Energy Policy Review

Mozambique 2024

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Executive summary

Mozambique has among the lowest levels of modern energy consumption per capita globally. With a population of around 34 million, the country faces lingering development challenges, including a high poverty rate and reliance on subsistence agriculture. Despite progress over the past twenty years, only 48% of Mozambicans had access to electricity in 2022. Bioenergy, mainly wood and charcoal, dominates the energy mix, with nearly 95% of the population relying on traditional fuels for cooking.

Yet, Mozambique is endowed with significant untapped energy resources – including hydropower, natural gas, solar, and minerals – which could help close this gap and catalyse industrial development. Leveraging these resources to build a modern and inclusive energy system is the focus of the country's Energy Transition Strategy (*Estratégia de Transição Energética*, ETE), approved by the government in 2023. The ETE aims to leverage the country's renewable and natural resources to expand energy access, drive economic growth through low-emissions industrialisation, and position Mozambique as a regional energy hub.

Strengthening institutions and regulatory frameworks, improving governance and transparency, and enhancing data management and planning tools will be essential for Mozambique to realise its full potential.

Ambitious goals for energy access amid socio-economic and demographic constraints

Access to modern energy is the cornerstone of Mozambique's ETE, with the target of achieving universal electricity and clean cooking access by 2030. More than half of Mozambicans still lacked access to electricity in 2022. The rate of clean cooking access is even lower, with only 7% of the population relying on clean cooking solutions. The disparity between urban and rural areas is stark with 76% and 16% of the urban population having access to electricity and clean cooking, respectively. These figures drop to 15% and 1% in rural regions.

Mozambique aims to extend electricity supply through a mix of grid-connections, mini-grids, and solar home systems, and cleaner cooking through liquified petroleum gas (LPG), improved biomass stoves, and electric cookers. This transition aims to improve living standards, promote small businesses, and mitigate the environmental and health impacts of traditional energy use.

The rate of electricity access has been accelerating, with the number of connections rising by over 50%, from around 8.2 million in 2017 to 12.7 million in

2022. In contrast, clean cooking has progressed slowly, increasing by just 5 percentage points over 22 years (2000-2022), leaving 30 million people still reliant on traditional biomass.

The challenge is immense, due to Mozambique's predominantly rural, low-density demographics and high population growth. Low-income levels make the upfront costs of electricity and clean-cooking solutions prohibitive for many, limiting demand and complicating network expansion. In this context, off-grid electrification is expected to play a growing role, but further reforms, such as predictable tariffs, structured financing, and cohesive policies, are needed to attract investment and scale both electricity and clean cooking access.

Leveraging domestic natural resources for Mozambique’s electricity mix

The 2022 Electricity Law expanded the participation of the private sector in the electricity value chain. So far, private investment has only occurred in generation, with independent power producers signing power purchase agreements with Electricidade de Moçambique (EDM), the state-owned utility that serves as the single buyer, system operator, and sole supplier in grid-connected areas.

Mozambique's total electricity generation is predominantly based on hydropower (83%), with the Cahora Bassa Hydroelectric (CBH) as the largest generation asset. However, over two-thirds of CBH’s output are exported to South Africa under a long-term contract due to end in 2030. Natural gas makes up 15% of electricity generation, partly provided by domestic gas production from the Pande and Temane projects.

With a solar irradiation level of 2 100 kWh/m²/year and estimated wind power potential of at least 4.5 GW, there is scope to significantly increase the role of variable renewables. Mozambique has launched competitive auction programmes, supported by development partners, to upscale the deployment of renewable energy. Several projects are under development, ranging from 15 to 120 MW, which could help reduce project costs and deliver lower tariffs for EDM. However, they have not yet led to the commissioning of new renewable capacity.

Mozambique does not yet have a single, unified grid across the country. While the central and northern grid contains most of Mozambique’s current and potential hydropower resources, the southern grid – which includes the capital city, Maputo – accounts for most of the country’s demand. Due to a lack of interconnections, the southern grid must import much of its power from South Africa, as does the Mozal aluminium plant, Mozambique’s largest consumer. A “Backbone” transmission project is under development, which aims to link the central-northern

and southern systems. It is a complex initiative carried out in several phases, whose completion will be critical in shaping the country's future import and export arrangements.

Harnessing gas for national and international markets

With some of Africa's largest gas resources, of which the National Petroleum Institute estimates 3 766 billion cubic metres (bcm) to be recoverable, Mozambique's ETE aims to provide gas to both national and international markets, to replace more polluting fuels such as coal and diesel. Domestically, priority is given to potential uses in power generation, as well as LPG and fertiliser production. Several natural gas projects are under development, which could increase the availability of gas for the domestic market and support industrial development, in line with Mozambique's long-term strategy set out in the Natural Gas Master Plan.

Current production mostly comes from the Pande and Temane gas fields with 80% of the output being exported to South Africa via the ROMPCO pipeline, and the remaining 20% supplying the domestic market. Further developments in the Pande and Temane areas are expected to supply the planned 450-MW Central Térmica de Temane gas-fired power plant.

Other projects, primarily aimed at export markets, include Coral South LNG, which came online in late 2022 and is expected to further add significant capacity in the coming years. The development activities of the Mozambique LNG project were suspended by TotalEnergies in 2021, due to the increase in insurgent violence in the Cabo Delgado province but is now expected to resume by the end of 2025.

Most of the revenue for Mozambique from these projects is set to arrive in the mid-2030s at the earliest. The 2024 establishment of a Sovereign Wealth Fund could support a transparent and efficient management of future gas revenues by stabilising the state budget against volatility in petroleum revenues and ensuring the benefits of oil and gas resources for future generations.

Coal set to remain a small player in domestic energy, while maintaining large role in exports

Since 2018, coal has been Mozambique's top export by value, surpassing aluminium and accounting for around one-third of the country's export revenues. Coal production expanded significantly in the 2010s following the rehabilitation of key infrastructure, and reached 14.3 million tonnes (Mt) in 2022, primarily from Tete province.

Although coal is the country's leading export, it contributes only marginally to its domestic energy supply (0.1%), with usage being largely confined to industry. While earlier government plans envisioned new coal-fired capacity, the ETE

prioritised other generation lower cost options, such as renewables and natural gas, which contributes to a broader strategy to fulfil the country's climate commitments and position itself competitively as a low-emissions export hub.

Paving the way for an energy efficiency regulatory framework

Mozambique's energy intensity declined by 56% between 2000 and 2021. Despite this progress, the country remains the sixth most energy-intensive globally and the second highest in the Eastern and Southern Africa regions.

Significant energy efficiency efforts are required in the buildings sector, which relies heavily on bioenergy, driving Mozambique's end-use energy consumption. Enhancing energy efficiency is an important objective for the government in this context, as it can play a crucial role in accelerating energy access and tempering energy intensity as demand grows. Other highly energy intensive sectors include transport whose demand, mostly for diesel and gasoline fuels, has increased nearly five-fold in the past 20 years driven by population growth, urbanisation and increasing rates of vehicle ownership.

According to the government, energy demand is expected to double between 2019 and 2027, partly due to significant efforts to improve electricity access. Adopting energy efficiency measures, such as Minimum Energy Performance Standards (MEPS) for key technologies, could save more than 2 000 GWh of electricity annually by 2030 and significantly reduce CO_2 emissions, with even greater savings possible through best available technologies. The government adopted its first energy efficiency strategy in 2023, with proposed measures for residential buildings, industry, and transport.

Strengthening commitments to climate adaptation, mitigation and resilience

Mozambique has contributed very little to greenhouse gas emissions (GHG) and in 2020 represented only 0.2% of global GHG emissions, despite being home to 0.4% of the world's population. However, the country's emissions are projected to increase due to population and economic growth, increased deforestation, and rising industrialisation.

According to the country's GHG inventory, energy is the second largest emitting sector after land-use, land use change and forestry. Within the energy sector, traditional use of biomass accounted for the largest share of emissions (39%), followed by the transport sector (35%), industry (13.5%) and electricity (12.5%).

Mozambique is a party to the United Nations Framework Convention on Climate Change (UNFCCC) and a signatory of the Kyoto Protocol and Paris Agreement. The country submitted its Intended Nationally Determined Contribution in 2015, its first Nationally Determined Contribution (NDC1) in 2018, and an updated NDC1 in 2021. The updated NDC1 aims to reduce emissions by about 40 million tonnes carbon dioxide equivalent ($MtCO_2$-eq) between 2020 and 2025 against its business-as-usual trajectory, requiring an estimated USD 7.6 billion investment. Efforts to increase data availability and consistency are key to monitor progress and support the revision and update of national targets.

Mozambique has also developed a comprehensive framework for climate resilience and adaptation. This includes the National Climate Change Adaptation and Mitigation Strategy and the National Adaptation Plan, which aim to enhance institutional capacity and access to resources for adaptation measures, such as strengthening co-ordination and early-warning systems. The Disaster Risk Reduction Master Plan further strengthens resilience to natural disasters. Additionally, Mozambique has developed 135 district-level climate adaptation plans, but these do not have funds for implementation as of 2025.

A challenging investment environment relying on development finance institutions

Mozambique faces significant challenges in attracting investment due to its high public debt levels, political instability, and a complex business environment. The government has relied heavily on development finance institutions (DFIs) for investments in its domestic energy sector, with private capital mostly flowing into the export-oriented fossil fuel supply sector.

Energy projects in Mozambique typically face a high cost of capital, which deters investors and limit the influx of necessary capital for development. Mozambique's banking sector, despite having seen growth in recent years, remains too small to mobilise large-scale investment.

Political and regulatory risks further complicate the investment landscape. The aftermath of the 2016 ''hidden debt'' crisis – whereby the government revealed previously undisclosed debts of more than USD 2 billion – and recent civil unrest have dampened investor confidence. Streamlined policies and fiscal support are needed to reduce perceived risks, enable viable business models, and expand access to affordable energy solutions.

Development finance remains crucial for Mozambique's energy sector, with DFIs playing a key role in derisking private investments and providing necessary capital. Over the past decade, DFIs and other official development aid providers have disbursed around USD 2 billion towards Mozambique's energy sector. However,

the decline in commitments from DFIs and other official development aid providers in recent years suggests that future funding will be scarcer, emphasising the need for strategic allocation of concessional finance to maximise its catalytic effect.

The global energy transition opens new avenues for critical minerals

Mozambique has extensive mineral resources and several large-scale mines producing key minerals for the global clean-energy transition, notably bauxite and graphite. The country holds one of the world's largest graphite deposits, with estimated reserves of 25 million tonnes, primarily located in the northern Cabo Delgado province. Its bauxite reserves, estimated at more than 2 million tonnes, are situated in the northwest near the border with Zimbabwe in Manica province.

Mozambique has a policy and legal framework for mining, but institutional capacity is limited, and existing processes serve more as response mechanisms rather than as planning and development tools. While there is no policy with a focus on critical minerals, the ETE has identified the potential benefits of developing these resources.

Mining operations in Mozambique are subject to various taxes, including value-added tax (VAT), income tax, and industry-specific royalties. In 2023, the government allocated 10% of mining tax revenue to community and provincial development, of which 7.25% was for local projects and 2.75% for community support. However, Mozambique faces significant revenue losses due to tax avoidance in the extractive industries.

Currently, almost all mineral production is exported, although Mozambique is exploring the possibility of processing and refining these minerals locally to support socio-economic development. For instance, leveraging its bauxite resources – the primary ore for aluminium production – Mozambique produced around 565 000 tonnes of aluminium in 2021, making it one of the world's largest exporters of this metal. Raw aluminium is the country's second-largest export by value, after coal, with annual sales worth USD 2 billion. With many countries seeking to diversify their critical mineral supply chains for greater security and resilience, Mozambique has the opportunity to expand operations and add greater value locally.

1. General energy policy

Country overview

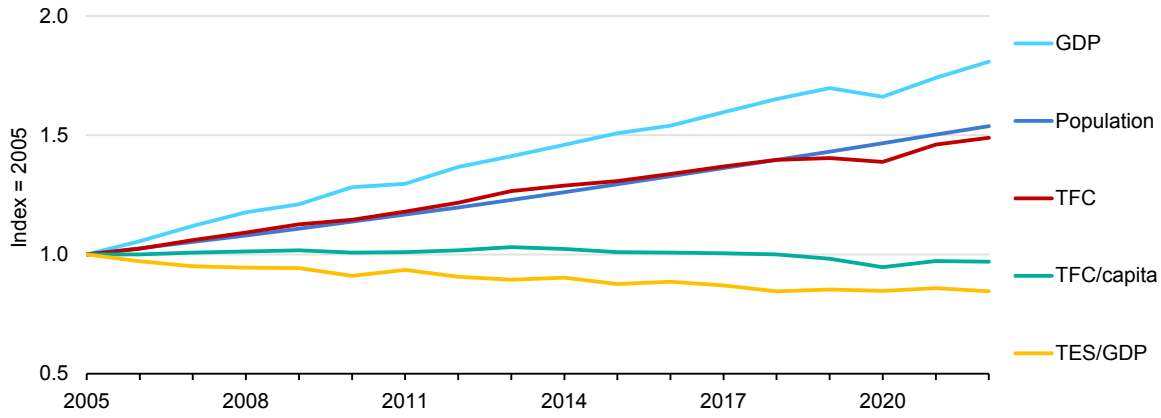
Mozambique lies in the south-east corner of Africa, where it borders eSwatini (formerly Swaziland), Malawi, South Africa, the United Republic of Tanzania, Zambia and Zimbabwe. It covers an area of 800 000 km^2 and has 2 700 km of coastline on the Indian ocean.

Mozambique had a population of 33.6 million in 2023, including over 1 million in the capital city of Maputo. The population is growing rapidly, with an annual growth rate of 3%. The country's urbanisation rate was around 39% in 2023, slightly below the African average of 45%. Portuguese is the official language and is spoken by about half of the population. Approximately 62% of the population is Christian, 19% Muslim (primarily in the northern regions), less than 5% are Jewish, Hindu, and Baha'i, and 14% report no religious affiliation. Many also practice traditional beliefs.

Mozambique's poverty rate is among the highest in the world and grew from 63.7% in 2015 to 74.4% in 2020 using the international poverty line of USD 2.15 (2017 purchasing power parity [PPP]) per person per day. Some 80% of Mozambique's poor live in its rural areas, particularly in the northern regions, and much of the population depends on subsistence agriculture. The energy use *per capita*, which is closely linked to the country's poverty rate, also declined between 2016 and 2021, reaching 2 241 kWh per person in 2021. This low level of energy consumption is a major contributor to hindered economic growth and development.

Agriculture accounted for 28% of gross domestic product (GDP) in 2021, industry 20% and services 52%. Natural resources include one of Africa's largest reserves of natural gas, significant hydropower potential, large coal reserves and vast amounts of arable land. Important exports include aluminium, electricity, coal, natural gas and sugar.

Figure 1.1 Trends of GDP, population and total final consumption in Mozambique, 2005-2022



Notes: TES = total energy supply; TFC = total final consumption.
Source: IEA (2024), World Energy Balances, (accessed 14 May 2025).

Mozambique's private sector is incipient, due to a challenging business environment and limited access to finance. The country is marked by structural fragility and high exposure to climate shocks (cyclones, floods, droughts).

Following the peace agreement that ended the post-independence civil war in 1992, annual GDP growth rates averaged 6%. This level of growth was disrupted by several shocks in the 2010s, including the "hidden debt" crisis of 2016 (Box 10.1), followed by two devastating tropical cyclones – Idai and Kenneth – in 2019, and the Covid-19 pandemic in 2020. There was also a resumption of violence between the two main political parties in 2013, and since late 2017 the country has suffered terrorist attacks in the north of the country, especially in Cabo Delgado province, home to the country's largest liquefied natural gas (LNG) projects.

Political structure

Mozambique gained independence from Portugal in 1975 and became a socialist People's Republic until 1990. Independence was followed by a civil war which, fought against the backdrop of the Cold War with intricate local dynamics, ended with the signing of the General Peace Accords in 1992.

Since 1990, the country has been officially known as the Republic of Mozambique, adopting a presidential system of governance in which the President of the Republic serves as both Head of State and Head of Government.

Energy supply and demand

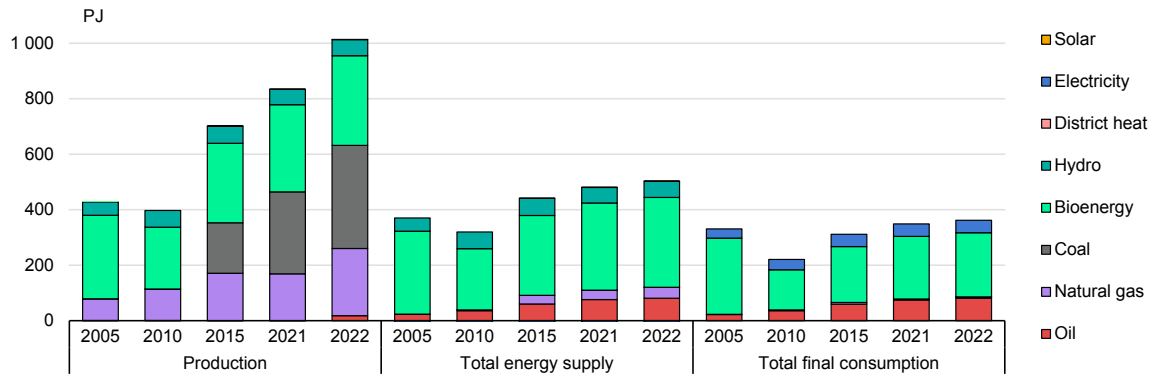
Mozambique's energy mix is dominated by bioenergy, although oil, hydro, and gas hold important shares. The country is a coal producer and exports most of its production, which makes the country a net exporter.

Mozambique produced 1 013 petajoules (PJ) of energy in 2022, 37% in the form of coal, 32% from bioenergy, 24% as natural gas and 6% in the form of hydroelectricity. Almost all coal and well over half of produced natural gas and electricity were exported. The production of natural gas increased in 2023 with the launch of Mozambique's first LNG export project in late 2022 (Coral South floating liquefied natural gas [FLNG] facility). Gas production could increase substantially in the coming years as additional planned LNG export projects come onstream.

Total energy supply in Mozambique in 2022 was 490 PJ, up from 428 PJ in 2015. Approximately 64% of energy supplied in 2022 was bioenergy, mainly in the form of wood and charcoal. Oil products (all imported) represented 16% of total energy supplied, while hydroelectricity and natural gas contributed 12% and 8% respectively.

Final energy consumption in 2022 was 362 PJ, up from 311 PJ in 2015. Around 64% of final consumption in 2022 was bioenergy, primarily wood and charcoal used by households for cooking. Approximately 21% of final consumption was in the form of oil products, mostly petrol and diesel for transportation. Almost two-thirds (65%) of final consumption was in the form of bioenergy and 1% was natural gas.

Figure 1.2 Energy production, total energy supply and total final consumption by fuel in Mozambique, 2005-2022



Note: "Solar" is not visible on this scale and accounted for less than 1 PJ of production and TES in 2022.
"Total energy supply" includes all the energy produced in or imported to a country, minus that which is exported or stored.
Source: IEA (2024), World Energy Balances, (accessed 14 May 2025).

The buildings sector (mainly households) accounted for about 65% of final energy consumption in 2022, with well over 95% of this in the form of bioenergy. Industry accounted for 18% of final consumption, 60% as electricity, 19% in the form of oil products and 18% as bioenergy. Transportation accounted for 17% of final energy consumption in 2022, all in the form of oil products.

In 2022, total final consumption *per capita* was 11 gigajoules (GJ). This was down slightly from 11.6 GJ in 2015, presumably due in part to the shocks the country experienced during that period ("hidden debt" crisis, tropical cyclones, Covid-19 pandemic), as well as population growth. Mozambique's *per capita* TFC remained slightly below the 2022 average for sub-Saharan Africa (excluding South Africa), which stood at 11.39 GJ.

Main energy institutions

The Ministry of Mineral Resources and Energy (*Ministério dos Recursos Minerais e Energia*, MIREME) is the main government body responsible for developing energy policy and ensuring its implementation. According to Article 1 of Resolution No. 33/2020 of 19 August, which approved its Organic Statute, MIREME oversees geological exploration; development of the power sector; and the supply of electricity, natural gas and petroleum products. It has five directorates, including Hydrocarbons and Fuels, Energy, Geology and Mining, Planning and Cooperation, and Legal Affairs and Litigation.

The Energy Regulatory Authority (*Autoridade Reguladora de Energia*, ARENE) is the regulator for the power sector as well as for the domestic oil products and natural gas markets. Established in 2017 by Law No. 11/2017 of 8 September, ARENE's mission is to supervise, regulate and license all operators in the energy sector, set tariffs, and establish and enforce technical and service standards. The law provides ARENE with administrative, financial and technical autonomy.

The National Oil Institute (*Instituto Nacional de Petróleo*, INP) is the regulatory body for the upstream petroleum sector. The INP operates under the framework of the Petroleum Law No. 21/2014 of 18 August. According to Article 22, it is responsible for the administration and promotion of petroleum operations, under the supervision of the Ministry. It is also responsible for the guidelines for public and private sector participation in the research and exploitation of petroleum products and their derivatives.

The Energy Fund (*Fundo de Energia*, FUNAE), established by Decree No. 24/97 of 22 July, and amended by Decree No. 101/2020 of 12 November, is the public institution responsible for promoting off-grid electrification in rural areas. Its mandate includes the development and operation of mini-grids and solar home systems, as well as the promotion of clean cooking solutions.

Electricity of Mozambique (*Electricidade de Moçambique E.P*, EDM) is the state-owned, vertically integrated electricity company responsible for electricity generation, transmission, distribution and commercialisation across Mozambique.

Cahora Basa Hydroelectric plant SA (*Hidroeléctrica de Cahora* Basa *SA*, HCB) is the country's largest power plant. It is majority-owned by the government (85%), but exports most of its power to South Africa under a long-term contract that expires in 2030.

National Company of Hydrocarbons (*Empresa Nacional de Hidrocarbonetos EP*, ENH) was created in 1981 as the state-owned oil and gas company and represents the state's share in all oil and gas projects.

The National Institute of Statistics (*Instituto Nacional de Estatística*, INE) is the main governmental body responsible for conducting official statistical activities, which until 2023 included the production and dissemination of energy-related data. Those functions have since been transferred to MIREME.

Energy Transition Strategy

The National Development Strategy 2025-2044 (*Estratégia Nacional de Desenvolvimento*, ENDE), approved through Resolution No. 16/2025 of 12 May, provides the overarching framework for national policies, including those in the energy sector. It is supplemented by the Five-Year Government Plan (*Programa Quinquenal do Governo*), approved through Resolution No. 17/2025 of 14 May, which covers the 2025-2029 period.

The Energy Transition Strategy (*Estratégia de Transição Energética*, ETE) was approved by Resolution No. 61/2023 of 29 December and presented at COP28. Building on the ten-year Energy Strategy of 2009, its goal is to leverage Mozambique's renewable and natural resources to drive low-carbon economic development. This approach is intended to foster inclusive growth, position Mozambique as a regional energy hub and support the global energy transition.

The ETE aims to accelerate universal access to clean energy, position Mozambique as a competitive location for energy-intensive industries, supply low-carbon electricity to neighbouring countries and export natural gas. Fundamental principles include achieving universal access to electricity and clean cooking by 2030 and gradually adopting cost-reflective tariffs.

The ETE prioritises renewable energy when viable, reducing biomass consumption, and minimising dependence on coal and its associated environmental impacts. At the same time, it considers natural gas to be an essential fuel for both Mozambique and the global energy market.

The ETE implementation roadmap is structured around 4 pillars and supported by 14 programmes (Table 1.1), some of which are discussed in Chapters 3, 4 and 5. Eight of these programmes are given a "higher priority" in the next five years, based on the scale of their expected impacts and their role of enabler for the other programmes. The high-priority programmes notably cover the development of solar and wind energy, the expansion and improvement of the electricity grid, and the widespread availability of clean cooking solutions. The implementation of the ETE requires an estimated USD 80 billion in investments by 2050.

Table 1.1 Mozambique's Energy Transition Strategy's four pillars and associated programmes

Pillar	Programme	Priority level
Pillar 1: Modern energy systems based on renewable energies	1. Hydropower development	High
	2. Expansion and improvement of the national electricity grid	High
	3. Development of solar and wind energy	High
	4. Decarbonisation of emissions from the natural gas sector	Normal
Pillar 2: Green industrialisation	5. Development of green industrial parks and corridors	High
	6. Integrated domestic gas plan	Normal
	7. Gradual reduction of dependence on coal	Normal
	8. Decarbonising energy in the mining sector	Normal
	9. Sustainable extraction and processing of critical minerals	Normal
	10. Hydrogen production strategy and roadmap	Normal
Pillar 3: Universal access to modern energy	11. Accelerating access to off-grid energy	High
	12. Massification of clean cooking solutions	High
Pillar 4: Adopting clean energy for transport	13. Decarbonisation of the transport system	High
	14. Development of the biofuels value chain	High

Source: IEA analysis based on data from Mozambique, Ministry of Mineral Resources and Energy (2023).

The ETE was developed with contributions from an inter-ministerial Taskforce for Mozambique's Energy Transition, led by a steering committee chaired by the Minister of Mineral Resources and Energy. The Taskforce is currently developing a detailed implementation plan, which includes creating detailed investment plans for each programme.

Energy statistics

The National Institute of Statistics (*Instituto Nacional de Estatística*, INE) is the primary entity mandated by law (Law No. 7/96) to collect and disseminate official statistics across various sectors, including energy. INE is the central executive body of the National Statistical System (*Sistema Estatístico Nacional*, SEN). In 2023, by means of a Joint Order signed by the Minister of Economy and Finance and the Minister of Mineral Resources and Energy, INE delegated to MIREME the official functions of notation, tabulation and co-ordination of statistical energy data. This task is coordinated through the Directorate of Planning and Cooperation (*Direcção de Planificação e Cooperação*). MIREME produces the Energy Statistics Report (*Relatório Estatístico de Energia*), a yearly bulletin on energy statistics that provides data and indicators on imports and exports, and the trends of electricity, hydrocarbons, and fuels. MIREME also publishes the Extractive Industry Statistics Report (*Relatório Estatatístico da Indústria Extractiva*), a yearly bulletin on the extractive industry, which provides statistics on mining and hydrocarbons. Both bulletins are available on MIREME's website.

Other entities are involved in the provision, validation and release of energy statistics. For instance, the regulator ARENE plays a crucial role in overseeing the implementation of energy data collection processes and ensuring compliance within the energy sector. The upstream regulator, INP, also publishes selections of energy statistics on its websites.

The recently enacted Electricity Law (Law No. 12/2022) also includes provisions on data collection to ensure effective monitoring and regulation of the electricity sector. Replacing the previous Law No. 21/97, this law aims to modernise the legal framework of the electricity sector to align with current social, technical, and financial dynamics, as well as sustainable development goals. The Electricity Law mandates private operators in the electricity sub-sector to provide certain types of information to the regulatory authorities. However, this requirement has not yet been extended to other sub-sectors.

Assessment

Energy Transition Strategy

Mozambique is in the early stages of economic development but blessed with an exceptionally diverse range of energy sources. These include significant renewable energy – such as hydropower, solar, wind and biomass – as well as large resources of gas and coal. The country recently adopted the ETE, which provides a coherent vision for leveraging its resources to "promote inclusive socio-economic growth, become a regional energy hub, and contribute to the

global energy transition". The IEA commends these efforts, which have been spearheaded by MIREME. The ETE has the potential to accelerate national development and economic diversification, improve living standards, and achieve Mozambique's ambition to become a middle-income economy. The ETE can also make the country a significant player in the emerging regional and global clean energy economy, positioning it as an exporter of clean energy and low-emissions manufactured products.

There have been positive – and in some cases rapid and effective – advances in the policies and institutions needed to implement the ETE. There are also outstanding challenges, including a narrow fiscal space, a high-risk environment for investment and limited institutional capacity. The implementation of the ETE will require a further focus on energy sector governance, as well as co-ordination and communication across key stakeholders. There is also a need to continue improving the quality of data and statistics to develop the tools that will enable least-cost strategic planning.

Energy statistics

While some areas of energy statistics are well covered, the quality of the data could be improved, as significant gaps exist, leading to the need to estimate data for several sources and sectors. A key area of improvement includes the further disaggregation of demand-side data for all sectors, with a focus on biomass consumption. Sectoral data are crucial to monitor key national policy and international commitments, such as to update Mozambique's nationally determined contributions (NDCs). To implement these improvements, additional resources need to be injected into the energy statistical system, including in more specialised human capital, ideally from national sources and mechanisms. While external funds (e.g. from international finance institutions) can help develop new capacity or programmes, the sustained implementation of data collection depends on national funding mechanisms.

The current gap in data sharing and inter-sectoral collaboration hinders effective policy development across the entire energy sector. The energy information system would benefit from a clear description of roles and responsibilities of all the relevant data-collecting entities, and identification of the optimal overarching data collection strategy. Setting up a multi-stakeholder group consisting of the key data producers and users may be useful to create a structured communication channel and an overarching energy data strategy to identify priority data needs, arrangements required among entities, methodologies and timelines to collect data.

In recent years, MIREME has implemented programmes to enhance the data and statistical capabilities of its energy experts, including through co-operation with the

IEA. Despite these efforts, significant gaps in technical competencies remain, making it difficult for MIREME to act as a co-ordinator of reporting institutions, and reducing its effectiveness in fulfilling its data-management role. It will be important to develop and sustain the technical skills of all the staff working on data across the relevant entities, together with their supporting environment (e.g. data management infrastructure).

The IEA is ready to continue supporting MIREME and other data-relevant entities in Mozambique to strengthen the national energy statistics and data management.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Strengthen institutions and regulatory frameworks to enable the long-term development of diversified energy sources, with continuous capacity building and training efforts that leverage international assistance and the country's universities.
- Build co-ordination mechanisms that improve governance and transparency, positioning the Ministry of Mineral Resources and Energy to lead co-ordination with key stakeholders, including other government bodies, donors and investors.
- Continue strengthening the Directorate of Planning and Cooperation by equipping it with essential tools and skills for advanced data management in the energy sector.
- Create a data mapping and collection strategy to identify crucial energy data types needed for decision making, aiming to enhance the accuracy, timeliness and completeness of energy data, especially demand-side metrics.
- Establish regulations and procedures for data acquisition and sharing in the energy sector, as well as a centralised data repository that is accessible to all sector stakeholders, to enhance inter-sectoral communication and data integration, with a particular focus on geospatial data.

2. Access to modern energy

Access to modern energy is a cornerstone of Mozambique's Energy Transition Strategy, reflecting the country's commitment to sustainable development and improving the quality of life of its citizens. Mozambique aims to achieve universal energy access by 2030 by transitioning households from traditional energy sources—such as wood, charcoal, and kerosene—to modern energy solutions. This includes promoting cleaner cooking options, such as improved biomass stoves and liquefied petroleum gas (LPG), alongside expanding electricity access through grid connections and mini-grids. This transition is aimed at enhancing living standards, promoting small businesses, and mitigating the environmental and health impacts of traditional energy use.

The challenge is immense, due to Mozambique's predominantly rural, low-density demographics and high population growth (among the highest in the world with a 3% annual growth rate in 2023). Low-income levels make upfront costs for electricity and clean cooking solutions prohibitive for most potential customers and generally result in low demand for connected customers, complicating efforts to finance and maintain expanded networks. Despite significant efforts, these socio-economic and demographic realities make it difficult for energy access to keep pace with the government's ambitious goals.

Access to electricity

Despite abundant energy resources, Mozambique faces significant challenges providing electricity in both rural regions, where access is minimal, and urban areas, where service quality is poor. In 2022, more than half (52.6%) of the population of Mozambique lacked access to electricity. A combination of worn-out transmission infrastructure, rising consumer demand, unstable power generation and exposure to severe weather conditions, in particular tropical cyclones, result in frequent power outages and fluctuations that interfere with daily life and damage household appliances.

Electricity tariffs are subsidised and not cost-reflective, straining the financial position of the public utility, Electricidade de Moçambique (EDM), which is facing increasing debt levels, hindering its ability to ensure reliable, quality and affordable services. In 2019, it was estimated that some clients, in particular state agencies and public and private companies, owed EDM over USD 100 million, underscoring the challenges in revenue collection. Electricity tariffs are subsidised and yet remain prohibitively high for most households.

Institutional framework

Several key institutions are involved in the planning and regulation of electricity access. The National Directorate of Energy at MIREME holds primary responsibility for co-ordinating electrification efforts. To improve this co-ordination, it established the Integrated Planning and Cooperation Unit for Electrification (*Unidade Integrada de Planificação e Cooperação de Eletrificação*, UIPCE) within the framework of the ProEnergia Project.

EDM is the state-owned utility that oversees the country's distribution and transmission networks and carries out on-grid electrification. FUNAE promotes renewable energy through off-grid and mini-grid solutions in rural and underserved areas, where access to electricity remains limited. ARENE ensures compliance with national energy policies and standards.

Together these institutions form the backbone of Mozambique's endeavours to improve electricity access as part of the government's wider efforts to foster sustainable development. To ensure co-ordination, members of the UIPCE include representatives from EDM and FUNAE, and there are discussions to include ARENE as well.

Key policies and strategies

Table 2.1 Key policies and legislation in the electricity access sector in Mozambique

Name	Year	Type
Renewable Energy Code	2023	Regulation
Energy Transition Strategy	2023	Strategy
Tariff Regulation for Mini-Grids in Off-Grid Areas	2023	Regulation
Mini-Grid Interconnection Regulation	2023	Regulation
Electrification Plan for Off-Grid Areas	2023	Plan
2022 Electricity Law (Law No. 12/2022)	2022	Law
Regulation on the Tariff System for the Supply of Energy through the National Electricity Grid	2022	Regulation
Regulation on Public Works, Supply of Goods and Provision of Services to the State	2022	Regulation
Regulation on Access to Energy in Off-Grid Areas	2021	Regulation
National Development Plan	2021	Plan
Regulation on Energy Access	2019	Regulation
Integrated Master Plan for the Mozambique Power System	2018	Plan

Name	Year	Type
National Electrification Strategy	2018	Strategy
Renewable Energy Feed-in Tariff Regulation	2014	Regulation
Regulations on the Public-Private Partnerships Law	2012	Regulation
Public-Private Partnerships Law	2011	Law

Mozambique's policy framework for universal access by 2030 is based first and foremost on the 2018 National Electrification Strategy (*Estratégia Nacional de Electrificação*, ENE), which defines roles for key institutions. A key feature of the strategy is the introduction of a dual electrification approach. In self-expanding areas, EDM is required to connect customers located within a 100-metre radius of existing low-voltage distribution lines. In subsidised expansion areas , where electrification is not commercially viable, government subsidies and international financing support grid expansion efforts. Under this framework, MIREME serves as the main co-ordinator of the electrification programme, ensuring close collaboration between EDM, FUNAE, ARENE and the private sector. The Electrification Account, managed by the Ministry of Finance, provides a rotating fund to finance capital expenditures and ensure sustainable, long-term investments in the electrification programme.

Legal and regulatory framework

The most recent 2022 Electricity Law (Law No. 12/2022) defines the legal framework for the entire power sector, including the generation, transmission, distribution, consumption and storage of electricity. It aims to ensure increased and universal access for all Mozambicans to good quality and reliable electricity, with a particular emphasis on renewable sources and mini-grids.

The official target of universal access by 2030 is mentioned in the Integrated Electricity Infrastructure Master Plan (2018-2043), where EDM estimates that the total on-grid electrification costs by 2042 could reach almost USD 5 billion. Recognising that grid extension might not be feasible everywhere, it also promotes off-grid solutions such as mini-grids and solar home systems (SHS) for remote areas.

The Regulation for Energy Access in Off-grid Areas (Decree 93/2021) complements the Electricity Law and creates a positive environment for off-grid developments by establishing the procedures for private investment in the sector. The Decree also provides guidelines for tariff calculations, considering affordability and economic incentives for efficiency in rural areas.

The 2014 Renewable Energy Feed-in Tariff Regulation aims to incentivise renewable energy integration by introducing the possibility for mini-grids to sell excess electricity back to the national grid.

Programmes

The "Energy for All" ("*Energia para Todos*" or ProEnergia) programme is the major government-led initiative for electricity access across the country, with a strong social dimension. Funded by the World Bank, it aimed to increase access to reliable and affordable electricity in Mozambique, primarily in underserved peri-urban and rural areas. The first phase of the programme successfully concluded in April 2024. Over the five-year implementation, it connected 514 862 households, surpassing its target and providing electricity to approximately 2.57 million people – nearly doubling initial projections. By leveraging cost-saving strategies, including bulk material procurement and innovative contract designs, the project reduced connection costs by over 30%, enabling broader coverage. It expanded distribution networks, prioritised connections in the country's five poorest provinces and contributed to raising Mozambique's national electricity access rate. Although the off-grid component faced challenges and was transferred to a follow-up project, ProEnergia's substantial achievements in grid-based electrification, gender inclusion and community engagement highlight its pivotal role in Mozambique's journey toward universal access by 2030.

The Fund for Sustainable Access to Renewable Energy (FASER) is a results-based financing fund aimed at reducing poverty and boosting economic growth through the development of modern renewable energy technologies, such as improved cookstoves and photovoltaics (PV) solar systems. It was established by the Foundation for Community Development in partnership with GIZ (*Deutsche Gesellschaft für Internationale Zusammenarbeit*) through the Energising Development (EnDev) and Grüne Bürgerenergie programmes. FASER stimulates the dissemination of high-quality technologies in off-grid peri-urban and rural areas, contributing to the Mozambican government's goal to achieve the universal energy access target by 2030. FASER is a pooled fund, which collects capital from multiple donors. It has received support from the Norwegian Agency for Development Cooperation (Norad), the European Union, and is open to additional contributors.

Other programmes include the Beyond the Grid Fund for Africa, under which the Swedish International Development Cooperation Agency has allocated EUR 6.7 million (2019-27) for institutional support for setting up mini-grids clusters. The United Kingdom's Foreign, Commonwealth & Development Office is supporting the BRILHO programme (2019-24, recently extended to 2026) with USD 40 million to catalyse the off-grid energy market by providing

non-reimbursable funding and specialised support for SHS, green mini-grids and improved cookstoves, while fostering private sector participation and regulatory improvements. The Belgian Development Agency, in co-operation with FUNAE and the National Institute of Irrigation, has allocated EUR 22 million for mini-grid equipment and trainings across the Zambézia, Namanla and Nampula provinces under the Renewable Energy for Rural Development-Phase 2 programme (2018-25). Completed programmes include Ilumina (2018-21) by the Italian Agency for Development Cooperation, which channelled EUR 580 000 to Cabo Delgado and EUR 675 000 to Zambézia for mini-grid construction, resulting in 560 and 300 connections respectively.

Table 2.2 Closed (yellow), ongoing (green) and starting (blue) programmes to support renewable electricity access sector in Mozambique

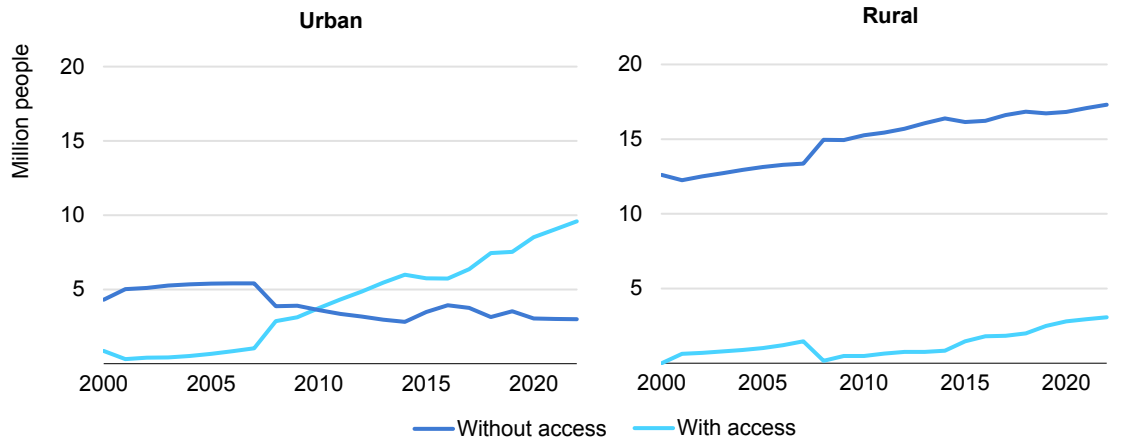
	MARKET SEGMENT				TYPE OF SUPPORT					FINANCING RECIPIENTS	
Support Programme	**Infrastructure**	**IPP**	**MG**	**SHS**	**TA**	**Grant**	**Equity**	**Debt**	**Guarantee**	**Public Sector**	**Private Sector**
EnDev				X	X	X				X	X
ILUMINA			X	X	X	X				X	X
SPEED+		X	X	X	X						
Beyond the Grid Fund for Africa			X		X	X					X
BRILHO			X	X	X	X					X
Centro de Recursos de Energía	X		X		X					X	
ElectriFI MZ		X	X			X	X	X			X
GETFiT		X			X	X					X
GET.invest			X	X	X						X
GET.transform			X		X	X				X	
Green People's Energy (GPE)			X		X	X					X
Modern Cooking Facility for Africa						X	X	X			X
ProEnergia			X	X		X					
ProEnergia +				X	X	X					
PROLER/PROLER+		X			X	X				X	
REACT SSA				X		X					X
Rural Energy for Rural Development 2			X		X	X				X	X
Private Finance Advisory Network		X	X		X	X					X
TSE4ALLM											X
Mozambique Renewable Energy Integration Programme					X	X				X	
AMAP			X		X					X	X
Small Scale Solar PV Portfolio		X			X	X				X	
Productive Use of Energy			X	X	X	X					X
Italy-UNDP Energy Partnership			X	X		X				X	

Note: IPP = independent power project; MG = mini-grids; TA = technical assistance; SHS = solar home system; UNDP = United Nations Development Programme.
Source: Reproduced from ALER/AMER (2023), Renewables in Mozambique, (accessed 27 May 2025).

Status, trends and outlook

In 2022, more than half (52.6%) of the population of Mozambique lacked access to electricity, making the country eighth globally and sixth in sub-Saharan Africa in terms of access gap. Of those having access, about 93% were on-grid, while the remaining relied on off-grid solutions like SHS and mini-grids. This distribution reflects Mozambique's continued reliance on grid extension, but also signals the growing importance of off-grid solutions in bridging the access gap. The urban-rural divide remains stark: 76% of the urban population had access to electricity, compared to only 15% of their rural counterpart. Since rural areas are home to over 60% of the population, more than 17 million people living in rural areas remained without power and this number of people continues to increase (Figure 2.1), as the population growth outpaces efforts to increase rural electrification.

Figure 2.1 Rates of urban and rural access to electricity in Mozambique, 2000-2022

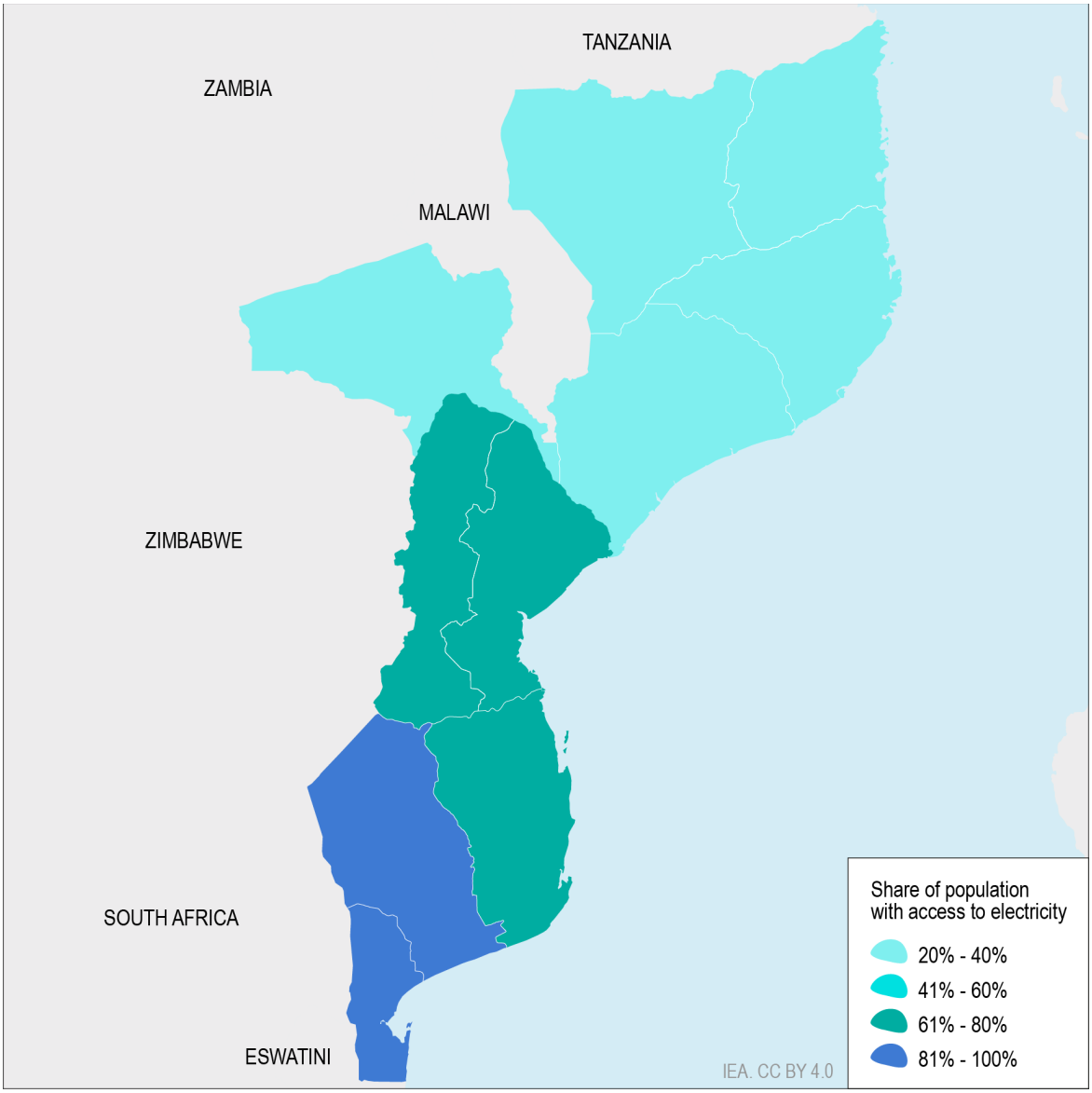


Note: The apparent drop in the rural electricity access time series around 2008 reflects a reclassification of administrative boundaries, with some districts previously designated as rural reassigned as urban. This adjustment, involving redefinitions within administrative posts (postos administrativos) and districts (distritos), affects the comparability of data across years but does not represent an actual decline in rural access.

Source: IEA (2023), SGD7 Database (accessed 22 July 2024).

Access is also highly concentrated in urban centres, particularly in and around Maputo City, where 96.5% of households – about 256 000 – are connected. Meanwhile, the provinces of Nampula and Zambézia, the most populous in the country, together account for almost half of those living without electricity, with over 1.8 million households lacking access. These figures highlight the urgent need for targeted electrification efforts, especially in underserved rural regions where access remains critically low.

Figure 2.2 Share of population with access to electricity by province in Mozambique, 2022



Source: IEA analysis based on data from Mozambique, Ministry of Mineral Resources and Energy.

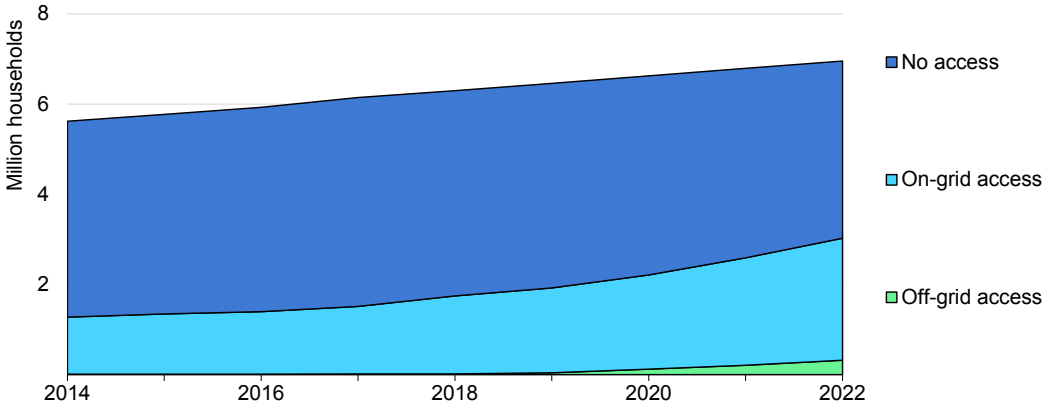
Historically, extending the national grid has been the primary means of expanding electricity access in Mozambique. However, low population density and the scattered nature of settlements (especially in the north), as well as low levels of consumption by customers once they are connected, make it difficult to finance grid extension and maintenance in a sustainable manner. This suggests the need to complement this strategy with significant investment in off-grid and renewable energy solutions that are tailored to the unique needs of Mozambique's remote and rural communities.

In 2020, the Mozambican government initiated a programme to bring electricity to 135 administrative posts that previously lacked access to electricity. By 2022,

Mozambique had 416 administrative posts, with 318 already connected to the national electricity grid, representing a 76% coverage rate. The goal was to achieve nationwide electrification of all administrative posts by the end of 2024. Strategically employing Mozambique's energy resources, the initiative used solar-powered off-grid systems for 41 administrative posts and extended the national electricity grid for the remaining 94.

Mozambique has made remarkable progress in expanding electricity access, doubling the number of connections between 2017 and 2022 and nearly quadrupling the number of yearly connections, from 115 000 in 2017 to 430 000 in 2022. If it can sustain this pace and achieve half a million connections per year, it could reach near-universal electricity access by 2030. However, this rapid growth has been largely driven by off-grid solutions, which accounted for just one-tenth of yearly connections in 2017 but grew to three-quarters by 2022.

Figure 2.3 Households' access to electricity status by mode in Mozambique, 2014-2022



Source: IEA analysis based on data from Mozambique, Ministry of Mineral Ressources and Energy.

On-grid access

Since the turn of the century, Mozambique has witnessed a substantial increase in its urban population. This growth has been fuelled by significant rural-to-urban migration and the emergence of new urban centres that have transitioned many rural regions to peri-urban and urban status. In 2000, a little over 5 million people resided in urban areas; this figure has reached almost 13 million. Increased urbanisation and accompanying population density have made it easier to reach more people through the grid, which now connects 38% of Mozambique's population, against 7% a decade ago.

However, there is a significant divide in the national grid network between the north and the south. The southern network is not currently connected to the northern and central grids. Instead, an interconnector with South Africa is used to

power the south, including the capital city of Maputo, while most of the power generated in the north is exported to South Africa (see Chapter 3).

In response to these challenges, the current electrification strategy assigns specific responsibilities to different entities based on potential customers' proximity to existing or planned grid infrastructure. EDM is now responsible for electrifying all populations within 30 kilometres of an existing or planned grid or substation. Areas beyond this radius fall under the purview of FUNAE (see also Chapter 3).

Off-grid access

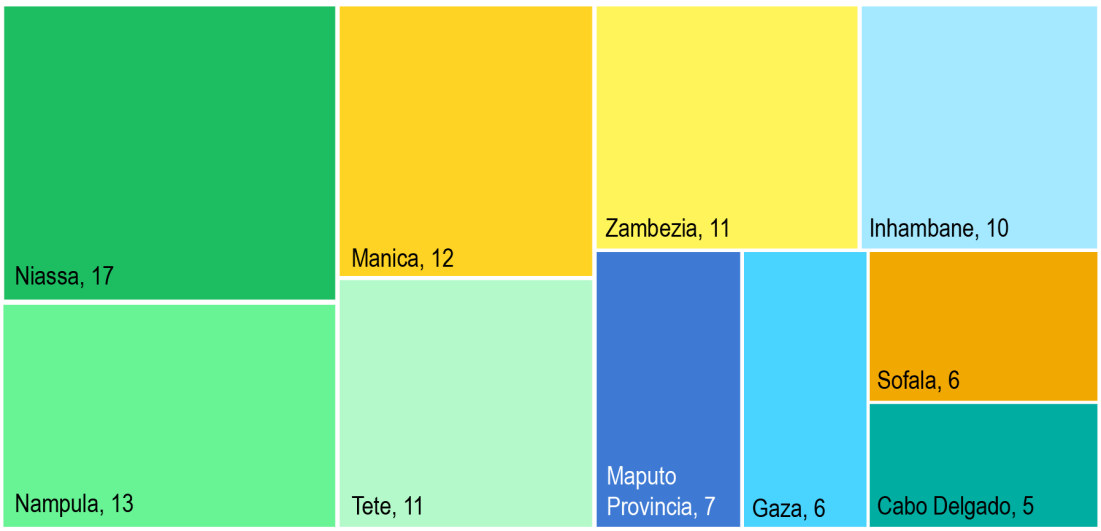
FUNAE has the mandate to foster off-grid electrification, with a significant focus on implementing mini-grids and, through co-ordination with the private sector, deploying standalone systems. In 2023, according to MIREME, off-grid renewable capacity in Mozambique reached 6.3 MW, 78% of which was solar, including solar mini-grids, solar lights and SHS. The remaining was hydropower.

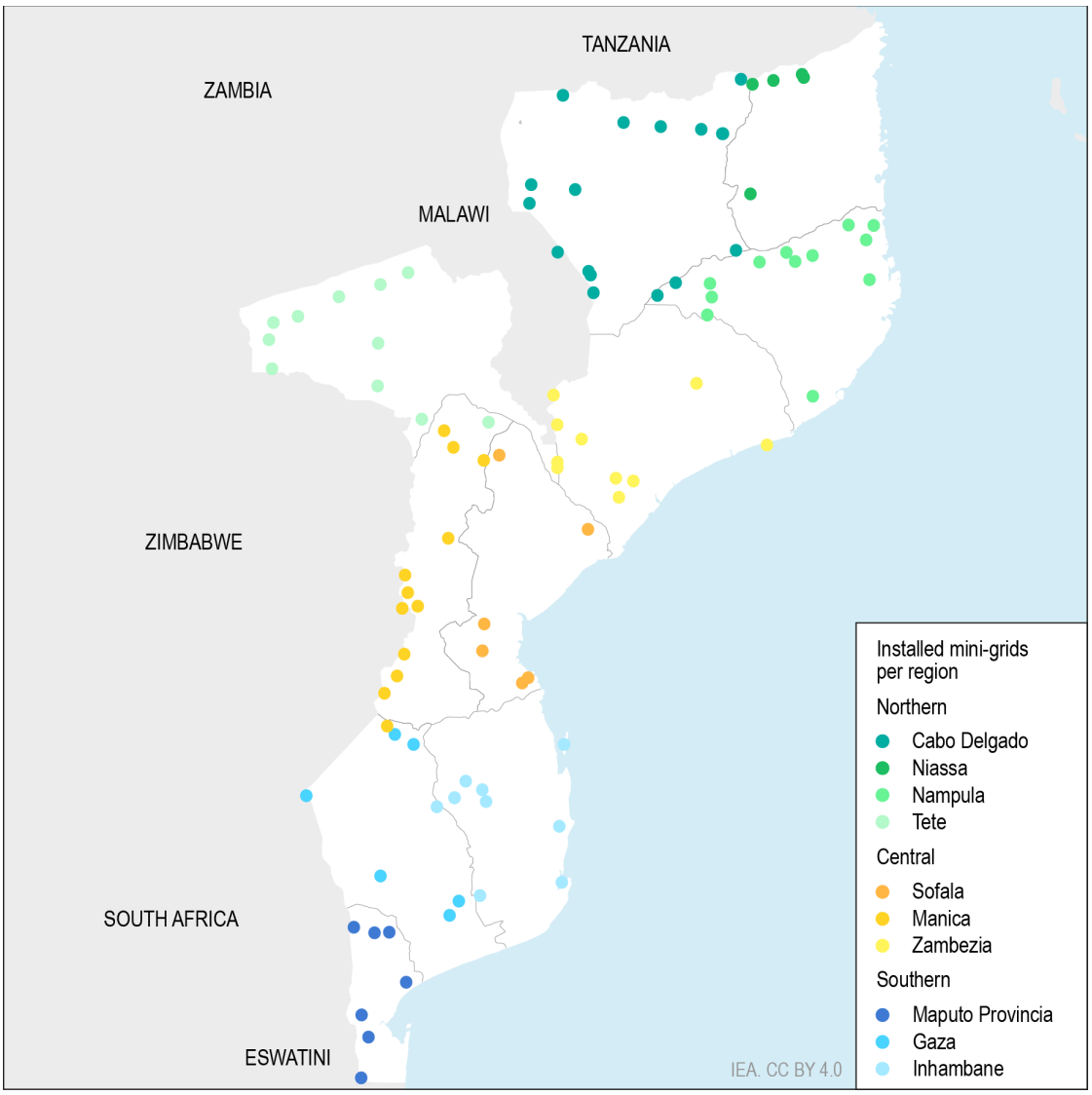
In Mozambique, the off-grid sector presents two contrasting dynamics. On one hand, solar home systems (SHS) have thrived, with support from development partners and the private sector, despite the lack of fiscal incentives for the deployment of these solutions (see Chapter 11). This drive has supported the expansion of electricity access in rural areas through SHS. On the other hand, mini-grids face regulatory barriers, such as uncertainties about the new electricity law, unclear private sector participation, and lack of regulations on tariffs and licensing. These challenges hinder investment in mini-grids, even in low-density rural areas where it is the most needed with grid expansion being not economically viable. Both SHS and mini-grids are crucial for Mozambique's electrification goals, providing cost-effective and scalable electricity solutions to remote communities.

Mini-grids

Initially, FUNAE focused on diesel-powered mini-grids, which were community managed and benefited from subsidised fuel. However, the discontinuation of diesel subsidies in 2010 resulted in many communities losing access due to decreased affordability compounded by challenges related to system maintenance and community training. Recognising these issues, FUNAE shifted as of 2015 towards solar PV hybrid mini-grids, despite some problems with battery theft, repair and bill collection. This experience prompted FUNAE to explore private sector involvement in off-grid solutions.

Figure 2.4 Number of installed mini-grids per province in Mozambique, 2024





Source: IEA analysis based on data from Mozambique, Ministry of Mineral Resources and Energy.

In an effort to showcase Mozambique's renewable energy potential and attract international investment for off-grid projects, FUNAE developed an Atlas of Renewable Energies. This initiative involved two years of rigorous fieldwork to compile renewable energy potentials, along with social and economic data, across the country. The Atlas used Geographic Information Systems (GIS) technology, which is now a cornerstone of FUNAE's operations, thanks to targeted technical assistance it received in this area. The resulting geographic database supports the development of renewable energy projects by providing preliminary assessments of potential mini-grid locations.

However, concerns surrounding the absence of protections in the event of expansion of the national grid to areas served by off-grid solutions have been hindering private participation in the off-grid sector. In 2014, FUNAE tested a fee-for-service mini-utility model in the village of Titimane, leveraging solar, storage, and biomass technologies. Despite initial progress and funding secured from the United Nations Environment Programme (UNEP), Energias de Portugal (EDP), and others, EDM's subsequent announcement of a future grid extension to Titimane rendered the project unfeasible.

The previous and now revoked Electricity Law (Law No 20/97) placed constraints on private sector involvement that hindered the development of innovative off-grid projects. The new Electricity Law (Law No. 12/2022) has put in place a different framework for off-grid electrification, encouraging private investment through innovative business models, allowing cost-reflective tariffs for off-grid projects, and mandating interoperability between mini-grids and the national power system.

Law No. 12/2022 has also paved the way for a series of new regulations designed to support off-grid initiatives. This includes the Mini-Grid Interconnection Regulation (RN No. 2/ARENE-CA/2022), which builds upon the existing Regulation on Access to Energy in Off-Grid Areas (Decree No. 93/2021) and establishes a comprehensive framework for the interconnection of mini-grids with the national electricity grid. This regulation not only defines clear terms, conditions and procedures for interconnection but also addresses the critical issue of compensation, specifying the methods for calculating payment to mini-grid concessionaires for unused or transferred assets and for any loss of concession rights due to interconnection with the national grid.

Another major concern has been the limitation on setting cost-reflective tariffs, or even those that exceed tariffs for the national grid. The recent update of the Electricity Law now permits such tariff structures and tasks ARENE with reviewing and approving each project's tariff proposal. This development will be instrumental for ensuring the financial sustainability of off-grid solutions. However, this also

depends on the customer's ability to afford the tariffs. Balancing affordability and sustainability will be crucial, as high tariffs may deter usage and hinder the success of mini-grid projects.

Standalone systems

Mozambique's sparsely populated regions, where the majority of the population is engaged in subsistence agriculture, present a significant opportunity for the productive use of energy powered by standalone systems. Such systems can be instrumental in transforming agricultural practices by enabling activities such as pumping, irrigation, cold chains and milling. Currently, such processes, where they exist, typically rely on diesel gensets, but could be replaced by more sustainable, standalone solar systems. While there are some initiatives targeting this transition, the high upfront costs of solar systems have limited their widespread adoption. However, the common practice in Mozambique of forming agricultural associations suggests a potential pathway for implementing such projects.

On the other hand, the SHS market has expanded rapidly in recent years, driven by pay-as-you-go models, partnerships with mobile telecommunication providers and the growing availability of innovative financing. Despite this growth, several obstacles remain. First, affordability is a major concern: many rural households cannot easily cover upfront or ongoing monthly fees, leading to high insolvency rates. Second, limited telecommunication coverage in some areas restricts the functionality of mobile payment options. Third, the SHS sector currently does not benefit from the tax exemptions that apply to some other renewable energy products. Overcoming these hurdles requires more targeted incentives and financing, including grants, concessional loans and results-based financing schemes.

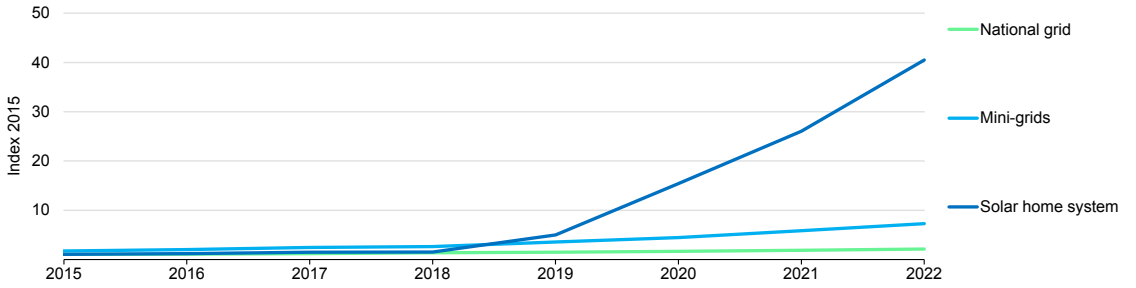
The number of people with access to electricity through SHS has grown significantly in Mozambique, from almost 40 000 in 2014 to 1.6 million in 2022. This more than a 40-fold increase can be attributed to FUNAE's efforts in involving the private sector and co-operation partners, alongside mobile payment possibilities and innovative financing methodologies such as result-based financing.

Mozambique's Electrification Strategy sets Tier 2 electricity access, as defined by the World Bank's Multi-Tier Framework, as the minimum level for a household to be considered electrified. Tier 2 ensures a reliable and adequate energy supply, allowing households to use multiple appliances, such as lighting, phone charging and small devices, for at least four hours per day, including at least one evening hour. This standard guarantees a meaningful and sustainable level of energy service, enhancing quality of life and enabling economic opportunities.

Outlook

Bridging the electrification divide in rural areas is crucial to Mozambique's ambitious goal of achieving nationwide electricity access by 2030, as outlined in the ENE. According to FUNAE's Off-grid Electrification Roadmap, the 2030 target will be met through a combination of grid expansion (providing electricity to 68% of households) and off-grid solutions, with SHS and mini-grids serving 19% and 13% of households, respectively. Despite the positive trends observed, current estimates suggest that Mozambique might not meet the universal access target by 2030.

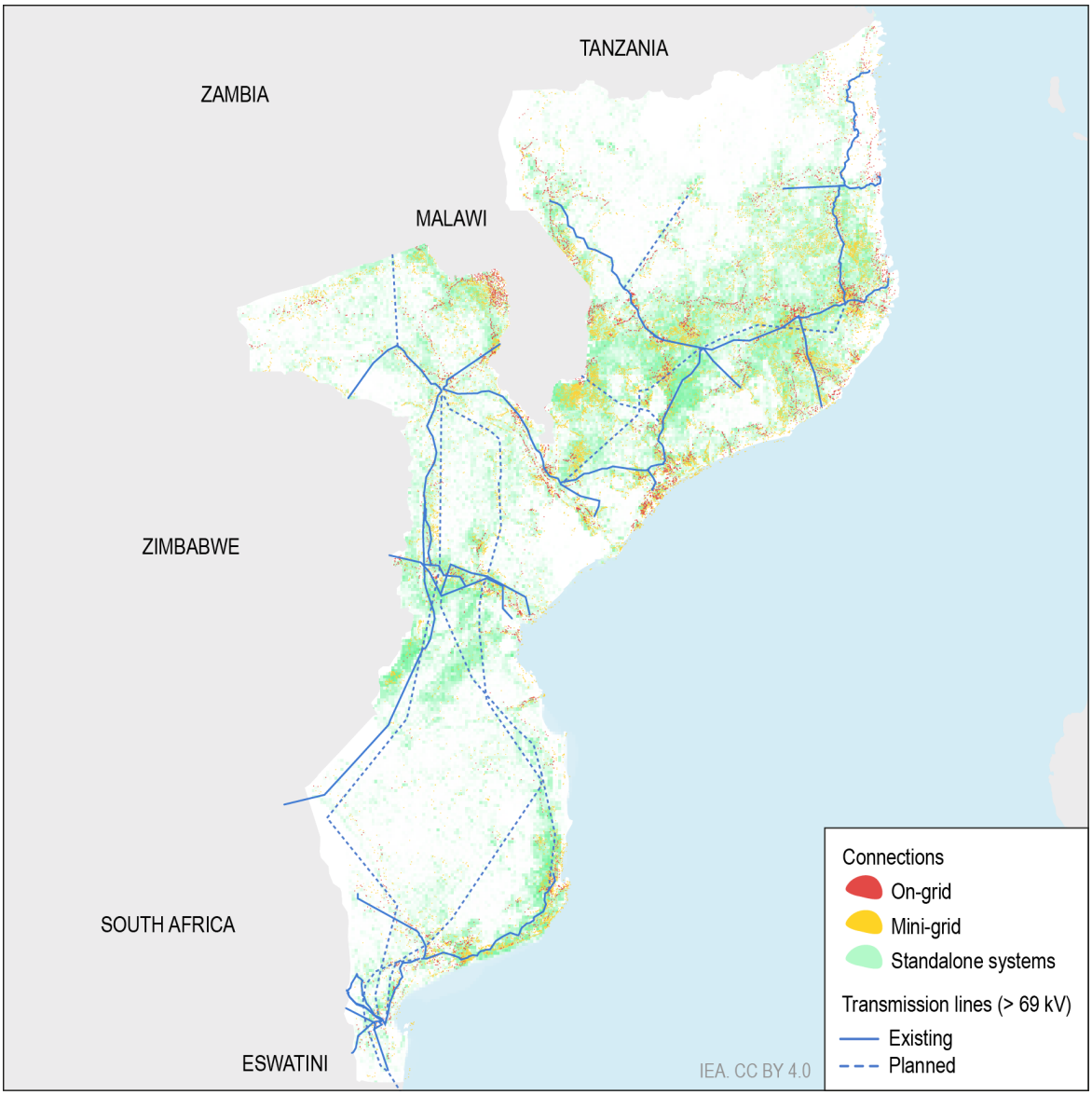
Figure 2.5 Indexed access solution growth by type in Mozambique, 2015-2022



Note: 2015 = 1.
Source: IEA analysis based on data from Mozambique, Ministry of Mineral Ressources and Energy.

The ETE recognises that, at current rates, the universal access target may only be achievable by 2035-40, or even as late as 2063, and that without an accelerated implementation of off-grid solutions, the government's goal is likely to remain out of reach. The IEA's least-cost geospatial analysis indicates that a blend of solutions will be essential to fulfil Sustainable Development Goal (SDG) 7 in Mozambique by 2030. The analysis suggests that, based on the location of populations currently without access, the least-cost option to provide them with electricity would be 12% through grid connections, 40% through mini-grids, and 43% through standalone solar home systems. These results are based on expected declines in solar PV costs, which make off-grid solutions increasingly viable. Moreover, it takes into account the fact that off-grid solutions are recognised as initial options, providing a way to achieve SDG 7 while awaiting the arrival of the national grid, something that is likely to take longer in sparsely populated areas than in more densely populated ones.

Figure 2.6 Least-cost electrification option by type for Mozambique



Note: kV = kilovolt.
Source: IEA (2022), Africa Energy Outlook.

Box 2.1: Key challenges for electrification projects

Financing: innovative financing models and partnerships are essential to bridge the funding gap.

Data collection and mapping: accurate and up-to-date data on existing distribution networks are critical for effective planning and implementation, but do not exist for many areas. Enhanced data collection and mapping using Geographic Information

Systems (GIS) can help identify gaps, optimise resource allocation, and guide infrastructure development.

Affordability and tariffs: the affordability of electricity tariffs relative to household incomes poses a major barrier. Subsidising costs for low-income households or implementing income-based tariff structures can make electricity more affordable for more potential customers.

Interconnection and grid readiness: in order to reassure investors, clear grid codes and guarantees from EDM will be necessary to facilitate the integration of standalone systems and mini-grids when the national grid reaches their areas.

Low demand: in many rural areas, the current demand for electricity is low, impacting the economic viability of electrification projects. Stimulating demand through the promotion of productive uses of energy, such as agricultural processing, irrigation, and small-scale industries, can help create a more sustainable market for electricity.

Assessment

Mozambique has made notable progress in expanding electricity access over the past decade, nearly doubling its electrification rate. This progress has been driven by a combination of grid extensions – primarily led by the state utility EDM in urban areas – and, more recently, off-grid solutions such as mini-grids and solar home systems (SHS), spearheaded by the Energy Fund (FUNAE) to reach rural communities. Much of the success in off-grid electrification has been enabled by grants and concessional finance. However, scaling up access further will require increased private sector participation, which has so far been limited. The new Electricity Law lays a strong foundation for greater private sector involvement to support the efforts of EDM and FUNAE. Yet, achieving universal access will depend on overcoming persistent challenges, including low electricity demand, limited financing, and affordability constraints.

Co-ordination between EDM and FUNAE operations has improved with the creation of the Integrated Planning and Cooperation Unit for Electrification within Ministry of Mineral Resources and Energy. The Unit is currently enhancing its GIS capabilities to more accurately map and plan rural electrification. However, limited staff capacity, insufficient assessment tools and fragmented data hinder comprehensive planning. Reliable, up-to-date GIS data on both on-grid and off-grid networks are not consistently available, making it difficult to co-ordinate expansion or inform private sector decisions.

To achieve its universal access target by 2030, the government of Mozambique is increasingly emphasising the development of mini-grids in rural areas. So far,

funding for this has primarily relied on international co-operation and the state budget. However, recently approved regulations anticipate greater private investment and aim to create a more financially sustainable sector. Although legal and regulatory enhancements, such as clear regulations for tariffs and interconnections, are a welcome development, significant challenges remain for mini-grids in Mozambique. These include high capital costs, tariff uncertainty, low household demand in some areas and difficulties in payment collection—issues that mirror experiences in other countries, where success depends on enabling policies, cost-reflective or subsidised tariffs, reliable demand or anchor loads, and strong community engagement.

While Mozambique has more mini-grids than many of its peers, all have been funded through grants or concessional finance, with the private sector primarily acting as Engineering Procurement, and Construction (EPC) contractors or operators rather than true investors. However, grants and concessional loans alone cannot meet the capital needs for nationwide electrification. Attracting private investment will require well-structured financial tools, predictable tariffs and a focus on productive energy uses to drive demand and revenue, alongside clear regulations and sustainable business models to ensure long-term viability.

The solar home systems (SHS) market in Mozambique has experienced rapid growth in recent years. This expansion has been supported by a combination of factors, including a clear policy to enhance rural electrification, support from development partners and FUNAE's co-ordination of SHS distribution through private sector partnerships. These efforts are further reinforced by grant-based initiatives, such as results-based financing programmes, which help reduce costs and incentivise market development.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Strengthen the Integrated Planning and Cooperation Unit for Electrification and ARENE through capacity building and assessment tools, with the aim of accelerating the planning and deployment of electrification programmes while also improving regulatory oversight.
- Develop a robust data management infrastructure (including GIS data) for comprehensive planning and data sharing with the private sector, with the aim of co-ordinating decision making between on-grid and off-grid electrification.
- Actively co-ordinate funding sources and use strategic financial tools, such as grants and concessional finance, to improve the viability of off-grid solutions with a focus on productive uses of electricity to attract private investment at scale.

Access to clean cooking

As of 2022, only 7% of Mozambique's population had access to clean cooking solutions, with most of the population relying on biomass and charcoal for cooking, with negative consequences for health, the environment, and socio-economic development. Traditional biomass cooking methods are a major source of indoor air pollution, which leads to respiratory illnesses and other health problems, particularly among women and children. They also contribute to deforestation and greenhouse gas emissions (GHG), exacerbating environmental challenges. Transitioning to clean cooking solutions – such as improved biomass stoves, LPG, ethanol, biogas and electric cooking – can significantly reduce these impacts while improving public health and economic opportunities and contributing to Mozambique's broader climate commitments, including those highlighted in its 2021 updated Nationally Determined Contribution.

However, the absence of a dedicated regulatory framework for clean cooking in Mozambique hinders the ability to establish clear targets, track progress and incentivise large-scale adoption of clean cooking solutions. Key challenges include customer affordability, access to private sector finance, market uncertainty, limited government strategy and last-mile delivery. According to analysis by the European Union's SEforAll programme, 90% of Mozambique's population cannot afford a USD 35 improved cookstove on a cash basis. Another significant barrier is "stacking," whereby households continue to use less efficient cooking methods even after adopting cleaner alternatives.

Nevertheless, there is growing momentum towards addressing these challenges. The government has prioritised clean cooking in its ETE, specifically through Programme 12: Massive Deployment of Clean Cooking Solutions. It is also developing a National Clean Cooking Strategy and has endorsed the Clean Cooking Declaration at the IEA's Clean Cooking in Africa Summit. These initiatives indicate a strong commitment to expanding access to clean cooking and integrating it into broader energy and climate strategies. With the right policy framework, financial mechanisms and market development, Mozambique can accelerate the transition towards cleaner, more sustainable cooking solutions, improving livelihoods while contributing to global climate and development goals.

Institutional framework

MIREME is the main body for energy policy making in Mozambique, including for clean cooking, with an emphasis on solutions that promote sustainable development.

Similar to the situation for electrification, FUNAE helps secure financing for clean cooking, with an emphasis on renewable energy. FUNAE's tasks also include raising awareness and ensuring the successful implementation of projects to increase accessibility.

The Ministry of Agriculture, Environment and Fisheries (*Ministério da Agricultura, Ambiante e Pescas*, MAAP) plays a central role in promoting sustainable development across agriculture, environmental management, and fisheries in Mozambique. MAAP is responsible for the sustainable management of biomass resources, particularly through its mandate over forest conservation, agroforestry systems, and land use planning. Its role includes developing policies and initiatives that promote sustainable harvesting practices aimed at reducing the deforestation and land degradation associated with traditional biomass use.

Key policies and strategies

Programme 12 of the Energy Transition Strategy is Massive Deployment of Clean Cooking Solutions, which aims for a significant shift from traditional biomass use to improved biomass cookstoves, LPG and electric cookers by 2030.

The 2013 Biomass Energy Strategy targets sustainable biomass supply, modern cooking fuels and efficient technologies to reduce the sector's carbon footprint.

A National Clean Cooking Strategy, initially expected to be released by mid-2024, has been paused until a to-be-determined date. The strategy will evaluate gaps and investment needs and assess how to adapt to cultural practices. This strategy aims to provide a comprehensive roadmap to enhance clean cooking access across the country.

Mozambique has also endorsed the Clean Cooking Policy Priorities during the IEA's Clean Cooking in Africa Summit. This document, included in the Chair's Summary, reflects the country's pledge to prioritise clean cooking initiatives and aligns with global efforts to improve access to sustainable and health-friendly cooking solutions.

Legal and regulatory framework

There is no comprehensive regulatory framework specifically dedicated to clean cooking in Mozambique. However, several key regulations and strategic initiatives lay the groundwork for future developments in this area. For instance, within the electricity regulatory framework, Decree No. 93/2021 emphasises the need to promote clean and efficient cooking solutions in rural areas, recognising the limitations to expanding grid-based electricity in these areas.

Moreover, the country currently lacks a dedicated national carbon credit framework, limiting the potential for clean cooking projects to leverage carbon financing. Similarly, there are no official standards or labelling systems in place for improved cookstoves, resulting in uneven product quality and reduced consumer confidence.

Mozambique's Environment Law (Law No. 20/1997) includes regulations aimed at improving air quality, which indirectly promotes clean cooking solutions as a means to reduce indoor air pollution.

Although the Forestry Regulation (Decree No. 12/2002) does not specifically address traditional biomass used for cooking, it governs the management and use of forest resources and could, therefore, be leveraged to promote the use of sustainable biomass.

Programmes

Mozambique's clean cooking landscape has seen significant developments over the past few years, driven by a mix of completed and ongoing international and domestic programmes. There is a clear trend towards leveraging private sector innovation and investment, supported predominantly by grants and technical assistance.

Table 2.3 Closed (yellow), and ongoing (green) programmes to support the clean cooking access sector in Mozambique

	TYPE OF SUPPORT					FINANCING RECIPIENTS	
Support programme	**TA**	**Grant**	**Equity**	**Debt**	**Guarantee**	**Public sector**	**Private sector**
EnDev	X	X				X	X
ILUMINA	X	X				X	X
BRILHO (Phase 1)	X	X					X
GET.invest	X						X
Modern Cooking Facility for Africa		X					X
ProEnergia +	X	X				X	
REACT SSA		X					X
TSE4ALLM		X			X		X
Italy-UNDP Energy Partnership		X				X	

Note: TA = technical assistance.
Source: Reproduced from ALER/AMER (2023), Renewables in Mozambique (accessed 27 May 2025).

The recently concluded EnDev, ILUMINA, and BRILHO programmes have made notable contributions to advancing energy access and clean cooking in Mozambique. EnDev provided advisory support and grants to public and private actors, enabling over one million people to access electricity and modern cooking

solutions, as well as supporting MSMEs and social institutions. ILUMINA facilitated mini-grid installations, deployed 30 000 solar home systems, and promoted local manufacturing of improved cookstoves, with a focus on women's empowerment. BRILHO expanded off-grid sector energy access, distributing over 250 000 improved cookstoves, and mobilising private investment to scale clean energy solutions. It also played a key role in developing Mozambique's first off-grid regulatory framework.

Building on this foundation, there are at least six currently active programmes aiming to further expand access to clean cooking. These include GET.invest, ProEnergia+, REACT SSA, TSE4ALLM, the Italy-UNDP Energy Partnership, and the Modern Cooking Facility for Africa (MCFA). These initiatives are mainly grant-based, supplemented by extensive technical assistance (TA), and continue to emphasise private sector engagement.

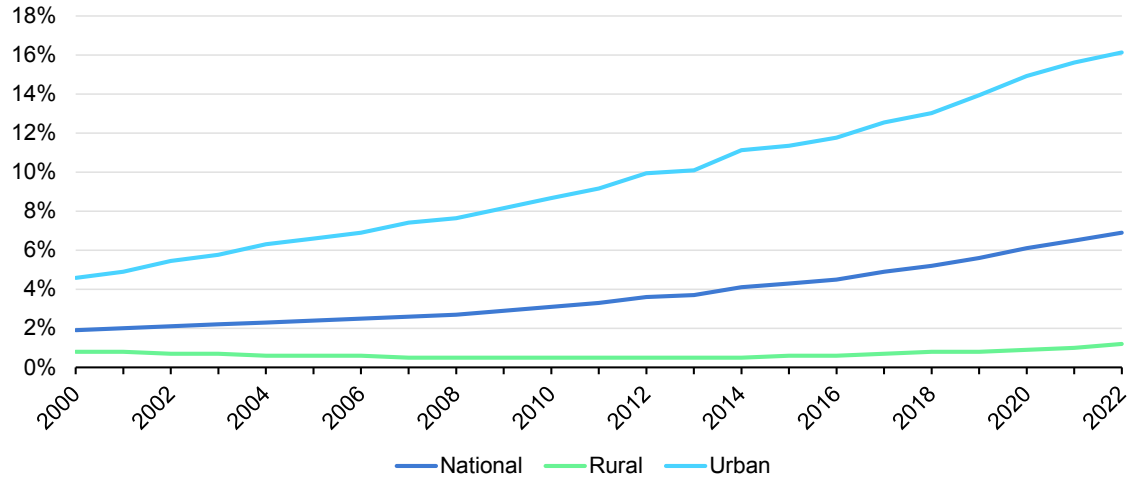
Together, these programmes have demonstrated the technical and operational viability of clean cooking solutions and laid a foundation for future initiatives. However, without scalable business models and sustained private sector engagement, clean cooking solutions will not reach the scale required to meet national and global access targets.

Status, trends and outlook

As of 2022, only 7% of Mozambique's population had access to clean cooking solutions, leaving over 30 million people reliant on biomass or coal to prepare their meals. This figure highlights the significant challenge Mozambique faces in expanding access to clean cooking, especially in contrast to neighbouring countries like South Africa (89%) and Zimbabwe (31%), which have made substantial progress in recent years. However, Mozambique's situation remains comparable to other neighbours, such as Malawi, Tanzania and Zambia, where access remains below 10%. Strengthening clean cooking efforts could also help Mozambique achieve commitments under its NDC, highlighting the cross-cutting potential of clean cooking in reducing GHG emissions and improving health outcomes.

The disparity is particularly stark between Mozambique's urban and rural areas: while 16% of the urban population has access to clean cooking, this figure drops to less than 1% in rural regions.

Figure 2.7 Rates of national, urban and rural access to clean cooking in Mozambique, 2000-2022



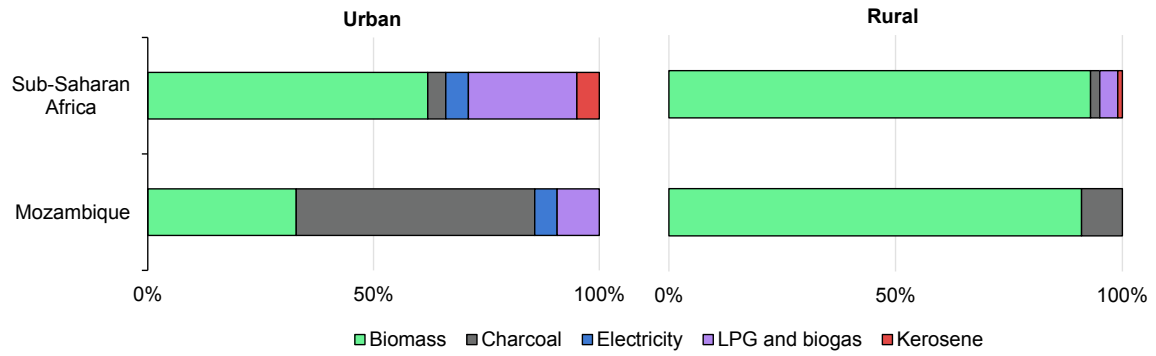
Source: IEA (2023), SGD7 Database (accessed 14 May).

As of 2021, around 53% of urban households in Mozambique relied mainly on charcoal and coal for cooking (47% charcoal and 6% coal). An additional 33% continued to use mostly solid biomass (i.e. firewood). Less than 10% of Mozambique's urban population used LPG or biogas, well below the sub-Saharan urban average of 24%. In rural areas, the dominant cooking fuels remained firewood (91%) and charcoal (9%), leading to high levels of indoor and outdoor particulate matter ($PM_{2.5}$).

The reliance on traditional biomass for cooking poses significant health risks, particularly for women and children. Cooking with biomass significantly exacerbates indoor air pollution, which caused 192 deaths per 100 000 people in 2019 in Mozambique (approximately 68 352 deaths per year), according to the World Health Organisation's estimates. Moreover, the time spent collecting firewood, predominantly done by women and children, detracts from the educational opportunities and productive activities available to these groups, perpetuating cycles of poverty and gender inequality.

The environmental impacts of traditional biomass use are also profound, contributing to deforestation that undermines local ecosystems and biodiversity. Soil erosion and reduced agricultural productivity are additional consequences, further threatening food security in rural regions.

Figure 2.8 Primary fuels used for cooking by households in Mozambique and sub-Saharan Africa, 2021



Sources: IEA analysis based on data from WHO (2024), Household Energy Database (accessed 22 July 2024).

In urban areas such as Nampula, where charcoal is relatively cheap compared to LPG, advanced charcoal stoves can achieve around 80% of the health benefits of LPG stoves. In cities such as Maputo and Beira, where charcoal is relatively expensive, LPG stoves may be the more viable, cost-effective solution.

According to the World Bank's Energy Sector Management Assistance Programme, Mozambique scores 29 out of 100 points on clean cooking indicators, reflecting deficiencies in planning, standards and financing incentives. According to the Programme, the absence of established standards and labelling for clean cookstoves, along with inadequate government planning for clean cooking, significantly impedes progress. Additionally, the lack of financial mechanisms to support both producers and consumers of clean cooking technologies hampers market development and adoption rates.

The World Bank estimates the cost of Mozambique's current reliance on traditional cooking methods at USD 17 billion annually in terms of climate, gender and health impacts, highlighting the need for further efforts to enhance access to clean cooking solutions.

LPG market

Mozambique's LPG logistics are centred around two main operating import hubs, Matola in the south and Beira in the centre, with a third hub under construction in Nacala in the north. Matola's Galp-IPG terminal, active since 2020, handles around 40% of the country's LPG, while Beira's Petromoc terminal, opened in 2018, supplies both the domestic market and neighbouring countries like Zimbabwe and Malawi.

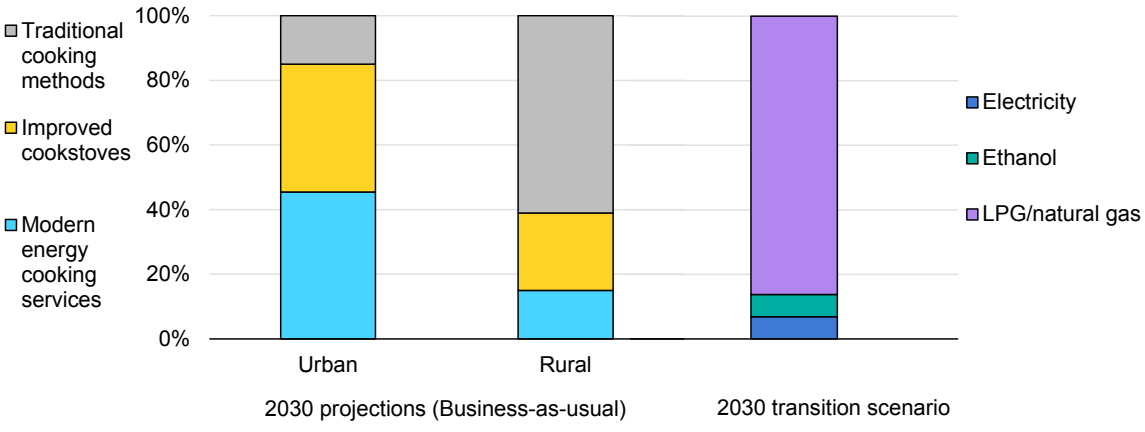
Much of the country's LPG storage is privately owned or co-owned, with companies like Galp and IPG investing heavily in facilities at Matola and Beira. Regulations introduced in 2017 require terminals to offer 15% of their capacity to third parties, enabling marketers to lease space rather than build their own infrastructure.

The Petromoc Beira LPG terminal, inaugurated in May 2018, is a significant addition to Mozambique's energy infrastructure. Located at the Port of Beira, the facility comprises three storage tanks, each with a capacity of 1 000 metric tonnes, totalling 3 000 metric tonnes of LPG. The terminal is equipped to fill approximately 600 gas cylinders per hour or six 25-tonne trucks per day, enhancing the distribution of LPG to central and northern regions of Mozambique and neighbouring countries such as Zimbabwe and Malawi.

Outlook

Currently, Mozambique is not on track to meet SDG 7.1. However, the government has prioritised clean cooking in Programme 12 of its ETE, "Massive Deployment of Clean Cooking Solutions", which aims to replace 100% of traditional biomass usage with improved cookstoves, LPG or electric cookers by 2030. Of this, 70-90% is expected to be improved stoves and most of the remainder LPG. By 2050, MIREME expects the use of LPG and improved stoves to be nearly equal, with a minority using electric cookers.

Figure 2.9 Projections: Business-as-usual and transition scenario for clean cooking access in Mozambique



Source: IEA analysis based on data from World Bank (2024), Clean Cooking Planning Tool (accessed 22 July 2024).

As in many developing countries, cultural resistance can pose a significant obstacle to the adoption of clean cooking solutions, particularly in rural areas, where traditional cooking methods are often ingrained in culinary practices.

Overcoming this resistance requires tailored approaches that respect and integrate local customs and preferences while promoting the benefits of clean cooking. Effective communication strategies that involve local leaders and community influencers can play an important role. Since cooking habits differ from one place to another, and particularly between rural and urban areas, tailored approaches may be needed, e.g. to account for the prevalence of traditional wood use in rural regions and charcoal in urban and peri-urban areas.

The sustainability of clean cooking initiatives in Mozambique is at risk without continued financial support. As initial grant-based programmes that facilitated market entry conclude, there is a notable lack of regulatory clarity and fiscal incentives, impeding the introduction of new technologies and business models.

The absence of a clear legal framework for issuing carbon credits is a significant barrier. Carbon credits can provide a substantial financial incentive for the adoption of clean cooking solutions, but without a supportive legal framework, their long-term potential remains at risk (see Chapter 9). Moreover, access to finance poses a major challenge for scaling up clean cooking technologies in Mozambique. Many businesses in the sector struggle to secure credit due to high interest rates, stringent collateral requirements, and a lack of tailored financial products. At the same time, affordability remains a key barrier for consumers, as limited access to microfinance and pay-as-you-go models restricts their ability to invest in cleaner and more efficient cooking solutions. Without stronger financial mechanisms and targeted policy support, widespread adoption of clean cooking technologies will remain out of reach (see Chapter 10).

Assessment

Mozambique faces a formidable task in extending clean cooking solutions to the 94% of its population that still relies on traditional biomass and charcoal. These fuels generate harmful indoor air pollution, which particularly affects women and children, and contribute to environmental degradation through deforestation and carbon emissions. While institutions such as the Ministry of Mineral Resources and Energy and the Energy Fund have initiated strategies (e.g. the 2013 Biomass Energy Strategy and Programme 12 of the Energy Transition Strategy), implementation gaps remain.

One of the main barriers to scaling clean cooking solutions in Mozambique is the fragmented institutional landscape. Public stakeholders, including ministries and working groups often operate in silos, resulting in poor co-ordination and missed opportunities for synergy across sectors such as health, gender, and the environment. Although these ministries have the potential to play pivotal roles, their limited involvement has hindered the effective implementation of existing programmes. Given that clean cooking intersects with multiple development

priorities, stronger inter-ministerial collaboration is essential. This includes integrating clean cooking into national frameworks like Mozambique's Nationally Determined Contribution (NDC), to ensure policies also advance broader social and climate objectives.

Clean cooking programmes supported by development partners have proven the concept of deploying clean cooking solutions in Mozambique. Unlocking scale will require a deliberate focus on enabling viable, market-driven approaches and fostering an investment-ready environment for clean cooking enterprises. By continuing to build on the groundwork laid by earlier projects and emphasising result-based financing and private sector engagement, Mozambique can make meaningful progress towards expanding the access to clean cooking. Sustained efforts and co-ordination among stakeholders will remain essential for overcoming challenges and achieving long-term success in providing clean, safe, and sustainable cooking solutions for all Mozambicans.

However, weak financial and market structures continue to limit both supply and demand. The conclusion of large grant-based programmes (EnDev, ILUMINA, BRILHO) exposes a financing gap that neither the private sector nor the public sector currently fills. Carbon credits could potentially finance more widespread adoption of improved cookstoves and other clean cooking technologies. Yet, in the absence of a transparent national carbon credit framework, stakeholders cannot capitalise on carbon offset revenues to scale solutions. Affordability remains a pervasive barrier: only 10% of urban households and less than 1% of rural households use modern cooking methods.

Petromoc's Beira terminal was a key pioneer in Mozambique's LPG sector, providing reliable, open-access storage in the country's centre. This proved that demand for bottled gas justified coastal infrastructure, lowered inland logistics costs, and established a reference tariff that private investors could compete with. As a result, companies like Galp and IPG have invested heavily, expanding capacity well beyond Petromoc's original facility.

Moreover, a lack of technical and quality standards constrains the cookstove market. Without national guidelines on efficiency, safety, or labelling, consumers cannot readily distinguish between reliable improved cookstoves and substandard products. In turn, producers lack clear quality benchmarks, making it harder to attract investment and achieve market transformation at scale.

Finally, cultural practices also present a challenge, especially in rural areas where firewood and charcoal remain deeply ingrained. Reaching universal access will require addressing these cultural dimensions, alongside policy and financing reforms. Without stronger co-ordination, structured financial mechanisms and

formal quality controls, Mozambique risks missing its 2030 target – delaying the economic, health and environmental benefits that clean cooking solutions can bring.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Formalise inter-ministerial collaboration to enhance the integration of clean cooking into national policies and its Nationally Determined Contribution while implementing financing programmes dedicated to clean cooking solutions.
- Establish a national carbon credit framework with transparent regulations to facilitate streamlined access to carbon markets for clean cooking projects.
- Establish standards for improved cookstoves to guarantee quality and efficiency and foster a market-driven, business-friendly environment that encourages investment and innovation, with a focus on locally produced technologies.

3. Electricity

Overview

Electricity generation in Mozambique is primarily based on hydropower (83%), as well as some domestically produced natural gas. The role of variable renewables is currently very small, but expected to grow in the coming years, including through capacity auctions. Mozambique's substantial potential as a clean power producer may help the country attract energy-intensive export industries seeking opportunities for low-emissions manufacturing. It could also play an important role in decarbonising the coal-dominated Southern African Power Pool.

Generation is dominated by the majority state-owned Cahora Basa hydropower plant, which is also the lowest cost electricity producer. Most of the output from this plant currently goes to South Africa under a long-term export contract.

The expiration of this long-term contract in 2030 and of Mozal imports in 2026 present opportunities to radically alter the supply and demand balance in EDM's system, as well as significantly lower EDM's cost of supply. However, such opportunities are likely to be hindered by delays linked to the complexities of overhauling the transmission system.

Mozambique does not yet have a single, unified grid across the country. While the central and northern grid contains most of Mozambique's current and potential hydropower resources (including Cahora Basa), the southern grid (which includes Maputo) accounts for most of its demand. Due to a lack of interconnections, the southern grid has to import much of its power from South Africa, as does the Mozal Aluminium plant, Mozambique's largest consumer.

Institutional framework

MIREME is the government body responsible for developing energy policy, and its National Directorate for Energy oversees the power sector.

ARENE is the regulator for the power sector (as well as for oil products and gas distribution). In addition to supervising, regulating and licensing all power sector operators, it sets tariffs and establishes and enforces technical and service standards.

FUNAE is the public body responsible for promoting off-grid electrification.

EDM is the state-owned, vertically integrated electricity company that is also responsible for on-grid electrification.

Key policies and strategies

Integrated Master Plan 2018-2043

The Integrated Master Plan – Mozambique Power System Development was published in 2018 as a "comprehensive national power system development master plan" for the subsequent 25 years. Its generation and transmission plans are divided into two main stages, the first of which (through 2026) assumes the continued separate development of the country's two main power grids (the northern and central grid, and the southern grid) and prepares for their eventual interconnection (stage 2).

The financial analysis for the 2018 plan was based on an estimated total cost of USD 34 billion over 25 years and looked at two main cases: 1) a base case that includes power imports from South Africa; 2) a comparison case that includes the ability to purchase additional (cheaper) power from HCB. Financing in both cases, however, was based on the assumption of fully cost-reflective tariffs, something that EDM has yet to achieve.

The 2018 Integrated Master Plan was an update of an earlier plan that covered the period 2012-27. EDM is planning a further update to take into account various factors that have led to delays and deviations in the current plan, including (as noted by the terms of reference) the Covid-19 pandemic, recent cyclones, the evolving security situation, and the global economy. Another motivation for the update is to align investments with the 2023 ETE.

According to the terms of reference for the updated plan, which is to cover the next 20 years, the new version will include a revised demand forecast, identify priority investments for the first seven years (i.e. through 2030), and be "based on least-cost economic principles…with an emphasis on renewable technologies".

National Electrification Strategy

The National Electrification Strategy, adopted by the government in 2018, aims to assign clear institutional roles, financing mechanisms, and technical standards and approaches for electrification, and has an overall goal of achieving universal access by 2030.

It follows from the recommendation of a diagnostic study that examined the state of electrification and its main institutional, financial and technical challenges, such as a lack of capacity for integrated planning and criteria for prioritising projects, as well as the need for a funding scheme that did not require EDM to operate at a loss while making connection costs and tariffs affordable.

The ENE assigns MIREME leadership in the planning process, makes EDM responsible for implementing grid-based electrification projects and delegates FUNAE to lead the implementation of energy solutions in remote rural areas with an emphasis on off-grid technologies (see also Chapter 3).

EDM Strategy 2018-2028

The current EDM Strategy (2018-2028) is intended to complement the Integrated Master Plan and the Electrification Strategy. Its "strategic priorities" include the achievement of universal access to electricity and "the establishment of Mozambique as a southern African energy powerhouse". A third priority is the development of EDM as a "model smart utility epitomising gender equality and managerial and operational excellence".

According to the Strategy, a key issue is how EDM can successfully balance its profitability with its mandate to provide affordable electricity and support the country in achieving universal access. It notes tension between the goals of low-cost power and reliability as it seeks to expand coverage, as well as the "extent to which [EDM] can act as a development agency or commercial entity." The Strategy calls for progressive tariff increases to reach cost-recovery levels by 2022, a goal still not reached as of 2025. It notes that EDM's immediate priority (as of 2018) is to increase generating capacity and promote "cleaner energy", and subsequently to address transmission and distribution bottlenecks.

Energy Transition Strategy (electricity aspects)

Chapter 1 provided an overview of Mozambique's Energy Transition Strategy. This section summarises the ETE's main points for the power sector, which features in 6 of its 14 programmes. All six are among the eight programmes that the ETE considers to be near-term priorities.

Programme 1, Hydropower development, calls for the addition of 2-4 GW of new hydropower by 2031 (notably including Mphanda Nkuwa and HCB Norte), and a further 9 GW by 2040. It also aims to "repatriate" most of the power currently being exported to South Africa from HCB and to avoid future long-term export contracts.

Programme 2 is Expansion, improvement and capacity increase of the national electricity grid. It calls for connecting the country's two separate transmission systems and reinforcing them to support a 15-25% share of variable renewables by 2030 and a 50% share by 2040. It also calls for a national study on integrating batteries into the grid.

Programme 3, Development of solar and wind energy, aims to construct 1-2 GW of solar and 200-500 MW of wind capacity by 2030. It calls for an additional 2.5 GW of solar and 1 GW of wind by 2040, and a further 3 GW of solar and 1 GW

of wind by 2050. It notes that this capacity should build on the principles of competition introduced by the current Renewable Energy Auctions Initiative (*Iniciativa de Leilões de Energia Renováveis*, PROLER) auction programme (see Chapter 4).

Programme 5, Development of green industrial parks and corridors, notes that HCB and Mphanda Nkuwa will be "key to Mozambique's green industrialisation". It seeks to build at least one industrial park by 2030 based on renewable energy. It also calls for changes in the new Electricity Law to make it easier for off-grid industrial consumers to purchase power from renewable power producers.

Programme 11, Accelerating access to off-grid energy, notes that off-grid solutions should account for 30-35% of the universal household access that the government aims to achieve by 2030, of which 15-25% would be through mini-grids and 10-15% through SHS. In the case of mini-grids, it emphasises the need to proactively promote productive uses and calls for the establishment of a single, public database for the off-grid sector.

Programme 13, Decarbonisation of the transport system, calls for a shift toward electric vehicles beginning in 2030. It aims to have 10% of private road passenger transport and 25% of road freight transport electrified by 2040. Noting that all rail transport currently runs on diesel, it calls for switching the line south of Ressano Garcia to renewable electricity by 2030.

2022 Electricity Law

The 2022 Electricity Law (Law No. 12/2022) revokes and replaces the 1997 law. Like its predecessor, it covers the entire value chain from production through consumption and cross-border trade, but adds a number of new areas, such as energy storage. The update is motivated by changing circumstances, such as the government's goal to achieve universal access by 2030, the desire to become an important clean energy exporter to the Southern African Power Pool (SAPP) and the goal to integrate increasing amounts of variable renewable energy on the grid.

While the previous law allowed private participation, this aspect is more pronounced in the revised version. It introduces the possibility of autoproducers and their sales to third parties and creates an energy supplier database, in which anyone providing energy services, such as SHS sales or rentals, must be registered. It also introduces the new role of national electricity system manager to manage both the system and market, as well as a new National Dispatch Centre to accommodate the grid's increasing complexity.

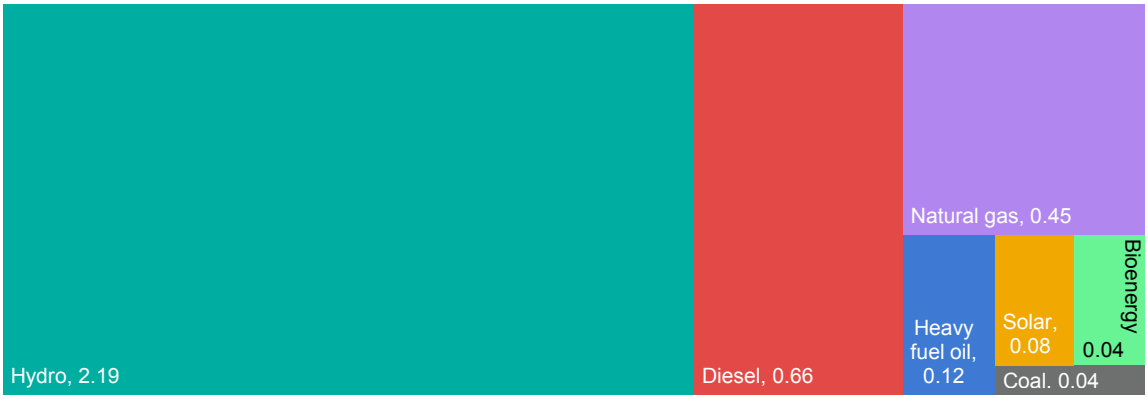
Supporting regulations are expected to provide more details on several aspects of the 2022 Electricity Law, such as energy storage systems, auto-production for third parties, energy efficiency and the role of the national electricity system manager.

Installed capacity

According to EDM, total installed capacity in Mozambique stood at nearly 3 GW as of 2023, close to half of which was available to meet domestic demand. Hydropower remains the dominant source, accounting for 74% of installed capacity but only around 50% of available capacity. This is due to the fact that the country's largest power generation asset, the Cahora Bassa hydroelectric plant, is contractually obliged to supply most of its output to South Africa under a long-term agreement that runs until 2030. Of the plant's 2 075 MW installed capacity, only 650 MW are available to supply the national grid.

The second-largest source is natural gas, with gas-fired power plants representing 15% of total installed capacity in the country but accounting for 30% of available capacity. Diesel generation, mostly used for emergency or peak demand, holds a 5% share of installed capacity (7% available capacity), while solar PV's share of 3% of installed capacity is largely available.

Figure 3.1 Installed on-grid capacity in Mozambique (GW), 2023



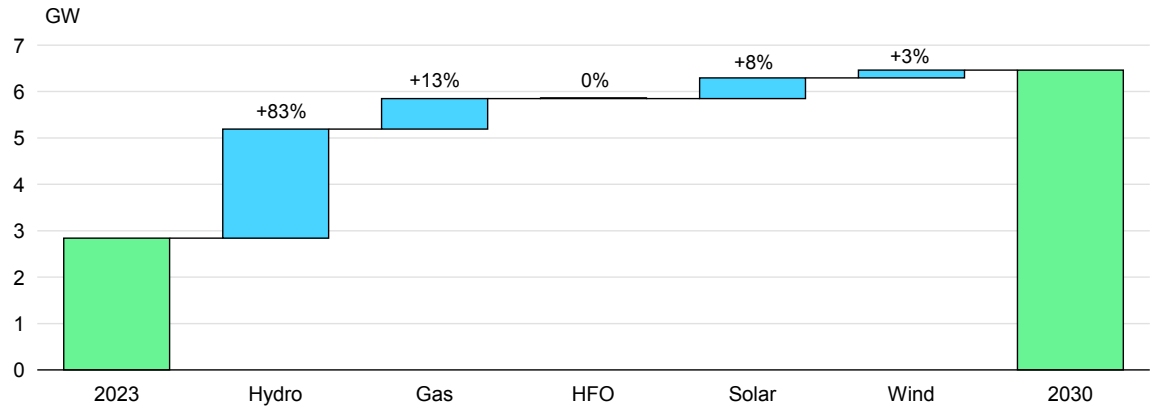
Note: Hydro includes the 2 075-MW Cahora Bassa hydropower plant, of which only 650 MW are available to supply the national grid.
Source: IEA analysis based on data from EDM (2024), Annual Report.

Future capacity

While hydro capacity is forecasted to double from 2022 to 2030, according to AMER/ALER, its share in the capacity mix is expected to decrease to 70.3%, considering the growth of solar PV to 8%, wind to 2.7% and natural gas to 17%.[1]

EDM has put forward a list of priority and structural generation projects, ranging from hydro and thermal sources to variable renewables, which if financed and implemented could add close to 4 GW of new capacity to Mozambique's power fleet. Several renewable projects at various stages of planning and development could add 690 MW of potential new capacity by 2030.

Figure 3.2 Evolution of electricity generation capacity by source between 2023 and 2030 (projections) in Mozambique



Source: IEA analysis based on ALER/AMER (2023), Renewables in Mozambique.

The 1 500-MW Mphanda Nkuwa hydropower plant is the largest EDM's planned structural generation projects, currently under development by a consortium comprising EDF, TotalEnergies and Sumitomo Corp, which won a tender in 2023 to co-invest with EDM and HCB. The plant, planned on the Zambezi River 60 km downstream from HCB, is estimated to cost USD 5 billion. Potential lenders have emphasised the importance of assessing the impact of climate change on the future flow of the Zambezi River, which they note has already been affected by drought several times over the last decade. Mphanda Nkuwa is currently expected to be operational in 2031. The full project will include a high-voltage transmission line to Maputo (over 1 300 km) as part of the "backbone" that is supposed to connect the country's separate grids (see "Transmission" section).

[1] The share of Mozambique's installed capacity by source in 2023 differs slightly between the ALER/AMER 2023 report Renováveis em Moçambique and the latest available data in EDM's 2023 Annual Report. We have referred to EDM's data for 2023 installed capacity and to ALER/AMER projections for future capacity.

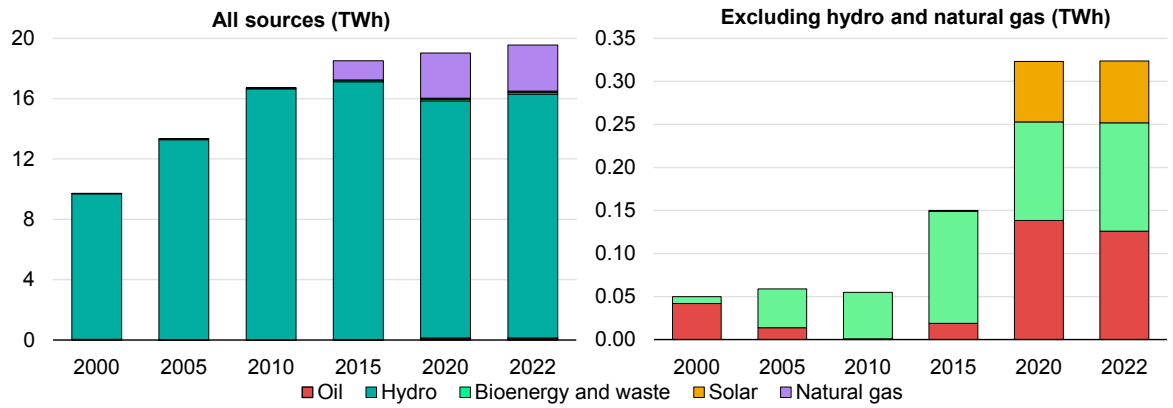
Another project expected to add dispatchable capacity to Mozambique is the 450-MW Central Térmica de Temane gas-fired power plant in Inhambane province. Awarded by tender to a consortium headed by Globeleq in 2017, the project started construction in 2022 but has suffered delays linked to the tropical storm Filipo that hit the country in March 2024. Now expected to start operations in early 2026, the plant will source its gas from the Pande and Temane fields, which have been operated by Sasol since 2004. The USD 2 billion project includes a 563-km power transmission line to Maputo, the first phase of a wider "backbone" project to connect the southern grid with the central and northern systems (see "Transmission" section).

Electricity generation and trade

In 2022, Mozambique produced 19 559 GWh of electricity, of which 83% from hydropower sources. According to HCB, the Cahora Bassa hydroelectric plant (by far the country's largest generator) produced 15 753 GWh. EDM notes that it purchased 4 532 GWh of this, while HCB exported the rest, mostly to South Africa.

For the same year, EDM purchased 2 497 GWh from IPPs within Mozambique, mostly from gas-fired plants. Solar IPPs accounted for only 3% of the IPP total, based on solar production of 69 206 MWh in 2021, according to MIREME. EDM's own gas-fired generation in 2022 accounted for 617 GWh, and its own hydropower generation 419 GWh. Natural gas accounted for 15% of total on-grid generation, while diesel and biomass sources together produced 1% of the country's electricity in 2022. Solar PV plants accounted for less than 1%, but represented an uptick from nearly zero prior to 2020, thanks to the commissioning of the Mocuba solar PV plant in 2019.

Figure 3.3 Electricity generation in Mozambique, 2000-2022

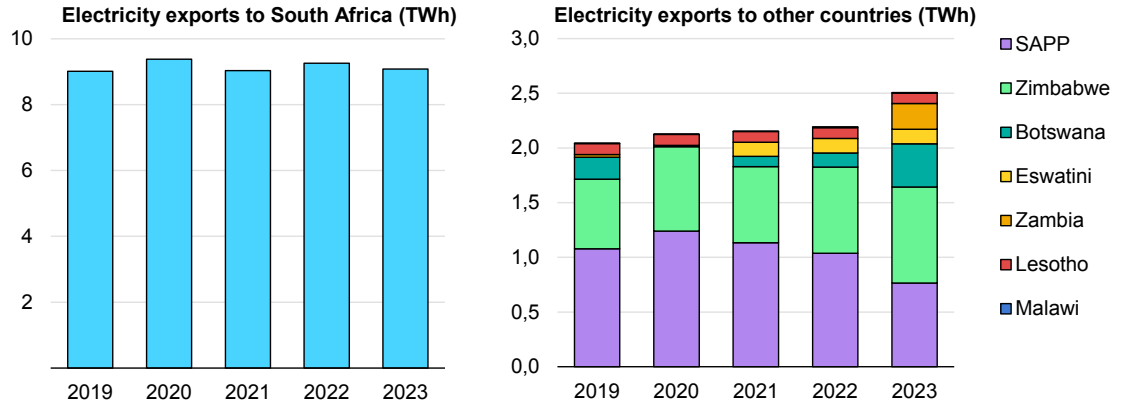


Source: IEA (2024), World Energy Balances (accessed on 14 May 2025).

In 2023, Mozambique's total exports were 11 682 GWh, most of which came from HCB. HCB reported exports for that year to be 9 791 GWh, of which 94% went to South Africa's Eskom, 5% to Zimbabwe Electricity Supply Authority (ZESA) and 1% to the Botswana Power Corporation (BCP) and other SAPP members.

In the same year, EDM reported exports of an additional 1 891 GWh, of which 36% were to the day-ahead market of the SAPP, 19% to Zimbabwe (ZESA), 17% to Botswana (BCP), 16% to Zambia (14% Zambia Electricity Supply Corporation Limited, 2% Copperbelt Energy Corporation), 7% to Eswatini (Eswatini Electricity Company), 5% to Lesotho (Lesotho Electricity Company), and less than 1% to Malawi (town of Mangochi). Much of this energy exported by EDM presumably was unused power from EDM's share of HCB's output and sent via HCB's HVDC export lines to South Africa. As part of its Energy Transition Strategy, the country aims to reallocate 8 000-10 000 GWh of electricity from HCB currently exported to South Africa for domestic use.

Figure 3.4 Mozambique's electricity export to South Africa (left) and to other countries (right), 2019-2023



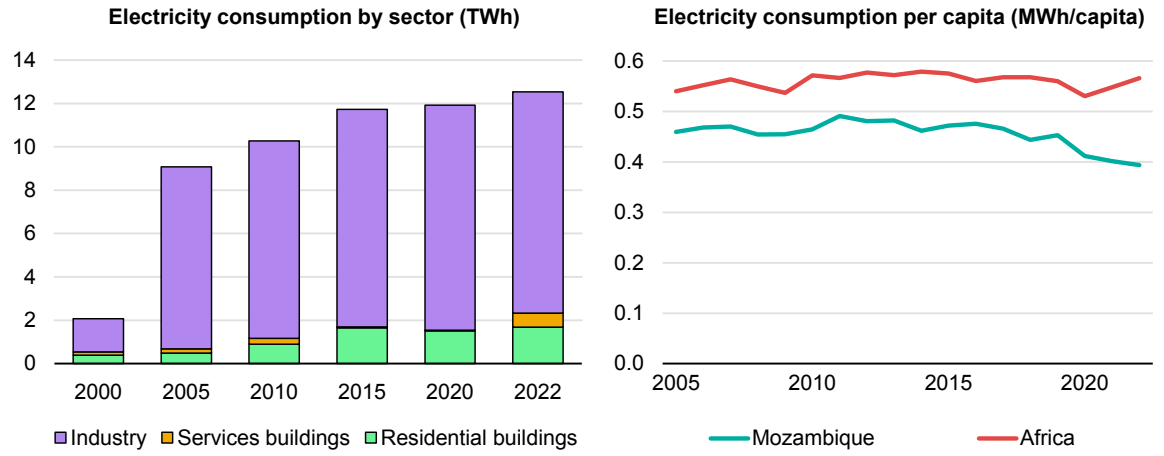
Source: IEA analysis based on National Institute of Statistics (2024), Statistical Yearbook 2023.

Imports, almost exclusively from South Africa via the Motraco transmission lines to Mozambique's southern grid, were mostly to supply the Mozal Aluminium smelter. Additional imports via Motraco were used by EDM to supply the southern grid more generally, including the capital city of Maputo and the nearby industrial centre of Matola. Total imports from South Africa in 2021 were 8 257 GWh, or nearly on the same scale as EDM's share of HCB's exports to South Africa.

Electricity consumption

Total electricity consumption in 2022 was 12.5 TWh, including consumption by autoproducers (notably in the mining sector) and the Mozal Aluminium plant (8.2 TWh). Electricity consumption grew five-fold from 2000 to 2010, before slowing down from 2010 to 2022 (+21%).

Figure 3.5 Electricity consumption by sector (2000-2022) and *per capita* in Mozambique (2005-2022)



Note: Africa's consumption *per capita* is not available for 2022.
Source: IEA (2024) World Energy Balances (accessed 14 May 2025).

The initial growth was driven by the opening of Mozal aluminium smelter in 2000, which remains to date the largest industrial park in the country. Mozal is also by far the largest single electricity consumer in the country, though currently supplied directly by South Africa's Eskom under a long-term contract that runs through 2026. Supplying Mozal from within Mozambique after this date could require an additional 8 TWh per year, more than doubling the domestic demand that is currently met by domestic sources. While looking at the potential for domestic supply alternatives, Mozal has expressed hope that its Eskom contract could be extended until "at least" 2030. The African Development Bank expects non-Mozal domestic demand to grow at an average annual rate of 7-8% over the next decade.

Domestic peak demand served by EDM increased from 706 MW in 2012 to 1 093 MW in 2023. Again, however, this does not include the Mozal plant, whose 900 MW of nearly constant demand would bring the total to nearly 2000 MW.

Cross-border interconnections

Mozambique has five interconnections with South Africa, two with Zimbabwe, and one with Malawi. The interconnections with South Africa notably include two 535-kV high-voltage DC lines that run 900 km from the Cahora Bassa hydroelectric station (HCB) along Mozambique's border with Zimbabwe before entering South Africa, where they run a further 500 km to Eskom's Apollo substation. These lines are managed by HCB and used exclusively for export.

The Motraco transmission company, which is jointly owned by EDM, Eskom, and the Eswatini Electricity Company (EEC), manages two 400-kV lines delivering power from South Africa to the Maputo region in Mozambique's southern grid, where the main customer is the Mozal Aluminium smelter, the country's largest electricity consumer. Mozambique and South Africa are also connected through a 275-kV line.

Mozambique has two interconnections with Zimbabwe, both also used for export: A 400-kV line goes from the Songo substation near HCB to Bindura, Zimbabwe, and a 110-kV line stretches from the Chicamba dam to Mutare.

Mozambique has one interconnection with Malawi at distribution level that is used to supply the isolated town of Mangochi, and an additional 400-kV transmission line is currently under construction, expected to be completed by October 2025.

According to the EDM Strategy (2018-2028), priority projects for future interconnections include two additional 400-kV lines, one to Zambia and another to Tanzania. In March 2025, Zambia and Mozambique signed an inter-utility memorandum of understanding (MoU) to pave the way for the development of the Mozambique-Zambia Interconnector, estimated to cost USD 411.5 million. The Mozambique-Tanzania Interconnector Project currently remains in the pre-investment phase.

The World Bank and African Development Bank have been encouraging Mozambique to develop further generation and related transmission capacity to help reduce the Southern African Power Pool's (SAPP) heavy reliance on Eskom's coal-fired capacity, as well as to help alleviate an increasingly serious power deficit in South Africa.

Transmission and distribution

Mozambique's power supply network, operated by EDM, is divided into two isolated power systems: the interconnected central-northern system, and the southern system. There are plans to connect the two systems, notably through the regional transmission "Backbone" project built and operated by Sistema Nacional de Transporte de Energia (STE), a company owned by EDM. Launched in 2011,

the overall goal is to link the central-northern and southern electricity transmission systems to wheel power from the central-northern region, where most of the generation occurs, to the southern load centre. This will materialise in the building of about 1 400 km of high-voltage lines at 400 and 500-Kv.

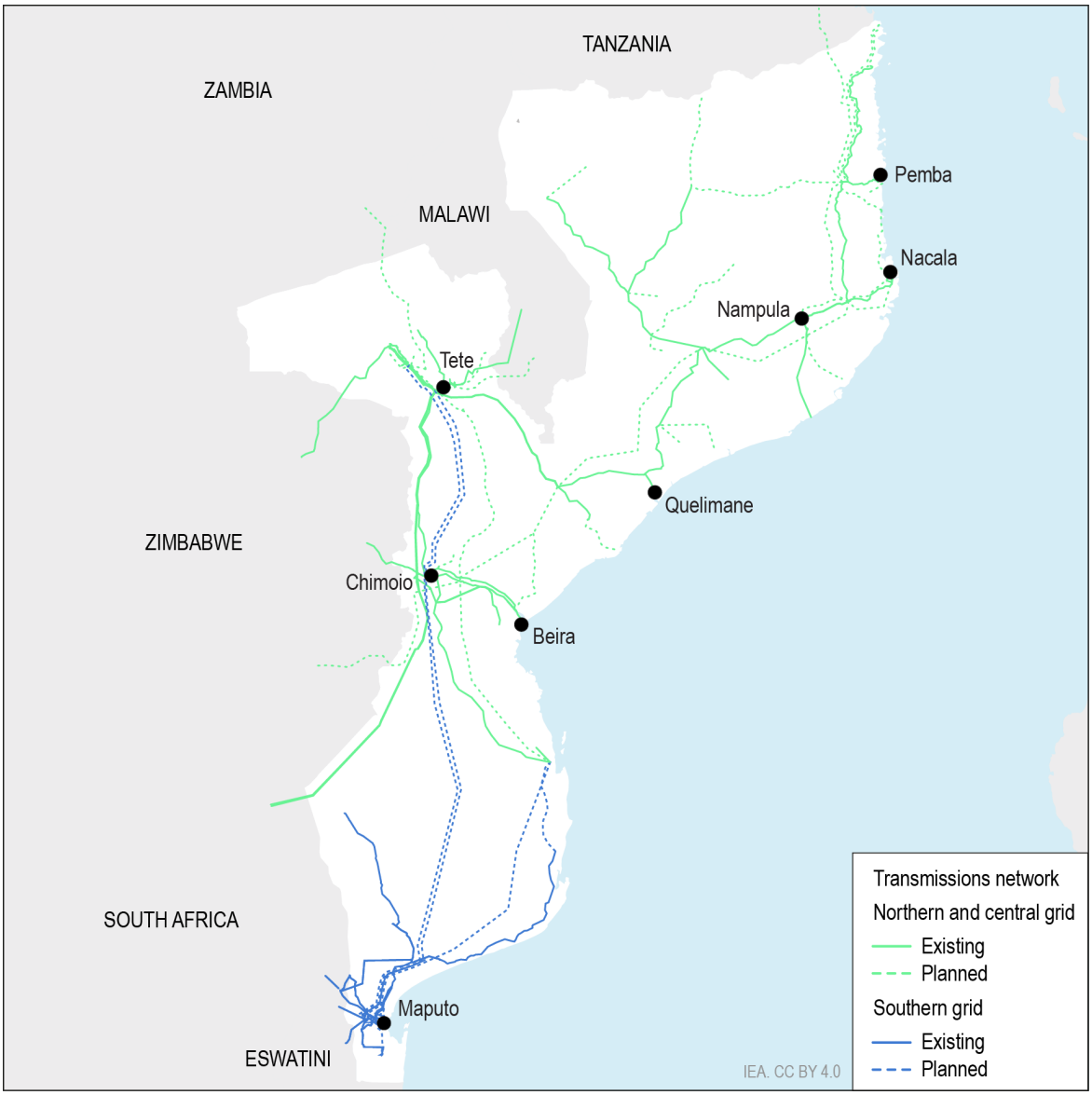
The current plan consists of three phases: a 400-Kv transmission line from the southern grid of Maputo to a new substation near Vilanculos to meet the 450-MW Temane power plant; a 400-kv line from Vilanculos to the Songo substation near HCB in west-central Tete province; and a 500-kV DC line from Songo to Maputo mostly following the existing HDVC lines that export HCB's power to South Africa.

The construction of the transmission line between Maputo and Temane – phase I of the project – was completed in December 2024 and is expected to enter commercial operation in the first half of 2026. Bids were recently opened for the Vilanculos-Songo transmission line, phase II of the project.

There is also an ongoing priority project to strengthen the interconnection between the central and northern grids with 220-to-400-kV transmission lines spanning a total of 820 km from Chimuara to Nacala. It is expected to connect HCB and the future Mphanda Nkuwa hydroelectric station to the northern part of the country. While the first phase of the project remains under construction, it was announced in 2024 that Gridworks, a subsidiary of British International Investment, would take the lead in the development of the second and third phases of the project.

As of 2023, EDM's transmission systems had 81 fixed substations and 11 mobile substations, 5 679 km of transmission lines and 15 319 transmission towers. Much of EDM's infrastructure is overloaded and in need of repair, notably including many of its substations. EDM identified priority infrastructure to be reinforced or modernised under the World Bank's USD 150 million Power Efficiency and Reliability Improvement (PERIP) project, which concluded in September 2024. Between June 2018 and July 2024, the project rehabilitated seven substations, reinforced ten 66kV transmission lines, and improved distribution infrastructure in eight cities (Maputo, Matola, Beira, Nampula, Nacala, Pemba, Lichinga, and Tete).

Figure 3.6 Mozambique's planned and existing transmission network, 2023



Source: IEA based on data from Mozambique, Ministry of Mineral Resources and Energy.

EDM's distribution system contains nearly 23 000 km of low-voltage lines, 11 000 public transformer stations and 5 000 private transformer stations. EDM has approximately 2.6 million distribution customers, the vast majority of which are households in urban and peri-urban areas.

As of 2020, 78% of EDM customers had pre-paid meters, and EDM's goal is for this figure eventually to reach 100%. However, non-payment continues to be a problem, particularly among non-residential customers, including state institutions. EDM declared it lost approximately USD 78 million in 2023 due to illegal electricity connections and vandalism.

A 2021 study by Salite et al notes that 60% of households interviewed in peri-urban areas of Maputo and Matola were "dissatisfied" with the quality of their electric service provision, particularly due to frequent power oscillations and outages. According to the study, this is due to lack of regular maintenance, as well as overloaded transmission lines and transformers, which the study notes are at least partly due to efforts to significantly increase the number of connections. In some cases, the voltage "is insufficient to power lighting and domestic appliances."

EDM reports that total energy losses in 2023 were 26%. It is not clear whether this includes both transmission and distribution losses, nor how much of this is due to technical losses, as opposed to non-technical losses, i.e., theft via illegal connections. Contributing factors to technical losses include high ambient summer temperatures, long distances between generation and consumption centres, overloaded and outdated infrastructure, and lack of adequate maintenance. EDM is implementing a Loss Reduction Program supported by the World Bank and several other partners to address both commercial and technical losses.

According to EDM's annual report, the average number of interruptions per consumer per year (SAIFI) in 2023 was 30.38, while the average duration of electricity supply interruption for the consumer per year (SAIDI) was 54 hours. This marks a significant decrease from the figures in 2018 and 2019 SAIDI figures, which were around 80 hours. For comparison, the SAIDI values for South Africa, Tanzania, and Zambia were 30.53, 20.90 and 51.22 hours.

Tariffs

Electricity tariffs are categorised based on the type of consumer and their usage patterns. EDM's customers are split into three broad groups: "regulated", "non-regulated", and "exports". Regulated customers, which form the main customer base, have tariffs set by the government, with approval from MIREME and ARENE. Non-regulated customers, i.e. special customers, which receive medium- and high-voltage supplies, have tariffs negotiated directly with EDM, subject to approval by MIREME and ARENE. The "exports" category refers to electricity that is sold to customers outside of Mozambique, primarily in neighbouring countries within the Southern African Development Community (SADC) region. EDM implements more specific categories of prices to tailor the tariff to the type of consumer and usage pattern.

Out of nearly 5 000 GWh of domestic electricity used by inland EDM customers in 2023, approximately 4 000 GWh (83%) was used by regulated customers, while the remaining 845 GWh (17%) was consumed by non-regulated consumers. The

pre-paid domestic tariff was equivalent to about USD 0.12 /kWh in March 2024, while the social tariff was about USD 0.015 /kWh[2]. Nearly 1 900 GWh of electricity were exported in 2023 by EDM.

Despite tariff increases of over 190% between 2015 and 2020 (in local currency), tariff revenues covered only about 85% of EDM's operating and debt-service costs in 2020, as there had been a lack of systematic adjustment to address the main cost drivers. The government is implementing a Financial Strengthening Plan with the assistance of the World Bank. This reportedly will include the development of tariff-adjustment mechanisms based on domestic inflation and changes in electricity purchase costs.

Based on EDM's current costs, cost-reflective tariffs are still likely to be too expensive for most existing and potential customers. One of the main reasons for the current high cost of electricity in Mozambique is the prices EDM must pay to IPPs and South Africa's Eskom, with which it has long-term power purchase agreements (PPAs). For example, according to ALER/AMER, EDM pays approximately 0.085 USD/kWh to the Ressano Garcia thermal plant and 0.13 USD/kWh to the Mocuba solar PV plant.

The cheapest power obtainable by EDM comes from HCB at 0.015 USD/kWh, but the capacity available to EDM from this plant is limited to 650 MW, since most output is contracted for export to South Africa through 2029 (for which Eskom pays HCB 0.025 USD/kWh). This means that EDM has an opportunity to significantly lower the cost of its supply after 2029. Due to the current lack of interconnection between the central-northern grid (where HCB is located) and the main demand centres in the south (Maputo and Matola), however, power from HCB to the southern grid currently could only be delivered indirectly via power swaps through the Motraco transmission lines from Eskom's system in South Africa.

Other major future capacity additions, such as the 1 500-MW Mphanda Nkuwa hydropower plant (near HCB), also currently lack a connection to the south. This is why the STE "Backbone" project to interconnect Mozambique's currently separated power systems is likely to be crucial for lowering EDM's cost of supply, and ultimately the tariffs paid by consumers.

Assessment

Promotion of low-carbon electricity along with the use of gas is at the heart of Mozambique's Energy Transition Strategy, which aims to enable electrification while reducing costs. However, co-ordinating investment in the power sector is

[2] Based on USD 1 = 63.86 meticais (MZN) on xe.com, 18 March 2024.

complicated by the lack of an integrated resource planning process that accounts for energy demand, grid development and generation scenarios.

There is a need to update the Integrated Master Plan of 2018 to reflect the priorities of the ETE. This will require improving planning instruments, notably by using specialised or integrated models to construct energy scenarios that demonstrate possible least-cost trajectories for the evolution of energy sources, including renewables.

Current efforts to move from the historical system of unsolicited bids for new generation to one of programmed auctions with greater standardisation and transparency of power purchase agreements offer significant potential for reducing costs. On the demand side, the ongoing effort to update regulated tariffs (most of which are set below EDM's average purchase price) towards cost-reflectivity will enhance the financial sustainability of the sector.

While the 2022 Electricity Law opened the door for private participation along the power sector value chain, including the possibility for new off-takers, such as large industrial and commercial consumers, to purchase power directly from independent power producers, market access regulations have yet to define clear rules for third-party power purchase agreements. Along with forex and fiscal challenges, this creates an off-taker risk for potential private investors in new generation capacity.

Steps taken to strengthen EDM's finances, starting with the management of arrears, reduction of non-technical losses and the enhancement of contract negotiation skills, are improving the credibility of the utility *vis-à-vis* potential financial and investment partners.

The ongoing project to establish a national dispatch centre is another positive development and should enable efficient system operations based on least-cost principles. To date, least-cost dispatch has been limited by the lack of capacity on the grid, which is characterised by ageing equipment in need of modernisation.

Mozambique's central-northern grid exports most of its power to South Africa, while the southern grid imports a significant amount of power from that country. Connecting much of Mozambique's existing and planned hydropower resources with its major demand centres in the south – and thereby also potentially lowering EDM's cost of power – is complicated by the lack of interconnection between the country's two main grids. Moreover, there appear to be delays in the Backbone transmission project to join them.

Mozambique's generation resources can help decarbonise the Southern African Power Pool, which is currently dominated by coal-fired plants in South Africa. However, as the Energy Transition Strategy rightly points out, Mozambique will

need to balance opportunities for exports with opportunities to harness its hydropower resources to bring down the domestic cost of power and promote universal access and green industrialisation.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Improve capacity for power system modelling to inform planning scenarios and improve the integration of generation assets (including thermal, hydropower, solar PV, wind) and exports.
- Expand and modernise the transmission and distribution networks to enable least-cost dispatch. Plans for the optimised use of existing and future power capacity should include integrated cost-benefit analyses on various interconnection scenarios for the southern and central-northern power systems and build on an updated electricity master plan.
- Update the tariff structure to gradually improve cost-reflectivity while embedding incentives for energy efficiency, based on a transparent and dynamic formula that takes key cost drivers into account and protects vulnerable customers.
- Review the market regulations, grid code and licensing procedures to ensure consistency with the new Electricity Law; provide certainty to IPPs, investors and off-takers regarding market access; and standards for operations, equipment quality and quality of service.

4. Renewable energy

Overview

Mozambique has abundant hydropower resources and substantial solar and wind power potential, though only a fraction of these resources has been developed.

In 2022, around 84% of the electricity generating capacity was based on renewable energy. Most of the capacity comes from hydropower, with only less than 1% of capacity coming either from solar PV or biofuels. The government plans to significantly increase both hydro and variable renewable capacity, notably with the country's future first utility-scale wind farm, Namaacha power plant.

The ETE seeks to leverage renewables to achieve universal access to modern energy in rural areas, attract export industries for which the use of renewable power could be a competitive advantage in their export markets, and contribute to decarbonising the SAPP. The government is also considering a mandate for blending imported transport fuels with domestically produced biofuels.

Institutional framework

MIREME is the main government body responsible for developing policy related to energy, including renewables.

ARENE regulates both on-grid and off-grid power supply, including from renewable sources.

FUNAE is responsible for off-grid electrification, with a focus on renewable energy in rural areas.

EDM is the state-owned, vertically integrated electricity company. It operates several hydropower and solar PV plants and has signed PPAs with a number of renewable energy IPPs.

Box 4.1 AMER/ALER

The Mozambican Association of Renewable Energies (*Associação Moçambicana de Energias Renováveis*, AMER) is a non-profit organisation whose mission is to promote renewable energy in Mozambique. It represents the interests of its private sector members, "acting as the common voice of the renewable energy sector in the

country". AMER is supported by the Lusophone Renewable Energy Association (*Associação Lusófona de Energias Renováveis*, ALER), whose mission is to promote renewable energies in Portuguese-speaking African countries. Among other activities, ALER and AMER jointly publish an annual overview of renewable energy in Mozambique.

Key policies and strategies

Renewable Energy Policy and Strategy

The New and Renewable Energy Development Policy (*Política de Desenvolvimento de Energias Novas e Renováveis*) was the first policy aimed at developing renewable energy. Approved in 2009, it targeted the delivery of new renewable technology at affordable prices, with the creation of a competitive market to stimulate employment and income.

This Policy was supplemented in 2011 by the Strategy for the Development of New and Renewable Energies (*Estratégia de Desenvolvimento de Energias Novas e Renováveis*, EDENR) for the 2011-15 period. The EDENR's three strategic objectives are to improve access to high-quality energy services based on renewables, develop technology to use and convert renewable energy sources, and promote and accelerate public and private investment in renewable resources.

The EDENR describes 44 actions to fulfil its 3 strategic objectives by 2025. Targets for actions under Objective 1 include installing systems for various public services based on renewable energy, promoting the creation of new enterprises that productively harness renewable energy for income-generating purposes and reducing the use of woody biomass. Targets under Objective 2 include mapping the country's renewable energy resources and establishing factories to produce key renewable technologies. Targets for Objective 3 include the development of licensing procedures, technical standards, tariff regimes, credit mechanisms and tax incentives to promote private investment in renewables.

Although many of the EDENR's targets remain unfulfilled, notable successes include the creation of a Renewable Energy Atlas in 2014, the installation of lighting and other applications for public services based on renewable energy in many off-grid regional centres, the construction of a factory to produce solar panels, the creation of a tariff regime, tax incentives, some technical standards, and the establishment of several programmes in co-operation with development partners to promote private investment in the sector.

Energy Transition Strategy (renewable energy aspects)

In December 2023, the government launched its Energy Transition Strategy, whose Vision is to "leverage Mozambique's abundant renewable and natural resources in order to accelerate the implementation of a low-carbon economic development path." At least 5 of the ETE's 14 programmes focus on renewable energy.

Programme 1 concerns large hydropower development, while Programme 2 aims to increase the capacity of the national grid to accommodate a 15-20% share of variable renewables by 2030. Programme 3 seeks to construct 1-2 GW of grid-connected solar and 200-500 MW of grid-connected wind capacity by 2030, with an additional 5.5 GW of solar and 2 GW of wind by 2050, noting that such additions should be based on the principles of competition as introduced by the country's PROLER auction programme (see below).

The ETE also calls for the development of "green industrial corridors" based on renewable energy (Programme 5); universal access to modern energy in off-grid areas, based primarily on solar-powered mini-grids (Programme 11); and clean cooking solutions (Programme 12). It also seeks to promote "green transportation" with a focus on electric vehicles (Programme 13) and biofuels (Programme 14). Recognising the potential role of hydrogen as a way to store and transport renewable energy, Programme 9 aims to position the country as one of the first and leading hydrogen producers in southern Africa by 2030 (see Box 4.3).

Key legislation

Decree No. 58/2014 establishes the tariff regime for new and renewable energy. It also provides several tax incentives for renewables, including exemptions for certain equipment from customs duties and value-added tax (VAT), as well as temporary income tax reductions for renewable energy projects. Decree No. 93/2021 approves regulations on access to electricity in off-grid areas, with a focus on mini-grids up to 10 MW, while the Renewable Energy Code (approved in April 2023) sets the technical rules and procedures for connecting renewable energy plants to the grid.

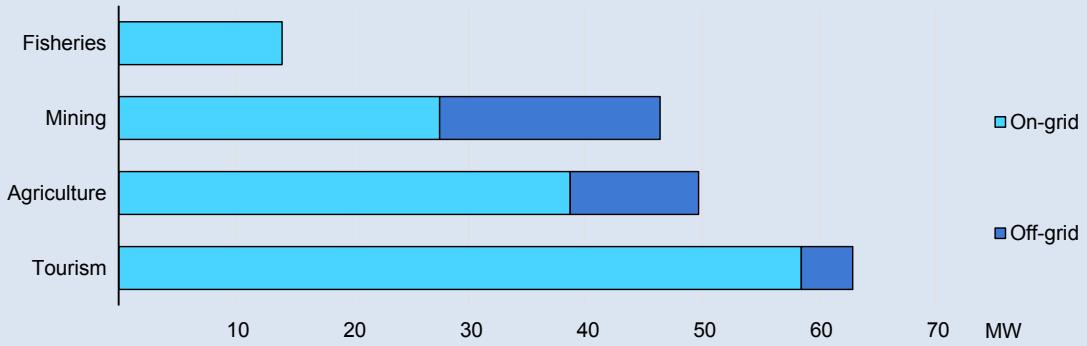
The 2022 Electricity Law (No. 12/2022) replaces the 1997 version. The update is motivated by changing circumstances, including the government's goals to achieve universal access by 2030, become a significant exporter of clean energy to the SAPP and integrate increasing amounts of variable renewable energy on the grid. It introduces the new role of national electricity system manager, as well as a National Dispatch Centre to better manage the grid's increasing complexity. Article 14 of the new law introduces the possibility of auto-production and sales to

third parties for both on- and off-grid renewable energy suppliers, although the requisite supporting legislation for grid-based third-party sales has yet to be developed.

Box 4.2 Market potential for solar self-generation

According to a study by GET.Invest, the total market potential for self-generation of electricity by independent operators (captive power or commercial and industrial activities, including sales to third parties) is 173 MW, of which 138.7 MW would be on grid. The largest on-grid potential market would be tourism (58.5 MW), followed by agriculture (38.7 MW), mining (27.5 MW) and fisheries (14 MW). The same study estimates the off-grid market for self-generation to be significantly smaller at 34.3 MW. The biggest off-grid potential is likely to be in the mining sector (18.9 MW), followed by agriculture (11 MW) and tourism (4.4 MW).

Figure 4.1 Market potential for solar self-generation of electricity by sector in Mozambique, 2023



Source: IEA analysis based on ALER/AMER (2023), Renewables in Mozambique.

Renewable energy resources

In 2014, FUNAE published the Renewable Energy Atlas of Mozambique. Based on analysis of existing data and new measurement campaigns, the Atlas indicates a renewable energy potential of more than 23 TW, of which it notes about 7 GW (covering over 500 potential projects) are suitable for consideration in the context of future network expansion. Most of the prioritised potential is hydropower, although the Atlas also identifies significant solar and wind resources, as well as biomass and geothermal potential. The following sections draw from information from the Atlas and other sources.

Hydro

Mozambique's hydropower potential is estimated to be 18.6 GW, at least 5.6 GW of which is considered economically and technically feasible, making such resources among the largest in southern Africa. Over 80% of this potential is in the Zambezi Valley, where most of the country's largest existing hydropower plants are located, including the 2 075-MW HCB. Although hydropower accounts for around three-quarters of Mozambique's existing grid-connected capacity, less than 2.2 GW of the country's potential has been developed. By 2030, hydropower generating capacity could more than double to 4.5 GW, mainly due to the addition of planned projects such as Mphanda Nkuwa (1 500 MW, expected in 2031), Lupata (600 MW), Boroma (200 MW) and Tsate (50 MW). Additionally, two mini hydroelectric plants in Lichinga and Cuamba, Niassa province, will be rehabilitated and modernised with funding from the German Development Bank (KfW), increasing production from the current 3 000 MWh to 3 900 MWh. However, Mozambique's vulnerability to climate change is likely to affect the hydropower energy production available, due to increased variability in precipitation that can reduce surface water and river flows.

Solar

Mozambique has a relatively high amount of solar radiation even for the southern African region, particularly in the provinces of Tete, Niassa, Nampula and Cabo Delgado. The country has a solar irradiation level of 2 100 kWh/m²/year. There is a potential of about 2.7 GW in the vicinity of existing substations and thus theoretically currently available for grid-connected projects. By the end of 2023, there were three grid-connected solar PV plants for a total of 75 MW, representing 2.5% of the country's total generating capacity.

Constraints in the transmission system, particularly in the north, are currently keeping most solar projects below 40 MW, thereby missing some opportunities for economies of scale and lower costs that might come from larger projects. A major exception could be the Matambo solar PV station, whose feasibility is currently being studied by HCB together with the World Bank Group's International Finance Corporation (IFC). Current plans call for Matambo to have a capacity up to 400 MW. (For information on off-grid solar, see Chapter 2.)

Wind

Mozambique has an estimated wind power potential of at least 4.5 GW. The coastal regions of Maputo and Gaza provinces reportedly have some of the highest wind speeds in the country (above 7 m/s), while the potential of Sofala, Cabo Delgado, Zambézia, Inhambane and Tete provinces is also considered to be substantial.

By the end of 2024, there were not yet any grid-connected wind power plants, but the 120-MW Namaacha wind farm in Maputo province is expected to start construction in 2025 after significant delays, and a 50-MW project in Inhambane province is being planned for the PROLER auction programme.

Biofuels

In the 2000s, several studies underscored the biophysical potential of Mozambique, positioning it as one of the most promising African countries for biofuel production. Mozambique boasts 36 million hectares of arable land, with only a small portion currently under cultivation. Its tropical climate supports the growth of various biofuel sources, including sugarcane and cassava for bioethanol production, and oilseeds such as soybeans and sunflower for biodiesel. However, a recent IFC study submitted to the government in the end of 2024, found that "current regulations are perceived as restrictive for companies looking to expand beyond the local market" and recommended clearer pricing mechanisms, standards and sectoral incentives.

Based on a study produced in 2008, Mozambique developed a Biofuels Strategy (approved by Cabinet Resolution No. 22/2009), which called for blending all imported oil-based fuels with local biofuels by 2012. Although these plans were subsequently abandoned, the government renewed its interest in biofuels in 2022 and included new blending goals as part of its Package to Promote Economic Growth (Pacote de Medidas de Aceleração Económica, PAE). Among other things, the PAE aims to "make it mandatory to blend all imported fuels with domestically produced biofuel, with the aim to promote job creation and import substitution", though does not specify targets. To support this goal, Decree No. 61/2023 approved a new Biofuels Regulation in November 2023. Starting from August 2024, the regulation mandates the blending of biodiesel with diesel and anhydrous bioethanol with gasoline (excluding aviation gasoline and 97 octane gasoline). The ethanol blend will increase from 10% (2024-2027) to 15% (2028-2032) and 20% (from 2033), while the biodiesel blend will rise from 3% (2024-2027) to 7.5% (2028-2032) and 10% (from 2033).

The development of the biofuels market in the country will require a total investment of around USD 190 million, according to a feasibility study commissioned by the Ministry of Economy and Finance from consultancy firm Green Light. According to the study, the final cost of producing biodiesel will be approximately USD 1.09 per litre, while bioethanol could cost between USD 0.90 and USD 1.4 per litre, depending on the optimisation of the production processes.

In 2022, Eni and Mozambique initiated feasibility studies on agricultural feedstock production for biofuels, intended to serve as sustainable feedstock for Eni's biorefineries in Italy. By 2023, pilot production of vegetable oil started in Eni

Rovuma Basin, with the oil being extracted from by-products of local agro-processing factories. Eni plans to further develop the project by involving local farmers and creating an industrial platform to produce agricultural feedstock in the country.

In June 2024, the office of the PAE signed a MoU with the Brazilian Union of Biodiesel and Biojet fuel (Ubrabio) for the joint development of biofuels.

Box 4.3 Low-emission hydrogen

Hydrogen is a clean-burning fuel found in nature but can also be produced using other energy sources. If it is produced using renewable energy, it effectively becomes a way to store and transport such energy. Hydrogen may be sent via pipeline as a gas, although this could weaken the pipeline material due to hydrogen embrittlement, or on special ships as a liquid, similarly to LNG. One company reportedly is planning to build a 12-GW solar-to-hydrogen plant in Mozambique that would be able to produce around 4 000 tonnes of hydrogen per year.

Programme 9 of the ETE seeks to position Mozambique "as one of the first and leading hydrogen producers in southern Africa by 2030". In 2024, the government planned to undertake an in-depth analysis of its potential resources as a first step in developing a comprehensive plan for hydrogen development. Among other things, the analysis would consider potential hydrogen markets, with the goal of exporting most of the eventual hydrogen production.

In an apparent separate development, the HyAfrica consortium is currently undertaking a three-year project to search for marketable deposits of natural hydrogen (so-called white hydrogen) in a number of African countries, including Mozambique. The project harnesses artificial intelligence to review existing subsurface databases. Jearrard Energy Resources is reportedly going to build a 12-GW solar-to-hydrogen plant, whose electrolysers will be able to produce around 4 000 tonnes of hydrogen per year.

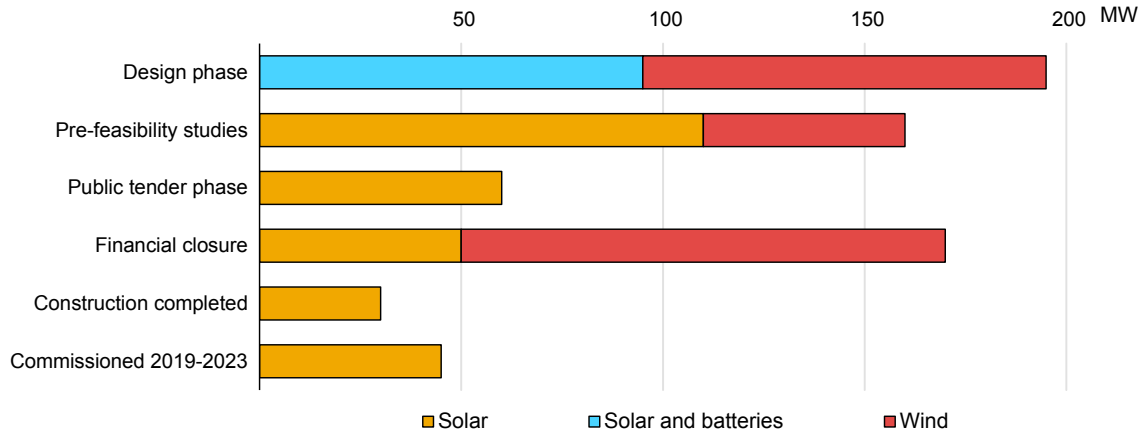
Renewables in the power sector

Renewables – mostly hydropower – already account for over 50% of Mozambique's available on-grid capacity, generating close to 84% of the country's electricity in 2022 (see Chapter 3). While variable renewable energy currently plays a small role in the national grid, off-grid solar PV has been successfully deployed to expand electricity access to rural and peri-urban populations (see Chapter 2).

According to AMER/ALER, a pipeline of IPP projects at various stages of development could add 690 MW of renewable on-grid capacity by 2030. These include solar PV (with and without battery storage) and wind power plants, ranging from 15 MW to 120 MW.

Some 11% (75 MW) of that potential is solar PV capacity that has already been constructed or commissioned (Figure 4.2). A further 26% (170 MW) is expected to come from renewable energy projects that reached financial closure in 2023 and 38% (260 MW) from additional projects with existing pre-feasibility studies. The remainder include projects developed through programmes such as PROLER and the Global Energy Transfer Feed-in Tariff (GET FiT) programme (see Feed-in tariffs), both currently ongoing.

Figure 4.2 Variable renewable independent power producer projects expected in Mozambique, by 2030



Source: IEA based on data from ALER/AMER (2023), Renewables in Mozambique.

Feed-in tariffs

EDM's Renewable Energy Feed-in Tariff programme, launched in 2014, offers long-term PPAs to small, grid-connected projects up to 10 MW based on guaranteed tariffs established by the regulator ARENE. Projects above 10 MW must either negotiate a tariff directly with EDM or participate in the PROLER auctions.

In 2023, there were 24 active programmes supporting renewable energy in Mozambique involving several development partners. Total funding of such projects was around EUR 312 million, approximately one-third of which was for grid-connected renewables and two-thirds for off-grid projects, including renewable cooking solutions. Two of the main programmes supporting the development of grid-connected renewable generating capacity are PROLER and

GET FiT. (For a discussion of off-grid programmes, including renewable energy-based mini-grids, see the Chapter 2.)

PROLER

PROLER organises auctions for the rights to develop specific grid-based renewable energy projects, each around 30-60 MW. Implemented by EDM, MIREME and ARENE, the programme is co-financed by the French Development Agency and the European Union.

The Initiative leverages feasibility studies that have been developed for the proposed projects and offers an optional financial package and set of guarantees for the winning bids. The transparent bidding process promotes competition among investors, with the goal of ensuring the lowest possible tariffs for consumers.

PROLER aims to add at least 150 MW of solar and wind power to the grid. The first auction was launched in September 2020 for the 40-MW Dondo solar PV plant in Sofala province, whose winner was announced in May 2022. However, the project has in the meantime been cancelled. In November 2022, two additional auctions were held for two 40-MW solar plants in Lichinga (Niassa province) and Manje (Tete province). An auction for a 40-50 MW wind farm in Inhambane province is expected in 2025.

GET FiT

The GET FiT Mozambique programme is aimed at small-scale projects (up to 15 MW), both on- and off-grid. GET FiT is implemented by MIREME with the assistance of Germany's KfW Development Bank. It provides advice to EDM regarding the grid integration of small-scale renewable systems, the development of standardised transaction documents for project developers and the procurement of small-scale renewable IPP projects through reverse auctions.

The first round of tenders, launched in 2024, aims to procure 25-30 MW of grid-connected solar capacity with battery storage. Each project will be 4-15 MW and obtain the right to sign a standardised PPA with EDM. Projects will be selected through a two-stage reverse auction process. After a pre-qualification stage, prospective developers will be invited to submit a business plan and financial offer, which will include a proposed tariff to supplement the existing feed-in tariff.

Another GET FiT programme will work with FUNAE to develop around 3 MW of renewable energy-powered mini-grids in rural areas, with each grid expected to be around 200-500 kW.

Mozambique Renewable Energy Integration Programme

As the amount of on-grid variable renewable energy increases, Mozambique's system will require a higher degree of control to maintain grid stability. The African Development Bank's Sustainable Energy Fund for Africa supports training to help EDM staff operate the new National Control Centre and fulfil the utility's new market-operator role. The Mozambique Renewable Energy Integration Programme provides training to complement a related project funded by the Sustainable Energy Fund for Africa, Mozambique Energy for All, which is building the Control Centre. Additional components of the Mozambique Renewable Energy Integration Programme are aimed at developing a pipeline of solar PV projects with battery storage, as well as floating PV systems that could be located on the reservoirs of selected hydropower stations, with which they would be integrated.

Assessment

Until recently, expansion of on-grid solar PV and wind power mostly entailed developers applying to MIREME for unsolicited projects. In the past few years, with the support of international partners, the government has started procuring new capacity through competitive auctions, such as those under the PROLER programme. This has helped reduce costs for individual project developers, as well as the resulting tariffs paid by EDM. However, these auctions have yet to lead to the large-scale commissioning of new renewable capacity, while the number of planned auctions has been limited. Updating the 2014 Renewable Energy Atlas could help expand the number of prospective sites for renewable energy development, including for future auctions.

The 2022 Electricity Law introduced the possibility of auto-consumption, though so far potential project developers are not able to sell surplus energy to the grid. The regulator is currently carrying out preliminary feasibility studies for behind-the-meter, grid-connected renewables, including electricity generation for self-consumption.

Given the long lifespan of hydroelectric assets, their susceptibility to climate change and current plans to expand Mozambique's already substantial hydropower capacity, comprehensive studies are needed to assess existing and planned infrastructure and options, notably considering such factors as climate resilience and multiple water uses.

The ETE foresees a role for biofuels with blending targets and the government is in discussions with industry to enable the implementation of this mandate as soon as practicable. There is also an important potential for the use of biogas in rural areas for clean cooking and the use of crop residues (e.g. from cashews) to generate power. Considering the massive availability of low-cost raw materials

and their ability to help improve the quality of life of lower income households, modern bioenergy could play a significant role in Mozambique's energy future, offering benefits such as waste utilisation, emissions reduction, health improvement and support for family farming while reducing reliance on traditional fuels such as charcoal and firewood.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Prioritise procurement of new generation via auctions and the standardisation of processes and contract terms to reduce the cost of power purchased by EDM. This will require adequate staffing and other resources to process proposals.
- Update the 2014 Renewable Energy Atlas to help more potential developers identify the most prospective project sites, including those that can be offered through auctions.
- Conduct a holistic assessment of hydropower assets, including power system interactions, hydrological implications, adaptation requirements in response to climate change and compatibility with other water uses such as irrigation.
- Support the development of modern bioenergy, notably by updating the biomass strategy and creating implementation mechanisms to develop biomass, biofuels and biogas.

5. Natural gas

Overview

Mozambique's gas resources are among the largest in Africa. The government has approved three LNG export projects, all of which lie in the Rovuma Basin, offshore the northern province of Cabo Delgado. The Coral South LNG project began exporting from a floating production and liquefaction platform in late 2022. As of mid-2025, the Mozambique LNG project, which started construction in 2019, remains on hold, after declaring *force majeure* in 2021 following armed attacks near the site of its planned onshore liquefaction infrastructure. The Rovuma LNG project has yet to take a final investment decision.

The onshore Pande and Temane fields, which lie in the south of the country, have been producing since the 2000s. Approximately 80% of their output is exported via pipeline to South Africa. Most of the rest is consumed domestically for power generation.

Institutional framework

The National Directorate of Hydrocarbons and Fuels within MIREME has overall responsibility for policy making in the petroleum sub-sector, which includes natural gas and LNG

INP is the upstream regulator created in 2004 to regulate, administer and promote petroleum operations. Its tasks include regulating and inspecting petroleum exploration activities, production and transport; conducting petroleum resource assessments; maintaining a national database of geological and geophysical information and studies; and licensing and monitoring petroleum operations.

The National Company of Hydrocarbons (ENH) is the state-owned oil and gas company holding the state's share in all petroleum exploration and production projects in the country. It has several subsidiaries, including Companhia Moçambicana de Hidrocarbonetos/CMH for production, ENH KOGAS and CMG for gas transmission and distribution, ENH Logistics, and several trading companies. ENH's main operations are currently downstream, though the company has ambitions to become an upstream operator as well.

Key policies and strategies

Energy Transition Strategy (the role of gas)

Chapter 1 provided an overview of Mozambique's ETE. This section summarises the ETE's main points for the gas sector, which features in 3 of the ETE's 14 programmes. One of the ETE's strategic objectives is to provide gas to both the national and international markets, viewing this fuel as an important source of financing for Mozambique's social and economic development.

Programme 6, Domestic gas development, calls for prioritising the use of natural gas as a "transitional energy source to replace coal, diesel and other fuels", though notes that renewable energy should be used instead of gas "whenever feasible and economically reasonable". It raises the possibility of building re-gasification facilities to transport gas from production areas in the north to expected consumption centres in the south as an alternative to domestic pipelines. Programme 6 highlights the role of gas in electricity production and industry.

Programme 7, Gradual reduction of dependence on coal, emphasises the role of gas in diversifying the country's exports, which are currently dominated by coal and aluminium.

Programme 4, Decarbonisation of emissions from the natural gas sector, aims to use clean energy sources rather than gas-to-power extraction and liquefaction activities for new LNG projects.

Natural Gas Master Plan

The Natural Gas Master Plan, adopted by the Cabinet Council in June 2014, is the long-term strategy that still guides the development of Mozambique's gas industry. The goal of the Master Plan is to ensure that the rationale and sustainable use of gas contributes to the country's socio-economic development while at the same time preserving the environment and ensuring sufficient resources for future generations. The Master Plan focuses on three main themes: 1) economic and institutional issues, including ensuring the availability of gas for the domestic market to facilitate industrialisation; 2) financing and tax issues, including the improvement of the legal framework for investors; and 3) environmental and social development issues, including training and capacity building for the domestic workforce.

Legislation

Important petroleum-related legislation includes the Petroleum Law (Law No. 21/2014), the Decree governing petroleum operations

(Decree No. 34/2015), and a law establishing the Specific Regime of Taxation and Tax Benefits for Petroleum Operations (Law No. 27/2014). Decree No. 56/2010 approves the Environmental Regulations for Petroleum Operations while Decree No. 44/2005 regulates the Distribution and Commercialisation of Natural Gas.

Mozambique developed a template Exploration and Production Concession Contract (EPCC) in 2016, which has been approved by MIREME and is available for use by INP. In addition, copies of all signed exploration and production contracts are also available on INP's website.

In August 2021, the Mozambiquan Council of Ministers approved the Strategy of Concession Areas for Exploration and Production of Hydrocarbons, which provides the basis for ensuring "continuous and systematic exploration" of hydrocarbons and promoting national and foreign investment in the sector.

Sovereign Wealth Fund

Revenues from natural resources can help a country develop, provided they are managed prudently and invested in ways that increase human and physical capital. History shows that countries face many challenges managing such revenues. Mismanagement of natural resource wealth can trigger symptoms associated with the so-called "resource curse", including substantial macroeconomic distortions, such as currency appreciation that undermines export competitiveness, as well as weakened democratic institutions and, in extreme cases, political violence or civil conflict. To increase the likelihood that Mozambique's oil and gas resources lead to development, the government established the Mozambique Sovereign Wealth Fund (*Fundo Soberano de Moçambique*, FSM) in 2024. The FSM has the twin goals of stabilising the state budget against volatility in petroleum revenues and ensuring the benefits of oil and gas resources for future generations.

The National Assembly established the FSM through Law No. 1/2024, informed by a careful study of similar funds in other countries, including those of Ghana, Norway, Botswana and Tanzania, as well as the Santiago Principles.[3] Norway provided assistance in drafting the law and related regulations, which seek to ensure transparency, accountability and prudent risk management for the FSM.

Government projections indicate that state income from gas projects could reach USD 95.7 billion in a scenario where all three major LNG projects are developed. While the government could begin seeing significant revenues from gas projects from 2028, the IMF notes that annual revenues are not likely to exceed

[3] The Santiago Principles are a set of 24 generally accepted principles and practices developed in 2008 and voluntarily endorsed by members of the International Forum of Sovereign Wealth Funds.

USD 1 billion until the 2030s, after project developers have recovered their investment costs and begin paying income tax. Law 1/2024 aims to accumulate savings for future generations and to stabilise the state budget in cases of oil and gas revenues fluctuation.

Box 5.1 Law No. 1/2024 on the Mozambique Sovereign Wealth Fund

Law No. 1/2024 creates a Transitional Account within the government's Single Treasury Account in the Bank of Mozambique that will receive the state's oil- and gas-related revenues. It is the Bank's responsibility to divide this revenue between the budget and the FSM, based on medium-term budget projections, and to publish monthly reports on all amounts transferred into and out of the account. For the first 15 years (i.e. through 2039), 60% of oil- and gas-related income is to go to the budget and 40% to the FSM, with a 50/50 split thereafter. The Law applies to revenues from LNG projects in offshore Areas 1 and 4 (South Coral LNG, Rovuma LNG and Mozambique LNG), as well as all future oil and gas projects. Types of income destined for the FSM include revenue from the petroleum production tax, corporate income tax, production bonuses, production sharing and returns on investments made by the FSM.

Law 1/2024 also appoints the Bank of Mozambique as the operational manager of the FSM and requires it to provide quarterly investment reports. The Ministry of Finance selects an auditor via public tender and publishes the FSM's audited financial statements. The government is responsible for appointing a seven-member Advisory Board of financial experts to advise the FSM managers and monitor the Fund's performance, while the parliament must appoint a Supervisory Committee made up of members from civil society to monitor FSM operations.

Exploration

Onshore exploration in Mozambique began in 1948. A number of oil and gas companies, including Gulf Oil, Amoco and Hunt Oil, conducted seismic and other studies prior to independence. Three large gas fields were discovered in the 1960s: Pande in 1961, Buzi in 1962 and Temane in 1967. Exploration activities were halted during the early years of the civil war that followed independence, but resumed in 1981, the same year the state-owned oil and gas company ENH was formed.

The first licensing round for exploration and production concessions concerned the Rovuma onshore area in 1984. INP organised additional licensing rounds in 2000, 2005, 2009, and 2011. The sixth and most recent round was held in

November 2021, and led to six concessions being awarded in 2022, for which most contracts had been signed by mid-2024.

The main exploration areas are currently offshore in the Mozambique basin in the south and the Rovuma Basin in the north, two of the most prospective gas exploration areas on the continent.

Table 5.1 Selected areas currently under exploration or development in Mozambique

Site, location	Operator and partners	Year	Remarks
Area 1, Rovuma Basin	TotalEnergies (operator) 26.5%, Mitsui 20%, ENH 15%, Bharat Petroleum 10%, ONGC 10%, Oil India 10%, PTT 8.5%	EPCC signed 2006 (2nd offshore licensing round)	The Mozambique LNG project reached a final investment decision and started construction in 2019 but has been suspended since 2021 due to *force majeure*.
Area 4, Rovuma Basin	Mozambique Rovuma Venture (operator) 70%, ENH 10%, Kogas 10%, ADNOC 10%. (MRV is owned 35.7% by Eni, 35.7% by ExxonMobil, and 28.6% by CNPC)	EPCC signed 2006 (2nd offshore licensing round)	The Coral South FLNG project, operated by Eni, began producing and exporting in November 2022. The Rovuma LNG project, also based in Area 4, entered the front-end engineering design (FEED) phase of the project in 2024, but FID has been postponed to 2026.
Pande and Temane Petroleum Production Agreement (PPA), Mozambique Basin	Sasol Petroleum Temane (operator) 70%, CMH 25%, IFC 5%	PPA signed 2000	Began producing gas 2004. 80% of gas exported by pipeline to South Africa. Also supplies some Mozambican customers, including several gas-fired power plants.

Site, location	Operator and partners	Year	Remarks
Pande and Temane Production Sharing Agreement (PSA), Mozambique Basin	Sasol Petroleum Mozambique 100%	PSA signed 2000	Overlaps geographically with PPA area, with some exceptions. Planning to supply gas to Temane power plant.

Notes: EPCC = Exploration and Production Concession Contract, PPA = Petroleum Production Agreement.
Source: IEA based on data from INP (2025), Projects (accessed 26 May 2025).

Resources

Mozambique's hydrocarbon resources are among the largest in Africa, and mainly in the form of natural gas. Estimated discovered gas resources are around 5 097 bcm, of which 3 766 bcm are considered recoverable. Most of these resources lie in the offshore portion of the Rovuma Basin in the north of the country. The government also recently announced it has discovered natural gas off the coast of Inhambane in south-east Mozambique.

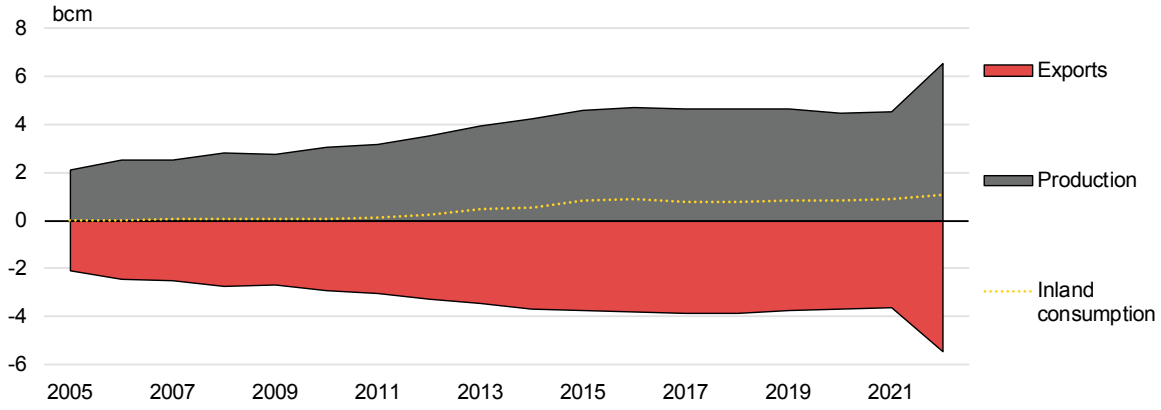
Production

In 2023, production of natural gas in Mozambique was 10.7 bcm, marking a significant growth from 2022 (+64%). Most of the production comes from the Pande and Temane site, which exports approximately 80% of its output to South Africa.

Since late 2022, the Coral South FLNG project has also been producing and exporting gas. Eni reported a production of around 1.3 bcm in 2023. The gas is processed at Coral South's floating production and liquefaction facility which handles treatment, liquefaction, storage and export, with a total capacity of 4.6 bcm of LNG per year.

Gas production could increase further in coming years, if the proposed Coral North FLNG project reaches final investment decision in the near future as planned by its operator.

Figure 5.1 Natural gas balance in Mozambique, 2005-2022



Source: IEA (2024), Natural Gas Information (accessed on 14 May 2025).

Major projects

There are currently six major gas development projects in Mozambique. The two Pande and Temane projects, Coral South and Coral North FLNGs, Mozambique LNG and Rovuma LNG. The Pande and Temane fields have been producing since the early 2000s, with most gas exported to South Africa and a smaller share used domestically. As reserves decline, new developments under the PSA aim to sustain supply for domestic power generation and LPG production. Offshore, Coral South became the country's first LNG export project in 2022, with Coral North expected to follow by 2028. Mozambique LNG and Rovuma LNG, both large-scale onshore projects, have faced delays due to security concerns but remain central to future export plans.

Pande and Temane

South Africa's Sasol began producing gas from the Temane onshore field in southern Mozambique in 2004, and since 2009 has also been producing from the nearby Pande onshore field, which is connected to the same central processing facility. Production takes place under the 2000 Pande & Temane Petroleum Production Agreement (PPA), currently owned 70% by Sasol subsidiary Sasol Petroleum Temane, 25% by ENH subsidiary CMH and 5% by the World Bank Group's IFC.

As of 2023, the two fields together had estimated remaining recoverable reserves of 36.8 bcm, with a production accounting for around 3.2 bcm that year. Due to the depletion of these reserves, Sasol is anticipating to cease supplying third parties by the end of June 2026. Some 80% of the gas is exported via an 865-km pipeline running to Secunda, South Africa. This pipeline, owned and operated by the Republic of Mozambique Pipeline Company (ROMPCO), also has five offtake

points in Mozambique to supply around 20% of the project's gas to the domestic market, notably for electricity generation, but also for vehicle transport and industry.

When Sasol signed the PPA, it also signed the Pande and Temane Production Sharing Agreement (PSA), whose project area overlaps geographically with that of the PPA, with the exception of several fields. The estimated reserves for discoveries made so far under the PSA are 28-42 bcm. In 2016, INP approved the field development plan for two of the PSA discovery areas: Pande/Corvo and Temane/Inhassoro. The gas from these developments is expected to supply the planned 450-MW Central Térmica de Temane gas-fired power plant. There are also plans to produce some 4 000 barrels per day of light oil for export and 30 000 tonnes per year of LPG for the local market.

Coral South and North FLNGs

The Coral South project is so far the only one of the four major LNG projects in Mozambique to have reached the production and export stage. Eni is the operator of the project, whose additional owners include the other partners in the Area 4 concession (see Table 5.1). The final investment decision for the project was taken in 2017.

The Coral reservoir, located in Mozambique's Rovuma Basin, on which the project is based, is estimated to contain about 500 bcm of natural gas. Drilling and completion of the project's six wells in the ultra-deep waters of the southern part of the basin took place between September 2019 and November 2021, with some interruption during 2020 due to the Covid-19 pandemic.

Construction of the Coral South FLNG platform began in South Korea in 2018. The platform was delivered to the offshore production site in Mozambique in January 2022, and the first LNG shipment took place in November 2022. The Coral Sul FLNG has the capacity to produce 4.6 bcm of LNG per year and is expected to produce 450 bcm of natural gas from the Coral reservoir. By August 2024, the project had produced a cumulative LNG volume of 6.9 bcm, which were exported across 70 shipments.

The fact that all production and liquefaction facilities are located offshore has made Coral South less subject to the security concerns that have impacted the country's two other LNG development projects.

The Coral South LNG partners are planning to install a second FLNG project, Coral North, to be installed 20 km north of its predecessor. The project has a planned production capacity of 4.6 bcm per year and is expected to start

operations in the second quarter of 2028, pending final investment decision. It will use six subsea wells from the Coral offshore reservoir located in Area 4 of the Rovuma Basin.

Mozambique LNG

The Mozambique LNG project is based on a large gas discovery made in 2010 in the Golfinho-Atum Discovery Area of Area 1. Estimated recoverable gas from the 23 associated production wells is 1 840 bcm. Current plans call for two onshore liquefaction trains with a total production capacity of 18 bcm of LNG per year.

The government approved the Mozambique LNG project for development in 2018. TotalEnergies acquired the project from Anadarko in 2019 and took a final investment decision for the USD 20 billion project that year. Following an increase in terrorist violence in Cabo Delgado province, however, including an attack in March 2021 on the town of Palma near the construction site of the project's onshore liquefaction facilities in Afungi, TotalEnergies declared *force majeure* and announced that it was suspending operations at the site indefinitely. Neverthless, TotalEnergies confirmed plans to restart the project by August 2025, notably following the approval of the Export-Import Bank of the United States board for a USD 4.7 billion loan.

Rovuma LNG

ExxonMobil is the operator of the second LNG project pursued by the partners of Area 4 (which also includes Coral South LNG). Eni is the operator for the relevant upstream operations, which include three deep offshore fields in the Mamba complex of Area 4. Confirmed gas resources for these fields are reportedly 2 400 bcm.

The government approved the original development plan for the USD 22 billion Rovuma project in 2019, but a final investment decision has been delayed due to the Covid-19 pandemic and subsequent security concerns at the onshore liquefaction site in Afungi.

The original plan for the Rovuma project called for two liquefaction trains, each capable of producing 7.6 Mt of LNG (around 10 bcm) per year. In early 2023, ExxonMobil and its partners announced they were now planning for 12 smaller 1.5-Mt trains for a greater total capacity of 18 Mt of LNG (approximately 25 bcm) per year. The Rovuma LNG project also plans to supply 17 000 tonnes of LPG per year to the local market.

Exports

Mozambique exported nearly 9.6 bcm of natural gas in 2023, showing a gradual significant increase compared to 2022 (5.5 bcm) and 2021 (3.7 bcm). All of the exported gas that year went to South Africa via the ROMPCO pipeline to Secunda and was sourced from the Pande and Temane PPA project.

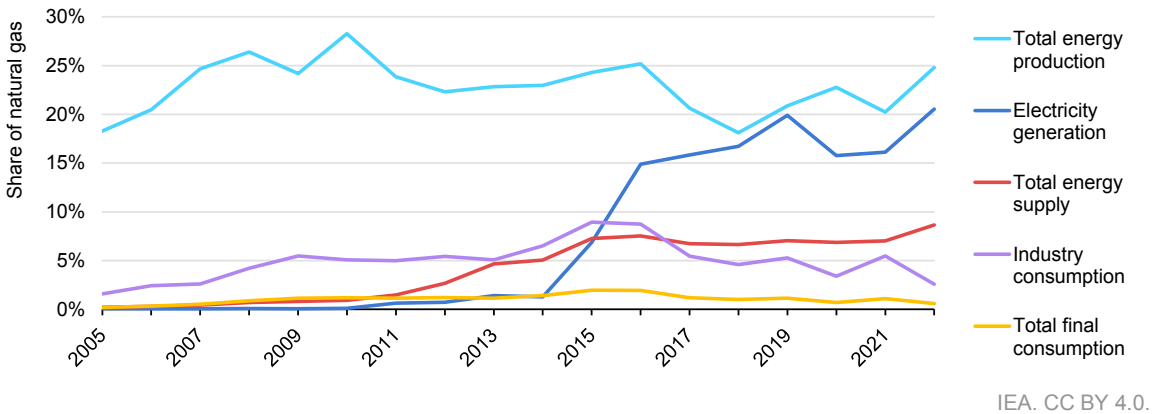
LNG exports from offshore Area 4 began in November 2022 from the Coral South project, helping increase Mozambique's total gas exports that year to 225.7 PJ (6.3 bcm). Coral South currently has the capacity to produce and export 3.4 Mt of LNG (about 4.6 bcm) per year, though this could double after the planned installation of a second FLNG in Area 4. Additional LNG exports will depend on investment and construction decisions yet to be taken by the two other main projects in the offshore Rovuma Basin.

Several investors are exploring the possibility of shipping some of the future LNG production from the Rovuma Basin in the north of the country to a re-gasification terminal, yet to be built, in the south. From there, some of re-gassified LNG could be exported to South Africa via the existing ROMPCO pipeline, in part to replace eventual declining production from the Pande and Temane fields.

Domestic gas market

Approximately 1.2 bcm of natural gas were supplied to the domestic market in 2023, up from about 1.1 bcm in 2022. As in previous years, all of the gas came from the Pande and Temane PPA project, delivered to the local market by ENH from several offtake points on the ROMPCO gas export pipeline that runs to Secunda, South Africa.

Figure 5.2 Share of natural gas in Mozambique's energy system, 2005-2022



Source: IEA (2024), Natural Gas Information (accessed on 14 May 2025).

According to Sasol, gas from the Pande and Temane PPA project, excluding the approximately 80% exported to South Africa, currently goes to several domestic customers, including three gas-fired power plants: Temaninho (11.2 MW), Ressano Garcia/CTRG (175 MW) and Kuvaninga (40 MW).

A handful of companies supports the domestic use of natural gas. ENH Kogas is implementing a project to build natural gas pipes to supply industrial, commercial and residential customers in Maputo and Marracuene provinces. ENH is responsible for supplying gas in the northern region of Inhambane province. The Matola Gas Company has built over 100 km of pipelines to supply natural gas to over 30 industrial customers in Matola, also delivering fuel to the 100-MW power station in Ressano Garcia and the 100-MW Maputo thermal power station. It supplies Autogas, a company selling compressed natural gas for use in vehicles.

Household use of natural gas remains small. Approximately 2 800 households are connected to a small gas distribution network in Inhambane province; another 350 are connected to a network in the city and municipality of Marracuene.

The most important future domestic customer of the Pande and Temane PSA project (distinct from the PPA project) is expected to be the 450-MW Central Térmica de Termane power plant, in which Sasol is an investor. This plant, currently being built in southern Mozambique, is anticipated to provide approximately 16% of the total electricity capacity and supply over 800 000 consumers.

The government allocates natural gas to the domestic market through auctions. However, there is apparently an exception for gas-fired power plants, which negotiate directly with ENH and pay a price that is "the lowest sufficient to recover the minimum cost of production and transportation to the generation sites".

A "Strategy for the Development of the Natural Gas Market in Mozambique" was approved by Cabinet Resolution No. 64/2009 of 2 November. Aimed at "maximising benefits for the country, reducing imports and preserving the environment", it lists priority domestic uses as gas-to-liquids, gas-to-power and fertiliser production. EDM's Strategy for 2018-2028 notes similar priorities, though replaces gas-to-liquids with use of gas as a fuel. The ETE calls for prioritising the use of natural gas, especially to replace more polluting fuels such as coal and diesel. However, it notes that renewables should be used instead of gas "whenever feasible and economically reasonable". The ETE highlights the role of gas in electricity production and industry, though states that the use of gas for electricity generation in industrial parks should be minimised, with priority given to renewable sources. It also discusses the construction of re-gasification facilities as a temporary solution for transporting gas internally from production areas in the north to expected consumption centres in the south.

Gas production projects approved prior to Mozambique's Petroleum Law (Law No. 21/2014) negotiate individually with ENH the amount of gas they must supply to the domestic market. New production projects will be required to supply at least 25% of their output to domestic users. This will be done on an aggregate basis, with ENH as the aggregator (implying that certain projects could supply more or less than 25%, e.g. swap arrangements).

Assessment

Significant economic development in Mozambique based on income from gas has yet to materialise, due largely to delays experienced by some of the major LNG projects. This is also due to the normal contractual structure of such projects, whereby upfront investment costs incurred by the developers are recovered before significant profit sharing can occur with the host country.

Most of the revenue for Mozambique from these projects is set to arrive in the mid-2030s at the earliest. Even if the Mozambique LNG project (which declared *force majeure* in 2021) was to resume construction in 2025, production from this project probably would not start before the end of the decade. Moreover, the need for enhanced security measures in Cabo Delgado could escalate costs, thereby diminishing potential revenue, while securing adequate financing for the project reportedly remains a challenge. Alongside government efforts to restore security in Cabo Delgado, actions taken by the government and the oil and gas companies to improve the social and economic infrastructure of the province could help ensure that gas developments benefit the local population, thereby reducing some of the underlying economic causes of the unrest that has been an important factor delaying investments.

Mozambique has plans to further develop domestic uses of natural gas. Currently, the main domestic use of gas is in power generation. LPG production, although relevant to support domestic access to clean cooking (see Chapter 2), may be limited by the leanness of the gas from the Rovuma Basin. A prospective new market for gas could be fertiliser production, which would have the further benefit of supporting the agricultural sector. Although international demand for LNG has increased in response to the Russian Federation's (hereafter, "Russia") invasion of Ukraine, supporting domestic uses for Mozambique's gas could also be important as a hedge against potential decreases in international demand, including in response to concerns about climate change.

In January 2024, the Mozambican parliament passed a law creating a Sovereign Wealth Fund that will support and regulate the future spending of revenues arising from the gas sector. Norway advised the government in the creation of the fund, which is based on best practices and aims to stabilise the state budget in the event of volatile oil and gas revenues and generate savings for future generations.

The IEA welcomes the establishment of Mozambique's Sovereign Wealth Fund and its related regulations and institutional arrangements, which can serve as important tools for managing Mozambique's natural-resource revenues and ensure that they contribute to the country's economic and social development. The amount and timing of resource revenues will depend crucially on the timing of the LNG export projects, which in turn will depend at least in part on the security situation in Cabo Delgado (where one of the projects declared *force majeure* in 2021 following terrorist attacks near its onshore facilities), as well as demand in the international LNG market, including the impact of evolving views on gas's role in the energy transition in importing countries.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Continue the dialogue with international gas developers to involve them in the social and economic development of local communities, including through implementation of the energy access components of the Energy Transition Strategy.
- Continue exploring opportunities to use natural gas resources domestically, including as a hedge against potential changes in international LNG markets.

6. Coal

Overview

Mozambique has one of the largest coal reserves in the world. Proven coal reserves are 38.4 billion tonnes, most of which are found in the Zambezi graben of Tete province in the western part of the country. Large-scale coal production began in the 2010s, with the majority of the coal being exported. This export activity has become the country's largest source of foreign exchange.

Institutional framework

The National Directorate of Geology and Mining within MIREME is responsible for policy making in the mining sector.

The National Institute of Mines was created in 2014 to regulate the mining sector, including all exploration, production and export activities.

Empresa Moçambicana de Exploração Mineira (Mozambican Mining Exploration Company, EMEM) was a state-owned company charged with developing mining projects in partnership with domestic and foreign firms. It was dissolved in 2021, after which the state's shares in mining projects (typically 5-10%) were transferred to the State Shares Management Agency (*Instituto de Gestão das Participações do Estado*, IGEPE), a general holding company operating across different sectors.

Legal and regulatory framework

The Mining Law of 2014 (Law No. 20/2014) is the main legislation governing the exploration and mining of coal and other minerals in Mozambique. It replaces Law No. 14/2002 of 26 June, although the older legislation still applies to mining concessions established prior to 2014. Article 8 of Law No. 20/2014 requires all mining contracts to be published.

Law No. 15/2017 of 28 December governs the specific tax regime for the mining industry, which is also subject to the general tax regime. It is accompanied by regulations on particular taxes and tax benefits contained in Decree No. 76/2022 of 30 December.

Ministerial Diploma No. 189/2006 of 14 December describes the basic environmental standards for mining operations, while Ministerial Diploma No. 118/2022 of 21 November regulates the assessment of

environmental impacts in the sector. Decree No. 61/2006 of 28 December approves the health and safety regulations for geological and mining activities.

Exploration and production

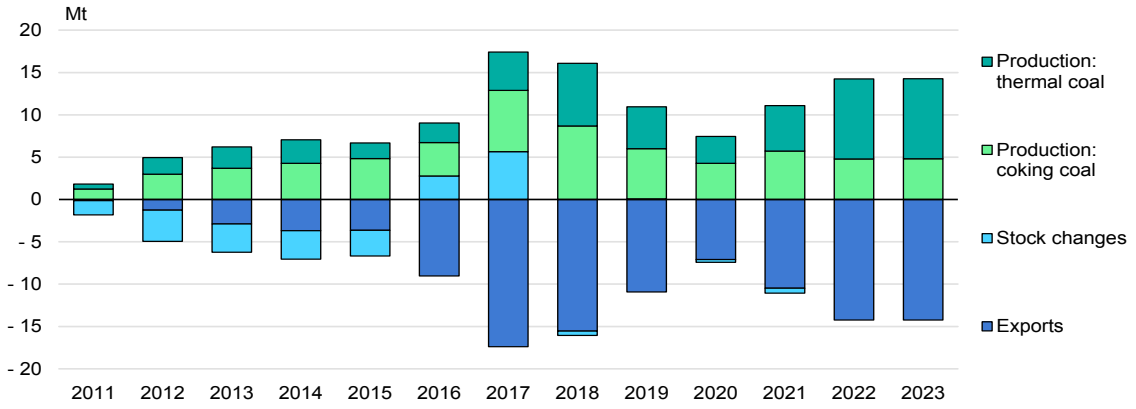
Despite records of coal deposits in Mozambique dating from the 19th century, large-scale exploration and production did not begin until the 2010s. Prior to this, the country produced only minor amounts of coal, in part because mining activity had been severely hampered by damage to important railway infrastructure during the civil war that followed independence. At the beginning of 2025, there were nine coal concessions, four of which were producing and exporting.

In 2003, the government asked the World Bank Group's IFC to help find a company to develop the Moatize coal mine in Tete province. The IFC compiled available data on the mine site and helped organise a tender. Ten mining companies submitted bids for pre-qualification, of which four were selected to submit full proposals. Brazil's Companhia Vale do Rio Doce (Vale) was declared the winner in 2004 with an offer that included rehabilitating a 1 600-km rail export corridor to the port of Nacala.

Vale started producing and exporting from the Moatize-1 mine in 2011. Three other large mining operations began production the following year: Benga, operated by Rio Tinto plc; Chirodzi, operated by Jindal Steel & Power Inc.; and Minas Moatize, operated by Beacon Hill Resources plc. These four mines, all located near the town of Tete, are still the main ones operating today, although two have changed ownership: International Coal Ventures Limited, a consortium of three Indian state-owned steel manufacturers and Tata Steel, purchased the Benga mine in 2014 from Rio Tinto, as well as a logistics firm operating the Beira rail export corridor. Vulcan, a private company that is part of India's Jindal Group (which already owned the Chirodzi mine), purchased the Moatize mine and Nacala logistics corridor from Vale in 2022.

In 2022, Mozambique produced 14.3 Mt of coal. This was nearly double the 7.4 Mt produced in 2020 (+93.2%), and more than twice the 6.7 Mt mined in 2015 (+113.4%). Some 36% of production in 2022 was coking coal (mainly used in steel production), and 64% was thermal coal (used in power generation). This was almost a reversal of the shares in 2015, when around three-quarters of Mozambique's production consisted of coking coal. Most operating mines in Mozambique produce both varieties.

Figure 6.1 Coal production, exports and stock changes in Mozambique, 2011-2023



Note: Stock changes are statistical differences, not physical stocks.
Source: IEA (2023), Coal Information (accessed 14 May 2025).

Exports

Mozambique exports almost all the coal it produces. Exports in 2024 were 16.6 Mt, up 55% from the 7.5 Mt that Mozambique exported in 2020[4]. Nearly 60% of Mozambique's exports in 2024 was thermal coal and 40% coking coal. In the recent years, the most important export markets for Mozambique's coal have been India, South Korea, Viet Nam and the People's Republic of China (hereafter, "China"). In 2024, Viet Nam had expressed its intention to increase the volume of coal imports from Mozambique to feed its industry.

In the recent past, port and rail infrastructure was a bottleneck to increasing coal exports, since the main mining region is far from the coast in the western part of the country. Today there are two main rail corridors for coal exports from the region around Tete, one to the Port of Beira and another to the port of Nacala. One branch of the 1 600-km Nacala logistics corridor passes through Malawi. The coal export capacity of the Nacala terminal, which opened in 2015, is reportedly 18 Mt per year, while the capacity of the Beira terminal, which opened in 2012 and receives coal via the 660-km Sena rail line, is 6.5 Mt per year. The bans and sanctions on Russian coal exports following the invasion of Ukraine, along with the surge in coal prices due to the ensuing energy crisis, have expanded export opportunities for Mozambique. However, the IEA foresees a 30% decrease in global coal demand to 2050 under the Stated Policies Scenario. Nevertheless, demand for coking coal, which accounts for Mozambique's main coal revenues, is expected to be more resilient than thermal coal, owing to more available technologies to replace thermal than coking.

[4] Source: IEA analysis based on McCloskey (2024), McCloskey Coal, Metals and Mining Service

The ETE, which de-emphasises the role of coal, nevertheless states that Mozambique will continue to export coal "as long as there is a global demand and a market".

Government revenues from coal mining

Coal has been Mozambique's largest export product in terms of value since 2018, when it surpassed aluminium. In 2022 it accounted for around one-third of the country's export earnings. However, coal contributed little to government revenues prior to 2015, due to favourable tax treatment for the mining companies. Law No. 20/2014 of 18 August introduced new tax arrangements which increased the sector's contribution from nearly zero to 4.8% of the state budget by 2017. Unlike the government's gas revenues, there are no plans to include coal revenues in the new Sovereign Wealth Fund.

Since 2015, Article 20 of Law No. 20/2014 of 18 August has required that 2.75% of government revenues from mining be transferred back to the local communities where mining takes place. Amendments to the Mining Law in 2022 raised this share to 10%. In response to concerns raised by the Extractive Industries Transparency Initiative and others regarding the lack of clarity on how these transfers are made, the government specified criteria for allocating this money in Decree No. 40/2023 of 7 July.

Domestic market

Domestic consumption of coal remains insignificant. According to MIREME, coal consumption in 2021 was only about 0.1% of production that year. All consumption was by industry, though coal represented only around 0.3% of that sector's energy use.

According to the ETE, the government expects the limited domestic coal consumption to further decline. The ETE calls for the "gradual and planned reduction of coal-fired self-generation in industries operating in industrial parks" and notes that the government will facilitate the development of solar PV solutions for remote industries such as mining that currently rely on coal-based self-generation. It also calls for the use of natural gas to replace coal "when it is the best option compared to clean sources".

Planned coal-fired power plants

Mozambique does not have any grid-connected coal-fired power plants. However, the 2018 Master Plan for the power system calls for 950 MW of coal-fired capacity to be built during the 2020s and 400 MW in the 2030s. Both the World Bank and African Development Bank have encouraged Mozambique to re-evaluate these

plans in the context of the country's climate commitments, as well as decreases in the relative cost of solar PV and wind power technologies. The World Bank Group notes that, based on modelling it has conducted, investments in coal-fired power in Mozambique would be economically less viable than a scenario featuring the rapid growth of hydropower, solar and gas.

The ETE notes that coal-fired plants would only be built under a business-as-usual scenario, recognising that the use of coal-fired electricity – including power imported from South Africa – could "represent a significant risk for Mozambican exports", such as aluminium, which would be penalised by the European Union's Carbon Border Adjustment Mechanism. The government is currently updating the 2018 Master Plan, and the new version is expected to de-emphasise coal-fired power compared to the current version.

Assessment

An important aim of the ETE is to leverage Mozambique's vast resources of clean energy to attract export-oriented investors looking for manufacturing locations that could reduce the carbon footprint of their products, e.g. energy-intensive industries that may be particularly subject to the European Union's Carbon Border Adjustment Mechanism. The ETE recognises that Mozambique's comparative advantage in this area would be undermined by adding coal-fired power to its mix. While Mozambique's goal to promote "green industrialisation" will need to be considered in parallel with energy security – of which fuel diversification is an important component – the country's abundant solar and gas resources offer less carbon-intensive complements to its current dependence on hydropower. Moreover, coal-fired power is not likely to be the least-cost option for increasing generating capacity.

Coal is Mozambique's largest export by value and provides much of the country's foreign exchange. The ETE notes that Mozambique will continue to export coal as long as there are markets for it. Most of the companies mining coal in Mozambique today are subsidiaries of foreign steel manufacturers, which are also typically their largest customers. Nevertheless, changes in relative costs, particularly for shipping, could make coal exports from Mozambique more expensive for the parent companies compared to their alternative sources of supply.

Even a temporary lack of competitiveness could have important negative consequences for Mozambique's mining communities if it results in halting production. Given expected increases in restrictions on coal in world markets, however, as well as a possible decline in availability of international finance for coal projects, Mozambique may need to phase-out its coal exports in the future. The experience of other coal-producing countries shows that it is useful to plan ahead, including by taking measures to promote environmental protection and

economic diversity in mining communities. Such plans could also involve the transfer of skills and other resources within the mining sector to take advantage of increasing demand for minerals that will be critical for the world's transition to clean energy, several of which are abundant in Mozambique. Addressing the economic and social challenges of reducing coal production can be more manageable if the country starts early and adopts a long-term approach.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Develop a national strategy to prepare for an eventual phase-out of coal production and exports.
- Work with international partners to manage the consequences of a phase-out, including the social and environmental impacts on mining communities.
- Continue plans to promote the country as a destination for manufacturers seeking a lower carbon footprint for their exported products in order to diversify the country's economy.

7. Downstream oil

Overview

Mozambique does not have any significant production of crude oil nor any refineries. All oil products consumed in the country (mainly in the transport sector) are imported, though the government is considering a mandate for blending imported petrol and diesel with domestically produced biofuels.

Several of the country's gas production projects are planning to produce LPG for the domestic market.

Institutional framework

The National Directorate of Hydrocarbons and Fuels within MIREME is responsible for policy making and planning for the energy sector in general, including for downstream oil.

ARENE regulates the downstream oil sector, including prices for all liquid and gaseous fuels sold on the domestic market.

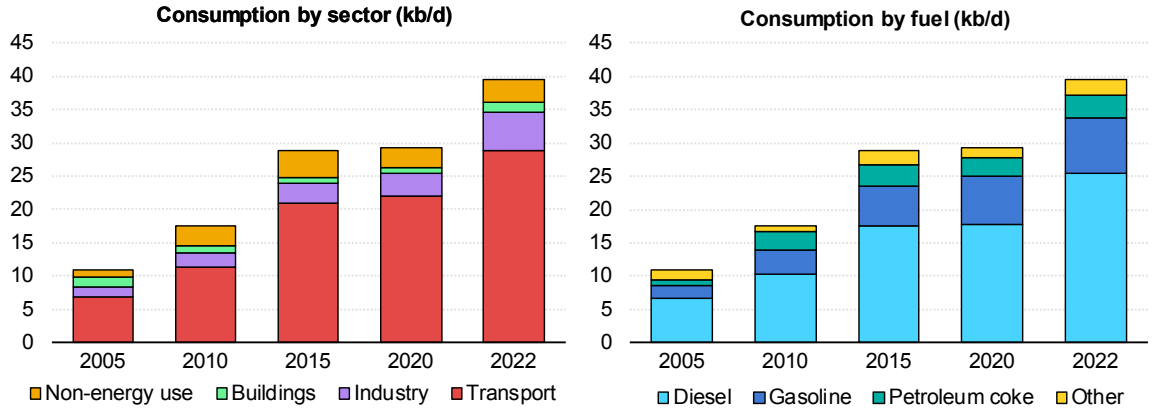
Mozambican Petroleum Importer (*Importadora Moçambicana de Petróleos*, IMOPETRO) is the exclusive agent responsible for importing fuels into Mozambique. It was created by Decree 1/97 and is owned by all fuel distributors authorised to operate in Mozambique. IMOPETRO is supervised by the Liquid Fuels Acquisition Commission (*Comissão de Aquisição de Combustíveis Líquidos*), whose members are appointed by MIREME and several other ministries.

Petromoc (*Petróleos de Moçambique*) is the state-owned distributor of petroleum products and the second-largest oil retailer in southern Africa. It operates over a quarter of Mozambique's service stations, as well as some 500 000 m^3 of storage for oil products.

Oil product demand

In 2022, Mozambique's consumption of oil products was dominated by transport (74%) (Figure 7.1). Demand for oil products has been growing in recent years and reached a record high of almost 40 thousand barrels per day (kb/d) in 2022. Most of the demand is for diesel (64%), followed by gasoline (21%).

Figure 7.1 Oil products consumption by sector and fuel in Mozambique, 2005-2022



Source: IEA (2024), Oil Information, (accessed 19 March 2025).

There are approximately 800 service stations in the country, dominated by 10 major retail networks. The largest is operated by state-owned Petromoc, with over 100 service stations. TotalEnergies now operates over 80 service stations after purchasing BP's 26 outlets in 2022. Approximately one-third of service stations are not part of branded networks.

While all LPG consumed in Mozambique is currently imported (44 kilotonnes [kt] in 2022), at least two gas development projects aim to produce LPG for the domestic market: 1) the Pande and Temane PSA project plans to supply 30 000 tonnes of LPG per year; 2) the Rovuma LNG project plans to supply 17 000 tonnes per year. However, LPG production potential may be limited by the leanness of the country's gas, particularly in the Rovuma Basin. (For more on LPG, see Chapters 2 and 5.)

Imports and re-exports

All oil products consumed in Mozambique are imported. IMOPETRO has exclusive rights to import fuels for domestic use and is jointly owned by all fuel distributors licensed to operate in the country (29 as of 1 June 2024). IMOPETRO is responsible for co-ordinating bulk purchases for its members, including the organisation of supply tenders and the mobilisation of foreign currency to pay for imports.

Although MIREME does not include transit volumes in its published statistics, data made available to the IEA by the Ministry of Transport and Communication on April 2024 showed that, for 2023, the volume of oil products imported for re-export to neighbouring countries was about more than double the amount consumed domestically. Most re-exported oil products went to Zambia and Zimbabwe and

were transported by road and pipeline. Article 43 of Decree 89/2019 states that the re-export of petroleum products may be authorised "after meeting the needs of the domestic market''.

The Port of Beira is Mozambique's largest hub for petroleum product imports and re-exports, handling over 3 Mt in 2023. Its strategic importance is underscored by its direct connection to Zimbabwe via a 294-km oil products pipeline linking the Port of Beira to Feruka, in Zimbabwe. The Companhia do Pipeline Moçambique Zimbabwe (CPMZ) pipeline is a public-private partnership between Mozambique and Sociedade Moçambicana de Investimentos, SA (SMI), which represents private investors. SMI has a small majority of shares in CPMZ and is responsible for its management. Beginning operations in 1965, the pipeline originally shipped crude oil to a refinery in Feruka, but was closed less than a year later in response to sanctions against the country then known as Rhodesia. After lying idle for over 15 years – during which time the Feruka refinery closed – the pipeline was reconditioned and re-opened as an oil products carrier in 1982. It was renovated between 2008 and 2014 and again between 2018 and 2024, when two new pumping stations increased capacity from 2 million cubic metres (mcm) to 3 mcm per year. There are plans to bring annual capacity to 5 mcm by adding two new pumping platforms, and CPMZ notes that capacity could be further increased by replacing the current 10-inch diameter pipe with a larger one. Zimbabwe is the pipeline's sole client, and there are currently no offtake points within Mozambique. The CPMZ pipeline supplies around 90% of Zimbabwe's oil products; the rest is imported by road. In 2021, CPMZ and the government of Zimbabwe signed a memorandum of understanding for the development of Harare, Zimbabwe, as a fuel distribution hub for the neighbouring land-locked markets of Botswana, Malawi and Zambia. Known as Project Cobalt, the plan includes connecting the CPMZ pipeline to another existing line that runs to Harare.

Other important ports related to the trade of oil products in Mozambique include the port of the capital city Maputo, located in the south west of Mozambique, which features an oil terminal as part of the Matola bulk terminals. Additionally, the Port of Nacala, located in northern Mozambique is becoming a significant hub for oil exports, notably serving Malawi, which imports fuel through this port. The Port of Pemba is also expected to have an increasing importance in the oil industry, as it recently became the fourth port to receive petroleum products imported for local consumption.

Fuel prices

Prior to 2016, Mozambique subsidised fuel prices. Although prices are no longer subsidised, they continue to be highly managed by the downstream regulator, ARENE, which sets maximum prices based on several components that are

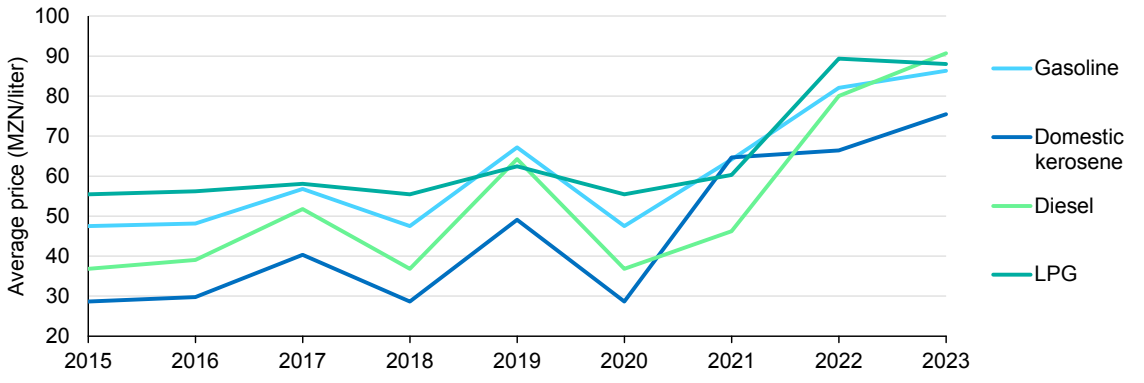
detailed in Chapter V of Decree 89/2019. These include the "base price" (Free on Board price plus insurance and port fees), a distributor's margin, transport costs and a retail margin.

The "base price" for each fuel is the average international market price of purchases made by IMOPETRO over the previous two months (or one month in the case of LPG). There is also a component in the price formula called "Correction of the base price", which considers, among other factors, the "impact of variations in international prices and exchange rates" (see formula in Article 74 of Decree 89/2019).

Until May 2023, the Bank of Mozambique supported fuel imports by making available half the foreign exchange required by IMOPETRO to pay its suppliers. While IMOPETRO still had to pay for this forex at the official rate, the arrangement reduced the risk that the importer would not be able to source enough forex from local banks. When the central bank announced in May 2023 that it would no longer prioritise forex for IMOPETRO, there was concern that it would be difficult to import all the oil products needed to meet the growing domestic demand. While IMOPETRO has noted some constraints in the fuel procurement process due to the withdrawal of the Bank of Mozambique's contribution to the provision of foreign currency, it has concluded that these "do not jeopardise the supply of oil products'' and that the local market "continues to show signs of resilience".

ARENE reviews and communicates fuel prices to distributors on a monthly basis. According to Article 75 of Decree 89/2019, ARENE is authorised to change retail prices as long the change is not greater than 20%, while changes greater than 20% may only be made by the Council of Ministers.

Figure 7.2 Fuel prices in Mozambique, 2015-2023



Note: 2024 data were not included, as only figures for January were currently available.
Source: ARENE (2024), Evolução de preços de produtos petrolíferos 2010 – 2024, (accessed 14 May 2025).

Oil product storage and supply security

According to Article 81 of Decree 89/2019, the ministry that oversees the energy sector (currently MIREME) is responsible for the security of supply of petroleum products. According to Article 78, all distributors must maintain a reserve for each petroleum product covered by the Decree (petrol, diesel, aviation fuel, domestic kerosene, LPG) amounting to at least 6% of annual sales (21.9 days), or 3% in the case of LPG. Such reserves are to be used "in accordance with crisis supply plans approved by the Council of Ministers on the proposal of the Minister who oversees the energy sector".

State-owned Petromoc owns and operates 19 oil product storage facilities throughout the country with a combined storage capacity of approximately 500 000 m^3, corresponding roughly to 100 days of total domestic consumption. This does not include private storage facilities, two of the largest of which are the IGBTL Beira Oil Storage Terminal (65 000 m^3), owned by Portugal's Galp Energia, and a Mozambican company; and the Matola Oil Product Storage Facility (58 000 m^3), owned by the Montfort Group.

Biofuels blending mandate

The Biofuels Strategy of 2008 called for the imposition of blending mandates for imported fuels. There was subsequently a plan for blending biofuels with petrol and diesel by 2012, although this was never implemented. The government renewed its interest in such a mandate in 2022, when it included goals for blending under its Package to Promote Economic Growth. Among other proposed measures, it undertook to "make it mandatory to blend all imported fuels with domestically produced biofuel, with the aim to promote job creation and import substitution".

A blending mandate would lower domestic oil consumption in the transport sector and reduce the country's dependence on imports. In June 2023, the government organised a consultation meeting to develop a "strategic roadmap" for biofuels production and blending, subsequently leading to the creation of a public-private working group on the issue. (See also the section on biofuels in Chapter 4.)

Assessment

Currently, all of Mozambique's petroleum products are imported, using a substantial share of the country's scarce foreign exchange while exposing it to risks related to international product prices and exchange rates. The government's plans to introduce a mandate for blending imported products with locally produced biofuels could help reduce some of these risks, while also potentially reducing net carbon emissions from fuel consumption in the transport sector.

Plans to produce LPG domestically to replace some of the LPG currently imported should also help reduce foreign exchange and price risks, though domestically produced LPG will not necessarily be cheaper.

The requirement for distributors to keep an amount of each product equivalent to nearly 22 days of domestic consumption in storage contributes to Mozambique's security of energy supply.

Recommendation

To reach its objectives, the government of Mozambique could consider the following action:

- Continue to pursue plans to introduce a mandate to blend domestically produced biofuels with imported petrol and diesel while ensuring that the biofuels are produced and sourced in a manner that does not increase net emissions.

8. Energy efficiency

Overview

Mozambique is at an early stage in its approach to energy efficiency. In 2023, the government adopted its first energy efficiency strategy (*Estratégia de Eficiência Energética*, EEE). This was intended to pave the way for an energy efficiency regulatory framework, with proposed measures for residential buildings, industry and transport. Mozambique's growing population and economy are expected to drive up energy demand in the coming years and decades. The new energy efficiency strategy presents an important opportunity for the government to avoid a lock-in of inefficient and high-emissions technologies.

Energy efficiency in Mozambique is inextricably linked with energy access. Most energy consumption – and a significant portion of GHG emissions – emanate from the buildings sector, which relies almost exclusively on bioenergy in the form of wood and charcoal (mainly for cooking), along with some domestic kerosene. Most energy consumption and related emissions occur in rural areas, where the level of access to electricity or gas networks is particularly low.

In this context, while measures such as minimum energy performance standards (MEPS) are one of the most effective energy efficiency measure, they have little impact on households without access to electricity. The picture is more nuanced for residential and commercial buildings in urban areas, where MEPS can have a pronounced effect on the energy efficiency of common equipment, such as that for cooling, ventilation, refrigeration and lighting. Performance standards are also essential for clean cookstoves to ensure they deliver meaningful health benefits and effectively reduce biomass consumption. On the electricity side, MEPS also help ease pressure on the grid and reduce the frequency of outages, as demand grows. Similarly, efforts can be made in the industry and transport sectors, where electricity and oil, respectively, are the main fuels, and where energy consumption and intensity have been increasing over the past few decades.

Institutional framework

MIREME is the main ministry responsible for energy efficiency in Mozambique. In 2023, an energy efficiency department, staffed by four officials, was established under MIREME's National Energy Directorate. This department led the development of the EEE (see below) and is tasked with its implementation. EDM and ARENE also have energy efficiency departments, though little information is available on their specific activities.

The government has considered the creation of a dedicated agency for energy efficiency, but the costs for its establishment were deemed prohibitive. Instead, the government has established a steering committee comprising MIREME, the Ministry of Environment, the Ministry of Industry, ARENE, FUNAE and EDM. The steering committee reportedly meets on a weekly basis to discuss further actions on the EEE and energy efficiency policy development.

Policy framework

There are currently no specific government policies, measures or programmes dedicated to energy efficiency in Mozambique, and no economy-wide or sector-specific energy efficiency targets have been set. Some energy efficiency initiatives have been carried out on an ad hoc basis by different public and private actors, including EDM, FUNAE, academic institutions and international partners. These include the collection of lamp sales data and testing of LED lamps by the National Institute of Standardisation and Quality (*Instituto Nacional de Normalizacao e Qualidade*, INNOQ), the country's standards body, to improve policy makers' understanding of energy consumption trends in the lighting sector. A handful of energy audits have also been carried out in industries, although recommendations contained in audit reports have only been implemented to a limited extent.

In 2023, the government signalled its intention to increase activity on energy efficiency by publishing a ten-year energy efficiency strategy (EEE), formally approved in Resolution No. 44/2023 and developed in collaboration with international partners. A headline objective of the strategy is to develop a regulatory framework for energy efficiency.

The EEE aims to support the achievement of SDG 7 (regarding universal access to electricity by 2030) while strengthening the investment climate for energy efficiency in Mozambique. For the period 2023-50, the Strategy estimates cumulative energy savings equivalent to more than double the TFC of all sectors in 2022 and cumulative cost savings of more than USD 22 billion.

The EEE defines 42 actions and 12 priority areas, notably including:

- connecting residential buildings to the electricity grid to cover the following key end uses: lighting, refrigeration, water heating, cooking and cooling
- deploying "super" energy-efficient residential off-grid technologies (lighting technologies, refrigerators, solar water heaters, cookers and fans) while driving cost reductions in solar and power storage technologies
- improving energy efficiency in non-residential technologies such as lighting, refrigeration, water heating, cooking, ventilation and air conditioning
- increasing industrial energy efficiency in key technologies, such as lighting, electric motors, variable speed drives, refrigeration and co-generation

- addressing high energy use and emissions in the transport sector through shifts to electric mobility for city buses, passenger cars, and two- and three-wheelers
- converting long-distance buses to natural gas and converting internal combustion engines to “flexfuel” engines to enable a mix of fossil and biofuels.

The EEE notes that energy efficiency could enable a number of broader objectives, such as freeing up capacity in the electricity system, growing the share of renewable energy, promoting the competitiveness of industry, increasing energy availability to support universal electricity access, supporting a clean energy transition in transport and increasing the availability of high-quality energy-consuming equipment.

Due to the lack of a legal framework for energy efficiency in Mozambique, the EEE has not yet been transformed into legislative proposals. Officials in MIREME are exploring ways to implement the EEE through the identification of funding to develop sector-specific regulations. Private sector stakeholder consultations are also underway to gather market feedback and ensure buy-in for future measures.

In the meantime, MIREME, EDM and other bodies are developing pilot programmes, with an initial focus on MEPS and labelling, LED lighting deployment, and energy-efficient appliances, starting with the development of standards for refrigerators and quality standards for off-grid appliances. MIREME is exploring an energy efficiency programme for public buildings: officials note that the main MIREME building in Maputo was constructed according to international efficiency standards. In industry, policy makers are exploring pilots on power factor correction to better align industrial sites with grid standards. In transport, a pilot programme is underway to deploy electric buses, although measures such as fuel economy standards or age limits on imported vehicles, are not envisaged in the near term.

Progress against the EEE is to be reviewed annually by a Monitoring Committee comprised of multiple ministries and government departments/agencies, including ARENE, FUNAE and EDM, with an annual report to be submitted to the Minister of Mineral Resources and Energy.

Energy consumption and intensity

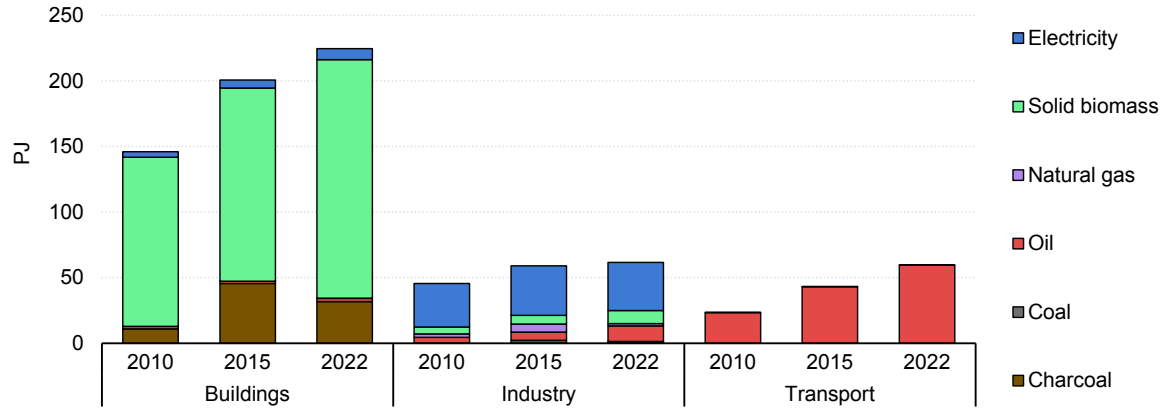
The buildings sector (primarily residential) dominates end-use energy consumption in Mozambique, accounting for more than 65% of TFC. Following a sharp decline between 2005 and 2010, energy consumption by this sector increased by 54% between 2010 and 2022.

Energy demand in the transport sector (almost exclusively petrol and diesel) has more than quadrupled over the last two decades, from just over 14 PJ in 2005 to nearly 60 PJ in 2022, while its share of TFC grew from 4% to 17%.

Energy demand in the industry sector has increased by more than 60% since 2005, from around 38 PJ to over 61 PJ in 2022. However, industry's share of TFC increased only slightly over the same period, from 12% to 18%.

As a result of these increases, TFC was 5% higher in 2022 than it was in 2005 – despite declining by 35% between 2005 and 2010. The reason for the large decline during that five-year period is not clear, based on available data, but may be due to problems with data quality and consistency rather than any structural changes in the economy or patterns of energy use.

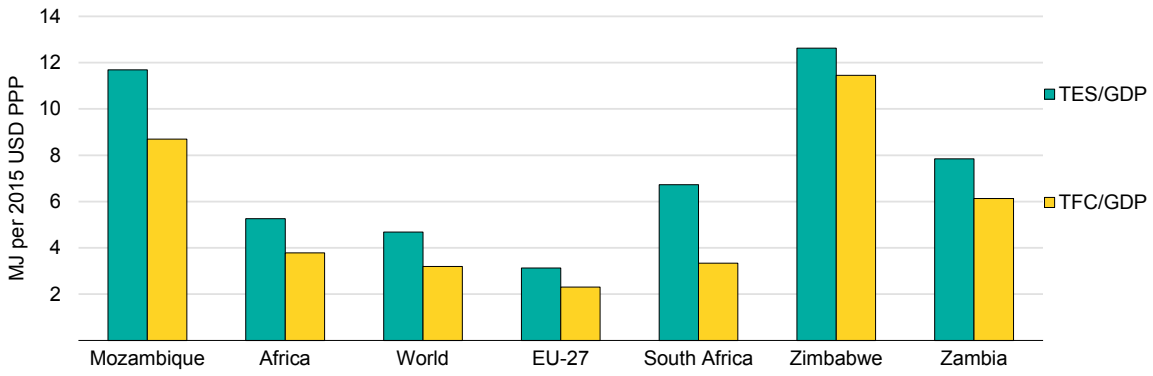
Figure 8.1 Total final energy consumption by fuel in end-use sectors in Mozambique, 2010-2022



Source: IEA (2024), World Energy Balances (accessed 14 May 2025).

Mozambique's energy intensity declined by 56% between 2000 and 2021. This may be due to its economic growth outpacing energy consumption in the last two decades, with increases in electricity use in commercial buildings and industry. However, the lack of consistent historical data on energy consumption patterns complicates the analysis of the reasons for the decline. Nevertheless, due to the persistently large share of biomass in TFC, Mozambique has the sixth most energy-intensive economy in the world and the second-highest among countries in the eastern and southern Africa regions (after Zimbabwe). At 6 668 MJ per thousand USD of GDP (2015 PPP), Mozambique's energy intensity is nearly 2.5 times higher than the global average of 2 673 MJ per thousand USD (2015 PPP).

Figure 8.2 Comparison of Mozambique's energy intensity with selected countries and groupings, 2021



Notes: MJ per 2015 USD PPP = Amount of energy in megajoules used per unit of economic output, measured in 2015 US dollars adjusted for purchasing power parity; TES/GDP = total energy supply per unit of gross domestic product; TFC/GDP = total final consumption per unit of gross domestic product.
Source: IEA (2025), World Energy Balances (accessed 14 May 2025)

The buildings sector has the highest energy intensity in Mozambique by a significant margin, despite a decrease of 76% between 2000 and 2021. In contrast, energy intensity in industry more than doubled between 2000 and 2021, with most of the increase taking place between 2000 and 2004. Energy intensity in the transport sector increased 40% between 2000 and 2021, with a rise of 61% between 2020 and 2021 alone.

Demand drivers and energy efficiency potential

Population growth is a key driver for increasing energy demand in Mozambique, where the annual population growth rate is currently 2.6%. The country's population increased 45% between 2010 and 2021, from just over 22 million to over 32 million, and is expected to reach 46 million in 2040 and 60 million by 2050, according to the 2023 EEE. In parallel, population density has doubled in the last two decades, along with increasing urbanisation. This has had important implications for energy use patterns, notably because more densely populated areas are easier to electrify.

Economic growth is a further important driver of energy demand. Mozambique has experienced significant economic challenges since 2016, due to a combination of commodity price changes and natural disasters. Nevertheless, its GDP (in current USD) increased by nearly 60% between 2016 and 2023, and remains on an upward trajectory, with LNG production and strong growth in agriculture and transport services contributing to economic growth in the medium term.

According to government projections in the EEE, Mozambique's energy demand is expected to double between 2019 and 2027. Efforts to improve electricity access are an important factor in the increase: the number of electrified households is forecast to nearly triple between 2021 and 2030, according to the ENE, with 70% of connections expected to be on-grid. A greater shift to electricity is also likely to reduce the energy intensity of economic growth.

Because of the rising demand for energy, there is a growing potential for energy efficiency to deliver energy savings and GHG emissions reductions in Mozambique. By 2030, the adoption of MEPS across key technologies such as lighting, air conditioning, refrigeration, motors and transformers could deliver over 2 000 GWh of annual electricity savings (equivalent to more than 15% of Mozambique's total power consumption in 2021), while avoiding 2.2 t CO_2 emissions annually. A shift to best available technologies in these product categories could deliver even greater savings. In the lighting sector alone, estimates suggest that adopting globally recognised MEPS for lighting in Mozambique could deliver nearly 7 000 GWh in energy savings annually by 2050 while reducing GHG emissions by nearly 1 Mt over the same period.

Barriers and cross-cutting issues

The lack of a legal framework for energy efficiency presents a critical barrier to energy efficiency in Mozambique. Without a legal framework, policy makers cannot adopt and enforce key legislation, such as MEPS in buildings, industry and transport. The lack of a legal framework also limits the development of dedicated incentive mechanisms for energy efficiency, such as tax credits or subsidies, while creating an uncertain environment for investment in energy-efficient technologies and services.

Other barriers to energy efficiency include subsidised electricity tariffs, which undermine incentives to save energy. EDM has long had a goal of achieving cost-reflective tariffs, but implementing this has proven difficult in practice (see Chapter 3). In the meantime, policy makers in Mozambique are exploring other ways to use tariffs to incentivise customers. These include time-of-use tariffs for medium- to high- and low-voltage consumers and on-bill financing to allow efficiency investments to be recuperated through utility bills, though both measures are still in the study phase, and officials note that the deployment of on-bill financing in particular would be dependent on support from international donors or lenders.

Limited and/or poor quality data on energy end uses in buildings, transport and industrial sub-sectors create a further important barrier by preventing granular assessments of energy end-use patterns, levels of deployment of energy-efficient equipment (such as LED lighting), the identification of opportunities for efficiency gains, and policy formation and implementation. In the buildings sector, for example, while data are available on energy consumption, floor area data are not yet available, complicating efforts to establish and benchmark building energy-intensity levels (e.g. kWh/m^2).

Low awareness about the benefits of energy efficiency among key stakeholders in the public and private sectors, as well as among the general population, is a further barrier for energy efficiency policy formation and market implementation. For example, without greater awareness, stakeholders are unlikely to advocate for progress on energy efficiency, while citizens and consumers are less willing to accept potentially higher upfront costs for more efficient technologies that offer lower lifetime running costs. Policy makers in MIREME are exploring awareness-raising strategies and efforts targeting consumers but note there is a lack of funding to advance these efforts.

There are presently no civil society organisations advocating for energy efficiency in Mozambique, though discussions are underway to establish a dedicated energy efficiency association.

Insufficient administrative capacity is another challenge. Energy efficiency and energy conservation have historically received less attention from the government compared to other issues, such as employment and economic growth, energy access, and poverty alleviation. Progress has been made in terms of dedicating staff in MIREME and other public bodies. Given the multiple and wide-ranging objectives cited in the EEE, however, increasing this capacity would boost implementation.

The lack of a skilled workforce and capable supply chain to deliver energy efficiency services and deploy efficient technologies are further important barriers, holding back opportunities for employment creation. In particular, there is a lack of qualified building and industrial energy auditors, installers, and technicians, along with a lack of dedicated training programmes for these and other professions. Moreover, there are currently no energy services companies active in Mozambique.

Box 8.1 Increasing capacity to advance energy efficiency and create jobs

Dedicated training programmes can bridge capacity and skills gaps, paving the way for employment opportunities in energy efficiency. According to IEA estimates, 20% of new jobs created as part of Africa's clean energy transition by 2030 could be related to energy efficiency, such as the installation of more efficient equipment and appliances. Several African countries are taking steps to address skills and capacity shortfalls in energy efficiency. For example:

- The South African National Energy Development Institute conducts trainings on energy performance certificates and energy efficiency data.
- The Centre for Energy Efficiency and Conservation in Kenya conducts trainings on energy audits, heating, ventilation and air conditioning systems, refrigeration, and other areas.
- The Centre for Research in Energy and Energy Conservation at Makerere University in Uganda conducts trainings on energy efficiency and energy management.
- The Energy Commission in Ghana conducts trainings as part of its Energy Efficiency Project, which has delivered around 400 GW of electricity savings through its Refrigerator Energy Efficiency Programme.

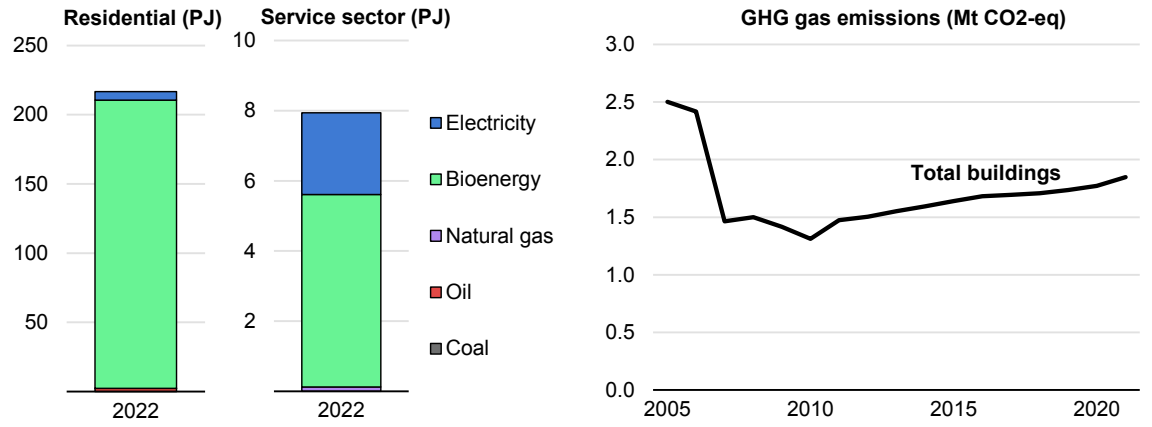
Mozambique has already conducted some trainings to increase capacity, supported by international partners, and officials from MIREME have participated in trainings organised by the IEA covering appliances, industry, and data indicators and evaluation. The government of Mozambique has an opportunity to build on these efforts as a key enabler of its efforts to adopt and implement the objectives contained in the EEE.

Sector trends

Buildings

As the largest user of energy in Mozambique, the building sector is a significant emitter of GHG emissions. Residential buildings, in particular, account for the largest share of biomass consumption and are a major contributor to the country's high levels of energy intensity.

Figure 8.3 Total final energy consumption (2022) and greenhouse gas emissions (2005-2021) from buildings in Mozambique



Source: IEA (2025), World Energy Balances (accessed 14 May 2025).

According to the EEE, around 67% of Mozambique's population relied on biomass (mainly wood, as well as agricultural wastes and residues) for their domestic energy needs in 2019. According to IEA data, bioenergy accounted for nearly 98% of residential TFC in 2022, with 76% of this consumption in the form of harvested biomass.

The use of biomass for cooking is particularly inefficient compared with alternative methods, notably those using electricity, with the use of charcoal for cooking requiring 15 times more energy compared with an electric pressure cooker, for example. Traditional use of biomass is also significantly more emissions-intensive compared to other methods, including LPG, a commonly used fuel in urban and peri-urban buildings (supplied in cylinders), mainly for cooking, water and space heating. LPG is more energy dense than traditional biomass, resulting in a transfer of 50% of its energy content to the cooking pot, compared to wood's 10-20%. Kerosene is also used for water heating in urban areas and for lighting in rural regions. The EEE considers the expansion of Mozambique's very small natural gas networks to be feasible only in urban areas, where it could be an alternative to LPG.

While electricity usage is low in rural areas, it plays an important role in meeting energy needs in urban ones. Electricity in urban buildings is used mainly for refrigerators and freezers, televisions, and lighting. Most electricity use in non-residential buildings is for heating, ventilation and air conditioning (23%); lighting (35%); and refrigeration (16%). According to the EEE, electricity demand in non-residential buildings is expected to increase five-fold by mid-century, from just over 500 GWh in 2020 to over 2 500 GWh in 2050, based on the government's estimates.

Appliances and lighting

Radios and wood/coal stoves are the most common types of energy-using equipment in households, followed by televisions, irons, refrigerators and freezers. Electric and gas stoves, as well as computers, are less common, with only 5% and 4% of households respectively owning them. Around 18% of households have no energy-using appliance of any kind due to a combination of low income and lack of access to electricity. In general, the high relative cost of common appliances presents an important barrier for much of the population.

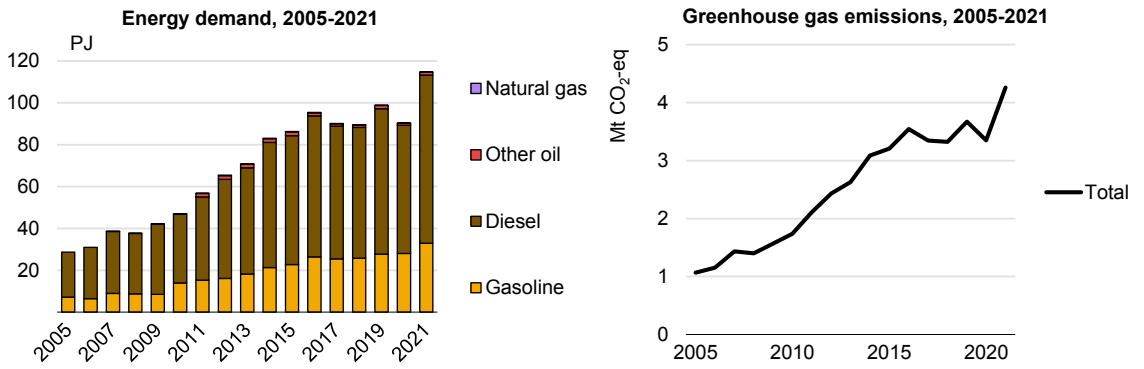
Lighting technologies are widely deployed in Mozambique and have an important impact on energy use. MIREME, in collaboration with international partners, has conducted lighting market assessments involving data collection at retailers, as well as standards testing of imported lamps in mobile testing labs. According to the EEE, there were nearly 654 million light bulbs in Mozambique in 2020: 41% of these were linear fluorescent tubes (LFLs), 17% compact fluorescent lamps (CFLs), 16% LEDs and 6% incandescent lamps. Other estimates suggest the share of incandescent lamps, which are used predominantly in residential buildings, is much higher, at 40%. In commercial buildings, LFLs constitute the largest share of lighting technologies.

EDM has promoted the use of CFLs as a more efficient alternative to incandescent lamps; however, in some instances, they are more expensive than comparative LEDs, and concerns have been raised about lamp safety and quality. In outdoor lighting, work is underway with support from international donors to deploy LED street lighting from 2024.

Transport

Energy demand in Mozambique's transport sector has increased nearly five-fold in the past two decades. Diesel and gasoline are the main transport fuels, with natural gas and other oil products accounting for a marginal portion of the sector's energy mix. This increase in demand has been reflected in rising GHG emissions, whereby the transport sector has overtaken buildings as the country's largest source of GHG emissions. Some 70% of transport sector emissions are from passenger vehicles.

Figure 8.4 Energy demand and emissions in transport by source in Mozambique, 2005-2021



Source: IEA (2025), World Energy Balances (accessed 14 May 2025).

The growth in transport energy demand has been driven by population growth, urbanisation and increasing rates of vehicle ownership. The vehicle stock more than doubled between 2009 and 2021, from just under 300 000 to nearly 700 000, and is expected to reach 1.4 million by 2050. Cars (over 400 000) and buses (nearly 275 000) constitute around 70% of Mozambique's current vehicle stock according to the EEE.

This increase in motor vehicles presents a key challenge for Mozambique, particularly since many of those in circulation are older models that are less efficient and more polluting. The average age of cars in Mozambique is between 13 and 15 years, and there are currently no restrictions on the age of vehicles imported into the country. As the government has not targeted transport sector measures in the near term through the EEE, there is a risk that the country will fall behind in efforts to improve the efficiency of the sector, with the likelihood of a significant rise in energy demand and emissions.

The Government of Mozambique could consider including fuel economy standards as part of the EEE, borrowing on the experiences of other African countries. More than 30 out of 54 African countries have already implemented standards for imported second-hand vehicles, with 4 countries having banned the import of used vehicles entirely. Twenty-five African countries have also implemented regulations limiting the age of imported vehicles, and nearly 20 have established emissions standards. The Economic Community of West African States fuel economy roadmap offers a potential reference point for policy makers, including measures such as fuel economy standards, labelling and fiscal incentives, as well as measures to support the transition towards electric mobility.

Mozambique's relatively extensive rail network is primarily used for cargo transport (including substantial amounts of mined minerals and coal) and has links with

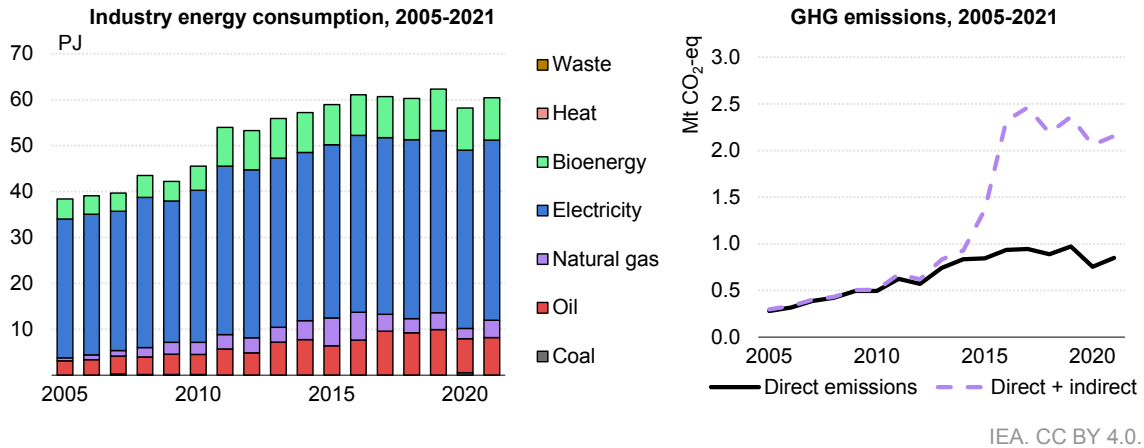
several neighbouring countries, though interconnectivity issues remain an important challenge. Connection with South Africa's rail network, for example, has been hampered because Mozambique's trains run mainly on diesel, while those in South Africa are powered by electricity. Discussions are underway to electrify the rail network in Mozambique, with an estimated USD 100 million required to launch a pilot project and the cost of electrifying one rail line estimated at USD 1.6 billion. As a result of these challenges, the majority of goods entering and leaving Mozambique are transported by an estimated 1 500 trucks daily, further driving up transport sector energy demand and emissions.

Efforts have been made to improve public transport in cities, for example through a World Bank-funded project to build the country's first bus rapid transit system in Maputo. Additional research is needed to understand the potential for improved public transport and modal shift options in urban areas. Affordability issues are an important consideration in this context. For example, in 2022, the government intervened to support fuel costs for minibus drivers to prevent an increase in fare prices. Officials note that persistent low fares hold back public transport investments and expansion.

Industry

Mozambique's industry sector is the country's largest consumer of electricity, resulting in a more modest growth in GHG emissions compared to the buildings and transport sectors.

Figure 8.5 Energy demand and emissions in industry by source in Mozambique, 2005-2021



Source: IEA (2025), World Energy Balances (accessed 14 May 2025).

Coal mining and aluminium production constitute the largest shares of industrial output by value, at 26.2% and 21.5%, respectively. Other major contributors to industrial output include natural gas production (7.4%), beer (5.9%), cement (5.8%), and other non-ferrous metal ores and their concentrates (4.7%).

Electricity consumption by industry increased 16% annually on average between 2006 and 2016, according to government figures, driven by foreign investments and the modernisation of sites. Based on government estimates, industrial electricity usage is expected to more than quadruple between 2020 and 2050, from around 20 GWh to around 85 GWh. The government expects natural gas use by industry to more than quadruple between 2020 and 2050, albeit from a relatively low base of around 10 GWh (0.036 PJ).

Mozambique currently lacks a comprehensive programme to improve industrial energy efficiency. As the country modernises and expands electricity access, developing appropriate energy efficiency measures for industry will become increasingly important for ensuring the sector's competitiveness. Policy makers in Mozambique could build on best practices in other countries in sub-Saharan Africa. For example, energy efficiency demonstration projects following International Organization for Standardization (ISO) certifications have been launched by several companies in member countries of the Economic Community of West African States, including Burkina Faso, Nigeria and Togo. These efforts include sharing information on efficiency levers and simplifying access to financial support for investments. In addition, the Southern African Development Community (SADC) Industrial Energy Efficiency Programme provides a framework and an action plan to develop MEPS and energy management systems, among other areas.

Agriculture

Few data are available on energy demand and emissions related to agricultural activities in Mozambique. Although the sector contributes less than 25% to GDP, it employs more than 70% of the country's population. Most agricultural activities are not mechanised, and energising them could significantly enhance productivity. For example, modern energy solutions can replace traditional methods of burning biomass for heating and drying processes. Collecting data on technologies currently used could help determine the potential for deployment of more efficient technologies, such as those related to water pumping and irrigation.

Assessment

Mozambique has taken important first steps on energy efficiency with the formulation of the energy efficiency strategy (EEE), which contains long-term estimates on energy savings potential and proposes a range of policies and measures. Early efforts to implement the EEE, which has been under development

for several years, suggest that the strategy may contain more priorities and objectives than can be feasibly converted into actionable policies in the short and medium term. This is due, among other factors, to the lack of a legal framework for energy efficiency and low capacity in government departments and market participants. The lack of measures to improve energy efficiency in the transport sector is a notable example of one of the EEE' priority action areas that is currently not being addressed.

The highest priority for energy efficiency policy making should be the adoption of a legal framework. In its absence, it will be difficult for the government to enforce critical policies and measures, such as MEPS and labelling for lighting, refrigeration, cooling and other energy-consuming equipment. A consultation process involving an intra-ministerial steering group has been launched to develop the requisite legislative proposals, though no clear timeline has been set for proposing, negotiating and adopting the legal framework.

Several barriers complicate progress on energy efficiency. These include subsidised electricity tariffs, which disincentivise efficient technology uptake, and low capacity in the public sector, markets and supply chains. There is a lack of civil society engagement and low awareness about energy efficiency among consumers, who often lack the means to procure efficient technologies. Scant granular data on energy consumption in sectors, challenges related to ministerial co-ordination and limited demand-side considerations in energy sector planning undermine the prioritisation of energy efficiency in policy formation and strategy implementation.

Compared to priorities such as increased energy access and infrastructure upgrades, energy efficiency has received limited attention in Mozambique. Given the prospect of strong population and GDP growth and the expansion of electricity access, however, the lack of a robust approach to energy efficiency risks locking in inefficient technologies, thereby undermining the achievement of Mozambique's strategic energy and economic development objectives.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Continue consultations on the EEE with enhanced ministerial co-ordination to rapidly develop, adopt and enforce a legal framework for energy efficiency.
- Ensure energy efficiency is taken into consideration during the development of long-term energy sector planning and reforms through demand-side planning.
- Increase institutional capacity through training programmes on energy efficiency in collaboration with international partners and through an increase in dedicated staff across ministries.

9. Energy, environment and climate change

Overview

Mozambique has historically contributed very little to global greenhouse gas emissions (GHG). In 2020, it represented only 0.2% of global GHG emissions, despite being home to 0.4% of the world's population. The country also has one of the lowest CO_2 emissions *per capita* in sub-Saharan Africa

Nevertheless, Mozambique, with its low-lying coastal areas and reliance on agriculture and fisheries, is among the ten countries in the world most vulnerable to the impact of climate change. This vulnerability is exacerbated by the country's heavy dependence on hydropower and biomass, which are both susceptible to seasonal weather variability. In recent years, with extreme weather events becoming more frequent, the Government has brought climate change mitigation and adaptation to the forefront of its energy policy.

Institutional framework

The Ministry of Agriculture, Environment and Fisheries (*Ministério da Agricultura, Ambiente e Pescas* – MAAP) is the governmental body responsible for planning and overseeing environmental protection, land management, climate change and related issues in Mozambique. It is responsible for drafting Mozambique's Nationally Determined Contribution and the Biannual Transparency report. It has several departments, subsidiaries and affiliated entities in charge of specific sub-sectors and thematic areas. These include the Environmental Inspection Agency, which enforces environmental laws and regulations; the Forestry Department, covering forest resources and the promotion of sustainable forestry practices; the Meteorological Service, which provides weather data and climate information; and the Hydrological Services, managing water resources and monitoring.

Policy framework

Mozambique's Environment Law (Law No. 20/97 of 1997) forms the cornerstone of its environmental legislation, establishing a framework for safeguarding the environment and ensuring sustainable development. It outlines the fundamental principles and regulations governing environmental protection, including requirements for environmental impact assessments (EIAs) to prevent ecological disasters. It also provides the basis for all subsequent environmental regulations,

such as the Environmental Inspection Decree (No. 11/2006), which establishes a system of checks and balances to ensure compliance with environmental laws. The Decree deters violations by setting clear enforcement mechanisms and penalties for non-compliance.

Decree No. 54/2015 further defines EIA processes and permitting procedures and outlines the requirements for all public and private activities with potential environmental impacts. It categorises projects based on their potential impact, defining the necessary level of EIA and establishing the EIA authority's responsibilities. The Decree details the EIA process, including pre-assessment, public participation and decision making, culminating in environmental licensing. It also outlines the roles of experts, consultants and government agencies, as well as inspection procedures, fees and penalties.

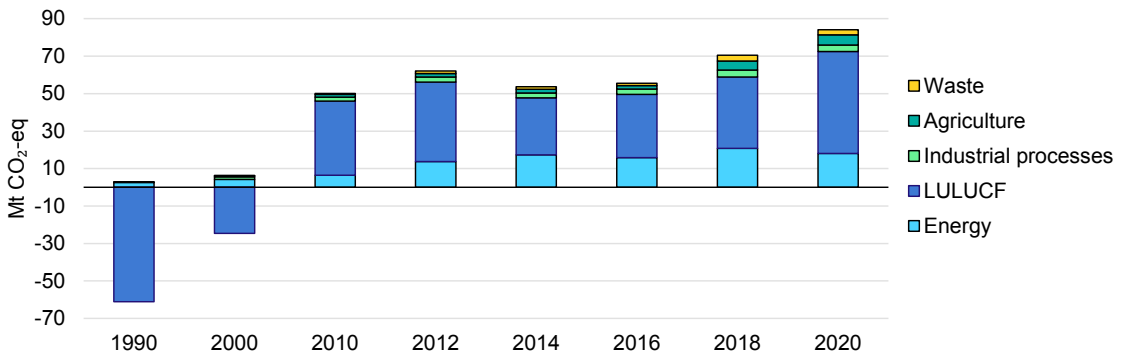
The National Climate Change Adaptation and Mitigation Strategy (NCCAMS), covering the period 2013-25, sets the direction for national policy making to reduce climate risk at the community and national level. It focuses on adaptation and climate risk reduction; mitigation and low-carbon development; and cross-sectoral issues, such as aligning the national legal and institutional framework with the NCCAMS, strengthening data collection on inputs to GHG inventories and national communications, and promoting research on climate change.

Greenhouse gas emissions profile

Mozambique's total GHG emissions have increased since 1990 driven by multiple interrelated factors, including increasing deforestation, the use of charcoal for energy production, changes in animal production, population growth, and the development of domestic industry. In 2020 – the latest available year of the 2024 GHG inventory submitted to the United Nations Framework Convention on Climate Change (UNFCCC) – the country's overall estimated GHG emissions, excluding land-use change and forestry (LULUCF) reached 30.6 Mt CO_2-eq, a three-fold increase from 10.5 Mt CO_2-eq emitted in 2010. In 2020, Mozambique's energy-related GHG emissions (i.e. the combustion of fuels, including traditional biomass) accounted for over 60% of all GHG emissions excluding LULUCF. Taking LULUCF into account, which contributed nearly 60% to total GHG emissions, the energy sector is the second-largest emitter at close to 20% (Figure 9.1).

Until 2002, LULUCF acted as a carbon sink, absorbing more carbon than it emitted. However, due to major deforestation in the 1990s and the impact of floods in 2000, the sector has since become a net carbon emitter.

Figure 9.1 Greenhouse gas emissions by sector in Mozambique, 1990-2020

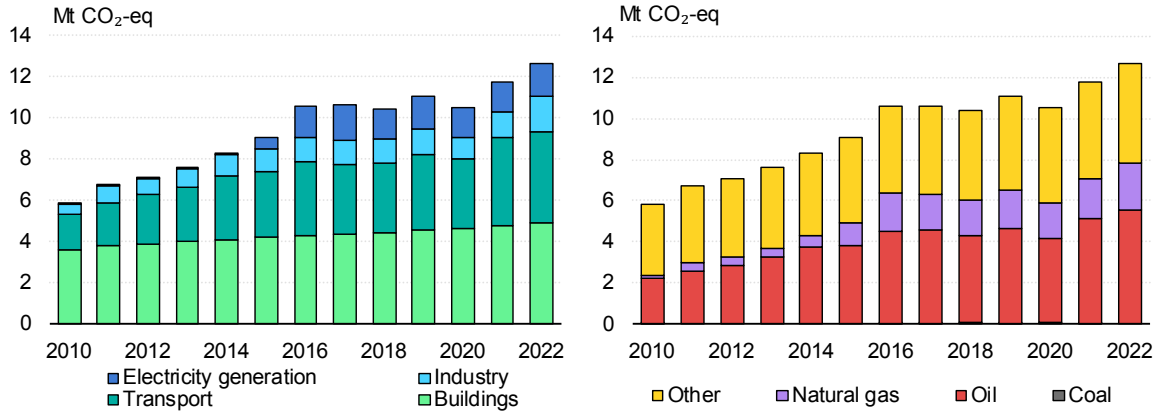


Source: IEA analysis based on data from UNFCCC (2024), GHG Profiles Non-Annex I and Mozambique, Ministry of Land and Environment (2024), Second Biannual Update Report.

Energy-related emissions and intensities

In 2022, Mozambique's GHG emissions from fuel combustion accounted for 12.7 Mt CO_2-eq. Oil products represented 44% of such emissions, followed by biofuels and waste (38%), and natural gas (18%). Looking at the split by sector for the same year, residential buildings were the largest emitter with 4.8 Mt CO_2-eq, corresponding to 39% of total energy-related emissions. The transport sector contributed with 35%, driven by oil-related emissions, followed by industry (13.5%) and electricity generation (12.5%).

Figure 9.2 Energy-related greenhouse gas emissions by sector and source in Mozambique, 2010-2022

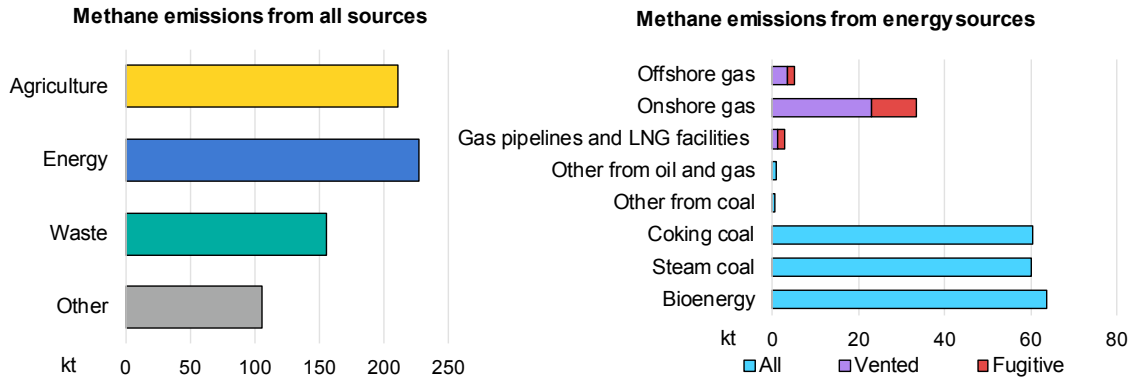


Source: IEA (2024), Greenhouse Gas Emissions from Energy (accessed 14 May 2025).

Methane

In 2023, Mozambique contributed around 0.2% of global methane emissions. According to IEA estimates, the energy and agriculture sectors together account for almost 60% of the country's total methane emissions, with energy only 1 percentage point higher than agriculture. Most methane emissions in the energy sector come from coal mining and the combustion of traditional biomass (notably charcoal and firewood) by households, though gas production represents another important source.

Figure 9.3 Estimates of average cumulative methane emissions by source in Mozambique, 2019-2022



Source: IEA (2023), Methane Tracker (accessed 27 May 2025).

Mozambique is one of 158 countries that signed the Global Methane Pledge. Launched at COP26, the Global Methane Pledge commits signatory countries to contribute to a global reduction of methane emissions of at least 30% below 2020 levels by 2030. Mozambique's current plans to provide universal access to modern energy and tackle deforestation are expected to contribute to this reduction. There are opportunities for Mozambique to further cut methane emissions in its natural gas supply chain and in coal mines. The IEA estimates that around 70% of methane emissions from Mozambique's gas sector could be reduced at no net cost, based on 2023 average natural gas prices. This is because the required outlays for abatement measures are less than the market value of the additional methane gas captured and sold or used.

Global climate agenda

Climate change mitigation

Mozambique has demonstrated a strong commitment to environmental and climate issues by entering into several key international agreements. Notably, the country was an early supporter of the 1992 United Nations Framework Convention on Climate Change, signing it upon its adoption and ratifying it in 1995 as a Non-Annex I party.

In 2005, Mozambique ratified the 1997 Kyoto protocol, further reinforcing its international commitments. The government also signed the Paris Agreement in 2016 and ratified it in 2018. Mozambique submitted its Intended Nationally Determined Contribution (INDC) in 2015, its first Nationally Determined Contribution (NDC1) in 2018, and an updated first Nationally Determined Contribution in 2021 (updated NDC1) for the 2020-2025 period. The government is working on the preparation and submission of its second NDC.

The updated NDC1 sets several national targets to both mitigate and adapt to climate change (Table 9.1). It commits the country to reduce its emissions cumulatively by about 40 $MtCO_2$-eq between 2020 and 2025 against its business-as-usual (BAU) trajectory. This translates into an expected *per capita* reduction of 1.2 tCO_2-eq by 2025, a decrease of about 70% from 2021 (including LULUCF). To achieve this conditional target, an estimated total investment of USD 7.6 billion would be required over the same period. This sum is equal to around half of Mozambique's nominal GDP in 2021, highlighting the need for international support in the implementation of the country's updated NDC1.

Table 9.1 Mozambique's 2030 targets and objectives for the energy sector

Action	Energy sub-sector	Target
Improve access to renewable energy	Hydro	• 66.75 MW new installed capacity
	Wind	• 240 MW new installed capacity
	PV	• 259 MW new installed capacity
Increase electrification	National grid, micro-grids	• Urban network expansion and 100% suburban interconnection to the national grid
Boost energy efficiency	Buildings	• 50 000 PV or wind turbine lighting systems installed
		• 5 000 PV systems for water pumping (including agricultural irrigation, livestock watering)
	Household appliances	• 5 000 glaciers powered from renewable energy for domestic use

Action	Energy sub-sector	Target
Boost energy efficiency (continued)		• Replacement of 2.5 million incandescent lamps with efficient lamps
		• Construction of eight centres for fish conservation
	Transport	• Expansion of metrobus to the country's main capitals
	Biomass	• Application and dissemination of production techniques and improved use of firewood and charcoal sustainability
Accelerate low-carbon urbanisation	Natural gas	• 450 MW thermal power plant based on natural gas • Increased access to LPG for cooking (+309% compared to today) • Construction of ten compressed natural gas (CNG) supply stations • Import of 150 imported CNG buses, 1 000 kits and natural gasNG conversion cylinders, 1 000 cars converted to natural gas • Repair of 150 natural gas buses for public transport
Reduce GHG emissions	Industry	• Installation of solid waste recycling industries under PRONAL
		• Creation of industrial research and development centres encouraging investors to evaluate GHG emissions in investment projects
		• Promotion of projects and programmes of microgeneration of energy in the industrial sector

Source: Adapted from Mozambique, Ministry of Land and Environment (2021), Updated NDC1 2020-2025, (accessed 27 May 2025).

The Biennial Update Reports

In December 2022, Mozambique submitted its first Biennial Update Report (BUR1), an obligation of all UNFCCC Non-Annex-I parties. BUR1 covers the period 1990-2016 and presents the country's historical data on GHG emissions, as well as mitigation strategies and constraints related to financial, technical and capacity-building needs.

Facing significant challenges with cyclical droughts, cyclones and floods – which are becoming increasingly frequent – the country submitted a second Biennial Update Report (BUR2) in December 2024. BUR2 updates the GHG inventory up to 2020 and provides a summary of ongoing and planned mitigation measures. It also highlights the important role that financial and capacity building support have had in strengthening the country's climate policy planning capacity, while noting that gaps still exist on the implementation and monitoring side.

Under the Enhanced Transparency Framework of the Paris Agreement, countries are now required to submit a Biennial Transparency Report (BTR) every two years starting from 2024. Mozambique has yet to submit its first BTR under the Paris Agreement.

As part of its obligation to communicate relevant information on the implementation of the UNFCCC to COP, Mozambique submitted its Initial Communication to the UNFCCC in 2003 and its National Communication 2 (NC 2) in December 2022. NC 2 highlights the financial, technological, and technical gaps identified in the National Capacity Self-Assessment, including needs listed in the Capacity Needs Action Plan for implementing the Convention. NC 2 develops a roadmap to achieve the UNFCCC objectives, highlighting capacity development across GHG inventories, adaptation, and mitigation.

Carbon credit markets

Mozambique has been active in carbon credit markets since 2010 under the Voluntary Carbon Markets (VCM) and the Clean Development Mechanism (CDM) frameworks. By 2024, the government of Mozambique was aware of 64 carbon credits projects in the country.

Between 2016 and March 2025, around 0.8 million credits had been retired, meaning their associated emission reductions or removals were claimed by companies or other organisations towards their decarbonisation goals. Approximately 30% of these retired credits were generated through energy-related projects, totalling an approximate value of USD 1.3 million, with the majority being clean cooking initiatives. Although estimating the exact value of retired credits does not fully capture the financial flows actually mobilised, this highlights the clean cooking sector's reliance on carbon credit revenues. In 2024 alone, Mozambique's energy projects sold over 100 000 carbon credits, valued at over half a million dollars.

Currently, the only legislation applicable to carbon credits concerns the REDD+ forestry sector (Decree No. 23/2018). The limited regulation of carbon markets in the country has several consequences, including a lack of transparency, lengthy governmental approval and authorisation process for carbon projects, and poor monitoring, reporting and verification of the projects. Towards the middle of 2023, the government of Mozambique decided to undertake a Carbon Markets Activation Plan with the help of the Africa Climate Mobility Initiative (ACMI), and to subsequently establish a Carbon Markets Decree, originally planned to be published in August 2024.

Climate resilience and adaptation

Mozambique is very vulnerable to the effects of climate change due to its extensive coastline, reliance on agriculture, and susceptibility to extreme weather events such as cyclones, floods and droughts. To address these challenges, Mozambique has developed a comprehensive framework for climate resilience and adaptation, anchored in Law 15/2014, which serves as the national framework law for disaster prevention, mitigation, and management.

A significant milestone in this effort was the establishment of the NCCAMS in 2012, which constitutes a foundational document for all subsequent policies. The NCCAMS provides strategic and priority guidelines to adopt and implement climate action plans for the period 2013-25. Recognising the adaptation and the reduction of climate risk as a national priority, the Strategy presents eight strategic areas for intervention, which includes infrastructure and institutional capacity.

In 2023, Mozambique published its National Adaptation Plan, within the UNFCCC framework, to complement the NCCAMS and further guide its implementation with a focus on adaptation. The Plan aims to enhance institutional and human capacity to facilitate greater access to financial and technological resources for adaptation measures. It outlines 16 strategic adaptation actions, with an estimated total cost of USD 7.2 billion to over a 10-year horizon (2022-30). These actions include strengthening co-ordination and early-warning systems, enhancing national capabilities to access climate finance, and improving access to renewable energy.

Mozambique has further completed its approach of climate resilience through the Disaster Risk Reduction Master Plan 2017-2030, which aligns with global frameworks such as the SDGs and the Sendai Framework for Disaster Risk Reduction 2015-2030. The Plan is designed to enhance Mozambique's resilience to natural disasters by improving disaster risk understanding, strengthening governance and the public and private sectors' involvement, and consolidating public investment and territorial planning with disaster risk considerations. It also aims to build local capacities for disaster preparedness and response to reduce loss of human life and destruction of vital infrastructures.

To further enhance local preparedness, Mozambique has developed 135 district-level local adaptation plans. However, the government has not yet secured funding to implement those plans. BUR2 has therefore identified gaps where the local adaptation plans could benefit from international support. The needs include financial and technological assistance for conservation measures in the agriculture sector, flood-warning system for the coastal zone, and solar PV systems in the field of energy. There is also a need for capacity building to enhance knowledge about climate change and its consequences and to develop an adequate data infrastructure.

Assessment

While Mozambique has been a low emitter of GHGs historically, its emissions are likely to increase due to population and economic growth, increased deforestation, rising industrialisation, and low energy efficiency.

Energy is the second-largest emitting sector after LULUCF. Oil combustion for transportation causes a large part of CO_2 emissions domestically, which is why the First Updated Nationally Determined Contribution includes measures to improve urban transport solutions, including public mass transit systems in urban areas. The growing use of natural gas for electricity generation is also increasingly contributing to GHG emissions.

Methane emissions also account for a significant share of energy-related GHG emissions. It will be difficult to curb methane emissions and air pollution in the buildings sector if biomass continues to be the main fuel used by households. The country's commitment to universal access to electricity should help fulfil commitments to reduce methane emissions under the Global Methane Pledge.

Decree No. 54/2015 lays a foundation for the environmental evaluation and permitting of energy projects, integrating environmental concerns into the decision-making process and regulation of such projects. However, more work is needed on minimising emissions and residues from gas and coal production, as well as the contamination of water and soil. While project developers are required to have waste management plans, a lack of requisite disposal facilities makes these challenging to implement, especially for smaller companies, e.g. for batteries used in SHS.

The lack of data on GHG emissions based on a standardised methodology is a major factor impeding effective climate change mitigation policy making and evaluation. Data availability and consistency will be key not only to keep track of progress on the NDC targets, but also to support their revision and update. While the 2030 targets regarding the energy sector mentioned in the updated NDC1 are clear, limited capacity to implement and monitor mitigation measures is hindering progress. National Communication 2 helps by proposing a government roadmap to fill the financial, technological and capacity-building gaps.

While the government demonstrates strong commitments to climate adaptation, particularly through its updated NDC1, the socio-economic and financial risks posed by the direct impacts of extreme weather events and emergencies suggest a need to take stronger action. In particular, Mozambique still needs to secure the funds to deploy district-level measures. To this end, it needs a comprehensive climate financing framework to directly fund green investments and prioritise disaster management initiatives. Important steps in this direction have been taken with the establishment of a Disaster Management Fund and the introduction of

climate-smart appraisal techniques within public investment management, but more needs to be done to respond to the significant climate risk it faces.

Technical and capacity-building barriers also need to be addressed to improve adaptation. This includes improving research and monitoring, particularly for early warnings. In terms of long-term planning, the National Adaptation Plan could benefit from a post-2030 review to ensure political continuity across key commitments.

While carbon credits have so far provided a vital stream of revenues for energy access projects, it may not provide a sustainable business model in the long run due to uncertainties around demand and price volatility. Increasing access to cleaner energy, as called for in the ETE, along with enhanced information and public awareness, should help contribute to more sustainable forest management and reduced carbon emissions.

Recommendations

To reach its objectives, the Government of Mozambique could consider the following actions:

- Conclude the preparations of a second NDC with a 2035 timeframe, as well as the Biennial Transparency Report submission to report on progress made in the first NDC.
- Include methane management in the upcoming second NDC, in order to address emissions from bioenergy, coal and gas (e.g. biogas for clean cooking, coal-bed methane recovery, limits to flaring and venting, and methane capture in power generation).
- Update the National Climate Change Adaptation Plan to review risks and potential measures to reduce impacts, with a view to mobilising support from international funds.

10. Energy investment

Overview

Mozambique is a low-income country and among the ten least developed economies in the world. In 2023, GDP *per capita* was USD 623, nearly a third of the sub-Saharan Africa average. The government has relied on strong support from development finance institutions (DFIs) to help the country tackle its growing energy needs. Limited fiscal space has constrained public spending, whereas private investment has mostly been concentrated in the fossil fuels sector.

Investment environment

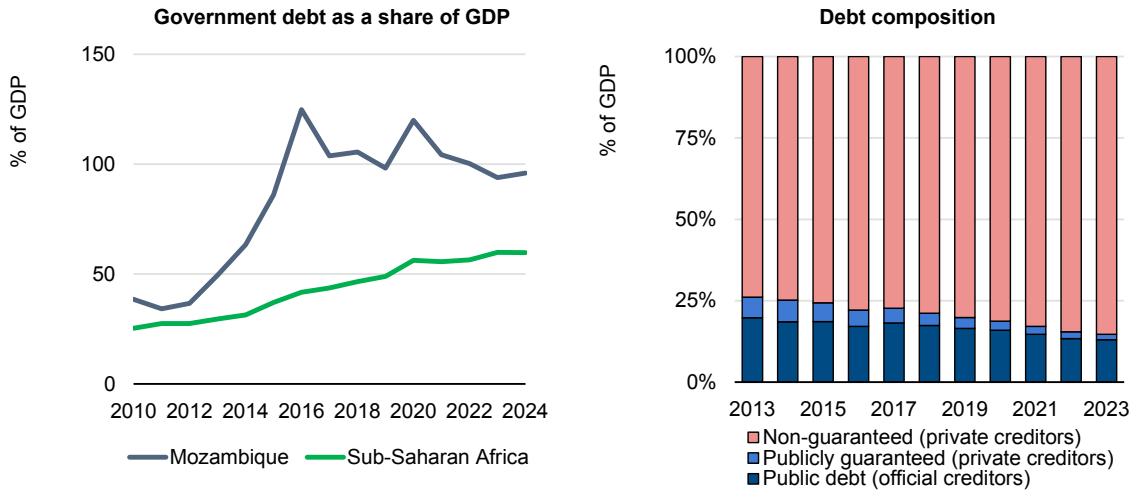
Sustained high public debt levels have put Mozambique at significant risk of debt distress, while also impacting sovereign risk ratings that guide investors. Civil unrest following the October 2024 elections has heightened political risk assessments, and GDP decreased almost 5% year-on-year in the fourth quarter of 2024. High interest rates coupled with a small and shallow banking sector hinder commercial banks' ability to play a large role in mobilising investment. As a result, Mozambique's investment environment is hampered by a high cost of capital, which raises the bankability bar for projects and increases the burden of bridging the energy infrastructure gap.

High public debt levels weigh on the state budget and impact sovereign risk ratings

According to the World Bank, Mozambique's total external debt stock has more than doubled over the past decade, having reached nearly USD 67 billion in 2023. However, interest payments increased by almost 40% between 2021 and 2023, due not just to the growth in debt issuances but also to the end of the global low-interest rate environment.

Mozambique's public external debt composition reflects the large investments from the private sector in the natural resources sector. The share of private debt not guaranteed by the government has increased by 10% over the past decade and, in 2023, represented 82% of Mozambique's total external debt stock (Figure 10.1). Meanwhile, over the last five years, the country's public external debt has decreased and as this debt is largely provided at concessional levels, this trend further exacerbates the rise in interest payments and presents a challenge to any debt-restructuring arrangements.

Figure 10.1 Mozambique's public debt-to-GDP ratio (2010-2024) and debt composition (2013-2023)



Source: IEA analysis based on IMF (2024) and World Bank (2024).

The sustainability of Mozambican public external debt has been the main concern for the government and international partners, particularly in the aftermath of the 2016 hidden debt crisis, in which previously undisclosed loans of over USD 2 billion were revealed (Box 10.1). The government has since reached agreements on some of the defaulted external loans, implemented fiscal consolidation measures and progressively fulfilled the criteria set out by the IMF to regain access to financing. Mozambique is notably in the final phase of its three-year Extended Credit Facility programme with the IMF.

Coupled with economic growth, these efforts have enabled the country's debt-to-GDP ratio to overall improve over the last decade, although it remains significantly higher than the sub-Saharan African average (see Figure 10.1). From a peak of 125% in 2016, the ratio reached 95% in 2024, still almost double the 50% threshold recommended by the IMF for developing countries.

Box 10.1 Hidden debt crisis

In 2016, the government revealed that it had amassed previously undisclosed debts of over USD 2 billion between 2009 and 2014 by issuing sovereign guarantees to several state-controlled companies without parliamentary approval, a practice that contravened the rules of its IMF programme and the International Development Association's non-concessional borrowing policy. Although the government subsequently enacted legislation to limit future debt guarantees for state-owned

companies and agreed on a new Credit Facility with the IMF in 2019, the disclosure significantly undermined ratings agencies', investors' and development partners' confidence in the country. This has made it challenging for the government to raise money for planned investments, including the state's share in large energy projects. The World Bank notes that "a significant share of the anticipated borrowing will be repaid directly from future LNG revenues".

Mozambique remains one of the 20 African countries at high risk of debt distress. Fiscal sustainability is also threatened by vulnerabilities posed by natural disasters, the potential escalation of terrorist activities in the north of the country, increasing geo-economic fragmentation and fiscal challenges associated with the recent civil unrest.

The country has consistently received non-investment grade credit ratings, limiting its ability to access international financial markets and reflecting a high default risk assessment. As of February 2025, it had been downgraded to a level denoting substantial risks to investors, further raising the country's risk premium and borrowing costs. Despite growing concerns around the level of subjectivity inherent in credit ratings assigned to African sovereigns and scrutiny of their methodologies, such ratings currently play a significant role in signalling risk perception and thus contribute to assessments impacting the cost of capital.

Political and regulatory risk assessments by investors raise the risk premia applicable to Mozambique

Investors look for signals to assess risks that could affect their ability to obtain a return on investment or, in the case of lenders, to recover their capital and make a return. These signals include economy-wide factors such as the macroeconomic environment, political context and currency risk (country-level risks) and those related to the project, technology or sector, including sector-specific regulatory frameworks (project-level risks).

While project-level risks are often the object of detailed risk assessments, country-level risks are typically derived from broader signals, including sovereign risk ratings, governance indicators and regulatory indices. Two risks that particularly weigh on these assessments are political stability and the predictability of regulatory frameworks.

Political instability, both real and perceived, signals a high risk for investors and therefore translates into a higher pricing of such risk. Countries perceived as suffering from political instability will typically have higher risk premia applied to

investments in their territory due to investor concerns that it would affect their ability to recover the invested capital.

Some civil society stakeholders estimated loss of revenue due to post-election protests in the last quarter of 2024 in Mozambique at around 2% of GDP. In December, the country's USD-denominated treasury bonds dropped in value, pushing the yield up to nearly 13%, signalling a higher risk assessment. In the same month, Mozambique issued up to MZN 4 billion (Mozambique metical) (USD 62.6 million) in domestic treasury bonds with a 5-year maturity and a nominal interest rate of 13.5%. By January 2025, news that the government was considering debt restructuring to counterbalance revenue loss linked to political turmoil caused Mozambique's euro-denominated bonds' value to drop by 3.5%.

This signals a higher risk assessment of political risk from investors, raising the cost for investment in the country. Security concerns in Cabo Delgado over recent years have also impacted investments, notably by delaying some LNG projects (see Chapter 5). The government has been deploying significant efforts to address the security situation in the northern province, as well as enhancing economic opportunities in the region.

The design and implementation of regulatory frameworks applicable to the energy sector is another signal that investors closely assess. Clear, predictable and standardised legal and regulatory frameworks reassure capital providers and tend to lower the perception of risk. On the other hand, ad hoc regulations and tailor-made procedures with limited clarity or unpredictable processes raise risk valuations, for instance by affecting investor confidence in streamlined treatment or access to recourse for decisions that negatively impact their investments.

In 2021, the World Bank noted that Mozambique's legal and regulatory framework for investment lacked transparency and clarity, with instances of unpredictable and discretionary conduct. The government has made significant efforts to improve Mozambique's regulatory environment with the aim of enabling increased private sector investment. In the same year, it adopted a set of regulations for the off-grid sector designed to facilitate private capital participation (see Chapter 2). A new Electricity Law was enacted in 2022, opening the whole sector to private participation (see Chapter 3). In 2023, the country approved a new Private Investment Law (Law No. 8/2023 of 9 June), which sets up tax incentives for investment projects, provides guarantees of equality of treatment and expands access to recourse including arbitration. Decree No. 8/2024 of 7 March approved in 2024 further clarified procedures related to applying to and developing investment projects in the country, including eligible incentives under the Private Investment Law.

While assessing regulatory risk is a complex process that depends on a range of variables, continued government efforts to further streamline and strengthen legal and regulatory frameworks can contribute to lowering investors' perception of risk.

A small banking sector currently limits the ability of domestic capital of playing a large role in energy investment

Despite having become more developed in recent years, Mozambique's banking sector remains relatively small. In 2023, there were 15 banks operating in the country, with the six largest representing 80-85% of the sector's total assets, loans and deposits. Of these, the three largest combined held 67% of total deposits, denoting a high level of concentration in Mozambique's banking sector.

The past decade has seen a gradual increase in the six largest banks' combined net assets, which reached nearly MZN 730 billion (USD 11.44 billion) in 2023, nearly a 5% surge year-on-year. Their combined loans-to-deposit ratio dropped from nearly 75% in 2014 to close to 38% in 2023, reflecting a prioritisation of liquidity and conservative lending practices as a result of more stringent regulations adopted in the aftermath of the hidden debt crisis. In 2023, net loans represented 28% of total assets, down from 30% the previous year and 30-35% in the years prior. According to the country's central bank, the Bank of Mozambique, in 2024 the banking sector remained "profitable and stable, with adequate capitalisation and liquidity levels". Capital adequacy indicators were particularly high in the first half of 2024 at 26%, more than double the minimum requirement. This reflects a robustness to withstand shocks that is particularly important in a highly concentrated environment, which can pose systemic risks.

While conservative lending policies have, on the one hand, increased the relative financial health of Mozambique's banking sector, they have also resulted in a low and declining loans-to-GDP ratio. In 2023, the ratio was around 20%, from nearly 37% a decade earlier. This signals an attempt to reduce borrowing risks but could have negative effects on economic growth. It is also indicative of the low levels of financial inclusion, despite progress made over the past decade.

The central bank has kept interest rates high, although it progressively reduced them from 17.25% in most of 2023 to 12.75% in November 2024. Average interest rates applied by commercial banks to their lending activities stood at 20-30% throughout 2024, making them prohibitive for most businesses. In addition to high interest rates, limited sectoral expertise and collateral requirements resulted in these banks playing quite small role in Mozambique's energy sector.

Development partners have promoted some initiatives to provide technical support to strengthen capacities for the structuring of financial products tailored to the

energy sector, particularly for renewables. This included a credit line to support the financing of renewable energy projects for productive uses, backed by the United Nations Industrial Development Organisation and implemented by Banco Comercial de Investimento. The credit line was launched in 2021 and capitalised at around MZN 60 million (USD 940 000), designed as a guarantee fund for risk mitigation and offering a fixed interest rate of 7.5%. Exhausted in 2024, this credit line contributed to the financing of several renewable energy investments by micro, small and medium-sized enterprises and co-operatives in Mozambique.

Despite the success of such initiatives at a small scale, larger investments have eluded the country's banking sector. The size of the local banks' balance sheets so far makes them more suitable to finance ancillary services, such as the small and medium-sized enterprises that can operate within the value chain of larger investment projects. They also tend to offer less competitive options than international banks in terms of tenors, interest rates and risk appetite, limiting their ability to finance such projects in the short to medium term.

High-risk signals translate into a high cost of capital for investment in the country

Mozambique's investment environment reflects significant high-risk signals for investors, which are generally conducive to a high cost of capital. The cost of capital represents the expected financial return, or the minimum required rate of return, necessary to justify an investment in a company or project. It is influenced by a broad range of factors, including country-level macroeconomic and political risks. A high cost of capital negatively impacts investment, particularly for capital-intensive projects like renewable energy generation, which require substantial initial expenditures despite having minimal operating costs.

Although limited data availability for Mozambique makes it difficult to determine an exact range, it is likely that the cost of capital in the country is relatively high compared to advanced economies, and in line with other countries in the region. According to the IEA's Cost of Capital Observatory, the weighted average cost of capital (WACC) for utility-scale solar PV projects in sub-Saharan Africa ranged from 8.5% to 11% in 2022, while for gas-fired power projects it was slightly higher, at 10-11%. While Mozambique's economic context and energy sector differ significantly from that of other sub-Saharan African countries, such as Kenya or Senegal, its WACC is likely to fall within a similar range. This is primarily due to the large role played by concessional capital in the financing of clean energy projects in the region, which offers more favourable rates compared to the commercial ones and leads to lower WACC levels. However, whenever concessional capital is not available and if projects were to be financed through domestic sources of financing, WACC levels in Mozambique are estimated to be significantly higher. The Clean Air Task Force estimates a 20% WACC for

Mozambique between 2030 and 2045, reflecting the rates applied by domestic sources of financing, with higher interest rates and lower shares of concessional tranches resulting in a higher effective cost of capital.

The elevated cost of capital has several critical implications for energy investments in Mozambique. Higher financing costs translate into increased overall project expenses, making energy projects, especially those requiring substantial upfront capital such as renewable projects, less financially viable. This can deter foreign investors, who may prefer to invest in countries with lower risk profiles and more favourable financing conditions, resulting in reduced foreign direct investment in Mozambique's energy sector and limiting the influx of necessary capital for development. Given Mozambique's massive need for infrastructure investment, with an annual gap of USD 6.2 billion, attracting foreign capital is all the more critical.

Current investment patterns in the energy sector

Limited fiscal space and high government debt constrain public spending

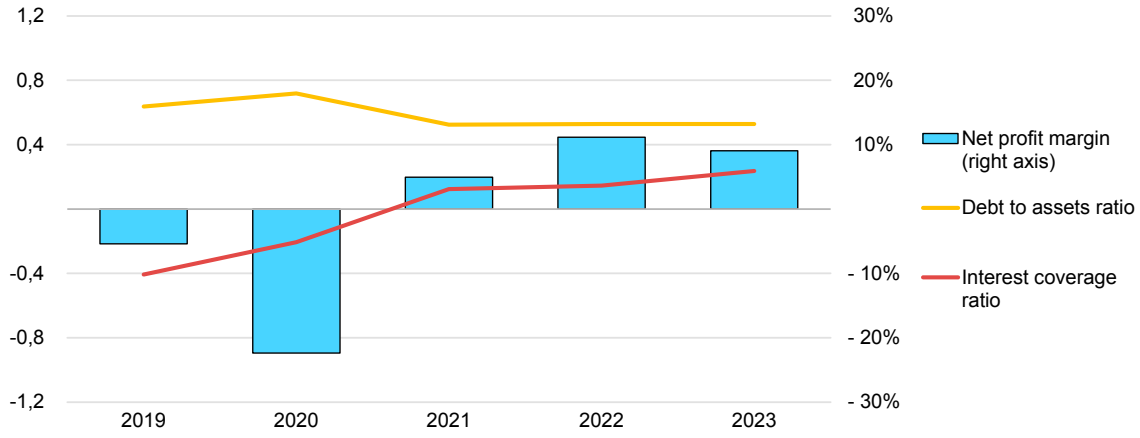
In 2023, the central government budget recorded a USD 33 million (MZN 2 113 million) allocation to the energy sector, 86% of which was earmarked for the power sector. However, spending in the energy sector has been declining year-on-year and has decreased 52% since 2020, despite the fact that the overall state budget has increased by 23% over the same period. Nonetheless, central government spending remains highly constrained by a limited fiscal space linked to increasing debt payment obligations, small budget availability and low available revenues. Against this backdrop, the low revenue predictability associated with the oil and gas sector is an exacerbating factor: while government revenues from the gas sector more than tripled from 2022 to 2023, halted production plans and the volatility of natural gas prices can translate into a strong decrease in revenues. On the other hand, the rollout of additional natural gas projects has the potential to free up more resources that can, in turn, be invested in energy infrastructure. In this regard, the newly established Sovereign Wealth Fund can prove instrumental in managing the financial resources generated from gas operations, acting as a hedge against future shocks and revenue fluctuation, but also as an instrument to accumulate savings for future generations.

In addition to central government spending, most public spending to the energy sector is channelled through state-owned enterprises (SOEs). Three stand out in the energy space: EDM, the electricity utility company playing a major role in the power sector; ENH on upstream natural gas; and HCB as the single largest

hydropower producer in the country. However, the SOE ecosystem in Mozambique faces several challenges, which are linked to the limited levels of investment, low rates of return, high indebtedness and overall low availability of financial resources. Although efforts have been made to improve overall management and operational performance, SOEs operating in sectors without cost-reflective tariffs, such as power, remain constrained. Varying degrees of financial health have prompted close monitoring from the government, especially given the fiscal risk of contingent liabilities linked to SOEs.

Over the past years, EDM has significantly improved its operating and financial health, having obtained positive net results since 2021 (Figure 10.3). Despite the revenue growth arising from gradual tariff adjustments to reflect the cost of supply, the utility continues to face challenges in revenue collection. These have implications for the sustainability of its operations due to non cost-reflective tariffs and with assistance from the World Bank, EDM is currently undergoing a restructuring process. As with many power utilities in sub-Saharan Africa, whose main revenue stream is represented by domestic consumption, EDM was notably hit by the impact of the Covid-19 economic crisis, which led to a reduction in overall sales due to restrictions, the inability to collect revenues and a decrease in consumer purchasing power. As a result, the utility absorbed a 23% decrease in cost recovery over the first 6 months of the crisis. This weighted on EDM's debt burden, with the company registering a 33% jump in its debt levels between 2019 and 2020 alone, reducing its ability to embark on capital-intensive energy infrastructure investments, such as grid expansion and modernisation. Given that EDM continues to serve as a single buyer of electricity, independent power producers selling to EDM may require credit enhancement support to mitigate offtake risk and ensure liquidity.

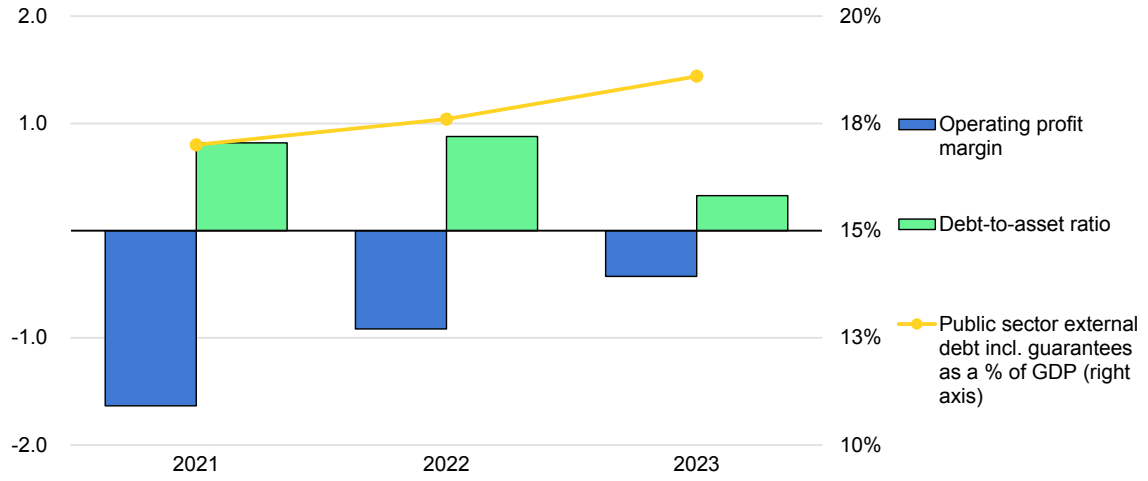
Figure 10.2 EDM selected financial indicators, 2019-2023



Source: IEA analysis based on data from Instituto de Gestão das Participações do Estado (2025).

As the SOE handling Mozambique's participation in the upstream natural gas sector, ENH has a different trajectory. Between 2020 and 2022, yearly revenues increased by 32% on average as a result of Mozambique's stakes in LNG projects in the Rovuma Basin. However, during the same period, ENH's operating costs and liabilities increased, both due to exploration costs and those linked to public shareholding in such projects. The capital-intensive nature of gas projects and the expansion of ENH's activities in the Rovuma Basin led to an increase in the company's debt levels, with ENH debt guaranteed by the public sector reaching over 18% of GDP in 2023 (Figure 10.4). Special investment vehicles have been set up to fund the LNG projects led by TotalEnergies and Eni, through which ENH holds its carried shares. The government of Mozambique has also issued a USD 2.25 billion sovereign guarantee to cover ENH's debt-financed share in the LNG financing package for the Mozambique LNG project led by TotalEnergies.

Figure 10.3 ENH selected financial indicators, 2021-2023



Source: IEA analysis based on data from Instituto de Gestão das Participações do Estado (2025).

Development finance is crucial in energy and end-use sectors

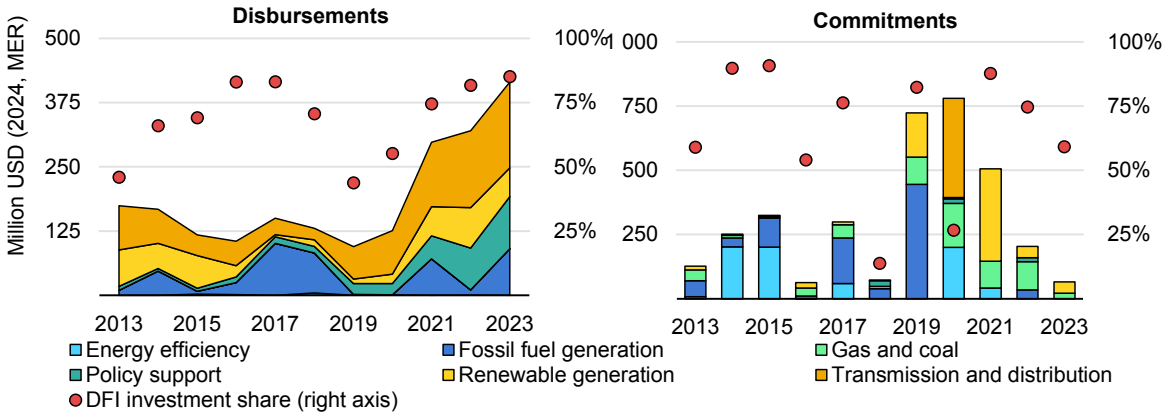
Development finance plays a crucial role in energy and end-use sectors. Over the past decade, DFIs and other official development assistance (ODA) providers have disbursed around USD 2 billion towards Mozambique's energy sector, with 42% going to grids, 21% to renewable generation and 16% to policy support. Fossil fuel generation, leveraging the country's significant endowments in natural gas, accounted for over a fifth of the disbursements (Figure 10.4).

Disbursements from DFIs and other ODA providers have increased over fourfold over the past 5 years, with grids, renewables and policy support driving this upward trend. In 2023, yearly energy-related official ODA flows into Mozambique

reached USD 414 million, up from USD 95 million in 2019. On average, DFI support has represented 72% of total energy-related ODA flows over the past decade. This signals strong support from DFIs partnering with Mozambique, particularly as the country dealt with multiple shocks and led efforts to increase energy access and develop its energy sector.

However, over the same period, commitments from DFIs and other ODA providers have been following an opposing trend, decreasing from USD 780 million in 2020 to USD 65 million in 2023 – a decline of over 90%. The slowdown was particularly acute from 2022 onwards, as the world dealt with the aftermath of the Covid-19 pandemic, a worsening macroeconomic environment, the Russian Federation's invasion of Ukraine, and the combined energy and food crises. This trend seems to point towards lower levels of DFI and ODA disbursements in the coming years, as previous commitments reach the end of their cycles and fewer new commitments have been made. This also suggests that, going forward, scarcer DFI funds will play a vital role in de-risking private sector investments, providing guarantees or other credit enhancements.

Figure 10.4 Official development assistance flows targeting Mozambique's energy sector, 2013-2023



Source: IEA based on OECD (2025), International Development Statistics (database accessed 24 June 2025).

Private investment mainly goes to natural resources

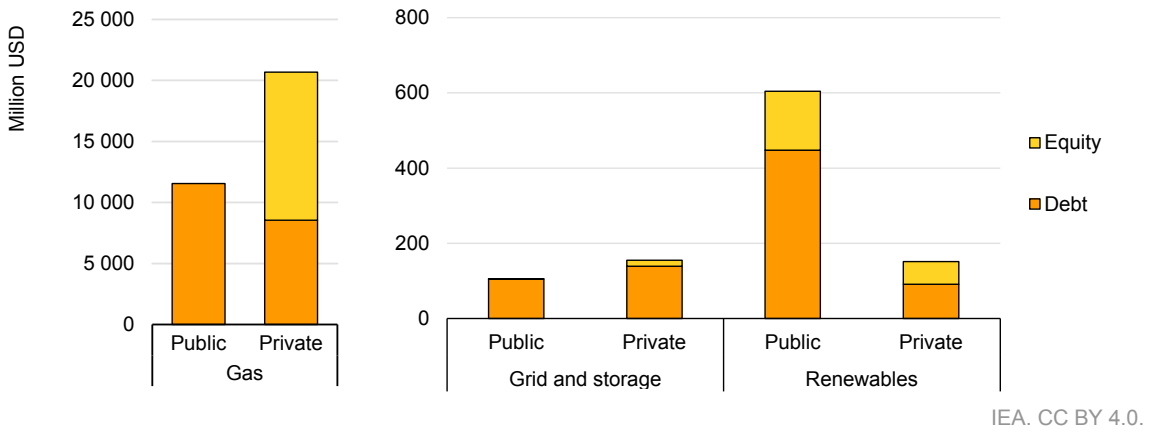
In Mozambique, private sector capital has predominantly been deployed towards fossil fuel investments. Between 2013 and 2024, approximately USD 20 billion in private investments were recorded for announced and completed natural gas projects (Figure 10.5). This included nearly 60% in equity and roughly 40% through debt instruments, reflecting the diverse financing strategies investors employ. While investment in fossil fuel assets has traditionally relied on significant mobilisation of equity, recent experiences in Mozambique include a combination of balance sheet financing with project finance structures. Large projects have

driven the private investment trends in the country, such as Coral South floating liquefied natural gas (FLNG) facility in 2017. Further developments are anticipated, notably from TotalEnergies with the Mozambique LNG project, and from Eni with the Coral North FLNG project, which is reportedly planning to take its final investment decision in the near future.

Coal extraction is also dominated by private companies, notably since public operators stopped operating in 2021 following the dissolution of the Mozambican Mining Exploration Company (EMEM, SA). Foreign companies with licences in Mozambique have developed export-oriented business models. However, the development of supporting infrastructure is particularly costly and has driven a number of private companies to exit deals or sell assets. The limited availability of data on coal investments hampers a thorough analysis but the absence of recent recorded transactions seems to indicate declining trends since the early 2010s, when investments surged to support the start of large-scale mining operations (see Chapter 6).

While having until recently played a minor role in the renewable energy sector, private capital has begun to flow more significantly towards Mozambique's power sector. This shift has been largely supported by DFIs, which provide de-risking mechanisms and concessional capital. The majority of these investments have been facilitated through project finance structures, which typically involves a debt-to-equity ratio of 70-80% debt to 20-30% equity. Despite this uptick, much more investment is needed to meet the country's energy goals, and the private sector is expected to play an increasingly important role in achieving them.

Figure 10.5 Main energy sector project investments in Mozambique, 2013-2024



Notes: This includes announced and completed projects. The bars representing renewable energy investments may not fully capture the actual investment landscape, as some companies do not disclose the amount of their investments.
Sources: IEA based on data from Bloomberg New Energy Finance (2025) and IJ Global (2025).

Overcoming barriers to attract investment

Designing national investment roadmaps to deliver the Energy Transition Strategy

In November 2023, the government of Mozambique approved its ETE and launched it at COP28. Initial government estimates indicate that implementing the ETE would require over USD 80 billion in investments between 2024 and 2050. This would entail mobilising a combination of sources of finance and financial instruments, from public, private, national and international institutions.

The ETE anticipates that most investment to be mobilised by 2030 would be directed towards the power sector, largely to increase hydropower generation capacity and grid expansion. Beyond 2030, the deployment of large-scale solar PV and wind power plants would attract the most capital. Distributed energy resources to achieve universal access would also play a critical role, with an estimated USD 1-2 billion required for mini-grids, USD 500 million for solar home systems and another USD 500 million for clean cooking solutions.

While the ETE establishes a high-level overview of investment requirements, it recognises the need to flesh out the details in sectoral investment plans and national roadmaps. By including precise targets and project mapping, these detailed sector-specific roadmaps can help identify concrete investment opportunities and highlight the most suitable financial instruments to unlock them. It can also pinpoint the areas where the private sector is expected to play a key role and therefore facilitate its mobilisation by providing clarity over priorities. This can help ensure the efficient deployment of private capital to meet the ETE's goals.

Clear roadmaps also help remove uncertainty for investors, which can be a significant deterrent, particularly in regions where perceived risks tend to be high. Mozambique benefits from strong support from international partners and DFIs, which is critical to strengthen the investment environment and reduce risks for investors. These roadmaps can play a significant role in guiding a strategic allocation of concessional finance to areas where it can generate the most significant catalytic effect.

Energy access financing has been complicated by limited fiscal incentives and its impact on costs

The government of Mozambique, with support from DFIs, has led significant efforts to accelerate energy access over recent years (see Chapter 2). However, projects have faced a challenging investment landscape, particularly in the aftermath of Covid-19 and the compounded food and energy crises, which translated into cost-of-living increases that affected the sector's profitability.

Alongside the numerous government and donor-led programmes aiming to support the achievement of universal access, it is crucial to mobilise private sector financing. To keep products affordable for end users, margins in the sector are kept small. Therefore, fiscal policies need be carefully designed to balance the needs of supporting commercial business models, providing affordable products and stimulating demand. At the same time, these policies must ensure that the government retains key revenue for reinvestment.

Although Mozambique's legal framework provides some fiscal incentives for renewable energy investors, such benefits are mostly limited to utility-scale generation projects. In 2022, the government amended the country's VAT Code (Law No. 22/2022 of 28 December) and extended the exemption regime to include solar panels used for rural electrification. However, it is unclear whether this would apply to mini-grids and other off-grid solutions. Developers consulted as part of this energy policy review reported a lack of clarity over the implementation of VAT and custom duties exemptions, noting that some solar PV components remain subject to standard rates.

The off-grid sector has played a particularly important role in expanding electricity access, backed by DFI and other ODA support. Nonetheless, the current legal framework does not provide fiscal incentives to support the sector's development through private sector financing. Products such as SHS, for instance, do not benefit from any exemption. They are subject to the standard VAT rate of 16%, and to import duties varying between 5% and 20%, depending on the specific type or components of the product. While these appliances can play a crucial role in stimulating demand for energy access solutions in Mozambique, the absence of fiscal incentives to keep them affordable for end users and profitable for companies has complicated efforts to scale up private sector participation in the sector. Exemptions and other fiscal incentives have played a key role in other countries in Africa that have rapidly expanded electricity access (Table 10.1), including the United Republic of Tanzania, where the removal of the VAT and import duties on solar products has been an important driver of rural electrification programmes.

Table 10.1 Fiscal incentives for selected solar products in key markets

	Solar home systems		Solar PV		Solar water pumps	
	VAT	Import duty	VAT	Import duty	VAT	Import duty
Kenya	Exempt	0%	Exempt	Exempt	16%	0%
Mozambique	16%	7.5%	Exempt*	Exempt*	16%	5%
Nigeria	10%	0%	5%	5%	7.5%	5%
Senegal	Exempt	0-20%*	Exempt	Exempt	Exempt	5-10%*
Uganda	0%	0%	Exempt	Exempt	18%	0%

Notes: Solar PV refers to utility-scale solar panels; Mozambique's exemptions on solar PV vary depending on the component; Senegal's import duties for solar home systems and solar water pumps vary depending on the component.
Sources: IEA analysis based on Energy for Growth Hub (2022), BDO (2022), Renewable Energy Association of Nigeria (2020), GOGLA (2022), Africa Clean Energy (2021), Energypedia (2022), GET.invest (n.d.), Law n°17/2022 of 28 December 2022 and Law n°22/2022 of 28 December 2022.

Similarly, the deployment of clean cooking solutions has been hindered by a lack of fiscal incentives that could help kick-start this very incipient market in Mozambique. Improved cookstoves, for example, are subject to the standard VAT rate of 16% and face a 20% import duty. Since a large part of these products are sold in rural and peri-urban areas, where low-income households comprise most of the potential customers, these levies can have a significant impact on the affordability of clean cooking solutions and the business models underpinning their deployment.

Moreover, access to finance remains a major challenge for scaling up clean cooking technologies in Mozambique. Many businesses in the sector struggle to secure credit due to high interest rates, stringent collateral requirements and a lack of tailored financial products. At the same time, affordability remains a key barrier for consumers, as limited access to microfinance and pay-as-you-go models restricts their ability to invest in cleaner and more efficient cooking solutions. Without stronger financial mechanisms and targeted policy support, widespread adoption of clean cooking technologies will remain out of reach.

Assessment

As one of the poorest countries in the world that is also particularly exposed to increased extreme weather events, Mozambique has enormous investment needs. These span not just the energy production sector and related end-use sectors but also infrastructure, making it difficult to set priorities for public investment and private investment attraction strategies. Despite multiple crises, the country has managed to improve its macroeconomic environment through a series of reforms that have helped control inflation, albeit at the cost of high interest rates. In 2022, then President Nyusi launched an Economy Accelerator Program to improve the business environment and attract foreign investment.

Donors and foreign investors are a fundamental source of financing in a context where constrained public finances and high cost of capital make it challenging to meet investment needs. However, the government seeks to attract and retain private investment, notably through the Agency for the Promotion of Investment and Exports, which is tasked with promoting private investments, and the central bank, which closely manages exchange rates and access to foreign currencies.

Despite steps to improve the regulatory environment for energy projects, one of the most important constraints for investors remains related to regulatory uncertainty and occasional adverse impacts of regulations on project bankability requirements. In addition, government investment incentives are not always in line with investors' needs. For example, while utility-scale renewable projects benefit from VAT and import tax exemptions, areas where affordability constraints are higher (e.g. off-grid access) are not covered by such exemptions. This limits consumer buy-in and hinders the scaling up of business models that can deploy energy access technologies, both off-grid electricity and clean cooking solutions.

Challenges for investors include limited foreign currency availability and major offtake risks, which constrain the involvement of the private sector. When financing is available, it often comes at high rates with prohibitively large collateral expectations. In part, this is worsened by the limited data available on energy projects to allow for a comprehensive assessment of risks. This results in an energy financing landscape where utility-scale projects are generally reliant on DFIs, and commercial banks can only support local value chains by financing contractors and small and medium-sized enterprises.

Concessional finance, either through direct project financing or blended finance solutions, plays a key role both to fund projects and strengthen the investment environment. Multilateral development banks and donors are working on large catalytic projects, such as grid expansion and the Mphanda Nkuwa hydropower plant, while offering support for key institutions, such as the national power dispatch centre. DFI-backed credit lines to commercial banks are also being used to lower interest rates for clean energy-related projects and to support more affordable small and medium-sized enterprises and consumer financing. Public and private actors are acting in a number of priority areas, such as energy access and clean cooking.

The ETE is a promising framework to foster, attract and retain investment, should it be followed by the creation of sector-specific roadmaps, with clear targets and project mapping where possible. These roadmaps would identify where concessional financing could play a key role and leverage the private sector's strengths through a two-way consultation with these actors, minimising roadblocks to investments and tapping local capabilities.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Build on the Energy Transition Strategy by creating sub-sector roadmaps with clear targets that identify where concessional financing is needed, in co-ordination with development partners and financiers.
- Review fiscal incentives for clean energy technologies to ensure that energy and fiscal priorities are aligned, in particular in the off-grid sector allowing end users to access affordable solutions for electricity and clean cooking.
- Undertake a blended finance needs assessment through engagement with domestic and international commercial financial institutions to help identify where concessional finance can suitably be deployed to mobilise private capital.

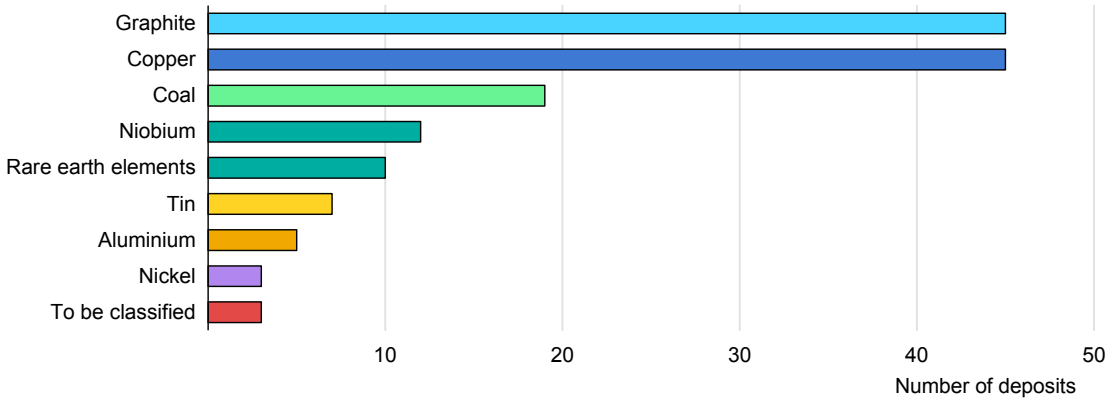
11. Critical minerals

Overview

As the clean energy transition gains momentum globally, the demand for critical minerals used in clean energy technologies is poised to grow. Mozambique has an opportunity to leverage its endowments of graphite, bauxite and other key minerals, and its strategic location near growing clean technology manufacturing centres in Asia. It is also considering adding more value locally by processing and refining domestic minerals, powered by its clean energy resources.

Mozambique's critical minerals sector is still in an early stage of development. Exploration activities are ongoing, but large-scale mining operations are limited. Mozambique faces several major challenges, including infrastructure gaps in transportation networks and power generation, a skills gap, and barriers for the large-scale investments needed for development and processing facilities.

Figure 11.1 Identified mineral deposits of selected commodities in Mozambique, 2024.



Source: IEA based on data from MIREME (2024), Mineral Information System, (accessed 27 May 2025).

Institutional framework

MIREME is the government body responsible for overseeing the mineral sector in Mozambique, including activities related to critical minerals and other key minerals. It is responsible for promoting the evaluation of mineral resources, awarding mineral rights and overseeing mining operations.

Policy and legal framework

Mozambique's mining industry is primarily regulated by national laws enacted by the parliament and by implementing regulations approved by the government. These establish the rules for the access, concession and exercise of mineral rights by private entities. Mining agreements entered into by the government and mineral rights holders usually do not follow a standardised format but are developed individually for each mining project.

According to the Constitution of Mozambique, all mineral resources found in the soil, subsoil, inland waters, continental shelf and exclusive economic zone are the sole property of the state. According to the Law on Public-Private Partnerships (Law No. 15/2011) and regulations related to large-scale enterprises and business concessions, the state reserves the right to negotiate a free carried participation of no less than 5% and no more than 20% (Article 33). Mineral rights can be awarded following an application on a first-come-first-served basis or through a public tender procedure for prospecting and exploration licences; mining concessions; and mineral handling, processing and marketing licences. The awarding of mineral rights does not include land rights over the concession area.

Mining activities are governed by the Mining Law (Law No. 20/2014), which outlines the general principles regulating the exercise of rights and duties relating to the exploitation of mineral resources. The Law contains provisions on state participation, support for local investment in mining projects and local content requirements. The Mining Regulation (Decree No. 31/2015) provides detailed implementation guidelines for provisions in the Mining Law, covering procedures for applications and processing of mining rights, EIAs for mining projects, health and safety standards for mining operations, and mine closure and rehabilitation plans.

Mozambique's environmental regulatory framework for the mining sector is based on the aforementioned policies, on the Environmental Regulation for Mining Activities (Decree No. 26/2004) and on the Basic Rules on Environmental Management for Mining Activity (Ministerial Order No. 189/2006). Mining operations are classified into three types of activities, each with specific regulatory requirements. Small-scale mining operations are subject to simple guidelines to mitigate environmental and socio-economic impacts. Mining activities carried out in quarries that involve the extraction of mineral resources for construction, as well as operations designated as pilot projects, are required to submit an environmental management plan and an emergency and risk management programme. Mining operations involving mechanised methods require an environmental impact assessment issued by the Ministry of Agriculture, Environment and Fisheries, as well as an environmental management programme covering a five-year period. The Inspector General of Mineral Resources and

Energy, created by Decree No. 31/2019, is responsible for monitoring and conducting inspections of mining activities, including verification of compliance.

Tax policy

Mining operations in Mozambique are subject to the payment of different taxes. These include general taxes such as value-added tax and income tax, and industry-specific taxes such as royalties. Law 28/2014 on the Taxation of Mineral Operations outlines the framework for charges and exemptions applicable to mining operations. These include a mining production tax (3% for basic metals, coal and other mined products); a surface tax that applies to mining areas and varies depending on the type, size and age of the operation; and a corporate income tax that applies to annual earnings (i.e. net positive cash flows) equal to or greater than an internal rate of return of 18%.

In 2023, Mozambique's government approved an allocation of 10% of the tax revenue from mining to support community and provincial development. This policy aims to ensure that communities living near mining and hydrocarbon projects benefit from the related revenue. Funding decisions will be taken by local advisory councils, prioritising transparency, participation and alignment with district development plans. The policy allocates 7.25% to provinces and districts for projects to boost local production and regional development in sectors such as education, agriculture and transportation. The other 2.75% is to support local communities. Over the course of 2024, the government has reportedly distributed USD 19.8 million from mining and oil revenues to provinces and districts to fund community development projects in the fields of education, health, agriculture, and infrastructure. The criteria for allocating and managing these earmarked revenues reportedly has yet to be determined.

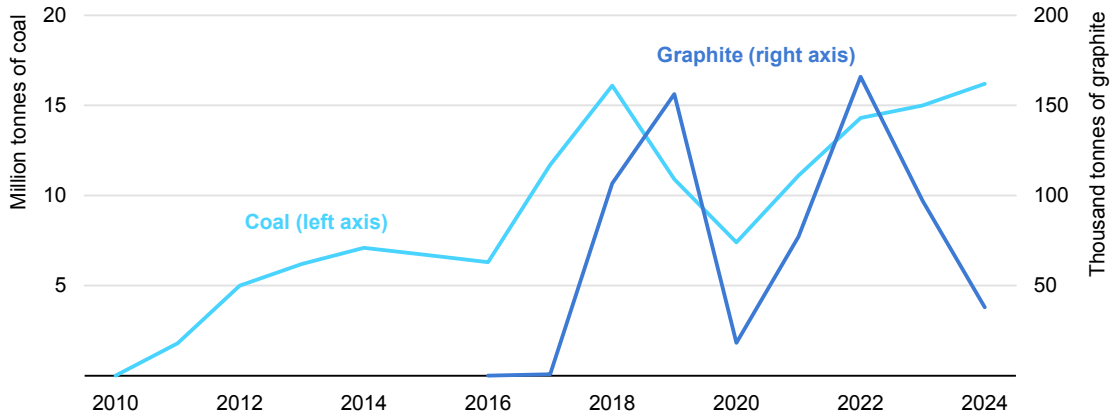
Mozambique may be losing substantial revenues to tax avoidance from companies operating in the extractive industries. Research by SOMO and the Centre for Democracy and Development shows that some companies have used tax treaties to reduce or eliminate withholding taxes on dividends and interest payments. An estimated USD 117 million in tax revenue has been lost since 2016 due to these practices in the mining sector alone. Transparency from companies operating in the extractive industries in Mozambique remains limited: a 2023 assessment by the Centre for Public Integrity reported an average transparency level of just 12.31% among 33 companies. The lack of mandatory company financial reporting makes it difficult to track the full extent of the problem.

Outlook for production

Mozambique's extractive sector remains largely untapped, with enormous growth potential. To date, reserves of minerals critical for the clean energy transition and other key minerals have been identified in the following provinces: Manica (bauxite and copper), Niassa (copper), Cabo Delgado (copper and graphite), Milango (bauxite) and Nampula (copper). Resources of rare-earth elements, lithium, nickel and other minerals have also been discovered.

Mozambique produces sizeable amounts of graphite – accounting for 2% of global output in 2024 – and, to a lesser extent, bauxite. Both commodities offer significant potential for expanded production. Currently, almost all production is exported, although the country is exploring the possibility of processing and refining these minerals locally, ideally leveraging its clean energy resources.

Figure 11.2 Coal and natural graphite production in Mozambique, 2010-2024



Graphite

Graphite is a form of carbon commonly known for its use in pencil cores and various technical applications, including as a lubricant, an electrical conductor, a refractory material and a source of raw carbon. Historically, the metallurgical industry has been the primary consumer of graphite, employing it in crucibles as an input to steelmaking and as electrodes in electric arc furnaces. The battery industry is rapidly emerging as a key driver of demand for graphite, with our projections indicating it may account for over half of total demand by the late 2020s.

Mozambique has one of the world's largest graphite deposits, with estimated reserves of 25 Mt, mostly concentrated in its northern Cabo Delgado province. In 2022, the country was the world's second-largest producer of natural graphite

(after China), accounting for around 9% of total global graphite production. Production volume declined notably from 170 kt in 2022 to just under 40 kt in 2024 due to the disruptions in major mines. However, it has ample capacity to ramp up production volume if the current issues are resolved.

Syrah Resources operates the Balama high-grade graphite deposit in Cabo Delgado province with a flake graphite production capacity of 350 kt per year, although actual output has so far not exceeded 160 kt. Balama is one of the largest natural graphite resources in the world, as well as one of the largest integrated graphite mining and processing facilities of flake graphite, which is the type of graphite used in battery anode production. In mid-December 2024, Syrah declared force majeure due to widespread protests and suspended the operations of the Balama mine, which had already been facing difficulties linked to occasional insufficient market demand. As of June 2025, Syrah resumed graphite production at Balama, with plans to restart large-volume shipments by the end of the year.

Graphit Kropfmühl, a subsidiary of AMG Graphite, operates the Ancuabe graphite mine in Cabo Delgado province. Ancuabe has a flake graphite production capacity of 9 kt per year and a resource estimate of 0.8 Mt with an 8% graphite content, implying a further nine years of production at full capacity. In 2022, AMG Graphit Kropfmühl declared *force majeure* and suspended its mining operations in the region.

There are currently eight ongoing graphite exploration projects in Mozambique, including Ancuabe (Triton)[5], Balama Central (Turipati Graphite plc), Caula (private investor), Cobra Plains (Triton), Montepuez (Turipati Graphite plc)[6], Nicanda Hill & Nicanda West (Triton), and Nipacue (Graphit Kropfmühl).

Mozambique's graphite production faces strong competition from China, which currently accounts for around 85% of global natural graphite production and 95% of refined output. China is also interested in Mozambique's graphite potential. For example, the Chinese company DH Mining Development Limited has plans to invest USD 30 million in a graphite mine in the Nipepe district of Niassa province, which was scheduled to come online in 2024.

Synthetic graphite is also a potential competitor. Although very energy-intensive and expensive to produce, with a considerable carbon footprint, synthetic graphite is gaining market share thanks to the continued decline in prices and improving quality.

[5] In July 2024, Triton Minerals signed a memorandum of understanding (MoU) with Shandong Yulong Gold, a Chinese company, to divest a 70% interest in its graphite assets in Mozambique. The MoU encompasses the Ancuabe Graphite Project, the Nicanda Hill and Nicanda West projects, as well as the Cobra Plains.
[6] In February 2025, Global Li-Ion, a company incorporated in Canada, announced that it had entered an exclusive MOU to purchase 100% in the Montepuez graphite project in Mozambique.

Bauxite

In 2022, Mozambique's bauxite reserves were estimated to be more than 2 Mt. Most of the country's bauxite ore deposits are located in the northern margin of the Precambrian greenstone belt in Manica province, extending along the border with Zimbabwe in Penhalonga district. The last comprehensive characterisation of bauxite ore deposits available in the open literature was conducted in 1960.

Mozambique has mined bauxite since 1935. One of its largest operating mines is the Mina Alumina Lda, situated on the border between Zimbabwe and Mozambique, in Manica province. Mina Alumina's reserves are estimated to be 2 Mt. There are plans to double the mine's current production to 20 000 tonnes per annum, while reserves could sustain an annual output of 50 000 tonnes for another 40 years with further investment.[7]

Bauxite is the primary ore used to produce aluminium, which is one of the two main materials (along with copper) used in making wires and cables, with some also used in transformers. Aluminium is also used in the production of induction motors for electric vehicles and often forms part of the structure of clean energy technologies, such as solar power equipment, electrolysers and wind turbines.

Mozambique produced around 565 kt of aluminium in 2021 and is one of the world's largest exporters of this metal. Raw aluminium is the country's second-largest export by value (after coal), with annual sales worth USD 2 billion. Mozambique's aluminium exports go mainly to Italy, Singapore and Spain, as well as to other countries in Europe, and it is Europe's second-largest supplier of primary aluminium.

The Mozal Aluminium plant, located just west of Maputo, is the largest industrial employer in Mozambique. It is also the single largest electricity consumer in the country, though it imports all of its power from South Africa under a long-term contract that is currently set to expire in 2025 (see Chapter 3). The government of Mozambique holds a minority share of Mozal (less than 4% through preference shares), while Australia's South holds 60%, the Industrial Development Corporation of South Africa Limited has 24% and Mitsubishi Corporation (through MCA Metals Holding GmbH) owns nearly 10%. To support the development of a downstream aluminium industry in Mozambique, Mozal supplies a portion of liquid metal to Midal Cables, a local company that sells products domestically and to international markets.

[7] The company also has access to a bauxite deposit in Mutare, Zimbabwe, that historically supplied Zimbabwe Phosphate Industries (Zimphos), a company that manufactures aluminium sulphate for water purification. Zimphos is seeking to build an aluminium sulphate plant in Mozambique, in association with the government, to supply the local market and exports to countries in the SADC.

Assessment

Mozambique has extensive resources and several large-scale mines producing minerals key to the worldwide clean energy transition, notably including bauxite and graphite. Many countries are currently looking to diversify their critical mineral supply chains to ensure greater security and resilience, presenting an opportunity for resource holders such as Mozambique to expand operations and add greater value locally. Mozambique's Regulation of the Mining Law mentions the concept of strategic minerals, but there is not yet a clear definition of which minerals the country considers strategic.

Mozambique has a policy and legal framework for mining, but institutional capacity is limited, and existing processes serve more as response mechanisms rather than as planning and development tools. No policies are specifically focused on critical minerals, but the Energy Transition Strategy has identified the potential benefits of developing these resources.

The growing interest in diversifying global supply chains represents an opportunity for Mozambique to position itself as a key supplier to potential buyers. Several countries are interested in its mineral resources. For example, in 2023, the US Development Finance Corporation announced a loan of up to USD 150 million to develop graphite mining and processing at Syrah's graphite mine in Cabo Delgado to support the diversification of global supply chains.

Mozambique could also increase exports of bauxite and primary aluminium as Europe seeks to shift its imports from Russia, which until recently accounted for around 30% of its primary aluminium supply. The European Critical Minerals Act could support new market developments in Mozambique, particularly if sustainably produced. The new EU legal framework facilitates trade collaboration, increases demand for responsible sourcing and offers the potential for access to financing.

An expansion of mining activities is dependent upon the continued development of the policy environment and key infrastructure, such as power grids and roads. Provision of such infrastructure also benefits the population and other local economic actors. The mining industry could also help bring improved waste management systems, formalisation of economic activities and other benefits if held to high environmental, social and governance standards. These synergies can be harnessed through greater co-ordination between energy planning and programmatic mining development alongside enabling industrial and environmental policies.

Despite vast reserves of critical minerals such as graphite and bauxite, Mozambique faces hurdles capitalising on this opportunity. Social and political instability, particularly the insurgency in Cabo Delgado, is disrupting investment in

mining and processing infrastructure. Local technological capabilities are limited, and the workforce lacks many of the skills needed for specialised operations.

An existing map of mineral resources offers a starting point for further development, but currently lacks much of the information the private sector needs to conduct initial economic assessments, notably regarding the estimated quality and size of the reserves.

Exploration is currently conducted by potential developers through an ad hoc authorisation process. However, companies typically do not provide a lot of their data to the government, which then must decide on the terms of individual mine developments based on a poor information base.

Areas under concession are often leased for long periods of time and can remain inactive without relinquishment of rights if operators do not have the means or interest in mining in those locations.

Artisanal and small-scale mining is a major part of the mining industry in Mozambique, with around 2 000 identified sites employing nearly 3% of the population. This type of mining is often related to gold extraction, but also targets other minerals, including construction materials and coal. Unfortunately, this type of mining comes with significant downsides, such as environmental damage, poor labour conditions, health risks, child labour and limited economic benefits for local communities due to the dominance of middlemen. Artisanal mining could be a way to develop small deposits and can provide social and economic benefits as long as it is supported by proper safeguards.

Recommendations

To reach its objectives, the government of Mozambique could consider the following actions:

- Build on its Mining Law to establish a legal framework for minerals that are considered strategic and promote the formal development of such resources, articulating with international partners on potential offtake agreements to lower financing costs and facilitate investment.
- Create a structured process for systematic resource assessment and project development, including mechanisms for data disclosure and provisions that encourage the optimal use of resources (e.g. suspension of rights in areas with no investment for several years).
- Promote the beneficiation of domestic mineral production in co-ordination with energy plans, allowing the development of anchor clients and grid expansion while creating local added value (e.g. the Balama pilot for spherical graphite production could be expanded).

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Rita Madeira managed the review, and designed and directed the report. Gaia Guadagnini assisted with the co-ordination of the report. Anders Caratozzolo and Claire Lesieur contributed to the data analysis and research. Beatriz Piloto assisted with the mission to Maputo. Principal authors include (in alphabetical order): Tomás de Oliveira Bredariol (Chapter 11), Darlain Edeme (Chapter 2), Gaia Guadagnini (Chapter 9), Rita Madeira (Chapter 10), Armin Mayer (Chapter 8), Philip Swanson (Chapters 3, 4, 5, 6, 7). Carole Etienne contributed to Chapter 5. Claire Lesieur and Beatriz Piloto contributed to Chapter 9. Blandine Barreau and Alessia Stedile contributed to Chapter 10.

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General annex

Abbreviations and acronyms

ALER	Lusophone Renewable Energy Association *Associação Lusófona de Energias Renováveis*
AMER	Mozambican Association of Renewable Energies *Associação Moçambicana de Energias Renováveis*
ARENE	Energy Regulatory Authority *Autoridade Reguladora de Energia*
BCP	Botswana Power Corporation
BUR	Biennial Update Report
CFL	compact fluorescent lamp
CNG	compressed natural gas
COP	Conference of the Parties
CPMZ	Companhia do Pipeline Moçambique Zimbabwe
EDENR	Strategy for the Development of New and Renewable Energies *Estratégia de Desenvolvimento de Energias Novas e Renováveis*
EDM	Electricity of Mozambique *Electricidade de Moçambique*
EDP	Energias de Portugal
EES	Energy Efficiency Strategy
EIA	environmental impact assessment
EnDev	Energising Development
ENE	National Electrification Strategy *Estratégia Nacional de Electrificação*
ENH	National Company of Hydrocarbons *Empresa Nacional de Hidrocarbonetos EP*
EPCC	Exploration and Production Concession Contract
ETE	Energy Transition Strategy *Estratégia de Transição Energética*
FASER	Fund for Sustainable Access to Renewable Energy
FLNG	floating liquefied natural gas
FSM	Mozambique Sovereign Wealth Fund *Fundo Soberano de Moçambique*
FUNAE	Energy Fund *Fundo de Energia*
GDP	gross domestic product
GHG	greenhouse gas
GIS	Geographic Information System
HCB	Cahora Basa Hydroelectric plant SA *Hidroeléctrica de Cahora Basa SA*
IFC	International Finance Corporation

IMOPETRO	Mozambican Petroleum Importer *Importadora Moçambicana de Petróleos*
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contribution
INE	National Institute of Statistics *Instituto Nacional de Estatística*
INP	National Oil Institute *Instituto Nacional de Petróleo*
IPP	independent power producer
LFL	linear fluorescent tube
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MAAP	Ministry of Agriculture, Environment and Fisheries *Ministério da Agricultura, Ambiante e Pescas*
MEPS	minimum energy performance standards
MIREME	Ministry of Mineral Resources and Energy *Ministério dos Recursos Minerais e Energia*
MoU	memorandum of understanding
MZN	Mozambique metical (currency)
NC	National Communication
NCCAMS	National Climate Change Adaptation and Mitigation Strategy
NDC	Nationally Determined Contribution
ODA	official development assistance
PAE	Package to Promote Economic Growth *Pacote de Medidas de Aceleração Económica*
PETROMOC	Petróleos de Moçambique
PM	particulate matter
PPA	power purchase agreement
PPP	purchasing power parity or power purchase agreement
PROLER	Renewable Energy Auctions Initiative *Iniciativa de Leilões de Energia Renováveis*
PSA	Production Sharing Agreement
PV	photovoltaics
REACT	Renewable Energy and Adaptation to Climate Technologies
ROMPCO	Republic of Mozambique Pipeline Company
SADC	Southern African Development Community
SAIDI	System Average Interruptions Duration Index
SAIFI	System Average Interruptions Frequency Index
SAPP	Southern African Power Pool
SDG	Sustainable Development Goal
SEforAll	Sustainable Energy for All
SHS	solar home system
SMI	Sociedade Moçambicana de Investimentos
SOE	stated-owned enterprise

STE	Sistema Nacional de Transporte de Energia
TA	technical assistance
TES	total energy supply
TFC	total final consumption
UIPCE	Integrated Planning and Cooperation Unit for Electrification *Unidade Integrada de Planificação e Cooperação de Eletrificação*
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	value-added tax
WACC	weigthed average cost of capital
ZESA	Zimbabwe Electricity Supply Authority

Units of measure

bcm	billion cubic metres
GJ	gigajoule
GWh	gigawatt hour
GW	gigawatt
kb/d	thousand barrels per day
km^2	square kilometre
kt	kilotonne
kV	kilovolt
kVA	kilovolt ampere
kWh	kilowatt hour
mcm	million cubic metres
Mt	million tonnes
$MtCO_2$-eq	million tonnes of coal equivalent
MW	megawatt
PJ	petajoule
TW	terawatt
TWh	terawatt-hour

See the IEA glossary for a further explanation of many of the terms used in this report.

International Energy Agency (IEA)

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Energy Policy Review

Government action plays a pivotal role in ensuring secure and sustainable energy transitions. Energy policy is critical not just for the energy sector but also for meeting environmental, economic and social goals. Governments need to respond to their country's specific needs, adapt to regional contexts and help address global challenges. In this context, the International Energy Agency (IEA) conducts Energy Policy Reviews to support governments in developing more impactful energy and climate policies.

This *Energy Policy Review* was prepared in partnership between the Government of Mozambique and the IEA. It draws on the IEA's extensive knowledge and the inputs of expert peers from IEA Member countries to assess Mozambique's most pressing energy sector challenges and provide recommendations on how to address them, backed by international best practices. The report also highlights areas where Mozambique's leadership can serve as an example in promoting secure and clean energy transitions. It also promotes the exchange of best practices among countries to foster learning, build consensus and strengthen political will for a sustainable and affordable energy future.