



United Nations  
Economic Commission for Africa



# **Regulatory Review of the Electricity Market in Mozambique:**

**Towards Crowding-in Private  
Sector Investment**







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This analysis is based on policies, laws and regulations adopted until April 2022. Therefore, the results will not consider and/or reflect the impact of policy and regulatory changes adopted thereafter.

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The national policy and regulatory data necessary for objective regulatory review, as well as the draft country economic, energy sector, and regulatory context was ably developed by the national consultant, Engineer Ade Sousa Fernando, former deputy Minister of Mineral Resources and Energy and ex-CEO of Eletricidade de Mocambique. 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, Energy Regulatory Authority, National Fund for Rural Electrification, Electricidade de Moçambique, Mozambique Transmission Company and other institutions represented by the following sector leaders and experts: Mr. Pascoal Alberto Bacela (National Director of Energy); Mr. Joao Domingos; Ms. Marcelina Mataveia; Mr. Techini Honwana; Mr. Yara Assia Cabra Ventura; Mr. Antonio Chicachama; Mr. Antonio Munguambe; Mr. Filipe Ilidio Mondlane; and Mr. Sansao Machiana.

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## Executive Summary

This report provides an analysis of Mozambique'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.

Mozambique has enjoyed stable economic growth during the last two decades. With the implementation of political and economic reforms, real GDP growth averaged 5 percent between 2010 and 2020, making it one of the fastest-growing countries in Sub-Saharan Africa.

Furthermore, the country has been actively pursuing energy sector reforms for more than two decades. Reforms have included the corporatization of the national utility, Electricidade de Moçambique (EdM), and the introduction of the Electricity Law, which provided an element of competition and opened up the electricity sector to new entrants. This entailed the creation of a regulatory body, the Autoridade Reguladora de Energia (ARENE), and the creation of a rural electrification fund, the Fundo Nacional de Energia (FUNAE).

The Electricity Law, adopted in 1997, regulates the licensing of energy projects and related activities. Its purpose is to open up the energy sector to greater private sector participation through concession contracts with the government and the implementation of power purchase agreements (PPAs) with the national utility EdM. The law requires that projects related to power generation, transmission, and distribution, as well as the construction, operation, and management of power plants be awarded concessions through a public competitive bidding process.

Mozambique's first independent power producer (IPP) was launched in 2015, paving the way for future negotiations and for a more standardized bidding process in recent years. Since then, several IPPs have emerged, operating under different contracts and using different resources, including coal and solar.

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 framework governing the electricity generation market of Mozambique is effective in crowding-in private sector investments. Investors benefit from efficient and transparent *market governance*, new generation capacities planning, and a relatively open environment for private sector participation. The awarding of standardized PPAs confirms 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 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, EDM. On the other hand, regulatory provisions concerning the availability and access to *direct* and *indirect incentives* for private generators remain unsatisfying. In addition, the lack of an updated *energy strategy* remains a major barrier to interested investors which lack long-term market signals on which building their investment strategies.

## Main findings related to the transmission segment

In Mozambique, a transmission investment plan and clear network development targets are present. However, despite concessions being made available to private entities, the transmission segment only offers moderate *attractiveness* to the private sector, as the regulation does not define the standard provisions that need to be included in these concessions. The access to several *credit enhancement* instruments to private investors in the transmission segment, such as concessional lending and revenue escrow agreements, is also possible. The regulatory environment demonstrates fair *readiness* since the *grid code* provides system operation rules and connection rules for generators. However, the contractual framework for connections to, and use of, the transmission network is not defined. Furthermore, the public sector preference to go progressively on implementation of full unbundling has limited actual private sector participation beyond the generation market. Finally, data on dispatching and quality of transmission service is not publicly shared, limiting transparency.

## Main findings related to the distribution segment

Similar to the transmission segment, private participation is theoretically possible through a concession or an engineering, procurement, and construction (EPC) model, albeit it has not occurred yet. EDM remains the sole national concessionaire for the distribution system and the segment lacks defined PPP models or competitive tenders that would aid in making private participation a reality. Mozambique performs moderately in the *attractiveness* Dimension of the distribution segment as the review has highlighted some gaps arising from the lack of standardized *contract regulation* to define the rights and obligations of electricity distributors as well as a transparent network tariff structure to provide information for private investors to evaluate the profitability of potential projects. *Access to data* and *authorizations and permits* score well in the *readiness* Dimension of Mozambique's distribution segment while the remaining other Topics leave ample room for improvement. There is no dedicated distribution *grid code* and the current *grid code* currently only considers the transmission system and does not define the system operation rules for the distribution system.

## Main findings related to the off-grid segment

Mozambique's off-grid market segment displays a fair degree of *openness* to private investment. This is mainly due to the clear electrification policy and programs such as Projecto Energia para Todos – ProEnergia. The broad national electrification policy is evidence of Mozambique's strategic commitment to the development of the off-grid market. Furthermore, the country's commitment is reinforced by the Regulation on Off-Grid Energy Access, approved on September 15, 2021, which details the relevant concession requirements and the rights and obligations of the parties involved. However, the sector currently offers limited incentives for private investors, mainly due to the absence of VAT or import duty reductions on generation assets and off-grid components, as well as the lack of defined standard retail contracts or rules on metering and tariffs. In addition, the lack of a standard tariff calculation tool has led to uncertainty in financial planning for potential investors. On the other hand, with the enactment of the Regulation on Off-Grid Energy Access, great progress has been made in the *readiness* Dimension by adopting clear rules on *off-grid system integration*, detailing commercial and exit options for mini-grid business continuity in the event of encroachment with the main grid, as well as specifying *system quality and security standards*.

## To enhance the *Openness* of the electricity market

- ⚡ Adopt an updated energy strategy, detailing strategic long-term priorities for the development of the electricity sector.
- ⚡ Set ambitious but realistic and quantifiable targets (i.e., in terms of power generation technology development, network expansion, serving customers, reducing GHG emissions, etc.), and adopt an explicit roadmap for their achievement.
- ⚡ Improve system planning by implementing formal plan review procedures, and a periodic review timeline.
- ⚡ Assess feasibility options for EDM restructuring to create a separate entity with the responsibility of transmission asset management and system operation.
- ⚡ Explore potential benefits of separating EDM's generation and distribution functions to create more opportunities for private sector participation in both market segments, as well as in electricity trading and retailing.
- ⚡ Adopt rules and procedures for processing and evaluating unsolicited proposals.

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

- ⚡ Adopt a standardized PPA template, or blueprint, for specific generation asset technologies to reduce transaction costs.
- ⚡ Adopt standardized Transmission and Distribution Service Agreements to establish roles and responsibilities, as well as clarify the financial terms during a project period.
- ⚡ Adopt a standard model for power supply agreements with clients of off-grid and mini-grid operators.

- ⚡ Define transparent rules for tariff setting and a consequent tariff methodology based on clear service cost-components, including network services.
- ⚡ Review the current regulation on tax and duties exemptions dedicated to electricity infrastructure investors and simplify access to these instruments.
- ⚡ Adopt the principle of cost-reflective tariffs for stand-alone networks and introduce a standard tool for calculating mini-grid tariffs.

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

- ⚡ Ease the procedures to obtain authorizations and permits through the implementation of a one-stop shop for their request and issuance.
- ⚡ Further improve the network development plan by adding a formal review procedure as well as regular assessments of the network expansion and grid flexibility needs.
- ⚡ Implement a dedicated distribution *grid code* to enhance the regulatory certainty.
- ⚡ Clarify the contractual framework for the connection to and the use of transmission and distribution networks as well as the allocation of costs.
- ⚡ Introduce compensation mechanisms for mini-grid operators stranded assets in case of arrival of main grid infrastructure in the area.

As Mozambique 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 Mozambique 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 Mozambique towards greater *openness*, *attractiveness*, and *readiness* of the electricity market.



# Introduction



*Night Skyline view Maputo Mozambique  
Photo credit: Getty Images/Sette Seves*

# 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). 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 national grid is primarily operated by the state-owned Electricidade de Moçambique (EdM), which is responsible for the generation, transmission, and distribution of electricity. It is overseen by the Ministry of Mineral Resources and Energy (MIREME). Notably, a small portion of the lines belongs to Hidroeléctrica de Cahora Bassa (HCB), operator of the Cahora Bassa hydroelectric power plant, and Mozambique Transmission Company (MOTRACO), which supplies electricity to Mozambique's aluminum plants.

Mozambique's energy sector consists mainly of hydroelectric power plants. As a result, climate change affecting hydropower use poses a serious challenge to the water sector. Across Africa, and in Mozambique in particular, water supply systems are at low levels and the government is already having difficulty in providing sufficient access to the population. Climate change will make the management of most systems more challenging in the future.

This regulatory review examines these and additional issues in-depth concerning the crowding-in of private sector investment in the electricity market of Mozambique, from generation to networks and off-grid market segments. This analysis is based on policies,

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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.

Sustainable Development Goal 7 aims to ensure access to affordable, reliable, sustainable and modern energy for all.

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laws and regulations adopted until April 2022. Therefore, the results will not consider and/or reflect the impact of policy and regulatory changes adopted thereafter. 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







*Spray of water coming out of Cahora Bassa's dam, Mozambique  
Photo credit: Getty Images/Patrick Durand/Sygma*



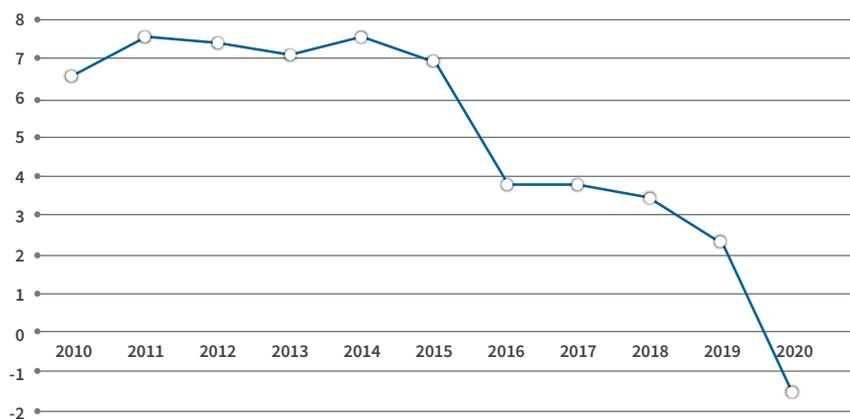
## 2.1 Macroeconomic overview

Mozambique is a low-income country (AfDB, 2018), yet it has experienced sustained economic growth over the past 20 years. Following political and economic reforms, pre-Covid real GDP growth averaged 5.5 percent between 2010 and 2019 (see Figure 1), placing Mozambique as one of the fastest-growing economies in Sub-Saharan Africa. Economic growth was supported by large foreign investment projects in the extractive and services sectors, political stability, and support from development partners (World Bank, n.d.).

However, the economic performance began to slow down in 2015 which is due to several reasons. Growth in services and agriculture sectors declined as a result of the completion of several major projects, freezing of budgetary support by partners, incidence of drought (El Niño) hitting agricultural production, and the prevalence of lower commodity prices negatively affecting aluminum exports (AfDB, 2018).

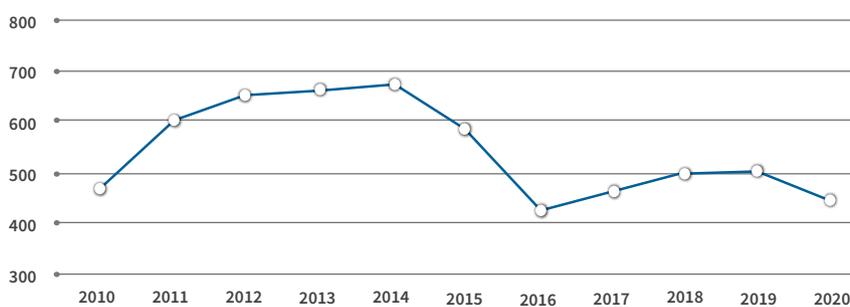
In addition, the economy contracted by 1.3 percent in 2020, which was for the first time in almost three decades (Figure 1) (World Bank, n.d.). Conversely, GDP per capita, after having declined in 2016, remained quite stable with an average value of \$470 per capita (Figure 2). Throughout the past decade, Mozambique also accrued more debt as a share of GDP, with a peak ratio of 119.9 in 2016 (Figure 3).

Figure 1: GDP growth (% , 2010-2020)



Source: World Bank (n.d., accessed 2021)

Figure 2: GDP per capita (USD, 2010-2020)



Source: World Bank (n.d., accessed 2021)

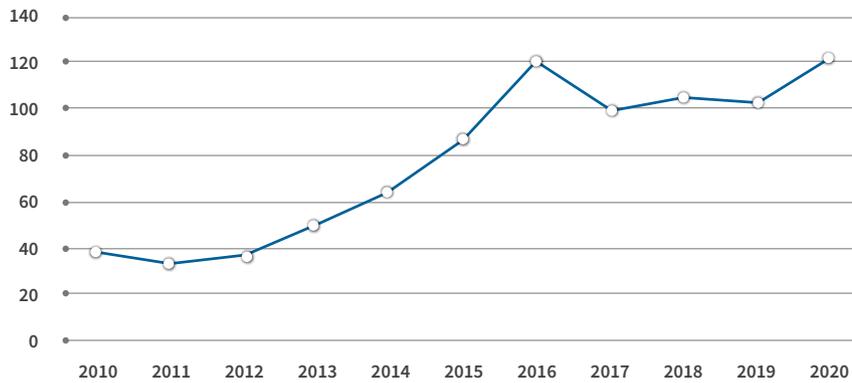
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### Debt-to-GDP

Figure 3: Debt to GDP ratio (2010-2020)



Source: IMF (2021)

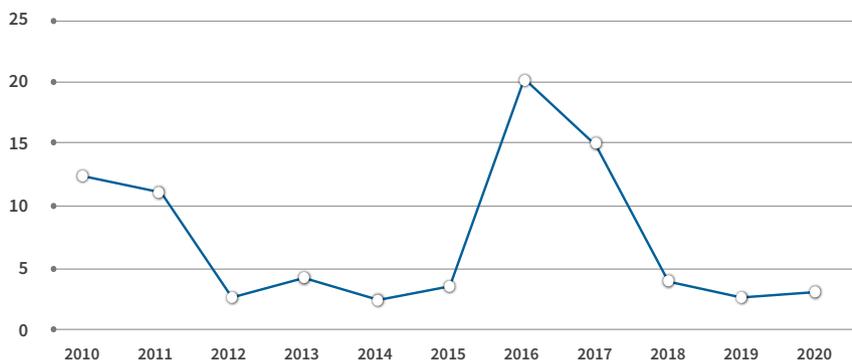
### Inflation and exchange rate stability

The central bank of Mozambique, Banco de Moçambique, issues and regulates the national currency, the metical (MZM). The MZM depreciated significantly in the second half of 2016 caused in part by the discovery of previously hidden loans to state-owned enterprises.

The devaluation led to higher-than-expected inflation. Indeed, inflation has averaged 7.5 percent over the past decade, reaching a record high of 19.9 percent in 2016, which is the highest since 1996 (IMF, 2021). As a result, Banco de Moçambique promulgated a Foreign Exchange Control Regulation establishing the rules and procedures to be followed for foreign exchange transactions and operations under the Foreign Exchange Law.

This Regulation proved adequate to control inflation and stabilize the currency. Since then, with the help of foreign exchange inflows from large coal exports, the metical has stabilized (AfDB, 2018) and inflation has dropped to 4 percent in 2018 (World Bank, n.d.).

Figure 4: Inflation rate (% , 2010-2020)



Source: IMF (2021)

### ***Business climate***

Mozambique ranks 138<sup>th</sup> out of 190 countries, a slight regression from its 135<sup>th</sup> ranking in 2019. It also underperforms compared to four of its neighbors: South Africa, Zambia, Malawi, and Eswatini (World Bank, 2020).

However, some improvements have been made in the payment of taxes and cross-border trade through streamlined procedures. In addition, it has been easier to obtain electricity due to improved monitoring and regulation of power outages (ibid).

On the other hand, setting up a business has been more expensive due to the increase in the cost of publishing the deed of companies and the obstacle of access to credit affecting business competitiveness (World Bank, 2020).

## **2.2. Electricity sector overview**

Most of the relevant generation investments took place between 2012 and 2019. During this period, thanks to the building of more than 10 plants and the rehabilitation of the Mavuzi and Chicamba plants, total generation capacity added reached 894 MW. Of this capacity, 288 MW is the capacity of emergency power plants built to minimize the energy deficit in the Southern African Region.

Most of the new plants built are gas-fired power plants, benefiting from the exploration of natural gas in Pande and Temane, which is being exported to South Africa. To meet domestic power demand, the government decided to allocate part of the natural gas to power generation.

### ***Electricity consumption***

Despite the overall growth in electricity production, consumption, and electrification rate, there has been a significant downward trend in 2016 due to a generation power deficit as well as the limited transmission capacity. The most notable case of this degrowth occurred in the Northern region of Mozambique (Nampula and Nacala), which also lacked network capacity.

To overcome the challenges of power supply in the North Region, the Government of Mozambique through EDM is implementing a long-term solution that includes the construction of the 400 kV Caia - Nacala transmission line, currently under construction on the Caia-Alto-Molocue section. The long-term solution also includes the construction of power plants in Nacala, which are under development stage.

Total electricity consumption in Mozambique grew at an average annualized growth rate of 2.78 percent per year between 2010 and 2019, resulting in an increase of 3 TWh over this period.

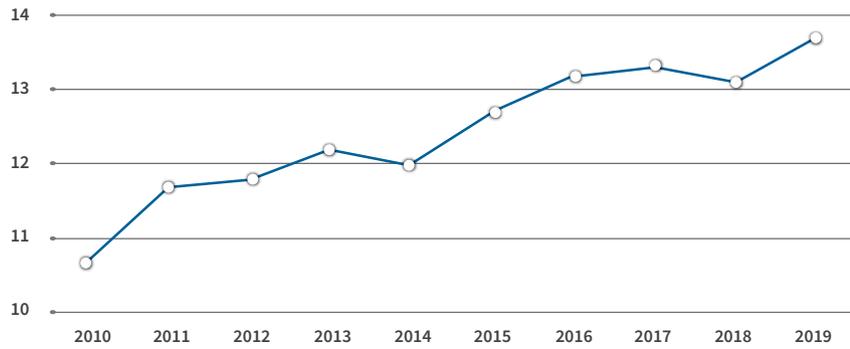
As the population grew steadily over the past decade, this trend has not resulted in a consequent growth in the per capita consumption of electricity.

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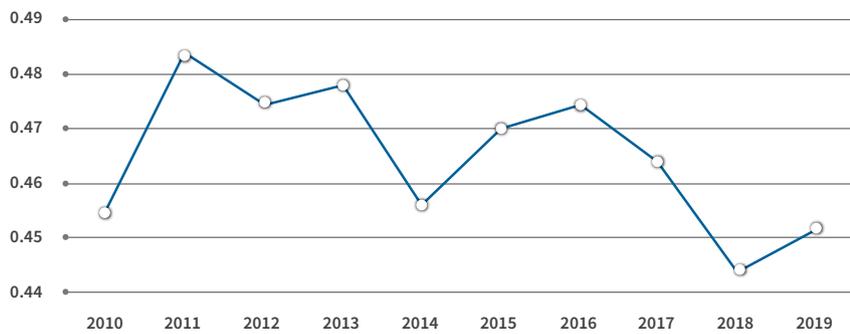
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Figure 5: Electricity consumption, total (TWh, 2010-2019)



Source: IEA (2020)

Figure 6: Electricity consumption, per capita (kWh, 2010-2018)



Source: IEA (2020), World Bank (n.d., Accessed 2021)

### On-grid installed capacity and electricity production

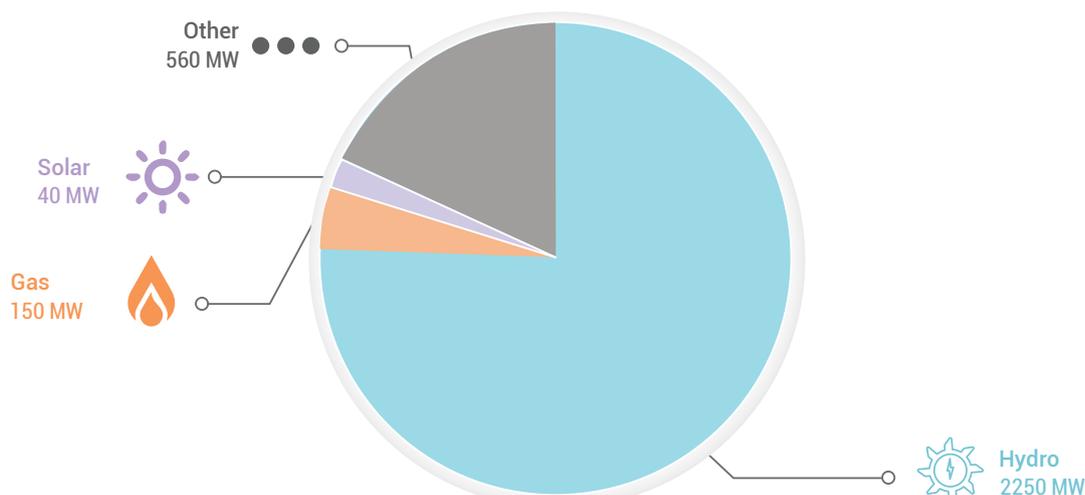
Similar to many other Sub-Saharan countries, Mozambique relies heavily on hydropower to meet its national power demand. Two-thirds of the roughly 3,000 MW installed capacity are based on hydro sources, whereas renewable and gas generation currently supply 1 percent and 5 percent, respectively (see Figure 7). This is also reflected in the total electricity production where 84 percent of total generation in 2018 was from hydro sources, followed by 16 percent gas and less than 1 percent solar (being residual, the latter has been omitted from the graph in Figure 8).

Yet, Mozambique made an effort in recent years to diversify its generation mix with some renewables but primarily gas, since before year 2010, 100 percent of the country’s generation depended on hydro with around 95 percent of it being in the hands of Hidroeléctrica de Cahora Bassa (HCB).

With the exploration of natural gas from Pande and Temane, the Government decided to allocate part for domestic use including gas to power projects. As a result, new installed capacity between 2010 and 2019, mainly came in the form of gas fired power plants.

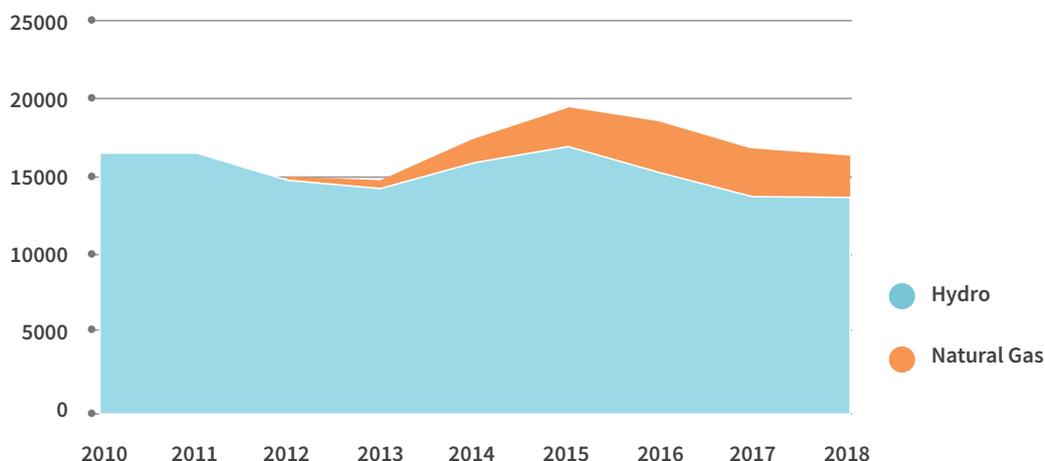
The emergency gas plants, however, were quickly decommissioned to allow for long-term power plants, the first being by Central Térmica de Ressano Térmica (CTRG) in 2015.

Figure 7: Installed generation capacity (MW, 2020)



Source: Power Africa (n.d., Accessed 2021)

Figure 8: Electricity production (GWh, 2010-2018)



Source: IEA (2020)

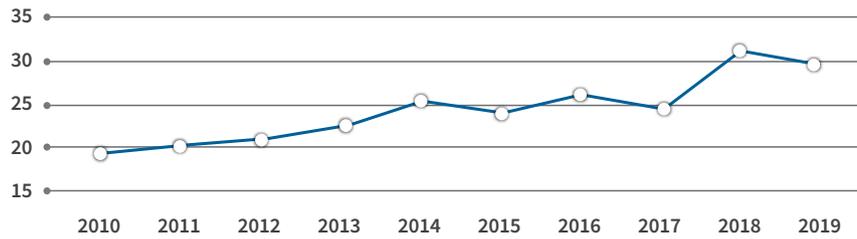
### Access to electricity

The investments made in generation, transmission, and distribution allowed an increase in the access to electricity from 18.8 percent in 2010 to 29.6 percent in 2019.

Particularly, since 2017, there has been significant growth in the access rate resulting directly from the current electrification program “Energy for All”. The program was launched in 2018 with funding support from the World Bank and aims to achieve universal access to electricity by 2030. The program is based on the following three pillars (World Bank, 2021):

- Peri-urban and rural electrification;
- Off-grid electrification;
- Technical assistance and implementation support.

Figure 9 : Electrification rate (% , 2010-2019)



Source: World Bank (n.d., Accessed 2021)

### Electricity service quality and reliability

One of the major challenges affecting EDM is energy losses, which are divided into technical and commercial losses, where around 80 percent of total losses are attributable to the distribution network and only 20 percent to the transmission network (IMP, 2018).

According to the IEA, transmission and distribution (T&D) losses have remained fairly stable over the past decade, hovering just below 15 percent of total output, with a high of 17.8 percent in 2013 (World Bank, 2018). One factor contributing to the losses has been cited to be energy theft, particularly triggered by tariff readjustment in 2015, 2017, and 2018.

Until 2014, EDM had an Energy Efficiency Department which, among other duties, was responsible for working exclusively on loss reduction programs and for that purpose, at the time, specific loss reduction programs were designed. In 2016, the Energy Efficiency Directorate was dissolved and replaced by the Revenue Protection and Loss Control Directorate, which is preparing a plan to reduce losses.

For many years, Mozambique’s power supply was based on HCB, with a contribution of over 90 percent. Taking advantage of HCB’s power, an electrification program was developed by the government, the first phase being the extension of the transmission network to all provincial capitals, whose program was completed in 2006 with connection to Pemba (Cabo Delgado Province).

While the implementation of the transmission network extension program was underway, there was a vast electrification program through the expansion of the distribution network to the districts. This effort led to the increase in the number of new connections.

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### Off-grid electricity market

The evolution of the off-grid systems and assets is at very early stage, since until now, only the National Energy Fund (FUNAE), which is the government entity responsible for this activity, has projects in this regard. However, initiatives from the private sector on off-grid solutions have been emerging and solar home systems have been implemented in some provinces, contributing to the increase in the electricity access rate.



## 2.3 Electricity sector governance and market structure

### *Overview of the electricity sector reforms*

This section presents a summary of key events in the history of power sector reforms in Mozambique.

#### **The first round of legislative reforms: towards the establishment of the Electricity Law (1975-1997)**

After gaining its long-awaited independence from Portugal in 1975, Mozambique entered a troubled political period marked by a devastating civil war (1977–1992). Along with the enormous suffering of the population, manifested in the overall decline in population and life expectancy, this period led to a generalized economic paralysis and the devastation of essential infrastructures, including electricity ones. In the years after the Rome General Peace Accords signed in 1992 and the end of the civil conflict, the government actively pursued economic reform programs to reignite economic growth within the country. The energy industry was among the priority sectors to be addressed by the reform programs, which culminated into the adoption of the Electricity Law (Law No. 21/1997). The Electricity Law defined the general governance framework of the national electricity sector and specified legal regimes for the electric power generation, transmission, distribution, and commercialization activities and operators. It also clarified power import and export, and the concession regime under which electricity operators had to provide their services. Furthermore, the Electricity Law established the National Electricity Council (CNELEC) as a body responsible for issuing opinions on the technical merit and quality of proposals submitted in reply to any tender for the concession of activities in the electricity sector (Final Energy Report Mozambique, 2018). In the same year, the Fundo Nacional de Energia (FUNAE) was established as a public institution to promote rural electrification and rural access to modern energy services, thus contributing to the economic and social development of the country.

Following the adoption of the Electricity Law (1997), which recognized the possibility for private entities to operate in the electricity market through concession agreements, the government moved forward with its vision to increase private sector participation in the electricity sector. In 1998, the Council of Ministers, under Resolution No. 5/1998, approved the Energy Policy, one of the main energy documents in the country, which focuses on the importance of meeting present and future demand, providing energy both to the households and productive sectors.

#### **Establishment of the national strategies' framework (2001-2013)**

A second wave of reforms came at the end of '00s years, initiated by the adoption of a new Energy Strategy, approved by the Council of Ministers through its Resolution No. 10/2009 of 4 June. Acknowledging the importance of electricity infrastructures and electric supply for national socio-economic development, the document identifies energy sector main challenges and opportunities, also in a period of increased prices of fossil fuels. The Strategy indicates major priorities for Mozambique's energy policy as: accelerate electrification efforts, also through the expansion of the national transmission grid and renewable energies deployment; adopt mechanisms capable of stabilizing prices and reflect costs; support productive usages of energy; increase institutional coordination and management of the sector; integrate in the

regional energy market, also thanks to SADC. As the strategy had the objective to diversify the energy mix, giving particular emphasis to new and renewable sources of energy, it was followed by the adoption of the Renewable Energy Development Policy, in 2009. Going in the same direction, the Renewable Policy aims to promote the use and exploitation of renewable energy resources to accelerate access to modern forms of energy and create a favorable investment platform.

**Reforming electricity sector governance and market framework (2014-current)**

Major steps towards reforming the governance of the electricity sector were taken in the last years. The Autoridade Reguladora de Energia (ARENE), which replaced the previous National Electricity Council (CNELEC), has been set up, under the Ministry of Mineral Resources and Energy (MIREME) directorate, by Law No. 11/2017. ARENE acts as a supervisor of the compliance to the laws, regulations and standards regulating the energy sector.

In November 2018, under the umbrella of the National Energy for All Program, the President of the Republic launched the National Electrification Strategy whose main objective, as remarked in the opening session of the program, was bringing energy to all Mozambicans (ALER, 2018). Also, during 2018, the Government approved the Integrated Master Plan of Energy Infrastructures which defines the expansion guidelines for power generation, transmission, and distribution, as well as the diversification of power generation matrix (EDM, 2018).

Along with these major reforms, the government is also discussing the reform of the Electricity Law, which will redefine more in depth the general operational framework of electricity services, providing further clarity about the rights and obligations of market operators.

***Institutions governing the electricity sector***

The electricity sector of Mozambique is governed by three main institutions: the Ministry of Mineral Resources and Energy; the Energy Regulatory Authority; and the Energy Fund. These institutions oversee the range of market players operating in the power sector and work towards the implementation of the electricity policy goals.

*Table 1: Institution governing the electricity sector*

<p>Ministry of Mineral Resources and Energy (MIREME)</p>	<p>The Ministry of Mineral Resources and Energy is a central State body that directs and ensures the execution of the Government’s policy in geological research, exploration of mineral and energy resources, and in the development and expansion of the infrastructure for the supply of electricity, natural gas, and petroleum products.</p> <p>Under the MIREME, the following sector Regulators have been established:</p> <ul style="list-style-type: none"> <li>• Energy Regulatory Authority (ARENE): Energy Regulator</li> <li>• National Petroleum Institute (INP): Petroleum Regulator</li> <li>• National Institute of Mines (INAMI): Mining Regulator</li> <li>• Atomic Energy Agency (ANEA): Nuclear Energy Regulator</li> </ul>
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Energy Regulatory Authority (ARENE)	The Energy Regulatory Authority is a governmental consultative and advisory body, under the directorate of MIREME, also functioning as a regulator for the generation, transmission, and sale of electricity. ARENE regulates and supervises the electricity, natural gas, and liquid fuels sub-sectors, thus ensuring that the energy sector is aligned with best international practices.
National Fund for Rural Electrification (FUNAE)	The Energy Fund is a public institution which has been established in 1997 under the Electricity Law. It aims to promote energy access by contributing to the development, production, and productive use of alternative energy sources in rural areas.

*Table 2: Market players*

The national utility, EDM, is the leading market player in the Mozambican electricity market. However, besides the state-owned generation, transmission, and distribution company, there are several IPPs and private companies operating in the transmission segment, in parallel with EDM.

Electricidade de Moçambique (EDM)	<p>EDM is the national utility responsible for the generation, transmission, and distribution of electricity throughout the country. Founded in 1977, EDM buys most of its power supply from Hidroeléctrica de Cahora Bassa (HCB), owner and operator of the Cahora Bassa hydro power plant on the Zambezi river.</p> <p>EdM currently owns hydro/gas and diesel capacity, as well as the national power grid excluding lines owned by HCB and MOTRACO.</p>
Hidroeléctrica de Cahora Bassa (HCB)	HCB is the operator of the Cahora Bassa Dam which was built in 1969 by the Portuguese administration. The Mozambican government currently owns 92.5 percent of the company while the remaining 7.5 percent is owned by the Portuguese government. HCB is the largest power producer in the country with an installed capacity of 2,075 MW. The company operates as an IPP supplying power to Mozambique, South Africa, and Zimbabwe.
Mozambique Transmission Company (MOTRACO)	Established in the late 1990s, the Mozambique Transmission Company (MOTRACO) is an independent power transmission operator whose shareholders are EDM, South Africa Electricity Supply Company (ESKOM), and Eswatini Electricity Company (EEC) with a share of 33.33 percent each. It is responsible to supply electricity to MOZAL aluminum smelter in Mozambique, wheeling of power to EDM in Mozambique, and EEC in Eswatini.

### ***Electricity market model***

The electricity supply industry in Mozambique is dominated by the state-owned utility company, EDM. It guarantees about 12 percent of the country's electricity production while the remaining 88 percent is mainly supplied by HCB (ScienceDirect, 2021). Recently, EDM has participated in power generation projects such as the Ressano Garcia Thermal Power Plant (175 MW on gas), Mocuba Solar Power Plant (41 MW of photovoltaic energy), and the planned Temane Thermal Power Plant (400 MW gas power plant) (EDM, 2019).

With regards to the transmission network, it has an extension of 5249 km based on 66, 110, 220, 275 and 400 kV transmission lines (EDM, ND) and almost 3000 MVA of installed capacity. EDM's transmission network is interconnected with neighboring countries, namely South Africa, Eswatini and Zimbabwe and an interconnection project with Malawi is under implementation (AfricaOutlook, ND).

In 2019, EDM's distribution network was extended by about 20,000 km with voltage levels of 33, 22, 11 and 6.6 kV supplying power (Integrated Master Plan, 2018) to around 2 million consumers (EDM, ND). Of these consumers, 91.5 percent correspond to domestic consumers, 8.3 percent are commercial, and the remaining 0.2 percent are industrial (Government of Mozambique, 2018).

The electricity market model also sees the involvement of MOTRACO and HCB (EDM, 2019). The latter is the main source of electricity generation in Mozambique with an installed capacity of 2,075 MW, of which 1,500 MW is committed to Eskom in South Africa under a long-term agreement that ends in 2029. The remaining 500 MW are allocated to domestic market consumption, of which 300 MW and 200 MW is respectively for firm and non-firm power (EDM, 2018).

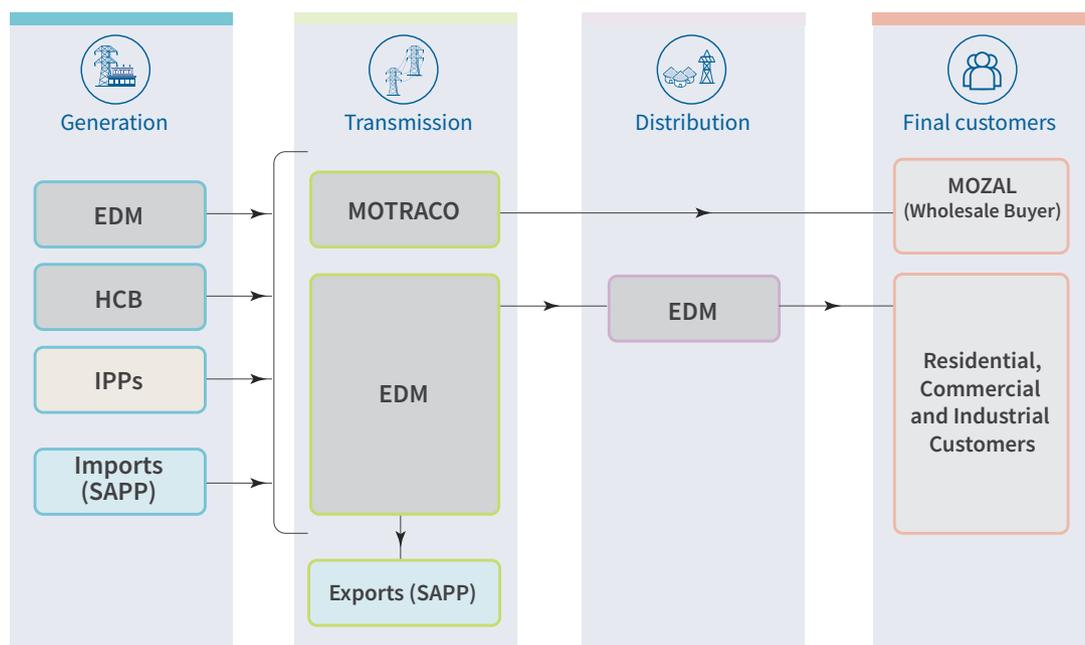
To evacuate the power generated at HCB, there are two 1415 km HVDC transmission lines from Songo (Mozambique) and Apollo (South Africa). The same line is being used to transport EDM's power allocation from HCB to the southern part of Mozambique since, there is no direct interconnection between Songo and the southern part of Mozambique (Eskom, ND).

The current HCB plant is located on the south bank of the existing dam, which was designed to install another power plant on the north bank with a capacity of 1,245 MW. However, the Government decided that its implementation should be realized after the Mphanda Nkuwa plant (1,500 MW), projected 70 km downstream from the current HCB plant. Furthermore, on the Zambezi River, apart from Mphanda Nkuwa, there are plans for other plants such as Boroma (200 MW) and Lupata (600 MW) (EDM, 2019).

MOTRACO was built to supply power to MOZAL aluminum smelter located in Maputo as well as to supply power to Mozambique and Eswatini. The Eskom-MOTRACO-MOZAL power supply agreement will expire in 2025 and MOZAL is currently looking for solutions after 2025.

Lastly, concerning the off-grid segment, the Fundo Nacional de Energia (FUNAE) main objective is the supply of power to isolated systems. The activities of FUNAE are complementary to that of EDM. Therefore, there is strong coordination between the two entities to avoid duplication of efforts; in particular, with the implementation of the Energy for All project that aims at ensuring universal access in 2030 (AfDB, 2017).

Figure 10: High-Level Market Structure



## 2.4 Policies and regulations governing the electricity supply industry

The electricity market of Mozambique 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

Energy Policy (1998)	<p>The policy objectives include capacity building and improved management of the electricity sector, leading to increased exports and efficiency. It sets out the following vision for the development of the sector:</p> <ul style="list-style-type: none"> <li>• Guarantee a reliable supply of energy at the lowest possible cost to meet current and future demand levels based on the trajectory of economic development.</li> <li>• Increasing the number of energy options available for household consumption.</li> <li>• Ensure greater energy efficiency.</li> <li>• Promote clean energy conversion technologies, namely hydropower, solar, wind, and biomass.</li> <li>• Promote competitive, dynamic, and more efficient entrepreneurship.</li> </ul>
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Energy Strategy (2009)	The Energy Strategy approved in 2009 covered the period 2009-2013. The strategy development considered the context of the energy sector which had been witnessing the participation of the private sector in energy production and transmission activities; the development of natural gas distribution and use; the preparation of an electricity master plan; the establishment of a Ministry of Energy; and the emergence of new activities such as the production and use of biofuels and new and renewable energy sources. The government is currently developing a new energy strategy covering the period 2019-2029. The main expected objectives are to strengthen Mozambique's position as an important regional energy producer, support social development and poverty alleviation, and contribute to the overall economic growth.
New and Renewable Energy Development Policy (2009)	The New and Renewable Energy Development Policy (PDENR), approved by Decree No. 62/2009, focuses on the importance of using available renewable resources to meet energy needs and sustainable development in Mozambique, seeking to promote access to modern forms of energy and create a conducive environment for investment. Its objectives are to: promote the provision of high-quality new and renewable energy services at affordable prices; strengthen local and national energy security; reduce the negative impact on the environment; promote technological development; create a competitive market; and promote jobs and income generation.
New and Renewable Energy Development Strategy for the 2011-2025 period (2011)	The New and Renewable Energy Development Strategy (EDENR) was adopted in 2011 at the behest of the former Ministry of Energy (now MIREME). EDENR recognizes the need to develop the use of renewable energy and sets as main strategic goals improving access to better energy services based on renewable energy and promoting public and private investments. EDENR further sets sector-specific RE goals, divided into off-grid and on-grid targets. The off-grid renewable energy target focuses on non-electrified areas and seeks to promote a range of activities that contribute to rural development and poverty eradication by providing access to better and safer energy. The target for grid-connected renewable energy is aimed at developing national renewable energy sources to provide grid power generation, meet demand, diversify the energy mix and protect the environment.
Energy Strategy (2014)	This energy strategy covers a ten-year period (2014-2023). It provided a vision to address challenges and opportunities in the energy sector. The main objectives were to strengthen Mozambique's position as an important regional energy producer, support social development and poverty alleviation, and promote overall economic growth.
EDM strategy (2018)	The EDM strategy for 2018-2028 provides the strategic direction to develop the company as a utility in Mozambique and achieve its transformation. The strategy seeks to address four main priorities: ensure high-quality electricity provision; expand power generation and transmission capacity to meet the growing domestic demand; promote industrial development; and increase energy supply.

National Electrification Strategy (2018)	The National Electrification Strategy has been launched in 2018. This 2018-2030 strategy aims to ensure access to energy by 2030 to all Mozambicans, including commercial and social consumers, on-grid and off-grid in rural, urban and suburban areas. The plan also calls for private operators to enter the electricity market.
Integrated Electricity Master Plan (2018)	The Mozambican Integrated Electricity Master Plan (IEMP) covers the period 2018-2043. It aims to increase the country's ability to generate, consume, and export electricity. The master plan also aims to ensure diversification of energy sources, including hydropower, natural gas, and coal.

## 2.4.1 Key laws and regulations for the electricity supply industry

### *Foundational legislation*

The Electricity Law (Law No. 21/1997) reformed the electricity market by defining the general legal regime for the generation, transmission, distribution, and commercialization of electricity in Mozambique, and the import and export regime and concessions for these activities.

The Electricity Law establishes the principle that all activities must be based on concessions, and creates an advisory body, the CNELEC (later replaced by ARENE). The law opens all areas of power generation, transmission, distribution, and sales to private operators through concession contracts issued by the Ministry of Mineral Resources and Energy. To date, however, private sector operator participation has been limited, except for two recently commissioned gas-fired IPPs and one utility-scale solar photovoltaic project (Ministry of Foreign Affairs, 2018).

Currently, the law is under revision to ensure consistency and adequacy of the applicable framework to facilitate the development of new energy projects in accordance with the government's comprehensive plan. To this end, the revision of the regulatory framework aims to simplify the regulatory regime and permitting processes and the tasks of several government and administrative bodies in the sector (Global Legal Insight, 2020).

As mentioned earlier, in May 2017, the National Assembly approved a law to dissolve CNELEC and create ARENE, the Energy Regulatory Authority. In August 2017, the President of the Republic promulgated the law creating ARENE, which was simultaneously published in the Official Gazette as Law No. 11/2017 of September 8.

ARENE is a legal entity of public law with legal personality and managerial, directive, property, and budgetary autonomy, overseen by the Minister responsible for the energy sector.

Its scope of activity includes the powers of supervision, management, representation, control, and sanction in the following areas:

- The generation, transmission, distribution, and sale of electricity generated from any energy source, as well as the operation of systems and markets;
- Production, storage, distribution, sale, and transportation of liquid fuels;

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The Electricity Law establishes the principle that all activities must be based on concessions, and creates an advisory body, the CNELEC (later replaced by ARENE). The law opens all areas of power generation, transmission, distribution, and sales to private operators through concession contracts issued by the Ministry of Mineral Resources and Energy.

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- Distribution, transportation, storage, and sale of natural gas under pressure up to and including 16 bar; and
- Production, transportation, storage, distribution and sale of other types of energy (ARENE, 2020).

ARENE's scope of activities does not include nuclear energy.

ARENE's responsibilities include, among the others, the protection of consumer rights and interests, the prevention of anti-competitive behaviors and abusive or discriminatory practices, the guarantee of the conditions which ensure the economic and financial balance of the activities carried out within the public service, the promotion of energy-efficient technologies and national energy security, and the creation of fair conditions for the efficient use of energy resources.

ARENE also performs, with respect to specifically identified issues and upon request, mediation, conciliation, and amicable settlement functions to resolve conflicts arising between concessionaires and licensing entities, or between concessionaires and licensing entities and their customers.

### ***Grid Codes and technical regulations***

The Mozambican national grid code, approved by MIREME, has been published in 2014 and entered into force on the date of its publication. It establishes the rules and procedures for the operation and planning of the National Electricity Transmission Grid, as well as connection rules to the network. Foremost, it states the right to third-party access to the national transmission network. However, system quality and security criteria for planning and operating the transmission network are not covered by the current grid code, and EDM is currently working on them.

Furthermore, Mozambique lacks a similar regulatory text for the distribution system. A dedicated distribution grid code is not available; the conditions for access to and use of the distribution network remain defined under the concession agreement of EDM.

### ***Tariff regulation***

The price or tariff paid by EDM for electricity generation is not subject to regulatory approval, but is set by the concession agreement for each project. The determination of the lowest potential cost is relative, so the "fairness" of the tariff is determined through negotiations with EDM (USAID, 2015).

Retail tariffs applied by EDM to its different customers are divided into four categories: social, household, agricultural and general (EDM, ND). Tariffs for all consumers, with the exception of social tariff consumers and prepayment participants, are progressive depending on the volume of consumption. EDM tariffs are uniform across the country. Tariffs' determination and approval was directly overseen by the Ministry and set by Decree; they now falls under the responsibility of ARENE. Despite recent tariffs adjustments, EDM is still operating below costs and the level of tariffs is not considered as reflective of the actual electricity service costs (GET).



Invest, ND). While ARENE has a plan to reach full cost-reflectiveness in 3-5 years, COVID-19 pushed the Government to lower electricity tariffs and forced EDM to support industrial and commercial activities by reducing its tariffs and lowering tariffs level for low-income residential consumers (International Trade Administration, 2021).

## 2.4.2 Other regulation for private sector participation

### *Private sector participation models*

Law No. 15/2011 of August 10 establishes the legal framework for public-private partnerships (PPPs) in Mozambique. The PPP law establishes the guidelines for the contracting, implementing and monitoring process of public-private partnerships, large-scale projects and business concessions, applicable also to electricity services. In this sense, the law and its implementation Decree No. 16/2012 provide further legal guidance on how private sector participation in electricity services provision has to be organized in the country.

In legal terms, a PPP means the undertaking in areas of public domain – excluding mineral and oil resources–, or in areas of provision of public services, in which, through a contract and under complete or partial private financing, the private entity undertakes, before the public partner, to make the necessary investment and explore the respective activity, for the efficient provision of services or goods that are the responsibility of the State to guarantee their availability to users. PPP contracts can take many forms, from BOT (build, operate, and transfer) to ROOT (rehabilitate, own, operate, and transfer) depending on sectors, services, and needs. It is worth noting that regardless of the types of contracts, the public partner retains property rights over the public domain assets that comprise the PPP, including the land. Transferring a PPP contract to another private party requires government approval (which is not automatic) and in the case of renegotiation, the procedure is the same as when approving a PPP for the first time.

The general legal regime for contracting PPPs is that of a public tender and PPPs must follow the general rules applicable to public procurement contracts. However, the law introduces the possibility for negotiation and direct award in “duly justified situations” under the prior express authorization of the government. The law also defines a general requirement to deal with unsolicited proposals. The law prescribes PPPs to be implemented by the sectoral Ministry under the financial supervision of the Ministry of Economy and Finance. The law does not establish a dedicated PPP Unit to support and facilitate PPP procurement and management.

Electricity infrastructure and services fall under the PPP Law. EDM owns the concession to transport and distribute electricity, except for the special concessions for HCB or MOTRACO to supply power to MOZAL (World Bank, 2019). IPPs operate under concession agreements in the PPP-type legal framework. Currently, conflicting provisions in the Electricity Law and the PPP Law raise some questions on the term of the concession and the requirements for its renewal in the electricity sector, as well as the payment of the concession fee and the respective payment criterion (PPPLRC, 2021). In addition, to enter into a concession agreement, the project company must also enter into a power purchase agreement (PPA) to sell generated electricity to EDM. Only few projects have a corporate buyer of electricity directly from the generator through private PPAs which require regulatory approval.

### ***Procurement processes***

Decree No. 5/2016 is the main piece of legislation governing the award of public contracts, goods supply, and services provision. This key legislation follows Law No. 15/2011 and Decree No. 16/2012, respectively establishing the legal framework for public-private partnerships (PPPs) and the rules applicable to procurement processes.

The procurement procedure commonly used is the open tender, which is the one applied under the general regime, thus following the common steps of an open tender procedure. In exceptional circumstances, as a last resort, and in the absence of a bidder, the government may enter into a contract with a company through direct negotiations (IGC, 2012). Furthermore, the law recognizes the possibility of unsolicited bids, which, if accepted, give the proponent a 15 percent advantage in the bidding phase without compensation for the cost of preparing the bid (IGC, 2012).

Finally, the integrity of the whole process, is guaranteed through a legislative framework that promotes integrity by sanctioning and excluding bidders found to have engaged in corrupt practices and by allowing bidders to challenge and appeal contract award decisions.

### ***Incentives***

Decree No. 58/2014 of October 17 approved the Regulation on the tariff regime for new and renewable energy, (“REFIT”) with the aim of promoting the diversification of the energy mix and the safe supply of electricity.

REFIT applies to electricity generation projects based on renewable sources, namely biomass, wind, small hydropower, and solar projects with capacities of 10 KW to 10 MW (FAO, 2014). This Regulation has not been successfully implemented to date. However, KfW Development Bank (German government owned development bank) and MIREME are preparing to launch a Global Energy Transfer Feed-in Tariff (“GET FiT”) program for Mozambique whose aim, also in support of the GoM’s REFIT Regulation, is to fast-track renewable energy generation projects (Government of Mozambique, ND).

KfW and MIREME began negotiations in 2014 with a focus on the development of 130 MW of renewable energy generation projects, i.e., photovoltaic projects with storage and small hydroelectric power plants. In May 2020, implementation partners were procured. Thus, the scheme is expected to start operating in the future (GLI, 2020).

On the other hand, on September 30, 2020, Mozambique launched its Renewable Energy Auction Promotion Program (PROLER). PROLER was developed by the Ministry of Mineral Resources and Energy with the support of the European Union and consists in structuring projects for public tenders in a system of auctions to grant concessions for renewable energy production.

To facilitate the implementation of these projects, Agence Française de Développement (AFD) provided technical assistance to EDM and the Mozambican authorities to prepare and launch the tenders. AFD also offered a guarantee mechanism for private power producers to limit the risk of non-payment by the buyer, the state-owned EDM operator.

The PROLER project, which aims to promote “the diversification of high-quality, low-cost energy sources and the greater contribution of renewable energy to the country’s energy transition and electrification,” will play a key role in increasing private sector participation and the provision of reliable energy services in Mozambique.

When it comes to indirect incentives, such as tax relief and duties exemptions, these mechanisms are yet underdeveloped, or poorly implemented in the country. Import duties and VAT for renewable technologies, notably solar, remain high compared with neighboring countries (Department of International Development, 2016). The Investments Law (Law No. 3/93) and the Tax Benefit Code introduced several general tax incentives such as exemption from customs duties and VAT for the importation of capital goods as well as their respective parts and accessories, and reductions of the Corporate Income Tax for infrastructure investments by 80 percent in the first five years, by 60 percent from 6<sup>th</sup> to 10<sup>th</sup> years, and by 25 percent from 11<sup>th</sup> to 15<sup>th</sup> years. However, these benefits, accessible through the Investment Promotion Centre (CPI), are often not uniformly applied (Ministry of Foreign Affairs, 2018).

Also, the country does not consider national dedicated pricing mechanisms for carbon emissions (Konrad Adenauer Stiftung, 2020).



# **Analysis of Electricity Market Policy and Regulatory Framework**





*Wind turbines in motion atop hills*  
Photo credit: Getty Images/Meinzahn

### 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.

 <p>Openness</p>	<p><i>Openness</i> – 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 <i>openness</i> of the electricity market to investors.</p>
 <p>Attractiveness</p>	<p><i>Attractiveness</i> – 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 <i>attractiveness</i> of the electricity market to private sector investors.</p>
 <p>Readiness</p>	<p><i>Readiness</i> – 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 <i>readiness</i> of the electricity market to investors along the value chain.</p>

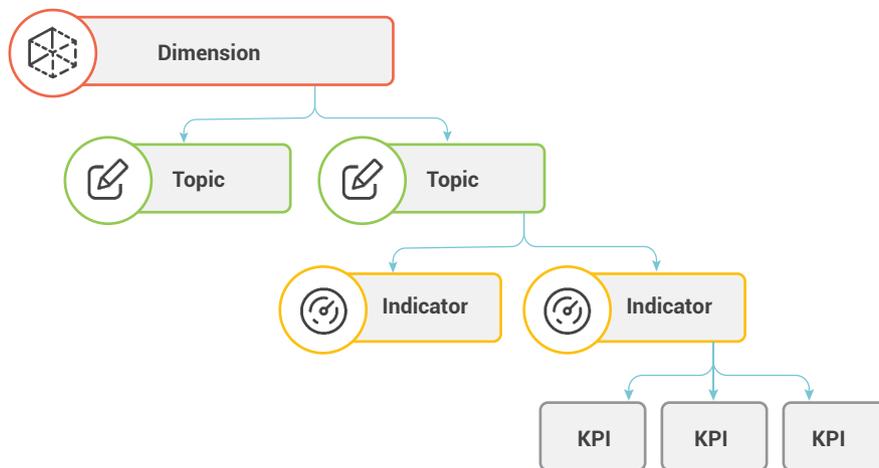
Figure 11: Overview of the Topics assessed within each Dimension



Each of these Dimensions is then disaggregated into three further levels, namely Topics, Indicators, and KPIs (key performance indicators).

- **Topics (1<sup>st</sup> 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 (2<sup>nd</sup> 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 (3<sup>rd</sup> Level)** are single elements, or specific questions, that provide a detailed understanding of Indicators, which in turn inform about Topics.

Figure 12: Methodological Building Blocks



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.



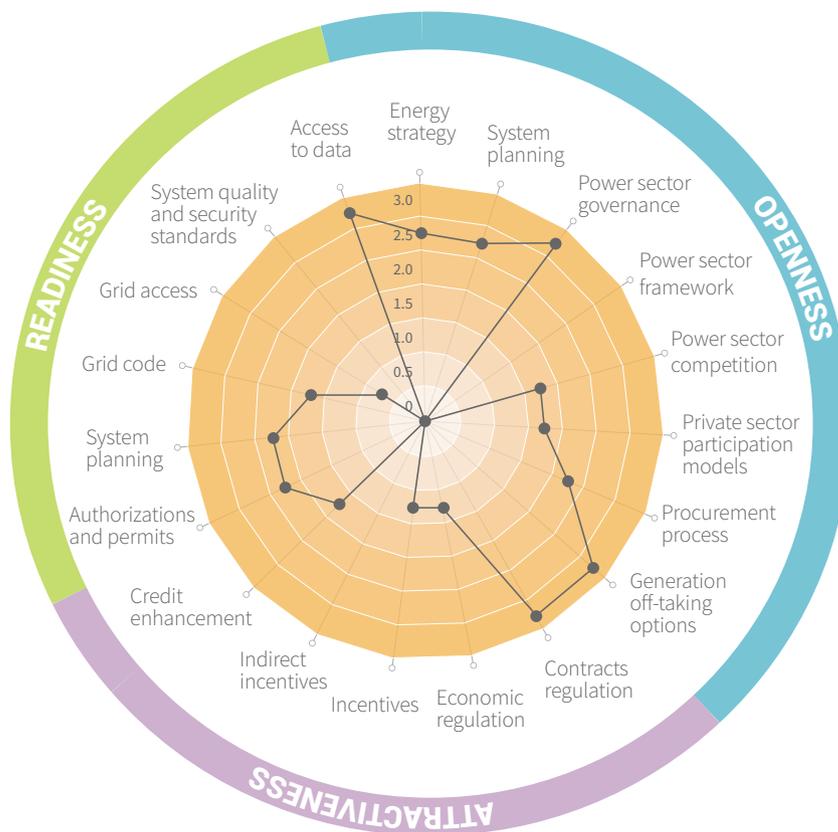
The quantitative results, therefore, are presented at the Topics level and use a scoring system based on a 0 to 3 point scale, where 0 is the lowest score – indicating a lack of regulatory preparedness on the assessed Topic related to private sector investment participation – and 3 is the highest – indicating a full regulatory preparedness on the assessed Topic.

### 3.2 Main findings

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

#### 3.2.1 Generation segment

Figure 13: Overview of the generation segment



Overall, Mozambique’s performance is moderate in most of the Topics assessed under the three Dimensions – *openness*, *attractiveness* and *readiness* – related to the generation segment. Mozambique performs outstandingly in key Topics such as *power sector governance* in the *openness* Dimension and *contracts regulation* in the *attractiveness* Dimension.

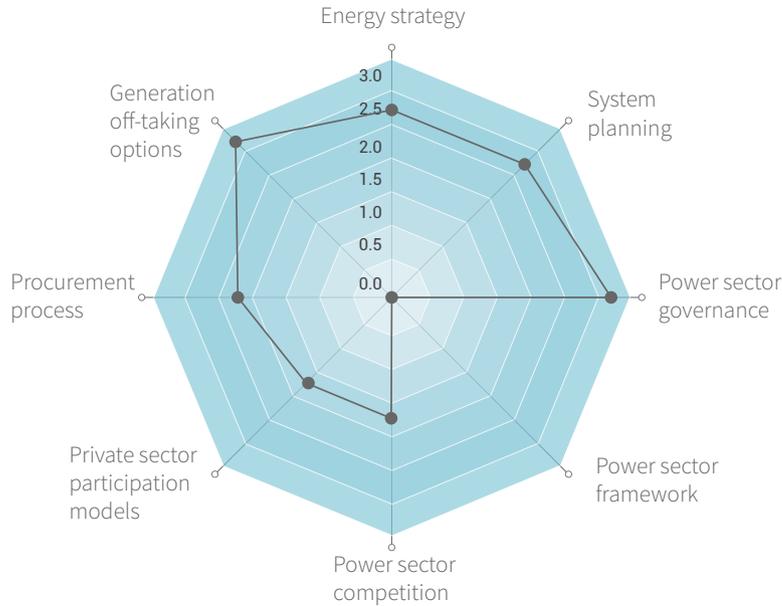
However, Mozambique still faces shortcomings in key policy and regulatory areas such as the adequacy of the *energy strategy*, the *power sector framework*, and the *private sector*

participation models in the *openness* Dimension. In the *attractiveness* Dimension, the Topics regarding *incentives* are a key area of improvement, while in the *readiness* Dimension, *grid access*, and the *grid code* are the main regulatory gaps.



### A deep dive into the Openness dimension

Figure 14: A deep dive into the Openness dimension for generation



Mozambique achieves high regulatory performances in a number of the Topics considered by the *openness* Dimension, except for the *power sector framework*, *power sector competition*, and *private sector participation models* where regulatory performance is relatively low.

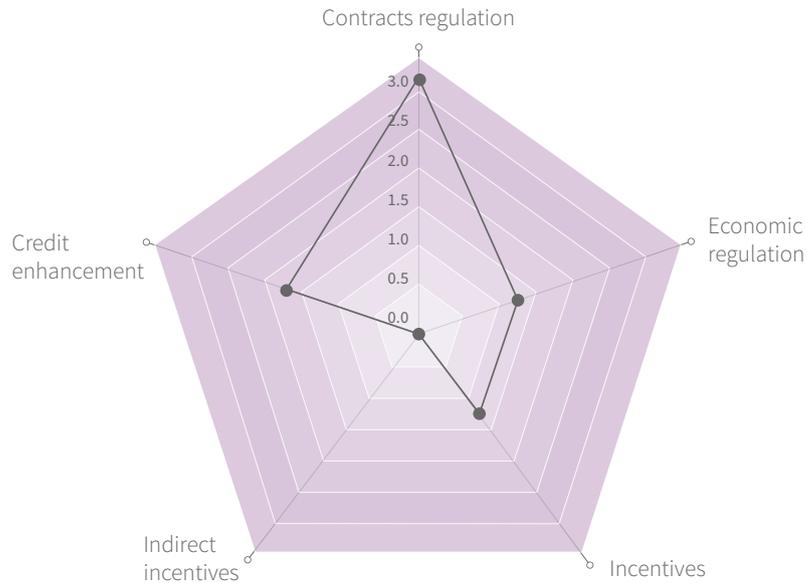
 <p>Energy strategy</p>	<p>The Energy Strategy, approved in 2009, defined a roadmap of reforms to be implemented between 2009 and 2013 to reinforce the position of Mozambique as a regional energy producer, to support social development, and to promote general economic growth. Another Energy Strategy, covering the period 2014-2023, was drafted but was never formally adopted by the government. As a result, the government is currently developing a new strategy, meant for the 2019-2029 period, which is expected to tackle crucial areas to improve the <i>openness</i> of the generation segment. However, the approval and adoption of the new strategy is still pending and the current objectives are therefore outdated.</p>
 <p>System planning</p>	<p>Mozambique reaches a high performance in <i>system planning</i> due to the presence of the Integrated Electricity Master Plan (IEMP). The Plan provides least-cost scenarios for expanding generation capacity, transmission, and distribution infrastructure over 25 years. The IEMP complements the planning with a long-term investment plan.</p>

 <p>Power sector goernance</p>	<p>Mozambique performs very well in <i>power sector governance</i> due to the adoption of the Electricity Law (Law No. 21/1997). This law is foundational defining the general governance framework of the electricity market and legal regimes for market operators. Furthermore, Law No. 11/2017 completed the framework by establishing the national regulatory authority for the sector. Acting as the independent sector regulator, the mandate of ARENE is to guarantee supervision, regulation, representation, control, and sanction related to over the operation of the electricity market. It is worth acknowledging that the Electricity Law is currently under review to address certain conflicting provisions that emerged subsequent to the approval of the PPP Law.</p>
 <p>Power sector framework</p>	<p>The power sector is organized around the vertically integrated utility which is active along the entire electricity sector value chain. The lack of unbundling of EDM's generation, transmission, and distribution activities results in a poor performance related to <i>power sector framework</i>.</p>
 <p>Power sector competition</p>	<p>While the generation market has shown progress in <i>openness</i> to private investors through successful IPPs integration, the lack of competition in the wholesale and retail markets pushes performance down in this Topic.</p>
 <p>Private sector participation models</p>	<p>Under the provisions of both the Electricity Law and the 2011 PPP Law, private sector participation is permitted in the generation market through concession agreements granted by the government. By current regulation, private participation through merchant models or divestiture is not possible, limiting market entry option for private investors..</p>
 <p>Procurement process</p>	<p>The regulatory framework of Mozambique is well developed in the area of procurement, with the PPP Law and related Decrees governing public procurement processes. The clear PPP process and the emergence of PPP models such as BOO, BOOT, and BTO demonstrate progress in this area. These models provide opportunities for private sector participation in electricity services.</p>
 <p>Generation off-taking options</p>	<p>The electricity market of Mozambique is open, legally speaking, which explains the high performance in this Topic. It has to be mentioned, however, that the market operates under a de facto single buyer model where EDM tends to be the sole buyer at the wholesale level. A handful of projects with corporate buyers of electricity directly from the generator exist, mainly as sleeved contracts. Wheeling is therefore possible. Captive generation for self-consumption purposes is also possible. In addition, Mozambique is part of the South African Power Pool, which has established a common electricity market in the SADC region. The market, therefore, offers multiple off-taking options.</p>



**A deep dive into the Attractiveness dimension**

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



The *attractiveness* of the generation market is enhanced by a strong regulatory performance in terms of *contracts regulation* for private investments. However, in a number of areas, performances are moderate or fairly low. The current policy and regulatory framework would require improvements, especially with reference to both *direct* and *indirect incentives* and *economic regulation*.

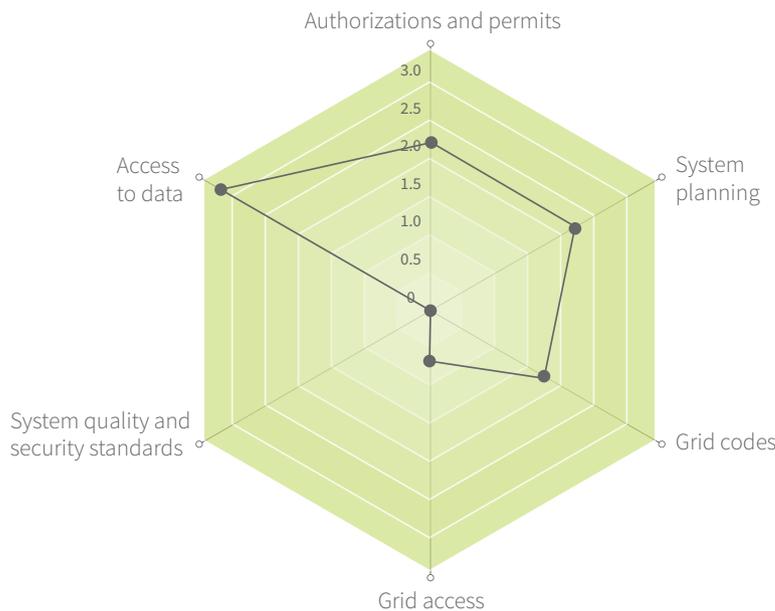
 <p>Contracts regulations</p>	<p>The performance of Mozambique in <i>contracts regulation</i> demonstrates its success in defining attractive contractual conditions for IPPs, through standardization of PPAs terms and provisions with EDM. These agreements include clear terms (project timeline, milestones, and expected completion dates), commissioning and availability goals, dispute resolution mechanisms, and non-contractual modifications. Economic considerations such as payment frequency, inflation indices, and hard currencies indexation are also provided. Contract termination provisions, including transfer obligations and early termination clauses, are also usually considered.</p>
 <p>Economic regulation</p>	<p>Equally important for ensuring market's <i>attractiveness</i> is <i>economic regulation</i>. Regulatory performance in this area is relatively low due to the unavailability of a transparent tariff determination methodology and its reviewing process. Tariffs are still bundled, without a clear distinction between the different cost components of electricity services (generation, transmission, and distribution components), and cost-reflectivity is questioned by EDM. However, retail tariff levels are publicly disclosed and available on EDM website, signaling transparency.</p>

 <p>Incentives</p>	<p>Supporting mechanisms for generation technologies, mainly renewable energy capacities, are still under development, or are being road-tested, thus, explaining the moderately low performance in <i>incentives</i> Topic. Feed-in tariff policy remains not implemented, while other mechanisms as green certificates and renewable energy sources (RES) quotas are not foreseen by the current regulation. However, Mozambique is moving towards the adoption of renewable energy auctions as the main supporting scheme for renewable energy deployment.</p>
 <p>Indirect Incentives</p>	<p>The performance in <i>indirect incentives</i> is very low since Mozambique does not offer attractive conditions in terms of duties exemptions and tax reductions for electricity generators. When available, as the ones considered in the Investment Law and managed by CPI, the Investment Promotion Center, these kinds of incentives are not uniformly implemented. Other climate-related mechanisms such as the national carbon pricing mechanism, is also not offered.</p>
 <p>Credit enhancement</p>	<p>The <i>attractiveness</i> of investments in the electricity generation market in Mozambique is improved by the existence of several credit enhancement instruments such as revenue escrow agreements and multilateral guarantees. Concessional lending is only available to state-owned generation companies and government guarantees are not present.</p>

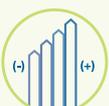


### A deep dive into the Readiness dimension

Figure 16: A deep dive into the Readiness dimension for generation

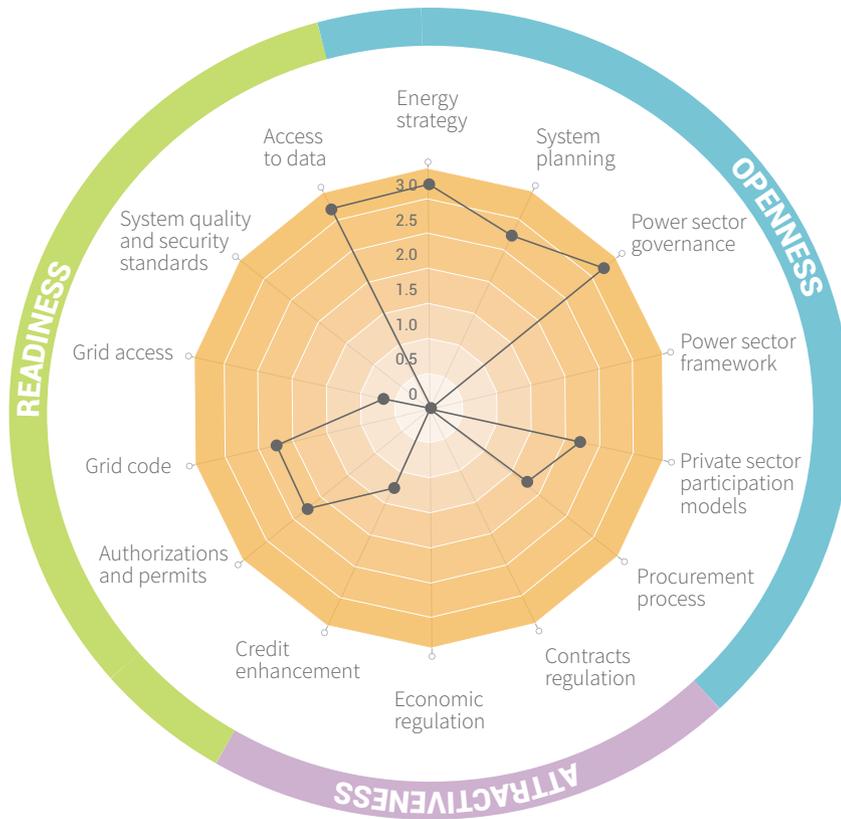


The *readiness* of the generation market to private sector participation is moderate in a number of areas. The performance is relatively low in *grid access* and *system quality standards*, and high related to *access to data*.

 <p>Authorizations and permits</p>	<p>In Mozambique, rules for application and issuance of <i>authorization and permits</i> are well established with competent authorities defined. The rules for obtaining an environmental permit are carried out according to the Electricity Law, applied at the national level, and with clear procedures. Similarly, rights to land access are governed by article 29 of the Electricity Law. Land in Mozambique is the property of the State and land use right is granted by the State through “Direito de Uso e Aproveitamento de Terra” (DUAT). With regards to construction permits, Mozambique simplified the process by improving internal procedures at the Department of Construction and Urbanization. Water rights are also clearly defined by Water Law No. 16/91. However, the absence of a one-stop-shop to facilitate access to all these permits reduce the performance achieved on this Topic.</p>
 <p>System planning</p>	<p>In terms of <i>system planning</i>, the analysis focused on the network development plan. Mozambique performs well in this regard. The IEMP covers network infrastructure development scenarios at the national level and associated system integration evaluations. However, explicit regulation defining a formal process for master plan review and update is not available, limiting periodic assessments of network expansion and flexibility needs.</p>
 <p>Grid code</p>	<p>The national transmission grid code defines system operation rules as well as the responsibilities and roles of grid participants in the Integrated Power System (IPS). While it provides regulatory certainty in key areas for system reliability such as system operation, rules for connecting the generation units, ancillary services provision rules are not covered; therefore, lowering performance on the <i>readiness</i> of the market related to the <i>grid code</i>.</p>
 <p>Grid access</p>	<p>The national transmission grid code establishes the right for third-party access to the transmission network and technical conditions for connection. However, a transparent contractual framework for access and use of the grid, as well as rules on the commercial conditions and allocation of connection costs are yet to be defined. As a result, <i>grid access</i> remains a key area of regulatory improvement.</p>
 <p>System quality and security standards</p>	<p>As stated by Article 90 of the national transmission grid code, the operator of the IPS is mandated to develop and submit to regulatory approval the rules concerning system quality and security. This regulatory text is yet to be developed, which explains the low regulatory performance related to <i>system quality and security standards</i>.</p>
 <p>Access to data</p>	<p>Mozambique makes its socioeconomic and basic electricity market data available. The financial reports of EDM are also publicly available. This ensures the transparency and accessibility of relevant data, and explains the optimal performance performance related to <i>access to data</i>.</p>

### 3.2.2 Transmission segment

Figure 17: Overview of the transmission segment

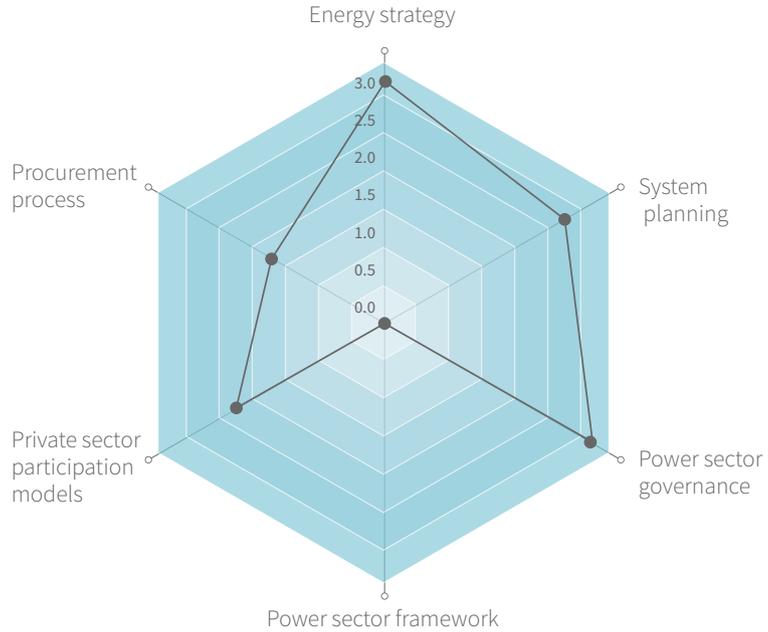


Overall, the analysis of the policy and regulatory framework for the transmission segment confirms moderate preparedness of the market to attract private investors. Barriers to greater *openness*, *attractiveness*, and *readiness* need to be addressed, particularly in the following areas: *power sector framework*, *economic regulation*, *grid code*, *grid access*, and *system quality and security standards*.



**A deep dive into the Openness dimension**

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



The performance of Mozambique in the *openness* Dimension is high, apart from *the power sector framework* and *procurement process* requiring further improvements.

 <p>System planning</p>	<p>The presence of the Integrated Electricity Master Plan explains the good performance in <i>system planning</i>. As mentioned in Generation – Openness, Mozambique approved the IEMP providing least-cost scenarios for expanding generation capacity, and roadmap for developing transmission, and distribution infrastructure over 25 years. It is noteworthy that a TSO investment assessment methodology is also approved by the government. A transmission investment plan is also in place.</p>
 <p>Power sector governance</p>	<p>Private sector participation in transmission services is defined by Article 9 of the Electricity Law, prior the grant of a concession by the State. The optimal performance in this Topic is explained by the presence of the Electricity Law as well as the institution of the national regulatory authority.</p>
 <p>Private sector participation models</p>	<p>Under the provisions of both the Electricity Law and the 2011 PPP Law, private sector participation is permitted through concession agreements. Furthermore, the Independent Power Transmission (IPT) model is also possible as a consequence of the status of MOTRACO. However, merchant and divestiture models are not allowed by regulation.</p>





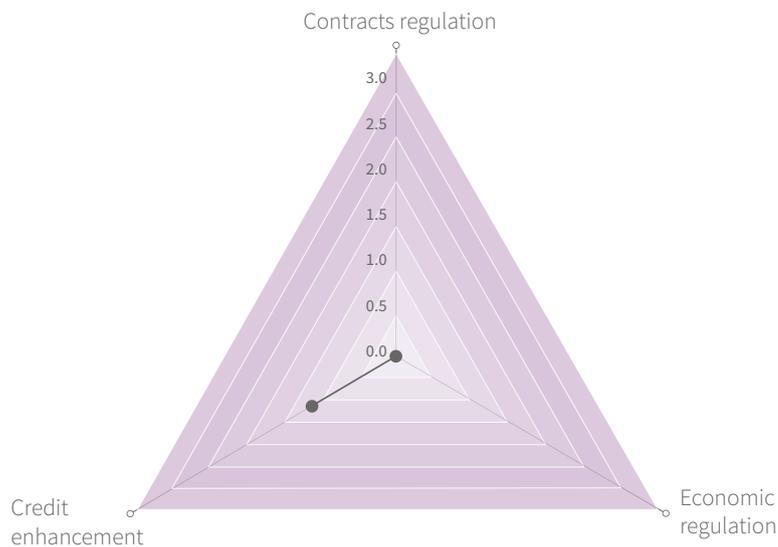
Procurement process

Procurement rules are well established and the law open to PPP models to develop transmission assets. The law considers and regulates both solicited and unsolicited proposals. However, no competitive tendering process has been launched to procure transmission investments so far.



### A deep dive into the Attractiveness dimension

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



Contracts regulation

Mozambique has yet to develop a contractual framework and its related regulatory administration to define rights and obligations, as well as performance requirements and payment terms, to be applied to private transmission operators.



Economic regulations

The unavailability of a regulation for transmission charges, detailing the cost structure of network charges, a clear methodology for the calculation of tariffs, and the definition of a regulatory period for their validity and review explain the very low performance in this area.



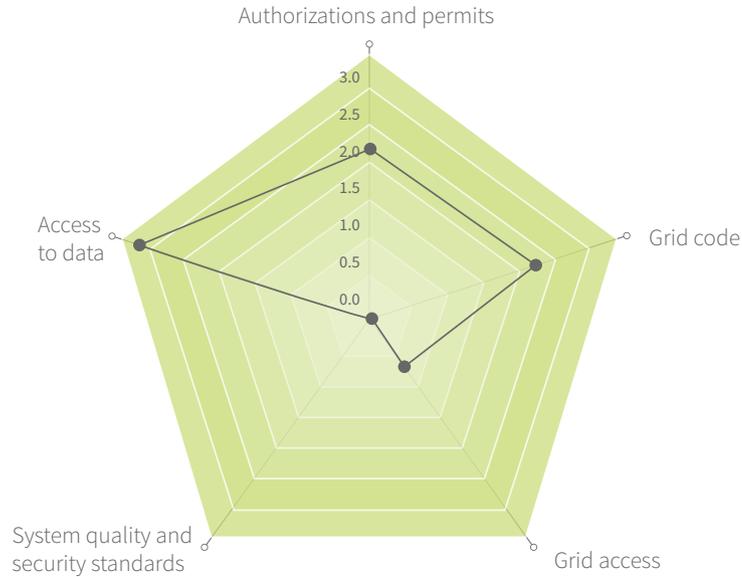
Credit enhancement

*Credit enhancement* also demonstrates a relative low performance. There is possibility of providing escrow agreements for transmission investors and concessional lending for state-owned companies. However, government and multilateral guarantees are not available to transmission investors under any model.



**A deep dive into the Readiness dimension**

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

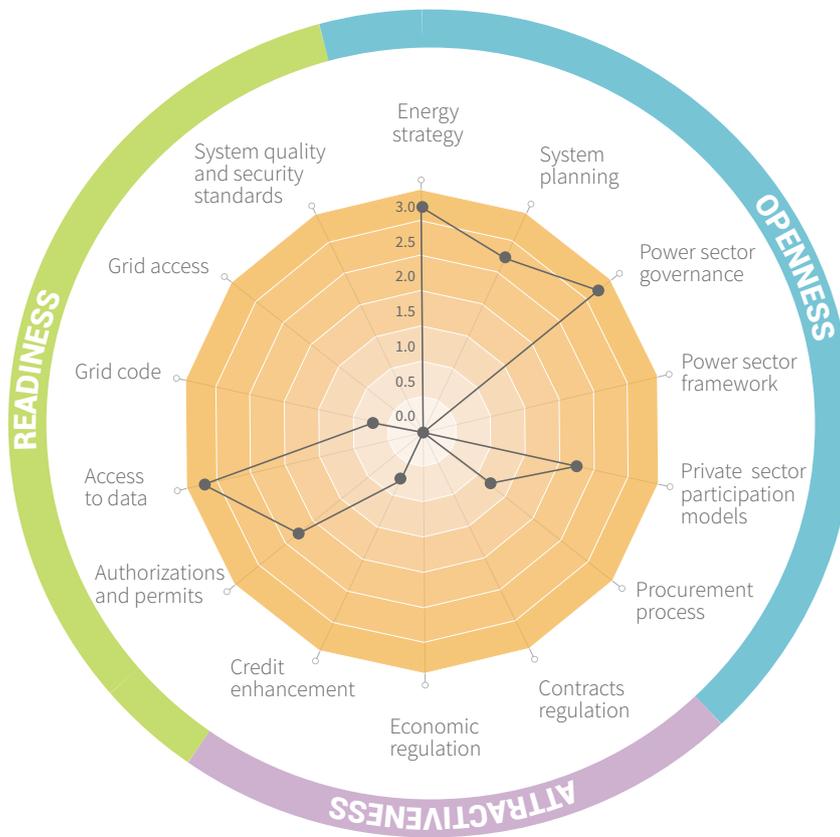


Aspects of *readiness* related to *authorizations and permits*, *system quality and security standards*, and *access to data* are already discussed (see Generation – Readiness). Overall, there are limitations for transmission potential investors related to connections rules and frameworks and third-party access to the grid. Regulatory improvements in these areas would enhance the *readiness* of the transmission segment of the market.

 <p>Grid code</p>	<p>The good performance derives from the presence of a national transmission grid code, which covers system operation rules as well as rules and technical standards for connection the grid. However, gaps are identified in the regulation of balancing and ancillary service provision.</p>
 <p>Grid access</p>	<p>The national transmission grid code establishes the right for third-party access to the transmission network, along with technical conditions for connection. However, a transparent contractual framework for access and use of the grid, as well as rules on the commercial conditions and allocation of connection costs are yet to be defined. As a result, <i>grid access</i> remains a key area of regulatory improvement.</p>

### 3.2.3 Distribution segment

Figure 21: Overview of the distribution segment

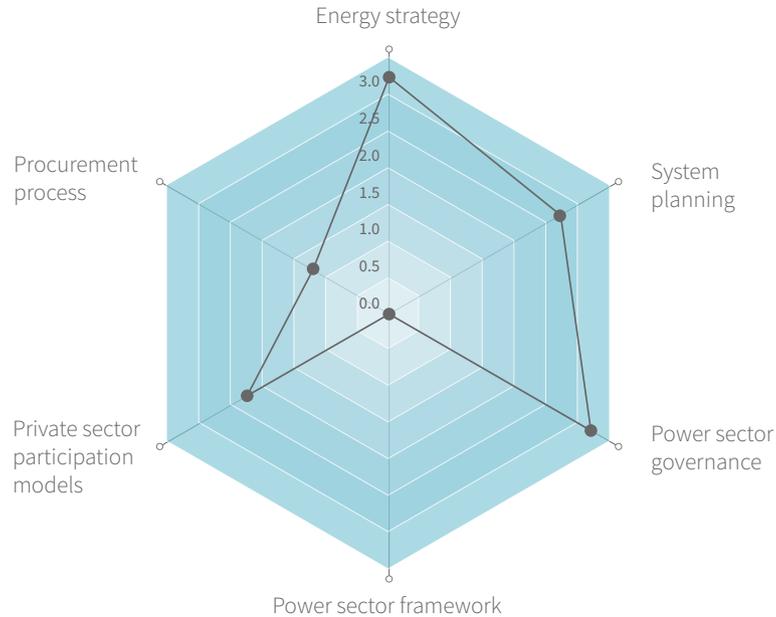


The policy and regulatory framework of the distribution segment of the market show significant strength related to market *openness*, whereas gaps are particularly more pressing in the *attractiveness* and *readiness* areas. The distribution market shows strength in the areas of *energy strategy*, *power sector governance*, *system planning*, and *access to data*. However, *power sector framework*, *contracts regulation*, *economic regulation*, the *grid access*, and *system quality and security standards* show major gaps, which is primarily explained by the vertically integrated electricity market structure and a lack of regulation governing these aspects in the distribution market.



**A deep dive into the Openness dimension**

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



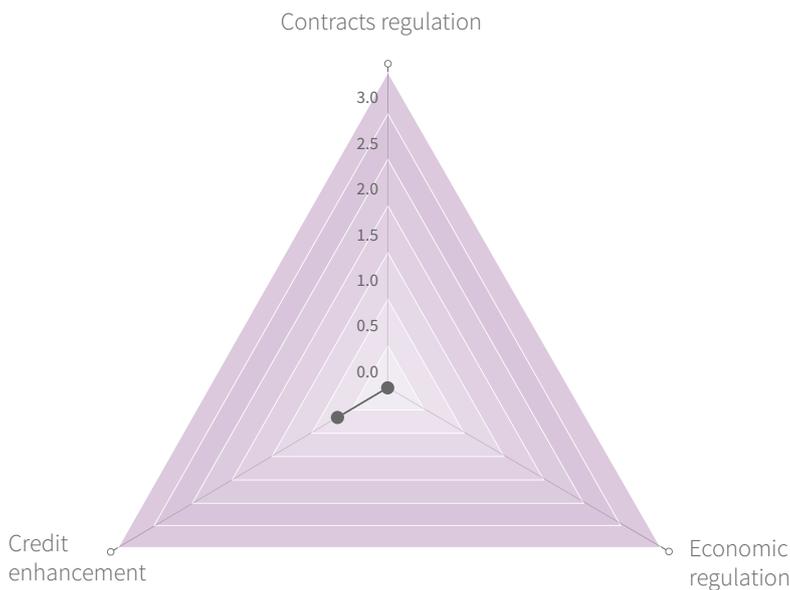
Similar to the transmission segment, the distribution market shows overall good *openness* related to the possibility of private sector participation in this segment. However, other than in the transmission segment, private investment participation in Distribution has not yet taken place. The publicly owned EDM remains the only entity with a distribution concession until now.

 <p>System planning</p>	<p>Mozambique performs well in <i>system planning</i> due to the existence of a national electrification plan, a clear methodology to evaluate DSO investments, as well as a publicly available network development plan, which is defined at a national level. However, improvements can be made by introducing a formal procedure for the regular revision of the national electrification plan and for the network expansion plan.</p>
 <p>Power sector governance</p>	<p>Article 9 of the Electricity Law allows for private entities to invest in distribution assets and obtain a concession to operate the system. However, as previously stated, there is currently no private party present in the distribution segment. EDM remains the sole national concessionaire for the distribution system. The existence of an established regulatory authority with clearly defined responsibilities and sufficient political and financial independence further adds to the strong performance on <i>power sector governance</i>.</p>
 <p>Private sector participation models</p>	<p>Mozambique performs well in the area of <i>private sector participation models</i> due to the possibility for private parties to enter the distribution segment through the whole of grid concession or an EPC model. However, it is not possible to participate by buying shares of the distribution company, EDM. There is currently no private distribution company operating in the country.</p>

	<p>Despite the existence of a public PPP Law, it is not clear if it covers the distribution segment and defines PPP models such as BOO, BOOT, and BTO. Currently, there are no competitive tenders for distribution investments.</p>
<p>Procurement process</p>	

**A deep dive into the Attractiveness dimension**

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



Mozambique currently shows little *attractiveness* for private investors to enter the distribution market. The absence of private concessionaires for distribution grids in the country, the lack of a standardized DSA, the gap in transparent network tariff structure, as well as the unavailability of credit enhancement mechanisms make it difficult for potential investors to accurately evaluate the viability of entering the distribution market of Mozambique.

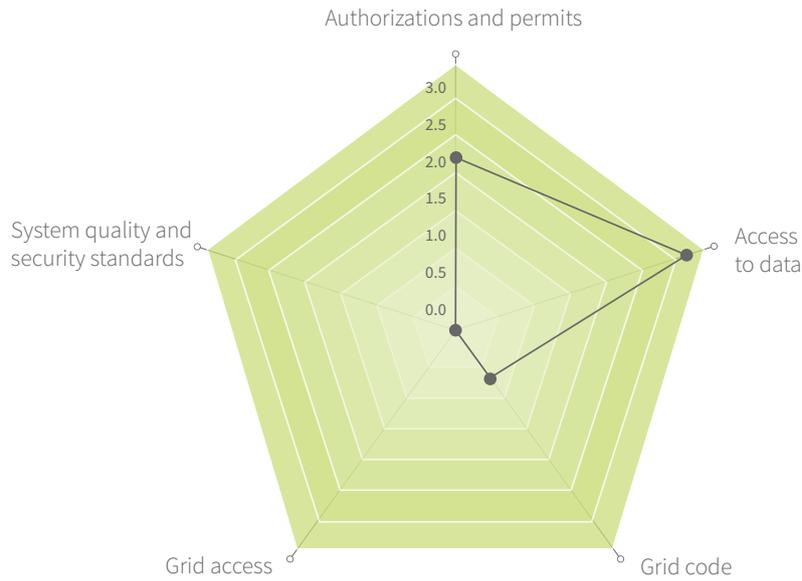
	<p>Contracts regulation</p> <p>The lack of standardized DSA adds a layer of uncertainty for private investors. The rights and obligations defined in the standard concession agreement remain unknown to private investors as the EDM distribution concession is not publicly available.</p>
	<p>Economic regulation</p> <p>Private investors run into similar regulatory challenges regarding the predictability of revenue streams due to the lack of a clear network tariff structure methodology and revision procedure in place.</p>

 <p>Credit enhancement</p>	<p>Since EDM is the only concessionaire for the distribution system, there are currently no credit enhancement mechanisms available except for concessional loans that are given to EDM.</p>
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**A deep dive into the Readiness dimension**

Figure 24: A deep dive into the Readiness dimension for distribution



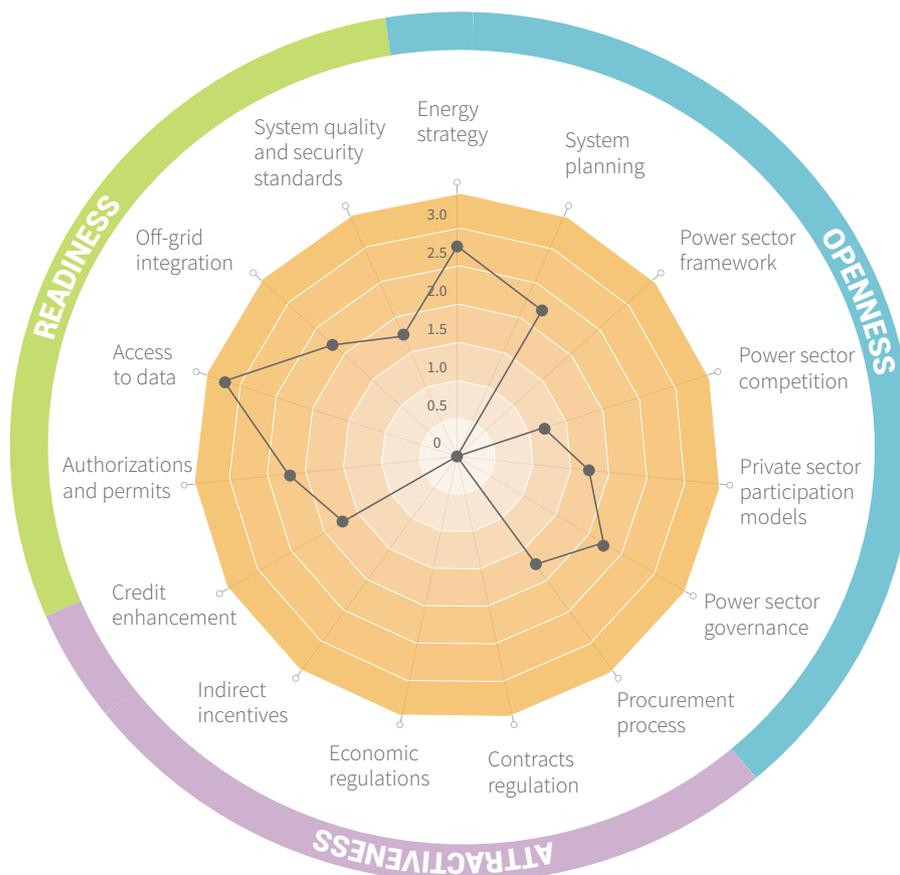
Both *access to data* and *authorizations and permits* are areas of strong regulatory performance. However, regulatory challenges in the areas of *grid access*, *grid code*, and *system quality and security standards* require further improvements.

 <p>Authorizations and permits</p>	<p>As mentioned in the generation segment analysis, there are clear rules and procedures set in place to acquire right-of-way and land authorizations, construction permits, and environmental approvals. Land ownership by private investors is not permitted; however, a 50-years land-use license called DUAT could be obtained. Other minor gaps include the lack of a one-stop-shop for the permits and authorizations as well as the lack of clear rules for the certificates of competencies regarding construction permits.</p>
 <p>Access to data</p>	<p>Fundamental socio-economic and electricity sector data are publicly available (see also: Generation – Readiness). Mozambique also publishes data regarding dispatch and quality of service related to the distribution system, resulting in an outstanding score for this Topic.</p>

 <p>Grid code</p>	<p>The lack of a distribution grid code, detailing the obligations and responsibilities of all of the grid users to ensure open and non-discriminatory access and use of the system, as well as its safe and efficient operation explains the poor performance in this area.</p>
 <p>Grid access</p>	<p>Rules have been put in place to ensure third-party access to the EDM network. However, the lack of a clear contractual framework for connection to the distribution grid, as well as of rules for the definition of connection charges remain a barrier to a correct implementation of the open access regime and motivates the very low performance in this area.</p>
 <p>System quality and security standards</p>	<p>Despite the lack of security standards for the planning and operation of the network, EDM is working on draft standards that are set to be reviewed and approved in the coming years.</p>

### 3.2.4 Off-grid segment

Figure 25: Overview of the off-grid segment

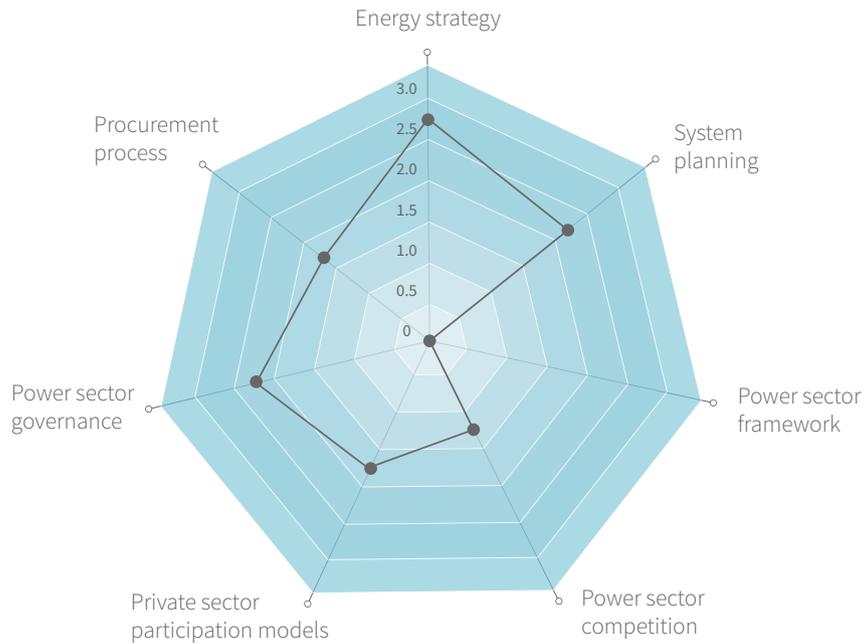


The results for the analysis indicate that the off-grid segment does provide a conducive environment for private investors in some areas, while clear gaps appear in others. Despite the good regulatory performance in the areas of *energy strategy* and *access to data*, relevant to the off-grid system are the gaps in *economic regulation* and *contracts regulation* which stem from an overall lack of regulation governing them.



**A deep dive into the Openness dimension**

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



While the *energy strategy* is well developed, the *openness* of the off-grid market mainly underperforms in areas related to *power sector framework*, *power sector competition*, and the *procurement process*. For a more extended review of these regulatory issues, refer to *Generation-Openness*, *Transmission-Openness*, and *Distribution-Openness*.



**Energy strategy**

The strategy to provide off-grid policy guidance is well articulated. The national electrification policy is part of the broader National Energy Policy, which is also subject to a formal review procedure. The Energy for All Project (Projecto Energia para Todos – ProEnergia), which is funded by the World Bank, has kicked off in 2018 intending to densify the grid, providing technical assistance, and increasing off-grid electrification through 13 mini-grids that will be implemented by FUNAE through PPPs.

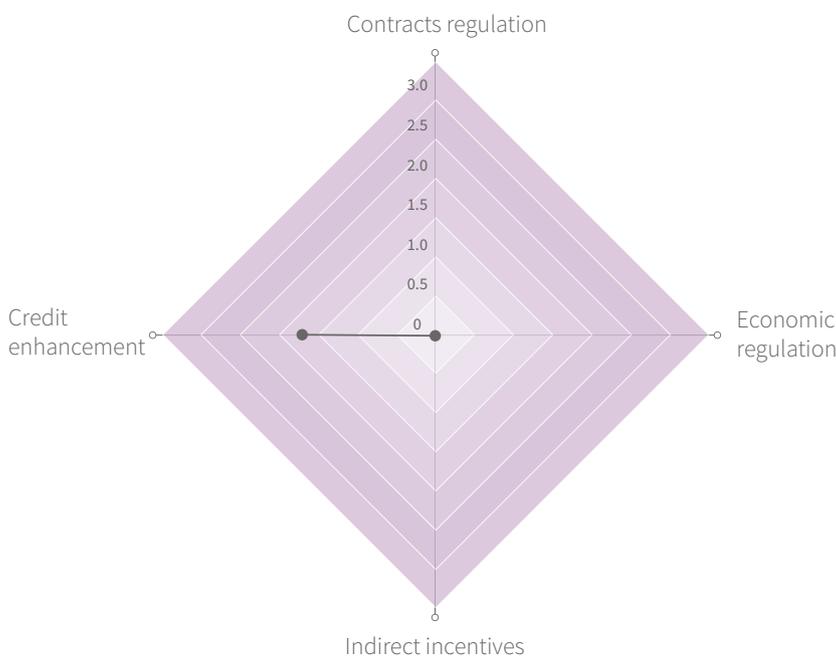


 <p>System planning</p>	<p>The National Electrification Strategy aims to achieve universal access to energy by 2030 and determines the necessary activities that will be required to support electrification based on institutional, financial, and technical requirements. It also proposes new electrification approaches through the definition of Self Expanding Areas and Subsidized Expansion Areas, as well as a rotating Electrification Account. However, currently, none of the policies or strategies specify concrete off-grid targets in terms of total capacity or number of customers to be connected.</p>
 <p>Private sector participation model</p>	<p>The current regulation provides for some degree of <i>openness</i> arising from the availability of multiple routes to enter the market such as off-grid concession or an EPC contract. A merchant model is currently not accounted for in the regulation.</p>
 <p>Procurement process</p>	<p>Both solicited and unsolicited proposals for new off-grid capacity are permitted. However, there are currently no clear rules and procedures, or valuation systems in place, rendering the process non-transparent in the eyes of investors. There are also some renewable off-grid tenders already in place even though a public schedule for them has not been made available yet. Nonetheless, the Regulation for Off-Grid Energy Access has been approved by Decree on the 15<sup>th</sup> of September 2021, detailing rules regarding concession requirements and procedures as well as the rights and duties of involved parties.</p>



**A deep dive into the Attractiveness dimension**

Figure 27: A deep dive into the Attractiveness dimension for off-grid



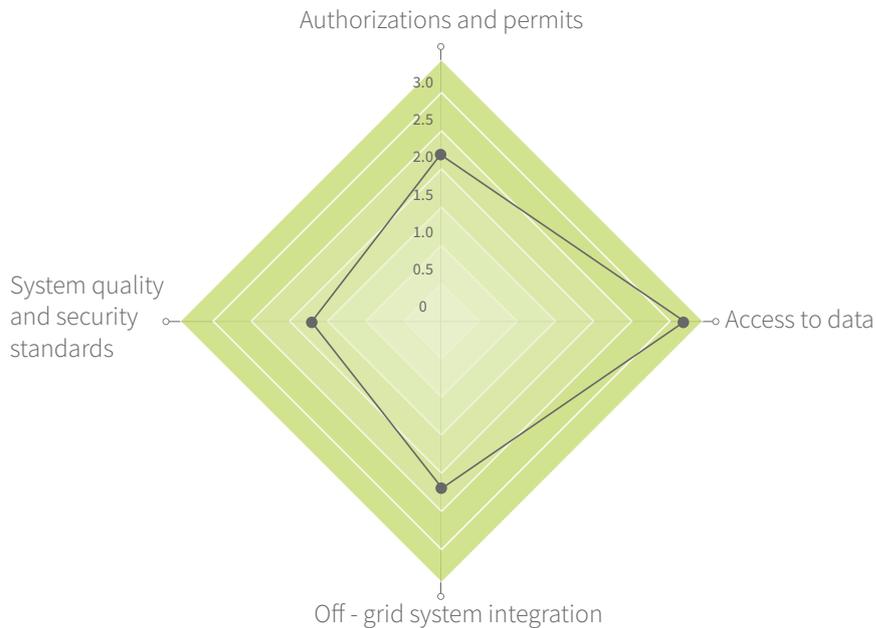
The off-grid market of Mozambique shows clear gaps in terms of *attractiveness* to private investors. There is a general lack of *incentives* and *contract regulations* providing little financial predictability to potential investors. For a more extended review of all the Topics, refer to *Generation–Attractiveness*, *Transmission–Attractiveness*, and *Distribution–Attractiveness*.

 <p>Contracts regulation</p>	<p>There are currently no standardized retail contracts for off-grid operators. This increases regulatory uncertainty. Rules regarding metering and billing are also not defined, therefore affecting project viability and bankability.</p>
 <p>Economic regulation</p>	<p>The Regulation for Off-Grid Energy Access states that a substantiated consumption tariff proposal needs to be submitted to the Energy Regulator as part of the concession application. The tariff structure is also fixed for each category of consumers. However, no standard tariff calculation tool is in place.</p>
 <p>Indirect incentives</p>	<p>Currently, there are no VAT reliefs or import duty reduction for generation assets and off-grid components in place. The off-grid market is not supported by indirect forms of incentives that are meant to strengthen the <i>attractiveness</i> of the market to private investment, and improve early stage off-grid market development.</p>
 <p>Credit enhancement</p>	<p>There is a relatively better performance related to credit enhancement. This is due to the possibility for off-grid operators to obtain multilateral guarantees as well as concessional lending from DFIs, although Mozambique currently does not issue government guarantees.</p>



**A deep dive into the Readiness dimension**

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



The regulatory performance of Mozambique is relatively good in areas of *access to data*, *off-grid system integration*, and *authorizations and permits*. The review below focuses on the relevant aspects for the off-grid market. For a more extended review of all the Topics, refer to *Generation–Readiness*, *Transmission–Readiness*, and *Distribution–Readiness*.

 <p>Off-grid system integration</p>	<p>Article 22 of the Regulation for Off-Grid Energy Access allows for a wide range of possibilities to integrate with the main grid, such as becoming a small power distributor or producer. Only the lack of compensation mechanisms for stranded assets and the lack of regulatory clarity regarding decommissioning and removal of the asset prevents the maximum regulatory performance in this area.</p>
 <p>System quality and security standards</p>	<p>Article 17 and 20 of the Regulation for Off-Grid Energy Access outline the duties of mini-grid operators and require that safety, service, and technical standards are up to par with the main grid standards. International standards and national certifications for off-grid products are in place, although the procedure to acquire the certificates are not transparent.</p>



## Conclusions and Recommendations





*Aerial view of the solar power plant on the top of the mountain at sunset.  
Photo credit: Getty Images/Zhihao*

## 4. Conclusions and Recommendations

Major progress have been achieved since Mozambique started reforming its electricity sector back in 1997 with the enactment of the Electricity Law and the establishment of FUNAE. The Electricity Law designed, for the very first time, the general legal regime of the electric power generation, transmission, distribution, and commercialization activities and recognized the possibility for private entities to operate in the electricity space through concession agreements. The following year saw the adoption of the National Energy Policy defining the strategic framework for the future evolution of the electricity sector of Mozambique. In the late 2000s, the second wave of reforms took shape. The adoption of a new Energy Strategy and the Renewable Energy Development Policy in 2009 set the road towards an increased energy mix diversification and enhanced attention to private sector involvement, which was yet to be accomplished. New impetus was also given by the establishment of the Autoridade Reguladora de Energia (ARENE) in 2017, and the definition of a National Electrification Strategy whose aim, under the umbrella of the National Energy for All Program, was to bring energy to all Mozambicans.

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The improvements made in the policy and regulatory regime so far brought important results. Starting from the successful introduction of IPPs in the generation segment, the diversification of the energy mix, to the issuance of an Integrated Master Plan in 2018.

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The improvements made in the policy and regulatory regime so far brought important results. Starting from the successful introduction of IPPs in the generation segment, the diversification of the energy mix, to the issuance of an Integrated Master Plan in 2018, defining the expansion guidelines for power generation, transmission, and distribution. Most recently, Mozambique has issued a new regulation on off-grid energy access in 2021. This regulation is meant to speed-up electricity access in remote areas and enable the expansion of mini-grid infrastructure through greater private sector participation. Mozambique is also working towards updating its policy framework dedicated to supporting renewable energy technology expansion. A new Electricity Law is currently under discussion and its approval by the Government is expected soon.

Despite these positive developments, however, the electricity market of Mozambique still shows certain gaps in terms of building a conducive policy and regulatory environment for private sector participation. The development of electricity infrastructure has been limited, despite some progress achieved since 2010, as manifested by the national electricity access rate which is lower than 30 percent in 2019. In terms of installed electricity capacity, Mozambique still heavily relies on hydropower, despite its richness in energy resources such as natural gas and non-hydro renewables. Moreover, its reliance on the HCB hydro-plant, counting for about two-thirds of installed capacity, increases its exposure to climate risks and related energy insecurity. The limited development of electricity infrastructure can be attributed, among other reasons, to the marginal participation of private investors and operators, despite the possibility to enter the market since the adoption of the Electricity Law in 1997.

The incompleteness of the policy and regulatory framework plays a huge role in the reluctance of private investors in entering the electricity market of Mozambique. From its still vertically integrated market structure to limited routes-to-market and business models available to private investors to the not yet cost-reflective tariff and the lack of incentives, the market still presents barriers to effective private sector participation. In this regard, the analysis has highlighted some of the regulatory areas where improvements are found to be necessary.

This review acknowledges all the efforts put in place by the Government of Mozambique in the last three decades to ensure the safety, reliability, and competitiveness of the national

electricity service. The assessment helps to pinpoint policy and regulatory areas where further improvements and reforms could bring the system to a higher regulatory standard to ensure reliable, affordable, and sustainable electricity for all by 2030. Indeed, Mozambique could benefit from the participation of the private sector to meet energy sector development requirements and achieve the Energy for All targets by 2030.

## 4.1 Takeaways from the regulatory review

### Related to the *Openness* of the electricity market

- ⚡ Current electricity sector legislation ensures a sufficient degree of *openness* of the generation market to private investors. Good regulatory performances in addressing fundamental aspects of *system planning*, *power sector governance*, and *energy strategy* confirms the ability of Mozambique to adapt and implement strong legislation for the sector. Current regulation provides a framework that enables private investors to participate through a concession model, as well as through PPP opportunities. However, the electricity market model of Mozambique is still organized around a vertically integrated utility, which could discourage greater private sector participation and limits market competition.
- ⚡ The electricity transmission market in Mozambique is relatively open to private investors. In particular, current legislation allows private sector participation through a concession model in which private entities can own transmission assets and be licensed to operate as transmission service providers. Expansion scenarios of the transmission network are determined by the comprehensive master plan. However, explicit procedure defining a formal process for master plan review and update is not available. Furthermore, the unavailability of commercial models for private sector participation in the transmission service and the absence of public procurement processes for transmission assets have limited in practice the participation of private companies in this segment so far.
- ⚡ In the distribution segment, private sector participation is possible through a whole-of-grid concession or an EPC model, albeit it has not occurred yet. EDM remains the only national concessionaire for the distribution system; therefore, the distribution segment lacks distribution-specific PPP models or competitive tenders that would aid in making private participation a reality. *System planning* is well developed as an extensive national electrification plan and a clear methodology for DSO investments is in place.
- ⚡ Similar to the distribution segment, the *openness* of the off-grid market benefits from the national electrification policy and the commitment of Mozambique to the development of the off-grid market. The national electrification strategy aims to pave the way to full electrification by 2030 taking into consideration institutional, financial, and technical aspects. However, it lacks concrete targets in terms of capacity to be added or connections to be built. Mozambique's Energy for All Project (Projecto Energia para Todos – ProEnergia) aims to densify the grid, provide technical assistance, and increase off-grid electrification through 13 mini-grids that will be implemented by FUNAE through PPPs.

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

- ⚡ A review of the relevant policy and regulatory areas demonstrates a fairly attractive business environment for private investors in the power generation sector. This is mainly due to the definition of attractive contractual conditions for IPPs, through standardization of PPAs terms and provisions with EDM. However, tariff regulation remains rather unclear, as the methodology for determining the structure of retail tariffs is not publicly available. In addition, tariffs remain below the cost of service, and the tariff review system needs to be updated. Generators benefit from renewable energy sources-specific auctions as well as the availability of *credit enhancement instruments* except for government guarantees. *Indirect incentives* are currently not implemented and may be beneficial to enhance the business case and address potential market failures.
- ⚡ Mozambique's regulatory framework in the transmission sector shows a low level of *attractiveness* for crowding-in private investment. Transmission concessions are granted to private companies. However, there is no standard Transmission Services Agreement. Appropriate regulation covering network charges definition and review is missing. Private investors in transmission assets have the potential to use credit enhancement tools. However, to date, concessional loans and revenue escrow agreements have been limited to state-owned utilities. Government and multilateral guarantees are not extended. Private participation in the future expansion of transmission assets may benefit from those specific credit enhancement tools.
- ⚡ The *attractiveness* of private investment in the Distribution market faces numerous regulatory barriers. Indeed, the lack of a standardized Distribution Services Agreement and gaps in transparent network tariff structure affect the bankability and viability of private investments. The absence of *credit enhancement mechanisms* affects the *attractiveness* of the Distribution market segment in which no private concessionaire currently operates. Finally, concessional loans are extended only to EDM.
- ⚡ The off-grid segment currently offers limited incentives for private investors to enter, primarily due to the absence of VAT, or import duty reliefs for generation assets and off-grid components. Standard retail contracts or rules regarding metering and billing are also not clarified. The lack of a standard tariff calculation tool results in financial planning uncertainty for potential investors. However, the presence of multilateral guarantees as well as concessional lending from DFIs are good steps towards offering sufficient incentives.

### Related to the *Readiness* of the electricity market

- ⚡ A review of the Topics covered by the *readiness* of the power generation segment reveals that Mozambique has taken efficient measures to regulate this area. The rules for obtaining land, water, building, and environmental permits are clear and specify related issuing authorities. Only the lack of a one-stop-shop should be recognized. *System planning* benefits from a comprehensive master plan that details the network infrastructure. The *grid code* establishes rules for the connection to the system, responsibilities, and roles of grid participants as well as the right for third-party access to the transmission network. However, the lack of a clear contractual framework for access and use of the grid and



rules for the allocation of connection costs remain gaps in the regulations and need to be addressed. In addition, EDM provides *access to data* on market fundamentals, and national statistical agencies and competent ministries provide access to data on socio-economic indicators. *System quality and security standards* for transmission network planning and operation are currently being developed by EDM.

- ⚡ There is a fairly good performance in terms of *readiness* related to the power transmission market segment. There is good performance related to *authorizations and permits* due to clear rules for obtaining lands, rights-of-way, and other permits related to investments in the transmission network, which would however benefit from the establishment of a one-stop-shop. The presence of a national transmission *grid code* defining system operation rules as well as third-party access to the transmission network is a key strength. However, the lack of a clear contractual framework for access and use of the grid and rules for the allocation of connection costs remain gaps. System quality and security standards are not defined in the national network code. In addition, the lack of a standard framework for interconnection protocols is indicative of poor performance on network access issues. EDM regularly publishes basic market data but data on quality standards for transmission services remain unavailable, thus reducing market transparency of this segment.
- ⚡ There is no dedicated distribution grid code, and the code currently in use only considers the transmission system and does not define the system operation rules for the distribution system. Even though rules have been put in place to ensure third-party access, there is a general lack of clear and transparent rules regarding connection costs, rules providing customers open access to the grid, and system quality and security standards for the planning and operation of the network.
- ⚡ With the decree on off-grid regulation in 2021, great progress has been made in terms of preparing the regulatory landscape for better involvement of private mini-grid operators. It provides a wide range of possibilities to integrate with the main grid, such as becoming a small power distributor or producer. However, in the event of grid arrival to mini-grid investment areas, guarantees or compensation mechanisms for stranded assets are currently lacking. Additionally, there are defined safety, service, and technical standards as well as international and national standards for off-grid products. This can be strengthened by instituting clear and publicly available procedures to obtain national certifications.

While acknowledging the efforts put in place by national institutions to strengthen Mozambique's electricity sector policy and regulatory framework, the analysis demonstrated that some further regulatory action and reforms (or improvements) are needed to ensure enhanced *openness*, *attractiveness*, and *readiness* of the national electricity market through policies and regulations to effectively crowd-in private investors.

Recommendations on how to address the regulatory challenges highlighted by the assessment are provided to the relevant energy institutions. If implemented, these reforms would constitute positive steps towards strengthening the role of the private sector in supporting Mozambique's electricity industry development and in providing reliable, competitive, and sustainable power for all.

## 4.2 Recommendations



### To enhance the *Openness* of the electricity market



Energy strategy

The most recent national energy strategy, covering the period 2014-2023, has not been formally adopted by the government. As a consequence, Mozambique lacks of updated national priorities and targets for the development of the electricity market. A new energy strategy, meant to cover the period 2019-2029, is under discussion at the government level, though its adoption has been delayed. As recently observed with the adoption of the Climate Change Strategy, which identifies strategic priorities for the energy sector, Mozambique would benefit from updating its national priorities for the energy sector and may consider:

- ⚡ Adopt an updated energy strategy, detailing strategic long-term priorities for the development of the electricity sector.
- ⚡ Set ambitious but realistic and quantifiable targets (i.e., in terms of power generation, network expansion, serving customers, reducing GHG emissions, etc.), and adopt an explicit roadmap for their achievement.
- ⚡ Introduce formal, extensive, and rigorous target monitoring and define responsible authorities for the implementation and surveillance to enhance accountability.
- ⚡ Consider legal backing of the energy policy to enhance accountability on target implementation.



Despite the existence of a comprehensive master plan covering the period 2018-2043, formal rules for managing master plan review and update are missing. Therefore:

- ⚡ Introduce specific provisions for the timely revision of the generation and grid expansion plans, and establish formal procedures for their approval. This should include consultation practices involving market participants and relevant institutions.
- ⚡ Develop and conduct periodic integrated assessments of system expansion and flexibility needs for the short, medium, and long-term.



Power sector governance

Conflicting provisions between the recently approved PPP Law and the current Electricity Law of 1997 confirms the necessity of updating the current Electricity Law to clarify the legal regimes available for electricity operators and market access rules. The government is working on this subject and the approval of a new Electricity Law should remain a priority for national authorities.



Power sector framework

Restructuring EDM and unbundling the company by separating its commercial and regulatory activities could bring a range of positive impacts to the electricity market and encourage private sector participation. Therefore:

- ⚡ Assess feasibility options for EDM restructuring to create a separate entity with the responsibility of transmission asset management and system operation.
- ⚡ Explore potential benefits of separating EDM's generation and distribution functions to create more opportunities for private sector participation in both market segments, as well as in electricity trading and retailing.



Power sector competition

Competition within the electricity market can be enhanced to benefit from opportunities for cost reductions and increase the affordability of the electricity supply. To do so, consumers at the wholesale and retail levels may benefit from being authorized to purchase power from preferred suppliers other than the public utility. In this regard:

- ⚡ Evaluate the opportunity to introduce a partial liberalization of electricity sales to defined categories of final customers



Private sector participation model

The current Electricity Law limits private sector participation to the granting of a concession agreement by the State. To support the expansion of private sector participation, Mozambique could investigate the potential to open other market access options such as commercial and merchant models to private operators. More flexible models could allow greater private sector participation in financing, building, and operating electricity assets.



Procurement process

With regards to public procurement of electricity infrastructure, Mozambique will benefit from:

- ⚡ Adopt rules and procedures for processing and evaluating unsolicited proposals.
- ⚡ Adopt of electricity infrastructure procurement plans. These plans, if made public and well-publicized, will provide the necessary visibility to investors and ensure greater competitiveness among bidders, thereby providing cost advantages.



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



### Contracts regulation

There has been progress in standardizing PPAs. To further improve contracts regulation:

- ⚡ Adopt a standardized PPA template, or blueprint, for specific generation asset technologies to reduce transaction costs.
- ⚡ Adopt standardized Transmission and Distribution Service Agreements to establish roles and responsibilities, as well as clarify the financial terms during a project period.
- ⚡ Adopt a standard model for power supply agreements with clients of off-grid and mini-grid operators.



### Economic regulation

Transparency in tariff methodology and procedures for tariff revision and timing are fundamental to achieve cost-reflectivity over time and ensure the financial viability of electricity sector operators in the long term. To facilitate this target:

- ⚡ Define transparent rules for tariff setting and a consequent tariff methodology for services cost components, including use of system charges.
- ⚡ Set regulatory periods for tariff cost review and rates update.

In the off-grid segment, the definition of guidelines for mini-grid tariff setting may facilitate the development of this market and speed-up regulatory review and decision on tariffs proposals. This effort can benefit from:

- ⚡ Assessing the effects of the current tariff system on mini-grid development.
- ⚡ Analyzing and quantifying the need for incentives to ensure the financial sustainability of mini-grid assets.
- ⚡ Adopting the principle of cost-reflective tariffs for stand-alone networks and introducing a standard tool for calculating mini-grid tariffs.



### Incentives

To improve the current incentive system and provide stronger and longer-term signals to potential investors, evaluate adopting specific legislation, especially for the renewable energy sector such as green certificates and RES quotas.



### Indirect incentives

The availability of indirect incentives plays a key role in strengthening the business case for private investment in electricity infrastructure. Review of the current regulation on tax and duties exemptions, notably for generation assets, off-grid components, and renewable technologies is advised. The possibility of using other indirect incentives, such as performance-based financing and carbon pricing mechanisms should be considered.



Credit enhancement

Credit enhancement mechanisms play a fundamental role in reducing risks for power infrastructure projects and in increasing project bankability. While investors in the generation segment have benefited from such instruments, they are much less available to investors in other segments of the value chain. Therefore:

- ⚡ Explore the possibility to facilitate access to credit enhancement instruments.



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



Authorization and permits

Mozambique has well defined rules and procedures for authorizations and permits that are required for the construction and operation of electricity assets. However, limiting factors for private investors remain the restriction in terms of land rights and land access regulation, as well as the absence of a single-window to access all required permits and authorizations. Therefore, Mozambique could benefit from easing land access rights to private entities and establish a one-stop-shop to streamline the investment process.



System planning

The Network Development Plan could be improved through:

- ⚡ The development of a regular RES network integration study to further add valuable information to private investors as well as for instructions regarding where opportunities and necessities for new power sector infrastructure arise.



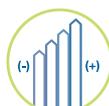
Grid code

The national Grid Code establishes system operation rules as well as the responsibilities and roles of grid participants in the Integrated Power System. However, Mozambique should address the current regulatory gaps related to ancillary services and dispatching by expanding existing regulation. Furthermore, adopt a dedicated distribution grid code to provide regulatory certainty in the distribution market.



Grid access

To effectively implement open-access regime, the country should institute regulation defining a contractual framework for connection and use of transmission and distribution networks as well as offer clarity related to the sharing of connection costs.



System quality and security standards

Operators in the generation, transmission, and distribution segments would greatly benefit from defined criteria on system quality and security standards. EDM, which is currently working on the definition of such criteria, should accelerate their elaboration and adoption. In the off-grid segment, institute regulation to define technical standards for mini-grid assets to provide regulatory certainty in this market segment.



Off-grid  
system  
integration

In order to support the development of off-grid assets, and in particular mini-grids, Mozambique could:

- ⚡ Introduce compensation mechanisms for mini-grid operators stranded assets in case of arrival of main grid infrastructure in the area.
- ⚡ Clarify rules for decommissioning and removal of mini-grid asset in case of arrival of the main grid.

### 4.3 Way forward

The review of Mozambique's policies, laws, and regulations relevant to the electricity supply industry confirms the good results achieved by national authorities in reforming the regulatory environment towards greater private sector participation, especially in the generation segment. Major progress is also made in the governance and regulation of the off-grid market to address the electricity access challenge in rural areas and support the scale-up of off-grid investments. However, the country is still confronted with structural challenges related to private sector participation in the transmission and distribution segments. Indeed, only MOTRACO operates as an independent transmission operator while EDM remains the only distribution concessionaire in the whole country.

Consequently, the government acknowledged the need to put electricity market reforms at the top of its political agenda and seek greater participation of private sector actors.

Areas of strength, as well as areas of further improvement, have been identified, and key recommendations are offered to support Mozambique in achieving its goals. Towards this end, this regulatory review offers constructive identification of areas of reform and policy and regulatory enhancement for a competitive, resilient, and sustainable electricity sector.

The economy of Mozambique will need a reliable electricity supply to sustain its recovery and future growth and its population will need affordable power to thrive. The UN Economic Commission for Africa and the RES4Africa Foundation remain committed to supporting Mozambique 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 of Mozambique towards greater *openness*, *attractiveness*, and *readiness* of the market. They also call on the development community, NGOs, ISOs, national organizations, and the private sector to play their constructive role in supporting the efforts of the Government of Mozambique in this reform process, guided by its public institutions, aimed at economic transformation and achievement of SDG7 goals.

## References

1. AfricaOutlook. ND. *Lighting the Transformation of Mozambique*. [online] Available at: <https://www.africaoutlookmag.com/company-profiles/1106-electricidade-de-mocambique-edm> [Accessed 20 October 2021]
2. African Development Bank (AFDB). 2018. *Mozambique Country Strategy Paper 2018 -2022*. [online] Available at: <https://www.afdb.org/fileadmin/uploads/afdb/Documents/Boards-Documents/MOZAMBIQUE - CSP 2018-2022 Final .pdf> [Accessed 20 October 2021]
3. African Development Bank (AFDB). 2017. *Mini-Grid Market Opportunity Assessment: Mozambique*. [online] Available at: [https://www.aler-renovaveis.org/contents/lerpublication/afdb\\_2017\\_abr\\_mini-grid-market-opportunity-assessment-mozambique.pdf](https://www.aler-renovaveis.org/contents/lerpublication/afdb_2017_abr_mini-grid-market-opportunity-assessment-mozambique.pdf) [Accessed 20 October 2021]
4. ARENE. 2020. *Poderes e Competências*. [online] Available at: <http://arene.org.mz/sobre-nos/quem-somos/> [Accessed 20 October 2021]
5. Britannica. 2021. Mozambique. [online] Available at: <https://www.britannica.com/place/Mozambique> [Accessed 20 October 2021]
6. Doing Business 2020. *Economy Profile Mozambique*. [online] Available at: <https://www.doingbusiness.org/content/dam/doingBusiness/country/m/mozambique/MOZ.pdf> [Accessed 18 January 2022]
7. Electricidade de Moçambique (EDM). 2019. *Overview of the Electricity Sector in Mozambique*. [online] Available at: <https://eneken.ieej.or.jp/data/8560.pdf> [Accessed 20 October 2021]
8. Electricidade de Moçambique (EDM). 2018. *Integrated Master Plan Mozambique Power System Development Final Report*. [online] Available at: <https://openjicareport.jica.go.jp/pdf/12318606.pdf> [Accessed 20 October 2021]
9. Electricidade de Moçambique (EDM). 2018. *Integrated Master Plan of Energy Infrastructures approved*. [online] Available at: <https://portal.edm.co.mz/en/website-mobile/article/news/integrated-master-plan-energy-infrastructures-approved> [Accessed 20 October 2021]
10. Electricidade de Moçambique (EDM). ND. *Energy Transmission Lines*. [online] Available at: <https://www.edm.co.mz/en/website/page/energy-transmission-lines> [Accessed 20 October 2021]
11. Electricidade de Moçambique (EDM). ND. *Company*. [online] Available at: <https://www.edm.co.mz/en/website/page/company> [Accessed 20 October 2021]
12. Electricidade de Moçambique (EDM). ND. *Electricity Tariffs*. [online] Available at: <https://www.edm.co.mz/en/website/page/electricity-tariffs> [Accessed 20 October 2021]

13. Energy Charter Secretariat Knowledge Centre. 2016. *Pre-assessment report of the Mozambican energy sector under the principles of the international energy charter and the energy charter treaty*. [online] Available at: [https://www.energycharter.org/fileadmin/DocumentsMedia/Occasional/Mozambican\\_Energy\\_Sector.pdf](https://www.energycharter.org/fileadmin/DocumentsMedia/Occasional/Mozambican_Energy_Sector.pdf) [Accessed 20 October 2021]
14. Eskom. ND. *The rationale behind the Apollo-Cahora Bassa Scheme*. [online] Available at: <https://www.eskom.co.za/sites/heritage/Pages/THERATIONALEBEHINDTHE-APOLLO-CAHORABASSASSCHEME.aspx> [Accessed 20 October 2021]
15. Food and Agriculture Organization of the United Nations (FAO). 2014. *Decree No. 58/2014 approving the Regulation on the tariff regime for new and renewable energy*. [online] Available at: <https://www.fao.org/faolex/results/details/fr/c/LEX-FAOC185558/> [Accessed 20 October 2021]
16. Global Legal Insights (GLI). 2020. *Energy 2020*. [online] Available at: [https://www.vda.pt/xms/files/05\\_Publicacoes/2019/Livros\\_e\\_Artigos/GLI-EN20\\_Mozambique.pdf](https://www.vda.pt/xms/files/05_Publicacoes/2019/Livros_e_Artigos/GLI-EN20_Mozambique.pdf) [Accessed 20 October 2021]
17. Government of Mozambique. ND. *About GETFIT*. [online] Available at: <https://www.getfit-moz.org/about-getfit> [Accessed 20 October 2021]
18. Government of Mozambique. 2018. *National Electrification Strategy*. [online] Available at: [https://rise.esmap.org/data/files/library/mozambique/Documents/Energy%20Access/Mozambique\\_Rural%20Electrification%20Strategy%202018-30\\_ENG.docx](https://rise.esmap.org/data/files/library/mozambique/Documents/Energy%20Access/Mozambique_Rural%20Electrification%20Strategy%202018-30_ENG.docx) [Accessed 20 October 2021]
19. International Growth Centre (IGC). 2012. *Assessment of Public-Private Partnerships in Mozambique*. [online] Available at: <https://www.theigc.org/wp-content/uploads/2014/09/Fischer-Nhabinde-2012-Working-Paper1.pdf> [Accessed 20 October 2021]
20. International Energy Agency (IEA). 2020. *Electricity consumption*. [online] Available at: <https://www.iea.org/countries/mozambique> [Accessed 20 October 2021]
21. International Energy Agency (IEA). 2020. *Electricity consumption per capita*. [online] Available at: <https://www.iea.org/countries/mozambique> [Accessed 20 October 2021]
22. International Monetary Fund (IMF). 2021. *Republic of Mozambique*. [online] Available at: <https://www.imf.org/en/Countries/MOZ> [Accessed 20 October 2021]
23. Konrad Adenauer Stiftung. 2020. *Carbon Pricing in Sub-Saharan Africa*. [online] Available at: <https://www.kas.de/documents/282730/282779/Carbone+Pricing+in+sub-Saharan+Africa+anglais.pdf/afbff20e-0b1a-61e8-24d6-38ae056c0c81?t=1594785554783> [Accessed 20 October 2021]
24. Lusophone Renewable Energy Association (ALER). 2018. *Official presentation of the Mozambique National Electrification Strategy until 2030*. [online] Available at: <https://www.aler-renovaveis.org/en/communication/news/official-presentation-of-the-mozambique-national-electrification-strategy-until-2030/> [Accessed 20 October 2021]



25. Ministry of Foreign Affairs. 2018. *Final Energy report Mozambique*. [online] Available at: <https://www.rvo.nl/sites/default/files/2019/01/Final-Energy-report-Mozambique.pdf> [Accessed 20 October 2021]
26. ScienceDirect. 2021. *Electricity access in Mozambique: A critical policy analysis of investment, service reliability and social sustainability*. [online] Available at: <https://www.sciencedirect.com/science/article/pii/S2214629621002164> [Accessed 20 October 2021]
27. U.S. Agency for International Development (USAID). 2021. *Mozambique energy sector overview*. [online] Available at: <https://www.usaid.gov/powerafrica/mozambique> [Accessed 20 October 2021]
28. U.S. Agency for International Development (USAID). 2015. *Sector reform and utility commercialization (SRUC) Background report on Mozambique's power sector; utility performance & loss reduction*. [online] Available at: [https://pdf.usaid.gov/pdf\\_docs/PA00M4WX.pdf](https://pdf.usaid.gov/pdf_docs/PA00M4WX.pdf) [Accessed 20 October 2021]
29. World Bank. ND. *Access to electricity (% of population) - Mozambique*. [online] Available at: <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=MZ> [Accessed 20 October 2021]
30. World Bank. ND. *Electric power transmission and distribution losses (% of output) - Mozambique*. [online] Available at: <https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=MZ> [Accessed 20 October 2021]
31. World Bank. ND. *Mozambique Overview*. [online] Available at: <https://www.worldbank.org/en/country/mozambique/overview#1> [Accessed 20 October 2021]
32. World Bank. ND. *GDP growth (annual %) – Mozambique*. [online] Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=MZ> [Accessed 20 October 2021]
33. World Bank. ND. *GDP per capita (current US\$) – Mozambique*. [online] Available at: <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=MZ> [Accessed 20 October 2021]
34. World Bank. 2019. *Project Appraisal Document*. [online] Available at: <https://documents1.worldbank.org/curated/en/603941561341688507/pdf/Mozambique-Temane-Regional-Electricity-Project.pdf> [Accessed 20 October 2021]
35. World Bank. 2003. *Mali: The Selingue Rehabilitation Project*. [online] Available at: <https://documents1.worldbank.org/curated/en/722141468281935962/pdf/273990PAPER0Findings0infobrief094.pdf> [Accessed 20 October 2021]

## Acronyms

<b>AfDB</b>	African Development Bank
<b>ANEA</b>	Atomic Energy Agency
<b>ARENE</b>	Autoridade Reguladora de Energia
<b>BOO</b>	Build, Own, and Operate
<b>BOOT</b>	Build, Own, Operate, and Transfer
<b>BTO</b>	Build, Transfer, and Operate
<b>BOT</b>	Build, Operate, and Transfer
<b>CNELEC</b>	National Electricity Council
<b>CPI</b>	Investment Promotion Centre
<b>CTRG</b>	Central Térmica de Ressano Térmica
<b>DFI</b>	Development Finance Institution
<b>DSA</b>	Distribution Service Agreement
<b>DSO</b>	Distribution Service Operator
<b>EDENR</b>	New and Renewable Energy Development Strategy
<b>EdM</b>	Electricidade de Moçambique
<b>EEC</b>	Eswatini Electricity Company
<b>EISS</b>	Energy, Infrastructure, and Services Section
<b>EPC</b>	Energy Performance Certificates
<b>ESMAP</b>	Energy Sector Management Assistance Program
<b>FAO</b>	Food and Agricultural Organization
<b>FUNAE</b>	Fundo Nacional de Energia
<b>GDP</b>	Gross Domestic Product
<b>GET FIT</b>	Global Energy Transfer Feed-in Tariff
<b>GHG</b>	Green House Gas
<b>HCB</b>	Hidroeléctrica de Cahora Bassa
<b>ICA</b>	Infrastructure Consortium for Africa
<b>IEA</b>	International Energy Agency
<b>IEMP</b>	Integrated Electricity Master Plan
<b>IGC</b>	Inverse Gas Chromatography
<b>IMF</b>	International Monetary Fund
<b>IMP</b>	Integrated Master Plan
<b>INAMI</b>	National Institute of Mines
<b>INP</b>	National Petroleum Institute
<b>IPPs</b>	Independent Power Producers
<b>IPS</b>	Integrated Power System
<b>KPIs</b>	Key Performance Indicators
<b>MIREME</b>	Ministry of Mineral Resources and Energy
<b>MOTRACO</b>	Mozambique Transmission Company

<b>MW</b>	Mega-Watt
<b>PDENR</b>	New and Renewable Energy Development Policy
<b>PPAs</b>	Power Purchase Agreements
<b>PPPs</b>	Public-Private Partnerships
<b>PROLER</b>	Renewable Energy Auction Promotion Program
<b>REFIT</b>	Renewable Energy Feed-in Tariff
<b>RES4Africa</b>	Renewable Energy Solutions for Africa Foundation
<b>ROOT</b>	Rehabilitate, Own, Operate, and Transfer
<b>SADC</b>	Southern African Development Community
<b>SDGs</b>	Sustainable Development Goals
<b>TSA</b>	Transmission Service Agreement
<b>TSO</b>	Transmission Service Operator
<b>TWh</b>	Tera-Watt hour
<b>UNDP</b>	United Nations Development Program
<b>UNECA</b>	United Nations Economic Commission for Africa
<b>USAID</b>	United States Agency for International Development
<b>VAT</b>	Value-Added Tax

## Annexes

### Annex A: Policies, Plans, and Regulations

Energy Policy (1998)	<a href="https://energypedia.info/wiki/File:PT_Politica_Energetica_Imprensa_Nacional_de_Mocambique.pdf">https://energypedia.info/wiki/File:PT_Politica_Energetica_Imprensa_Nacional_de_Mocambique.pdf</a>
Energy Strategy (2009)	<a href="http://extwprlegs1.fao.org/docs/pdf/moz119871.pdf">http://extwprlegs1.fao.org/docs/pdf/moz119871.pdf</a>
New and Renewable Energy Development Policy (2009)	<a href="http://extwprlegs1.fao.org/docs/pdf/moz119723.pdf">http://extwprlegs1.fao.org/docs/pdf/moz119723.pdf</a>
National Electrification Strategy (2018)	<a href="https://rise.esmap.org/data/files/library/mozambique/Documents/Energy%20Access/Mozambique_Rural%20Electrification%20Strategy%202018-30_ENG.docx">https://rise.esmap.org/data/files/library/mozambique/Documents/Energy%20Access/Mozambique_Rural%20Electrification%20Strategy%202018-30_ENG.docx</a>
Integrated Electricity Master Plan (2018)	<a href="https://openjicareport.jica.go.jp/pdf/12318606.pdf">https://openjicareport.jica.go.jp/pdf/12318606.pdf</a>
Electricity Law No. 21/1997	<a href="https://www.edm.co.mz/en/website/page/legislation">https://www.edm.co.mz/en/website/page/legislation</a>
Mozambican Grid Code (2014)	<a href="https://www.dlapiper africa.com/export/sites/africa/mozambique/insights/legislation-series/energy/downloads/diploma-ministerial-n_184.2014.pdf_2063069299.pdf">https://www.dlapiper africa.com/export/sites/africa/mozambique/insights/legislation-series/energy/downloads/diploma-ministerial-n_184.2014.pdf_2063069299.pdf</a>
PPP Law No. 15/2011	<a href="https://s3.amazonaws.com/rgi-documents/7d88eef7849f9b9cd4c2a4c1b7c6d78fdbace642.pdf">https://s3.amazonaws.com/rgi-documents/7d88eef7849f9b9cd4c2a4c1b7c6d78fdbace642.pdf</a>
Public Procurement Decree No. 5/2016	<a href="http://www.ufsa.gov.mz/Docs/BR_28_I_SERIE_SUPLEMENTO_2016.pdf">http://www.ufsa.gov.mz/Docs/BR_28_I_SERIE_SUPLEMENTO_2016.pdf</a>
Tariff regime Decree No. 58/2014	<a href="http://extwprlegs1.fao.org/docs/pdf/moz185558.pdf">http://extwprlegs1.fao.org/docs/pdf/moz185558.pdf</a>

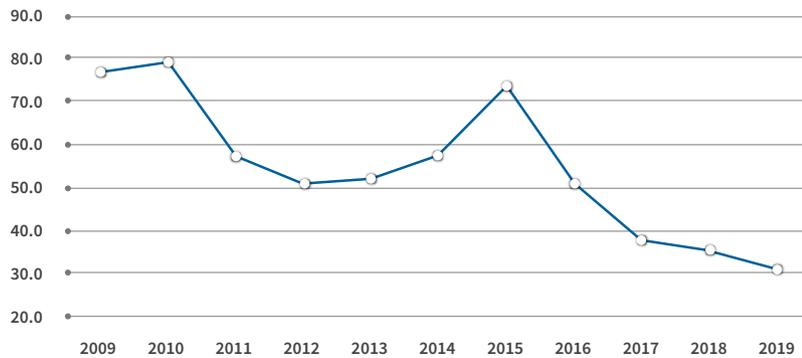
## Annex B: An overview of the Topics assessed

 Openness	Energy Strategy	The existence and characteristics of energy and climate policies.
	System Planning (also <i>readiness</i> )	The existence and characteristics of plans for generation expansion, network development and electrification.
	Power Sector Governance	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.
	Power Sector Framework	The degree of unbundling of generation, transmission, and distribution services.
	Power Sector Competition	The openness of the electricity market to competition.
	Private Sector Participation Model	The number of available models for private parties to participate in the power sector.
	Procurement Process	The characteristics of PPP procurement policy, competitive tenders, and solicited/ unsolicited proposals.
	Off-taking Options (for <i>Generation</i> )	The existence of a spot market or single-buyer as well as the regulatory characteristics of private PPAs and captive generation.
 Attractiveness	Contract Regulation	The structure and characteristics of public PPAs, TSAs, DSAs, and standard retail contracts for off-grid operators.
	Economic Regulation	The structure and definition of the retail and network tariff.
	Incentives	The existence of instruments incentivizing private investors to operate in the power sector (e.g., FiT, capacity payments, green certificates, RES quotas).
	Indirect Incentives	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).
	Credit Enhancement	The existence of lending agreements or guarantees that reduce risk or costs for private investors entering the power sector.

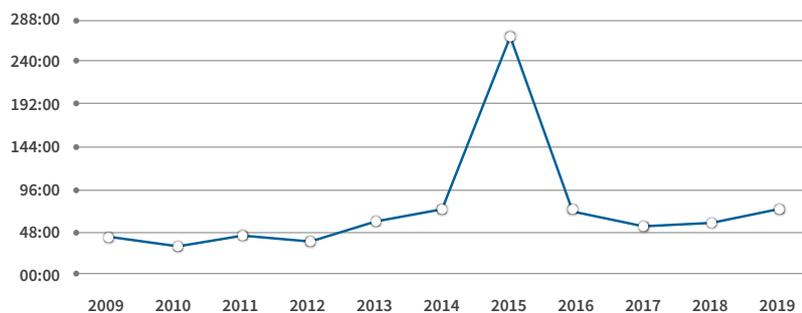
 <p>Readiness</p>	Authorizations and Permits	The existence and characteristics of permits needed for the construction of assets in the power sector (e.g., land & water rights, construction, and environmental permits).
	System Planning	The existence and characteristics of the network development plan.
	Grid Code	The characteristics of the grid code (e.g., the existence of rules for system operation and connection).
	Grid Access	The existence of third-party access and the characteristics of grid connection and operation agreements.
	System Quality and Security Standards	The existence of quality and security standards for transmission network planning and operation.
	Access to Data	The public availability of data related to electricity sector performance.
	System Integration (for Off-Grid)	The existence and characteristics of regulation for grid arrival.

### Annex C: SAIFI and SAIDI

System Average interruption Frequency Index



System Average interruption Duration Index (Hours)







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