foresees contracts between the DMRE and each of the successful bidders to provide non-grid electrification solutions in all participating provinces. The providers are also required to offer operation and maintenance services to their customers for the duration of the concession period.</td>
</tr>
<tr>
<td>Economic regulations</td>
<td>The country also lacks dedicated regulation for off-grid services, particularly important for mini-grids, explaining the minimum score in economic regulation. Under the concession agreements procured by INEP, the selling price of SHS results from the bidding process.</td>
</tr>
<tr>
<td>Indirect incentives</td>
<td>There is also no evidence of regulation dedicated to indirect incentives, such as VAT or import duty relief, for off-grid components or products. Such incentives are often fundamental support to the financial viability of off-grid technologies.</td>
</tr>
</tbody>
</table>
Credit enhancement

The off-grid segment attracts minimal credit enhancement. However concessional loans, overseen by the South African Reserve Bank, could be provided to off-grid operators.

A deep dive into the Readiness dimension

Figure 28: A deep dive into the Readiness dimension for off-grid

As for the segments previously discussed, South Africa policy and regulatory framework demonstrate a high degree of performance in the authorizations and permits and access to data Topics in the readiness Dimension also related to the off-grid segment. However, gaps are identified in the remaining two other Topics.

Authorization and permits

The authorization and permits Topic benefits from the clarity of the existing regulations concerning the requirements, procedures, and responsible authorities in relation to accessing the necessary permits. Such processes are well established and transparent in South Africa, despite the lack of a one-stop-shop.

Mini-grid integration

The striking outlier is off-grid systems integration, with prevailing regulatory gaps related to the lack of regulation defining the rules for off-grid system integration with the main grid, as well as the commercial options, rights, and obligations for mini-grid operators if the main grid arrives.
There are also regulatory challenges related to system quality and security standards for the off-grid segment. This is mainly due to the absence of standards for service quality related to off-grids. The SADC defines technical standards for distribution networks, potentially applicable to mini-grid distribution assets and equipment. With regards to the quality of service of the SHS supplied by concessionaires within the INEP framework, the NGPG foresees the need to define the level of service agreements between the DMRE and the service provider, and between the service provider and the municipality.
Conclusions and Recommendations
Towards Crowding-in Private Sector Investment

Analysis of Electricity Market Policy and Regulatory Framework

Aerial over solar panels, South Africa.
Photo credit: fivepointsix
4. Conclusions and Recommendations

South Africa has one of the largest electricity systems in Africa. Its installed capacity accounts for over 40 percent of the total installed capacity in Sub-Saharan Africa. It enjoys among the highest electrification rate in the region and has been able to expand its electricity services to about 94 percent of the national population in 2019, as compared to about 56 percent of electricity access in the late 1990s. South Africa succeeded in introducing the private sector in the electricity generation segment and, more recently, the country has implemented one of the most successful public renewable tender programs in Africa, procuring about 6,400 MW of new RE capacity from IPPs. These results are achieved thanks to South Africa’s ability to reform the governance of the national electricity sector and implementation of legislation and regulations that enabled the attraction of private investors to support electricity infrastructure expansion. However, the electricity market remains dominated by Eskom.

The public vertically integrated utility operates most of the country’s generation fleet, the entire transmission network and service, and a large part of the distribution of electricity at the national level, with the rest covered by municipal distributors. Furthermore, the procurement of new generation assets is managed primarily through centralized public procurement programs, such as the REIPPPP. It benefits from government guarantees that may add a burden on the public budget. Recently, for instance, the REIPPPP has faced challenges in its implementation because of Eskom refusal, between 2015 and 2018, to sign PPAs with successful bidders due to concerns about its financial position, and its despite of NERSA’s tariff regulation related to the pass-through of cost to the consumer. Consequently, the REIPPPP has been halted for about 6 years, though it is recently restarted, with consequences on the development of South Africa’s national renewable industry (Pombo-van Zyl, 2015).

The electricity sector is almost fully dependent on the government for financing its expansion and development, impacting the national balance sheet.

At the end of 2019 and throughout 2020, South Africa faced severe power shortages with consequent black-outs and load-shedding. This has put under a spotlight the operational performances of Eskom’s aging generation fleet and the worrying financial conditions of the public utility (Reuters, 2019). At the same time, the strategic importance of Eskom for the stability of the electricity supply industry and the whole of South Africa’s economy once again gained renewed policy attention. The last crisis demonstrated the need to progress in the reform process for the electricity market governance and the importance of crowding-in private players to support the electricity sector development and expansion. However, while the regulatory environment related to private participation in South Africa is relatively advanced in the generation segment, it remains mostly restricted in other segments of the electricity market.

In February 2021, His Excellency the President of the Republic reiterated plans to reform the sector by unbundling Eskom into generation, transmission, and distribution subsidiaries of Eskom Holdings with independent governance structures. The new National Transmission Company (NTC) will be separated first and will be the entity responsible for power procurement, system operation, planning, and transmission, and ownership of Eskom peaking power assets.

The unbundling of Eskom is a first step in reforming electricity sector governance and market structure. However, South Africa can achieve further benefits by also implementing other
policy and regulatory reforms to facilitate the crowding-in of private investment across the entire sector value chain. Acknowledging all the efforts put in place by the government in the last three decades to ensure the safety, reliability, and competitiveness of national electricity service, this regulatory review attempted to pinpoint policy and regulatory areas where improvements and reforms can be beneficial to crowd-in private investments. It also advises reforms meant to support South Africa in providing a reliable, affordable, and sustainable electricity supply for all by 2030.

4.1 Takeaways from the regulatory review

Related to the *Openness* of the electricity market

- Regarding the generation segment, South Africa demonstrates its ability in ensuring an effective policy and regulatory framework to private investors. This is thanks to the efficient and transparent market governance, a comprehensive energy strategy that pursues expansion of electricity capacity with defined targets per technology, and with clear timelines. The ability of South Africa to create an open environment for private sector participation in the electricity generation market segment is confirmed by the availability of several models and routes-to-market for private operators. It is also confirmed by the definition of clear regulation and institutional responsibilities for the public procurement of new generation assets. However, overall competition in the electricity market remains limited, given the vertically integrated structure of Eskom and the market framework, organized under a single-buyer model.

- Private sector participation within the transmission segment remains restricted due to the presence of Eskom as the sole licensed entity as system operator and transmission asset manager for South Africa's national electricity supply industry. The SAGC foresees the possibility for independent transmission service providers to obtain licenses for the provision of specific requirements, such as cross-border trade facilitation. However, it limits their role to the ownership and maintenance of the transmission asset. The current provision of the ERA does not explicitly exclude private operators from the possibility of obtaining a transmission service license, opening to some regulatory uncertainty that may need to be resolved, especially considering the unbundling of Eskom.

- Related to the distribution segment, the lack of a coordinated, single electrification policy in conjunction with the lack of a coordinated approach for the extension of the electricity service significantly hampers the governance of the national electrification efforts and initiatives. Furthermore, within the distribution segment, private sector participation is restricted, with the Municipalities and Eskom, all public entities, as the only licensed distributors in the electricity supply industry. However, ERA does not explicitly exclude the possibility of private operators to obtain distribution licenses. It also doesn't restrict private sector participation through share ownership in distribution companies.

- South Africa lacks dedicated legislation for the off-grid segment. The national electrification policy is scattered among several policy guidelines. It also lacks a national electrification master plan. Current system planning documents do not consider the potential development of off-grid solutions, even if the IRP-2019 states the need to quantify off-grid and micro-grid opportunities as well as the need to put in place the
necessary framework for accelerated development. Only SHS are openly considered by the available INEP’s policy guidelines which define a concession model to procure SHS from private operators in defined areas. Private sector participation does not appear restricted but halted by the lack of dedicated regulation, notably for mini-grids. Policy decisions on mini-grids could be informed by Eskom’s successful pilot project in the Free State Province, which services households that would take more than 3 years to access the grid.

**Related to the Attractiveness of the electricity market**

- The well-established public tender programs led to bankable PPAs, benefitting from security against payment default through the public guarantees available from the National Treasury. This was complemented by sufficient incentives for IPPs providing an attractive environment for private investors in the generation segment. The REIPPPP was successful in kick-starting the development of the South African renewable market. However, the refusal of Eskom to sign PPAs with the winning bidders, between 2015 and 2019, and the consequent stoppage of the REIPPPP raised questions about the governance of public tenders’ program. The restart of the REIPPPP, in early 2021, shows the willingness of government to reignite renewable market development. The implementation of the Carbon Tax Act also enhances the attractiveness of the electricity market to clean energy technology investors.

- The transmission service license defines the rights and obligations of the national transmission company, referring also to its obligation related to the national grid code. However, the attractiveness of the transmission market segment is hampered mainly by the lack of a defined methodology for the definition of the wheeling tariff for network users as well as the lack of credit enhancement mechanisms to support investments in new transmission assets.

- In the distribution segment, the assessment pointed out some gaps emanating from the lack of standardized contract regulation to define rights and obligations of national electricity distributors. This is related to the scattered governance of the distribution sector, where Eskom coexists with about 300 municipal distributors. The SADC provides principles for distribution retail tariff and network charges design and allocation of costs. There is also a general lack of credit enhancement mechanisms to support investments in new distribution assets.

- The South African Reserve Bank currently issues concessional loans to off-grid operators, which adds to the attractiveness of the off-grid market. However, the market lacks other supporting mechanisms, such as tax reliefs, to support off-grid business models for private operators. The lack of dedicated regulations for the off-grid sector, in terms of electricity supply contracts with final customers and tariffs rules, reduces the potential attractiveness of the South Africa off-grid market. This is especially the case for mini-grid operators which are more exposed to regulatory changes.
Related to the *Readiness* of the electricity market

The analysis reveals that South Africa benefits from an excellent level of development of the technical regulations relevant for the efficient integration of generation infrastructure. Network system planning is well managed, with clear rules and defined responsibilities for the national transmission company. The SAGC details the system operation and grid connection rules, including dispatch and ancillary services provision. Clear rules are also available for all authorizations and permits required to generators and relevant sector data are accessible to inform potential investors.

The transmission market segment enjoys a high degree of *readiness*. The SAGC sets the technical and operational standards of performance for the transmission service, it provides the legal framework for open access to the transmission network, and it defines connection rules for generators and bulk suppliers. Data about transmission service quality is reported by the national transmission company and the rules for all authorizations and permits required are also defined and accessible.

The distribution segment also shows a high degree of *readiness*. This is due to the presence of the SADC, defining operation rules, metering services as well as safety and technical requirements for the distribution network and service. Furthermore, it ensures non-discriminatory grid access for operators, a key factor in determining the fairness of grid regulation. Data about distribution service quality is reported by Eskom and the rules for all authorizations and permits required are also defined and accessible.

In relation to the off-grid segment, the country is penalized by the absence of dedicated regulations, notably for mini-grids. The lack of technical standards for mini-grid integration with the main-grid and the definition of commercial options available for mini-grid operators and asset owners in case of main-grid arrival represents a high risk for potential private investors. South Africa defined and implemented standards for the quality of off-grid products. The SADC defines standards for the quality of distribution service that, as for now, may apply also to mini-grids.

Acknowledging the efforts put in place by national institutions for reforming South Africa’s electricity sector policy and regulatory framework, the analysis shows that further action and further reforms (or improvements) are needed to ensure enhanced *openness*, *attractiveness*, and *readiness* of national electricity market through policies and regulations to crowd-in private investors effectively. This section guides the policy and regulatory areas that would benefit from reforms. Suggestions on how to address the challenges highlighted by the assessment are provided to the relevant energy institutions. If implemented, after further investigation and adjustments to the national context, these reforms would constitute positive steps towards strengthening the private sector role in supporting South Africa’s electricity industry development and in providing reliable, competitive, and sustainable power to all.
4.2 Recommendations

To enhance the *Openness* of the electricity market:

South Africa’s strategic Energy Policy and Renewable Energy White Papers appear outdated, having been issued in 1998 and 2003. While the process for updating the IRP ensures a review of the main strategic directions for generation expansion in the medium-term, South Africa will benefit from a comprehensive review of its strategic priorities in terms of electricity policy. This would provide long-term visibility to sector stakeholders and interested investors. In this regard:

- The “Roadmap for Eskom”, issued by the Department of Public Enterprises in 2019, goes in this direction, detailing future evolutions of the national electricity market structure beyond the unbundling of the public utility. The roadmap can be used to inform the update of the White paper on Energy Policy, to be issued by the DMRE.

- Consider the definition of a comprehensive and coordinated electrification policy, able to appropriately consider on-grid and off-grid technology solutions. Lessons from the Eskom mini-grid pilot facilities could be used to inform the policy. The Government would also benefit from quantifying off-grid and micro-grid opportunities and put in place the necessary regulatory framework for accelerated development, as recommended by the IRP-2019.

South Africa has been able to implement efficient regulations to deal with electricity system planning. The IRP, issued by the DMRE, is recognized as a reference in terms of electricity generation planning. This is thanks to its legislative backing and the close coordination between the IRP and public procurement programs for new generation assets. Network planning, both for the long-term and medium-term, remains the responsibility of Eskom, but its integration with the IRP needs to be ensured. However, the implementation of some of the outlined programs in the IRP-2019 will necessitate adopting sub-sector policies, plans, and/or regulations. As such:

- Adopt a Gas User Master Plan to provide regulatory certainty for the development of the gas-to-power program, as stated in the IRP-2019.

- Develop an integrated electrification master plan, as foreseen by the INEP, to define a coordinated planning approach for electrification expansion, both on-grid and off-grid. Ensure coordination among on-grid expansion scenarios, defined in the IRP, network planning, and the electrification master plan.
The “Roadmap for Eskom” set the direction for the future reforms of South Africa’s electricity market framework with the objective to modernize the electricity industry and improve its efficiency. The Roadmap recommends to move forward with the unbundling process of Eskom and the creation of an independent transmission company, as well as potentially separate Eskom’s generation and distribution activities. The implementation of the suggested reforms included in the roadmap has to be ensured through comprehensive legislative reforms, including secondary regulations adjustments, that will require the involvement of the DMRE and Parliamentary approval.

In terms of private sector participation, South Africa has been very successful in introducing competition in the electricity generation segment IPPs procured by a centralized public tender scheme. However, the potential of new emerging business models for private participation can be better explored: industrial customers have access to capital that could be tapped into supporting the development of new generation plants, through the corporate PPAs market and the self-generation/consumption models; the potential of the SAPP regional market can also open new routes-to-market for large, utility-scale private generators. These options offer valid opportunities to develop viable solutions for industrial and commercial customers. Moreover, private sector participation can be supported in the commercial electricity services, mainly generation and retailing, by increasing the clarity and transparency of the current regulation. This could also mitigate the Eskom concentration risk. To support such development, regulatory improvements are necessary:

- The IRP-2019 has increased its allocation for embedded generation from 200 MW (in the initial draft of the update) to 500 MW per annum. However, such limitations may restrict more development and diversification from Eskom. Although a ministerial determination can be used to allocate additional new capacity, this market could benefit from a simplified process, reducing the barriers to new market opportunities.

- Simplify procedures for accessing the authorizations required to small generators and speed-up the licensing process. At the end of 2020, the requirements for license applications for small plants (between 1 and 10 MW) were simplified thanks to a ministerial determination relieving applicants from having to prove compliance with the IRP-2019. However, plants above 1 MW still have to submit environmental authorization, land use, generation licenses, and Eskom permissions (where wheeling is required) to obtain a license from NERSA. This is a potentially cumbersome and time-consuming process that reduces opportunities to develop decentralized market models.

- Improve wheeling regulation, notably the transparency of connection agreement definition, to facilitate the development of projects under decentralised market models.
Conclusions and Recommendations

- Adopt rules related to the selling of surplus electricity from private generators based on a bilateral contract with a customer to the grid. In this regards, national guidelines or regulation regarding net-metering would advance self-generation.

- South Africa can also benefit from the progressive opening of the electricity retailing service, by simplifying the possibility for large consumers to procure bilaterally their electricity from traders, or directly from generators. Dedicated regulation to clarify the commercial relations between the generator, the network operator, the trader and the customer, is needed to support the entry of new trader operators in the South Africa electricity market.

To support the expansion of the transmission assets, South Africa could assess the potential of opening this segment to private sector participation beyond the current limited scope. Emerging models, as the independent transmission operator, could allow the private sector to finance, build and operate transmission assets under the management of a national transmission operator and dispatch manager.

The “Roadmap for Eskom” details potential reform paths also for the governance of the distribution segment. These reforms may look to:

- Reform the current governance structure and the challenges it poses to a coordinated approach to electrification expansion; and

- Adopt necessary regulation to implement the ability of distributors to procure energy directly from embedded generators, or invest in their generation infrastructure.

Eskom’s repeated challenges to NERSA’s tariff decisions in the High Court increase the uncertainty around regulatory decisions. The creation of an appeal mechanism to solve disputes among market operators would benefit the governance of the ESI and increase regulatory stability.

To enhance the Attractiveness of the electricity market:

- Transparency of the tariff methodology, the tariff review rules and procedures, as well as the cost-reflectiveness of tariffs are fundamental for ensuring the financial viability of the electricity sector operators. The decision of Eskom to contest NERSA’s recent tariff increases in the High-Court shows the sensitivity of tariff regulation in South Africa and leaves the door open to uncertainty about tariffs in the country. South Africa may benefit from:
Conclusions and Recommendations

- Continue to pursue cost-reflectiveness of tariffs in the long-term.
- Unbundle the tariff system, also in view of the creation of an independent transmission company.
- Introduce better transparency in the cost of wheeling service and charges.

The development of dedicated regulation for the definition of mini-grid tariffs would support the evolution of this market, today penalized by the lack of dedicated regulation. This effort can be implemented by pursuing:

- An assessment of the implications of the current tariff system on the development of mini-grids.
- The analysis and quantification of the need for incentives to ensure the financial sustainability of mini-grid assets.
- The adoption of the principle of cost-reflectiveness for off-grid tariffs and the implementation of a standard tool for mini-grids’ tariffs calculation.

Define and publicly disclose medium-term schedule of public tenders for the procurement of new capacities, notably the ones under the REIPPPP, to provide long-term visibility to investors and increase competition.

Improve the accessibility to incentives and credit-enhancement instruments for distribution and off-grid investors to enhance project bankability.

To enhance the Readiness of the electricity market:

Streamline authorizations requirements and issuing rules for investors and market operators by the implementation of a one-stop-shop for authorization and permits application and issuance.

Regulatory advancements in the off-grid segment, especially through the adoption of dedicated regulation for mini-grids, would support the expansion of these technologies. This could be done by:

- Adopt clear rules on commercial options for mini-grid operators and asset owners in the case of main grid arrival.
Conclusions and Recommendations

Adopt clear rules on commercial options for mini-grid business continuity or exit options to reduce potential risks and provide investors with clarity about the continuity of revenues after the main grid arrives.

The development of mini-grid assets will also benefit from the adoption of dedicated regulation for technical standards and requirements for their integration with the main grid infrastructure. This could be done by defining dedicated technical standards for mini-grids, which can offer mandatory and optional grid-compatible standards that will ensure the safety, stability, and reliability of the power system without adding unnecessary burdens and costs for developers.

4.3 Way forward

The success, in expanding electricity access and developing generation capacity, through the integration of IPPs confirms the success of past reforms in ensuring the development of South Africa’s electricity market. The results of the assessment confirm the preparedness of the country’s electricity legislation and regulation to address concerns to private sector participation, most notably in the generation market. However, recent challenges in terms of ensuring the reliability of the electricity service and the continuing financial challenges of the public utility highlighted the risk of great dependence of the national electricity system on the public utility. It further pinpointed the need to increase private sector participation. Indeed, the South African government acknowledged this need and put electricity market reforms at the top of its political agenda.

As South Africa enters a new phase of electricity market reform and seeks greater participation of private sector actors, policies and regulations will play a key role in ensuring its success. This regulatory review evaluated the openness, attractiveness, and readiness of the current national policy and regulatory framework across the value chain to determine its ability to effectively crowd-in private sector participation. Areas of strength, as well as areas of further improvement, have been identified and key recommendations have been offered to support South Africa in achieving its goals. To this end, the review offers a constructive identification of areas of policy and regulatory enhancement and reforms for a competitive, resilient, and sustainable electricity sector.

South Africa’s economy will need a reliable electricity supply to sustain its recovery and future growth and South Africans will need affordable power to thrive.

The UN Economic Commission for Africa and the RES4Africa Foundation remain committed to supporting South Africa in addressing any of the identified regulatory and policy gaps, investing in the necessary regulatory capacity development, as well as any area of particular
reform interest for South Africa towards greater openness, attractiveness, and readiness of the market. They also call on the development community, NGOs, ISOs, national organisations, and the private sector to play their constructive role in supporting South Africa in this reform process, aimed at economic transformation and achievement of the SDG7 goals.
References


29. XE. n. d. [online] Available at: https://www.xe.com/currencyconverter/convert/?Amount=1&From=USD&To=ZAR [Accessed 24 May 2021]
Acronyms

BOOT  Build, Own, Operate, and Transfer
DEA   Department of Environmental Affairs
DMRE  Department of Mineral Resources and Energy
DoE   Department of Energy
DPE   Department of Public Enterprises
DWS   Department of Water and Sanitation
EAF   Energy Availability Factor
EPC   Engineering, Procurement and Construction
ERA   Electricity Regulation Act
GDP   Gross Domestic Product
GHG   Greenhouse Gas
GoSA  Government of South Africa
GTAC  Government Technical Advisory Centre
IEP   Integrated Energy Plan
IMD   Institute for Management Development
IPPPP Independent Power Producer Procurement Program
INEP  Integrated National Electrification Program
IPP   Independent Procurement Program
IPPs  Independent Power Producers
IRP   Integrated Resource Plan
KPIs  Key Performance Indicators
MPC   Monetary Policy Committee
MW    Mega-Watt
MYPD  Multi-Year Price Determination
NDC   Nationally Determined Contributions
NDP   National Development Plan
NERSA National Energy Regulator of South Africa
NGPG  Non-Grid Policy Guidelines
NNR   National Nuclear Regulation
NT    National Treasury
NTC   National Transmission Company
PPAs  Power Purchase Agreements
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPPs</td>
<td>Public-Private Partnerships</td>
</tr>
<tr>
<td>PSP</td>
<td>Private Sector Participation</td>
</tr>
<tr>
<td>REFIT</td>
<td>Renewable Energy Feed-in-Tariff</td>
</tr>
<tr>
<td>REIPPPP</td>
<td>Renewable Energy Independent Power Producer Procurement Program</td>
</tr>
<tr>
<td>REIPPs</td>
<td>Renewable Energy Independent Power Producers</td>
</tr>
<tr>
<td>RES</td>
<td>Renewable Energy Sources</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposal</td>
</tr>
<tr>
<td>SADC</td>
<td>South African Development Community</td>
</tr>
<tr>
<td>SAGC</td>
<td>South African Grid Code</td>
</tr>
<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
</tr>
<tr>
<td>SHS</td>
<td>Solar Home Systems</td>
</tr>
<tr>
<td>TWh</td>
<td>Terawatt-hour</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>VAT</td>
<td>Value-Added Tax</td>
</tr>
</tbody>
</table>
### Annexes

#### Annex A

**Policies, Plans and Regulations (Accessed 24/05/2021)**

<table>
<thead>
<tr>
<th>Policy/Act</th>
<th>URL</th>
</tr>
</thead>
</table>
## Annex B

An overview of the *Topics* assessed

<table>
<thead>
<tr>
<th>Openness</th>
<th>Attractiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy Strategy</strong></td>
<td>The existence and characteristics of energy and climate policies.</td>
</tr>
<tr>
<td><strong>System Planning</strong> (also <em>Readiness</em>)</td>
<td>The existence and characteristics of plans for generation expansion, network development and electrification.</td>
</tr>
<tr>
<td><strong>Power Sector Governance</strong></td>
<td>The existence of an Energy Act or Law defining the operational regime of market agents, and the existence and role of an energy regulatory authority.</td>
</tr>
<tr>
<td><strong>Power Sector Framework</strong></td>
<td>The degree of unbundling of generation, transmission, and distribution services.</td>
</tr>
<tr>
<td><strong>Power Sector Competition</strong></td>
<td>The Openness of the electricity market to competition.</td>
</tr>
<tr>
<td><strong>Private Sector Participation Model</strong></td>
<td>The number of available models for private parties to participate in the power sector.</td>
</tr>
<tr>
<td><strong>Procurement Process</strong></td>
<td>The characteristics of PPP procurement policy, competitive tenders, and solicited/unsolicited proposals.</td>
</tr>
<tr>
<td><strong>Off-taking Options (for Generation)</strong></td>
<td>The existence of a spot market or single-buyer as well as the regulatory characteristics of private PPAs and captive generation.</td>
</tr>
<tr>
<td><strong>Contract Regulation</strong></td>
<td>The structure and characteristics of public PPAs, TSAs, DSAs, and standard retail contracts for off-grid operators.</td>
</tr>
<tr>
<td><strong>Economic Regulation</strong></td>
<td>The structure and definition of the retail and network tariff.</td>
</tr>
<tr>
<td><strong>Incentives</strong></td>
<td>The existence of instruments incentivizing private investors to operate in the power sector (e.g., FIT, capacity payments, green certificates, RES quotas).</td>
</tr>
<tr>
<td><strong>Indirect Incentives</strong></td>
<td>The existence of policies or instruments indirectly incentivizing private investors to operate in the power sector (e.g., carbon pricing, result-based financing, tax relief).</td>
</tr>
<tr>
<td><strong>Credit Enhancement</strong></td>
<td>The existence of lending agreements or guarantees that reduce risk or costs for private investors entering the power sector.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Authorizations and Permits</td>
<td>The existence and characteristics of permits needed for the construction of assets in the power sector (e.g., land &amp; water rights, construction, and environmental permits)</td>
</tr>
<tr>
<td>System Planning</td>
<td>The existence and characteristics of the network development plan.</td>
</tr>
<tr>
<td>Grid Code</td>
<td>The characteristics of the grid code (e.g., the existence of rules for system operation and connection).</td>
</tr>
<tr>
<td>Grid Access</td>
<td>The existence of third-party access and the characteristics of grid connection and operation agreements.</td>
</tr>
<tr>
<td>System Quality and Security Standards</td>
<td>The existence of quality and security standards for transmission network planning and operation.</td>
</tr>
<tr>
<td>Access to Data</td>
<td>The public availability of data related to electricity sector performance.</td>
</tr>
<tr>
<td>System Integration (for Off-Grid)</td>
<td>The existence and characteristics of regulation for grid arrival.</td>
</tr>
</tbody>
</table>
### Annex C
#### ESKOM Losses

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>Transmission Losses</th>
<th>Distribution Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009/10</td>
<td>3.3</td>
<td>5.9</td>
</tr>
<tr>
<td>2010/11</td>
<td>3.3</td>
<td>5.7</td>
</tr>
<tr>
<td>2011/12</td>
<td>3.1</td>
<td>6.3</td>
</tr>
<tr>
<td>2012/13</td>
<td>2.8</td>
<td>7.1</td>
</tr>
<tr>
<td>2013/14</td>
<td>2.3</td>
<td>7.1</td>
</tr>
<tr>
<td>2014/15</td>
<td>2.5</td>
<td>6.8</td>
</tr>
<tr>
<td>2015/16</td>
<td>2.6</td>
<td>6.4</td>
</tr>
<tr>
<td>2016/17</td>
<td>2.2</td>
<td>7.6</td>
</tr>
<tr>
<td>2017/18</td>
<td>2.0</td>
<td>7.7</td>
</tr>
<tr>
<td>2018/19</td>
<td>2.2</td>
<td>8.5</td>
</tr>
<tr>
<td>2019/2020</td>
<td>2.2</td>
<td>8.8</td>
</tr>
</tbody>
</table>

*Source: Eskom Integrated Report (2019)*