



# ENERGY TRANSITION *in* Mozambique

*Opportunities and Challenges*

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Opportunities and Challenges

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# ACRONYMS

CDD – Centre for Democracy and Development

EDM – Electricidade de Moçambique

FLNG – Floating Liquified Natural Gas

FUNAE – Fundo Nacional de Energia

HCB – Hidroeléctrica de Cahora Bassa

SADC – Southern African Development Community

# I. INTRODUCTION

Addressing climate change through energy transition is a central part of the global agenda on sustainable development. Indeed, the 2030 Agenda's Sustainable Development Goal 7 sets out to ensure "access to affordable, reliable, sustainable and modern energy for all". Nevertheless, in many low and middle-income countries, a large share of the population has no access to electricity at all. For instance, while only 10% of the global population has no access to electricity<sup>[1]</sup>, for Mozambique this figure jumps to 61% of the population, corresponding to nearly 19 million people.<sup>[2]</sup>

As a country with significant reserves of energy sources including hydro, gas and coal, and yet having low electrification rates, the debate around energy transition provides Mozambique with a crucial opportunity to strengthen its vision of the role of natural resource exploration and the need to increase access to energy for all. The energy transition debate is even more relevant for the Cabo Delgado Province and Pemba City in particular, which is set to be an energy production hub.

It is within this context that the Centre for Democracy and Development (CDD), supported by the British High Commission in



Mozambique, aims to promote a more inclusive energy transition and sustainable urban development plan for the city of Pemba, by leading a citizen consultation process that encourages greater involvement of civil society for better outcomes for people, the environment and the economy.

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[1] <https://ourworldindata.org/energy-access>.

[2] Interview with EDM staff, month? 2022.

[Within this framework, the present report aims to discuss the fundamental economics and socials of energy transition in Mozambique, and Pemba particularly. The report demonstrates that taking into account that natural gas is considered a transition resource of choice and the enormous challenges the country still faces to ensure reliable energy access for all, just energy transition for Mozambique means that the use of natural gas to solve issues of access cannot be underestimated.

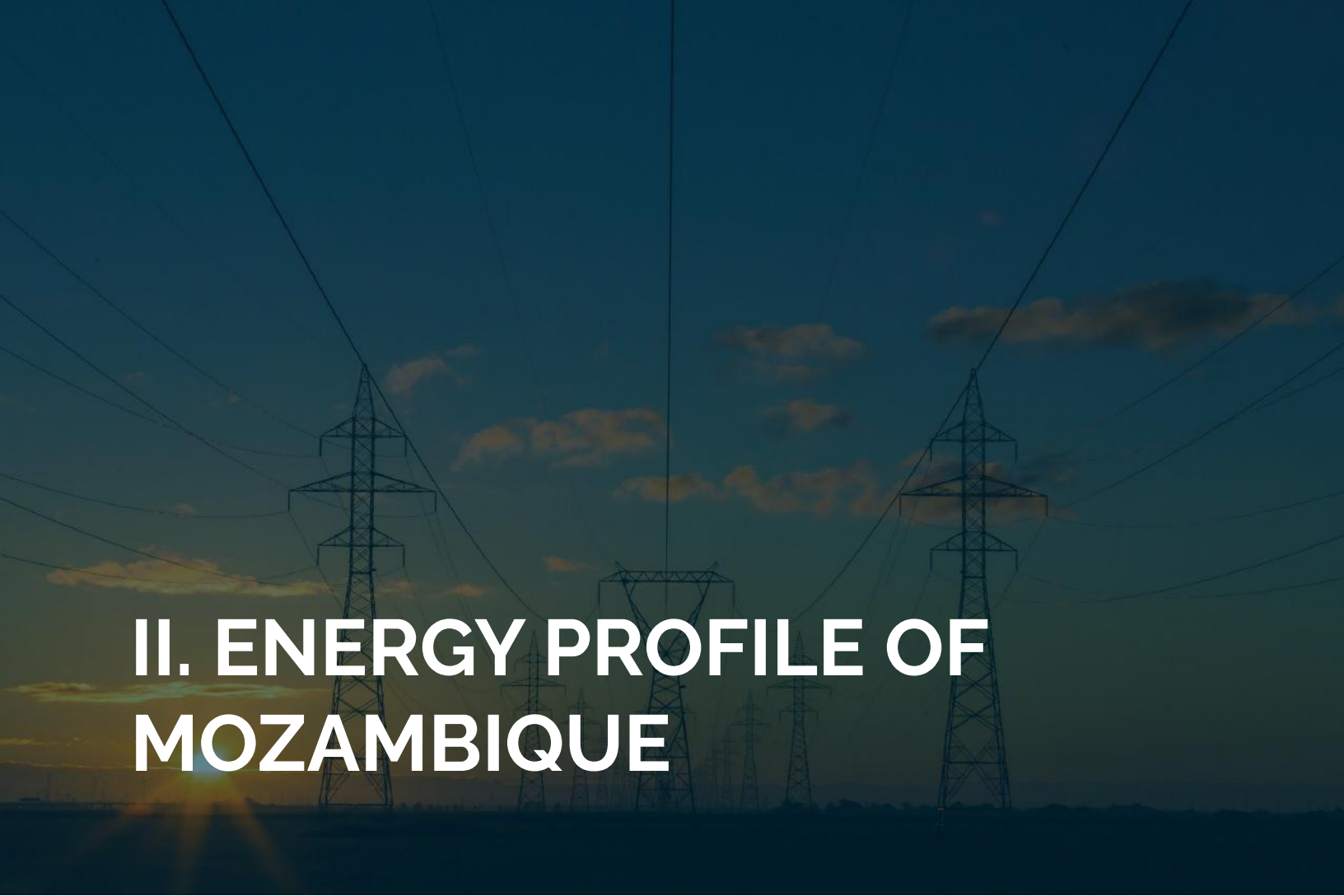
The methodology used for this report was a combination of primary data collection using semi-structured interviews with key stakeholders in the energy sector and secondary sources such as relevant academic articles and reports. The report also benefitted from the debate and contributions made by the government and private sector representatives during the conference held on April 28 in Maputo City,

organized by CDD, to present the results of the “Citizens Consultation and Dialogue to Promote an Inclusive Energy Transition in Pemba” . However, the unavailability of important stakeholders for individual interviews is a limitation of this report.

In addition to this introduction, the report contains four other sections. The following sections describes the energy profile of Mozambique by presenting the main sources of energy and the levels of access to energy. The third section examines the opportunities and challenges for accelerating Mozambique’s energy transition from a macroeconomic point of view, highlighting the role of natural gas in fostering sustainable economic development. The fourth section presents the results of the Citizens Consultation and Dialogue to Promote an Inclusive Transition in Pemba. The last section presents the conclusions and recommendations of the report.







# II. ENERGY PROFILE OF MOZAMBIQUE

## A. Main Sources of Energy

The energetic matrix of Mozambique is dominated by renewable sources, particularly biomass and hydro. However, the growing availability of recently discovered fossil fuels, such as coal and gas, associated with limited production and consumption of solar power impair long-term energetic transition.

### Renewable sources

Biomass and hydro are the dominant renewable energy sources in Mozambique. Biomass is the main source of energy used in households in the country for heating and cooking, especially in rural areas.<sup>[3]</sup> Similarly, charcoal is mostly used in medium to high-income households in urban areas and firewood is mainly used in rural areas.

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[3] Salite, D., Kirshner, J., Cotton, M., Howe, L., Cuamba, B., Feijó, J., & Zefanias Macome, A. (2021). Electricity access in Mozambique: A critical policy analysis of investment, service reliability and social sustainability. *Energy Research & Social Science*, 78, 102123.



[In terms of hydro power, the main source is the *Hidroeléctrica de Cahora Bassa* (HCB) located in Tete province, followed by smaller dams spread over the country such as Mavuzi, Chicamba, Corumana, Lichinga and Cuamba. The hydroelectricity produced is supplied by the public company *Electricidade de Moçambique* (EDM), controlling power generation, distribution and commercialisation. All provincial capitals and all district headquarters across the country are covered by the national grid sourced from HCB, except for the Nacala floating power station that uses diesel.

The energetic matrix of Mozambique is dominated by renewable sources, particularly biomass and hydro. However, the growing availability of recently discovered fossil fuels, such as coal and gas, associated with limited production and consumption of solar power impair long-term energetic transition.

Regarding solar power, photovoltaic stations are a recent development in Mozambique, having started operations only in 2019. Specifically, Mocuba (Zambézia) and Metoro (Cabo Delgado) are EDM's pioneer projects for correct integration of renewables with the national grid, increasing the share of renewables in the energy mix. Metoro's photovoltaic plant will benefit Cabo Delgado and Pemba City.

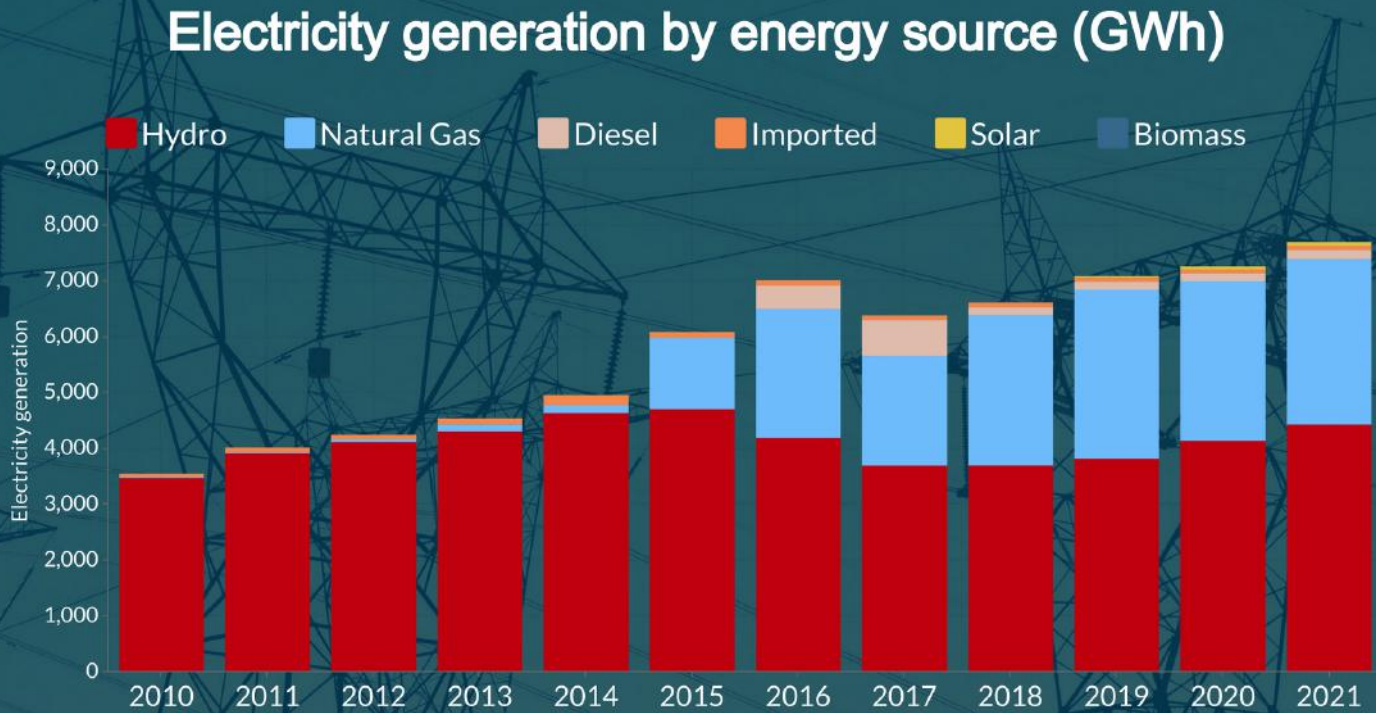
The least represented renewable source in EDM's energetic matrix is biomass, which is supplied intermittently from the Maragra sugar estate, whenever there is excess bagasse (waste of sugar processing).

## Fossil fuels

The largest fossil fuel in Mozambique's energetic matrix is natural gas. However, natural gas is the energy transition resource of choice as it is the cleanest hydrocarbon, producing only about half the carbon dioxide and only one-tenth of the air pollutants as coal when burned to generate electricity.

The availability of gas-fired electricity has been increasing in the country as independent power producers have developed on-grid generation projects, in particular, the 175MW *Central Térmica de Ressano Garcia* (CTRG) power plant commissioned in 2014, the 100MW Gigawatt power plant commissioned in 2015 and the 40MW Kuvananga power plant commissioned in 2017. In the short term, the upcoming operations of the 450 MW *Central Térmica de Ciclo Combinado de Temane* will further increase the share of natural gas in the energy matrix. In the long term, the gas from the Rovuma basin estimated at 277 trillion cubic feet has the potential to consolidate Mozambique's reliance on gas to produce electricity.

Figure 1 Electricity generation by energy source (GWh)

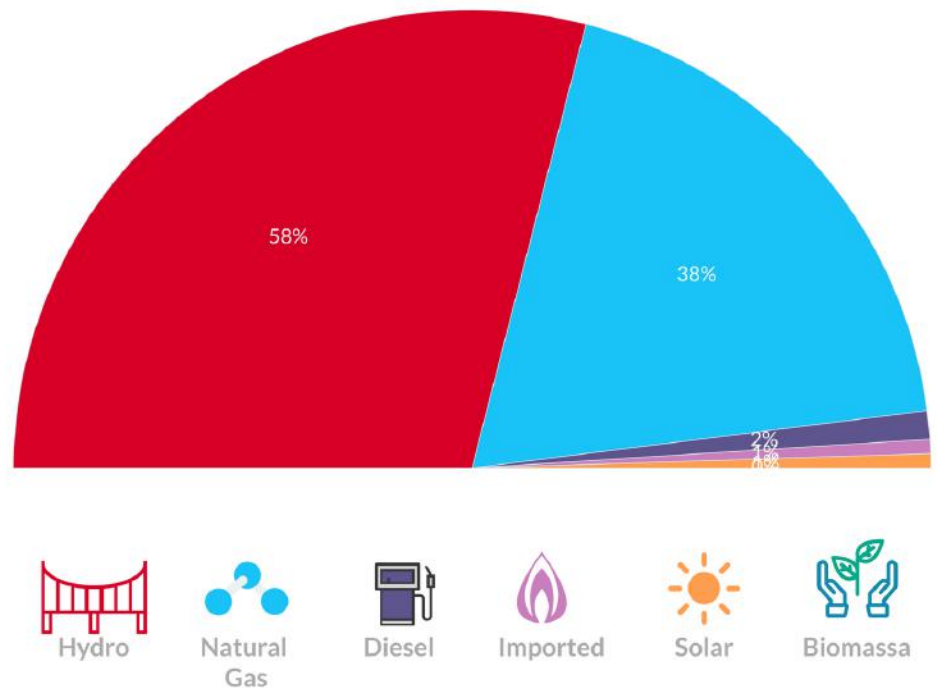


Source: Interview EDM, 2022

Figure 1 shows the evolution of EDM's electricity generation by energy source over the last 10 years. It highlights that in 2010 EDM's energy sources were mostly hydro and imported electricity from South Africa and 2015 onwards natural gas started gaining prominence and its increasing growing faster than hydro. While natural gas has improved access to energy in the country and is a cleaner energy source than other fossil fuels,

the slower growth of supply from hydro, solar and biomass has implied a reduction of the share of renewables in the energetic matrix of Mozambique. Nevertheless, Mozambique's energetic matrix remains relatively clean compared to other countries, as shown in Figure 2, where the current energy distribution by the source is displayed, showing that hydro represented 58% of total electricity production, followed by gas with 38%.

**Figure 2 Energy production in 2021**



Source: Interview EDM, 2022

## B. Access to Energy and Reliability

Currently, only 39% of the population has access to electricity through the national grid, mostly in urban areas. As Figure 3 demonstrates, the provinces with the highest electricity rates are Maputo City (99,9%), Maputo Province (96%) and Gaza (68%), and the lowest electricity rates are in Zambézia (19%) and Cabo Delgado (22%). There are

significant regional imbalances in terms of access to energy as in the centre and north of the country.

Only a quarter of the population has access to electricity in the north, while in the south the national power grid covers more than three-quarters of the population.

Given the limited access to electricity, the most common source of energy for lighting at the national level is car batteries, especially in Tete and Cabo Delgado provinces, followed by kerosene oil<sup>[4]</sup>.

**Figure 3** Access rate at national, regional and province levels 2020 and 2021

<b>NATIONAL</b>	<b>2020</b>	<b>2021</b>
<b>National</b>	<b>35%</b>	<b>39%</b>
North	25%	30%
Centre	25%	27%
South	72%	77%
Cabo Delgado	19%	22%
Niassa	25%	33%
Nampula	27%	32%
Tete	20%	22%
Zambezia	17%	19%
Manica	30%	33%
Sofala	44%	47%
Inhambane	27%	30%
Gaza	62%	68%
Maputo Province	83%	96%
Maputo City	99,6%	99,9%

Source: Interview EDM, 2022

[4] ALER (Isabel Cancela de Abreu, Rita Roque), Guilherme Daniel e Associados. (2017). Renewables in Mozambique – National Status Report (Second Edition). ALER – Associação Lusófona de Energias Renováveis.

Limited access to energy in Mozambique is explained by the massive costs associated with investing in the appropriate power generation and distribution network to connect the dispersed population in rural areas across the country within a context where the tariffs remain too low to cover costs. It is estimated that 70% of the 30.8 million people<sup>[5]</sup> in the country live in rural areas, where the access rate is as low as 8% in 2021.<sup>[6]</sup>

Furthermore, the power supply is not stable and there are regular interruptions. Electricity provision is perceived as of low or poor quality and unreliable, demonstrated by the widespread reliance on private generators.<sup>[7]</sup> Therefore, a core challenge for EDM is building the required on- and off-grid infrastructure to supply quality and reliability in remote villages across the country, particularly given government's commitment to achieving universal access by 2030. Nevertheless, in order to increase access to electricity, Fundo Nacional de Energia (FUNAE), the national energy fund develops

and implements alternative and off-grid forms of providing low-cost and sustainable power to rural areas across the country, including solar power and mini-hydro solutions. Between 1997 and 2017, FUNAE reached 5.3 million beneficiaries through the implementation of 1,767 projects of various dimensions, including the electrification of villages, schools, health centres, administrative post buildings, gas stations and social infrastructures.<sup>[8]</sup>

In Cabo Delgado, there is a need to provide power not only for Pemba but for the entire logistic corridor created by the oil and gas projects as well as other mineral explorations in the province as well as industry, commerce and new services that will be created. For instance, the construction of a dry port on the outskirts of Pemba is expected soon. The dry port is expected to have a storage capacity for as many as 2,000 containers, and warehousing for 20,000 tons of product. In Cabo Delgado, households account for 46% of electricity total consumption, followed by industry (36%), commerce (16%) and services (2%) (Figure 4).

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[5] <http://www.ine.gov.mz/noticias/populacao-mocambicana-para-2021>

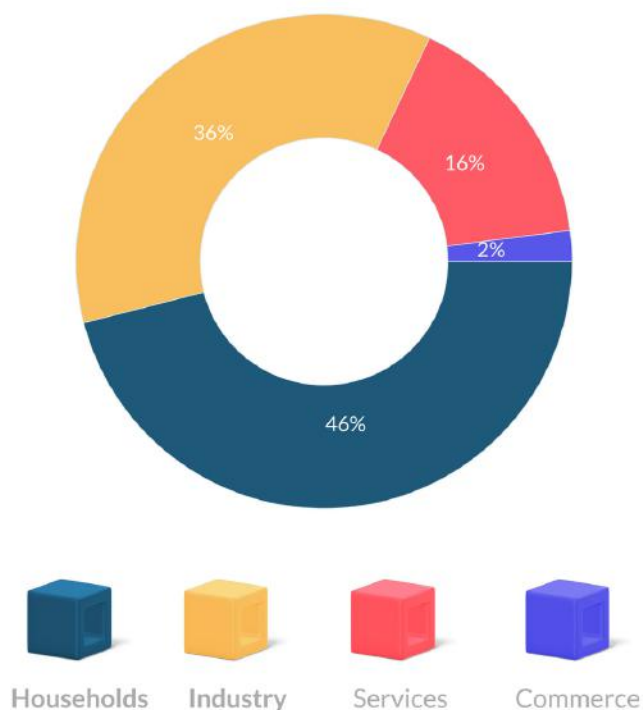
[6] <https://www.worldbank.org/en/news/press-release/2021/12/14/world-bank-supports-greater-access-to-energy-and-broadband-services-in-rural-mozambique>

[7] EDM, Electricidade de Moçambique, EP (2017). EDM Strategy 2018-2028.

[8] ALER (Isabel Cancela de Abreu, Rita Roque), Guilherme Daniel e Associados. (2017). Renewables in Mozambique – National Status Report (Second Edition). ALER – Associação Lusófona de Energias Renováveis.



**Figure 4** Electricity consumption by category in Cabo Delgado



Source: Interview EDM, 2022





# III. ACCELERATING THE ENERGETIC TRANSITION: OPPORTUNITIES AND CHALLENGES

Mozambique has abundant resources to produce clean energy, including gas, hydro, solar, wind, biomass and geothermal with enormous power generation potential. This latent potential offers many options to diversify the sources of generation to provide energy at competitive prices to boost electrification and support economic development.

According to FUNAE's Energy Atlas, Mozambique's main energy potential is as follows:

- In terms of hydro, there are identified 1,400 projects to increase the country's generation capacity, with Mphanda Ukuwa's 1,500MW project being the major priority to be developed over the coming years. Expanding hydro-fired electricity in Mozambique is also dependent on EDM negotiating a new agreement with HCB for a larger electricity allocation (the current agreement ends in 2029).



A new agreement would benefit Mozambique not only in terms of increasing the share of renewables in the energy matrix, but also financially as HCB electricity is considerably cheaper than the other sources (imports and IPPs)<sup>[9]</sup>;

- Regarding solar, Mozambique has high volumes of solar radiation, in particular in the provinces of Tete, Niassa, Nampula and Cabo Delgado, with a potential to generate 23TW;
- Mozambique has some of the largest coal reserves in the world, estimated at 23 billion tons of proven coal reserves, corresponding to a 2,000MW generation capacity. EDM aims to develop coal to power projects in Nacala (200MW), Cuamba (300MW) and Tete (600MW). However, EDM has faced challenges in securing loans to fund coal- to- power projects due to global demand for reductions in emissions levels. Therefore, it is unlikely that these projects will be implemented in the nearest future.
- The Plan for Natural Gas indicates that two gas to power plants<sup>[J1]</sup> will be built in the Rovuma Basin.<sup>[10]</sup>

In general, interviews have shown that the main stakeholders in the energy sector in Mozambique are conscious of the global debate on the energy transition and highlight that the increasingly frequent natural disasters in the country are an illustration of the need to take measures to address climate change. However, it has been noted that the combination of the fact that Mozambique has very low levels of CO<sub>2</sub> emissions and the enormous and growing energy needs of the country implies that the country should maximize the exploration of its energy potential in the short to medium- term.

For instance, one interviewer explained that the country cannot forego even the use of coal, not to mention gas, to produce energy because there is still over half of the population without access to electricity as well as growing demand from SADC countries. Moreover, it is argued that gas to power plants take a relatively shorter time to build compared to hydro plants, responding quickly to the urgent needs of the country.

For instance, a combined cycle power plant can be built in one or two years, while building a hydro plant is a much more complex process, requiring extensive environmental studies, and taking no less than 4 or 5 years.

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[9] EDM, Electricidade de Moçambique, EP (2017). EDM Strategy 2018-2028. Maputo

[10] República de Moçambique, Conselho de Ministros (2014). Plano Director do Gás Natural (Aprovado Na 16.<sup>a</sup> Sessão Ordinaria Do Conselho de Ministros). República de Moçambique.

## A. Using Rovuma's gas to produce energy

The main challenge in establishing gas to power plants appears to be ensuring that foreign concessionaires in the oil and gas sector allocate part of the production to the domestic market. Quite often, their interests reside in exporting the entire production to their respective countries of origin. Therefore, negotiating with the foreign firms to leave part of the gas for the domestic market is crucial.

Accordingly, the gas from the Coral Sul FLNG project led by Eni, which is expected to start production in later 2022, has been entirely sold to British Petroleum, leaving no room for domestic power generation. As for the Golfinho project in Area 1 currently led by TotalEnergies in the Palma district, it has been suspended since April 2021 and activities are supposed to resume in 2023. With the implementation of this project, it is expected that part of the gas produced will be allocated to the domestic market.

Indeed, the Gas Law 21/2014 has a requirement that the government should ensure that 25% of oil and gas produced must be allocated to the domestic market.<sup>[11]</sup> However, as explained by one interviewee, such allocation is contingent on the availability of concrete projects that can use such resources. Furthermore, the domestic consumption of gas is not solely for power generation.

Other projects that could demand gas and are part of the government priorities include fertilizers, urea, methanol and liquified gas. In other words, power generation projects will have to compete with other industries for the allocation of electricity.

The fact that the country has a considerable number of gas-to-power plants is seen as a positive pressure for ensuring that concessionaires companies allocate gas to the domestic market. Nonetheless, as of now, interviewees indicated that concrete plans for the construction of gas power plants in the Rovuma basin have not been initiated, although there is a clear interest from the government in their implementation.

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[11] República de Moçambique, Conselho de Ministros (2014). Plano Director do Gás Natural (Aprovado Na 16.<sup>a</sup> Sessão Ordinária Do Conselho de Ministros). República de Moçambique.

## B. Using gas revenues to expand the provision access of energy

As mentioned, improving the provision of energy will require massive investments not only in the power plants but also in the transmission and distribution network, particularly in the northern region. Within this context, the potential revenues from the oil and gas sector, estimated at USD 96 billion by the Bank of Mozambique, can have an impact in supporting the development of the required infrastructure for improving the provision of electricity.

While the specific criteria for the referred projections have been questioned in many studies, current fluctuations in oil prices have further increased uncertainty regarding the potential revenues the country will receive from oil and gas production in the Rovuma Basin. Regardless of the price fluctuations, it is still not possible to deduce how the increase in government revenues will directly impact infrastructure development and, in particular, energy provision and access. For instance, the revenues will be limited during the first 20 years of production as the concessionaire companies will aim to recover



*Improving electricity provision and access as well as diversifying energy sources requires ensuring that it electricity remains relevant in the country's development agenda (...)*

investments costs, limiting the potential for corporate and profit taxes.<sup>[12]</sup> Additionally, the recently proposed establishment of a Sovereign Fund stipulates that, during the first 20 years, 50% of the revenues must be channelled to the State Budget and 50% must be deposited in the Sovereign Fund account.<sup>[14]</sup> Consequently, infrastructure development, including rural electrification, will be targeted through the State Budget allocation to these sectors. Yet, it is a questionable argument because resources in the State Budget can be channelled into recurring expenses instead of investment, including servicing debt.<sup>[15]</sup>

Improving electricity provision and access as well as diversifying energy sources requires ensuring that it electricity remains relevant in the country's development agenda and reflected through the continued expansion of domestic investment in the sector.

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[12] [https://cartamz.com/index.php/politica/item/2491-abdul-magid-osman-adverte-que-encaixe-de-bilhoes-de-usd-no-gas-do-rovuma-e-uma-miragem?fb\\_comment\\_id=2183582088363699\\_3823317761056782](https://cartamz.com/index.php/politica/item/2491-abdul-magid-osman-adverte-que-encaixe-de-bilhoes-de-usd-no-gas-do-rovuma-e-uma-miragem?fb_comment_id=2183582088363699_3823317761056782)

[14] Banco de Moçambique (2020). Proposta de modelo de fundo soberano para Moçambique. Banco de Moçambique.

[15] Siuta, M., & Mosca, J. (2020). Comentários sobre o modelo de fundo soberano proposto pelo Banco DE Moçambique (Destaque Rural No 110). Observatório do Meio Rural e Instituto de Estudos Sociais e Económicos.

In fact, energy provision, particularly rural electrification, is among the current priority sectors of the current government along with agriculture, tourism and infrastructure. Indeed, in 2018, the government launched the program ‘Energy for All’ with the aim of securing universal access to electricity by 2030.


Nevertheless, data from the General State Accounts between 2015 and 2019 demonstrate that the share of realised domestic investment in the electricity sector on total realised domestic investment has remained on average below 3%. The investment on electricity has only increased significantly in 2020, doubling to nearly 6%.

Extended expansion of energy provision and access will require strengthened advocacy for increasing the share of investment in the electricity sector over time.

In conclusion, while the provision and access to energy continues to be a great challenge for Mozambique, particularly in rural areas, improving the provision and access to energy from natural gas and its potential revenues cannot be taken as a given. Both resource and revenue allocation are dependent on a range of factors that need to be yet planned and discussed. Therefore, there is a need for setting up the agenda for effectively achieving universal energy access by 2030 as the government has stipulated and how these goals will be achieved while ensuring lower CO<sub>2</sub> emissions.

**Figure 5** Domestic Investment on in the Electricity Sector 2015-2020 (Million MZN)

	2015	2016	2017	2018	2019	2020
<i>Realised Domestic Investment in Electricity</i>	954.9	741.2	507.7	828.2	1 229	2 537
<i>Total Realised Domestic Investment</i>	42 677	23 629	23 074	32 934	44 747	44 191
<i>% Realised Domestic Investment in Electricity on Total Realised Domestic Investment</i>	2,2%	3,1%	2,2%	2,5%	2,7%	5,7%



# IV. CITIZENS' CONSULTATION AND DIALOGUE TO PROMOTE AN INCLUSIVE ENERGY TRANSITION IN PEMBA

## ***What does an equitable energy transition mean for an extractive-based developing and emerging economy as Mozambique?***

Global net zero scenarios for 2050 indicate over 50% reductions in oil and gas- related revenues between now and 2040 and, according to the international energy agency, the governments should have refused to approve any new oil and gas fields by 2021.

Therefore, equitable pathways still need to be defined to help countries manage macro-economic risk, while providing support to structural economic transition. In contrast, if countries fail to prepare, significant fiscal pressures are likely to undermine the capacity to meet public expectations and service delivery. This, in turn, will result in increased social tensions. However, potential access to significant LNG - the cleanest fossil fuel - from the Rovuma Basin (adjacent to Cabo Delgado province) means that these scenarios do not necessarily need to apply to Mozambique.



Providing there is effective population-centric governance of the sector and natural gas is used as a complementary solution in the context of an energy transition, alongside renewable energies (solar, wind power, biomass) to produce electricity or fuel, Mozambique has the potential to manage the process to its advantage.

But, seizing opportunities offered by an energy transition to renewables and clean energies is extremely challenging in an environment where there are significant strategic considerations - as is the case in Cabo Delgado and Pemba - including multiple competing interests and priorities in an unstable, insecure province; elite-capture versus inclusive prosperity; and reconciling political, private sector, and community interests. Moreover, avoiding the catastrophic socio-economic effects of climate change while embracing an energy policy based on affordable and clean energy provision is critical, and requires the buy-in of the population. This is unlikely to be accepted unless it comes together with:

- Peace and the application respect of for basic human rights;
- Reductions in poverty levels and hunger;
- Improved health, well-being and the quality of education;
- Decent work and economic growth.

In short, the provision of basic needs and services must be a priority, which creates limited horizons in relation to concerning the energy transition debate. In the context of Pemba and Cabo Delgado, four aspects must be taken into consideration:

**1 Unexpected national dynamics have an impact on long-term macro-economic planning related to the energy transition.** Detailed consideration and the balancing of a range of macroeconomic factors, including (but not limited to) the list below, is required to shape a coherent national energy transition strategy that also addresses geographical inequalities between the north and south of Mozambique, and thus benefits Cabo Delgado and Pemba:

- Balancing national revenues from energy production, which are subsequently invested in other sectors, versus investment to increase energy provision and access.
- The "reverse transition" that is likely to take place in the coming years as gas is increasingly used for power electricity production, compared with hydro.
- The future of re-negotiations for the export of hydro-power is scheduled for 2029.
- Reducing reliance on coal-fired energy production.
- Investment in the use of clean energy, using funds generated from the sale of LNG (particularly solar).
- Future industrial requirements in Cabo Delgado and appropriate sources.

**2 Limited capacity and local understanding.** Understanding the logic behind, and details of the energy transition narrative are limited among CSOs in Pemba (and Cabo Delgado) and extremely limited among the population. *Energy access* is, understandably, the highest priority for the population (particularly when energy access is estimated at 22% in Cabo Delgado) not the *energy transition*.\*

There is a need for more time and resources to raise awareness among the population about the energy transition, as a precursor to a citizen's assembly. This can be done through educational support to provincial civil society. In other words, the Pemba population is not ready for a citizen's assembly yet, until it understands more about what is at stake and what are the reasonable expectations for the energy transition. However, once awareness is raised and the assembly is formed, it will need to advocate at national and provincial levels (where the decisions are made) as it is clear the municipality currently has little influence on the macro aspects of energy provision or transition.

It is worth noting that as a result of the recent migration of displaced people to Pemba, the city is now home to representatives from multiple different provincial communities. Given the cross-community dynamic in Pemba, it is important to realise that the population is likely to think more provincially about issues relating to energy, rather than from a city- perspective.

**3 Limited municipal influence and advocacy.** Authorities in Pemba (and Cabo Delgado) have limited autonomy, channels or resources to influence the energy transition at the municipality and provincial levels other than encouraging lower-level initiatives such as solar-powered street lighting. Substantial influence, which results in structural change and development, can only be achieved through engagement with national- level authorities.

There is a need to build capacity in the municipality so that they can play a positive role in influencing decision-making at other levels. This should involve taking existing (and future) socio-economic development plans and adding the energy transition / environmental considerations and approaches. The municipality are is seemingly open to this type of support.

**4 The need for conflict sensitivity.** The Energy transition issues should only be discussed in the context of satisfying basic human needs first (the priority), while trying (where possible) to adopt environmentally friendly approaches. This should be done without compromising efforts to achieve the priority requirement. For example, suitable approaches could include using solar- powered water supplies and lighting for new settlements within Pemba. There is also a need to manage the expectations of local stakeholders. Promises of improved infrastructure, revenue generation and opportunities have already been dashed because of the lack of LNG development, so it is important to be realistic about the potential for an equitable and inclusive energy transition from the outset, especially when engaging with the population of Pemba.



## ***Steps towards energy transition in Pemba: Recommendations.***

- Raise awareness, improve basic understanding and increase knowledge on the energy transition, firstly with local CSOs and then (through cascading processes) to the communities of Pemba. Concurrently, developing a robust strategic communications plan to highlight the key considerations required for an effective energy transition.
- When sufficient capacity to understand the key issues around the energy transition is achieved - combined with a nucleus of CSOs that are able to convene community representatives on the subject - begin the process of forming a *Citizens' Assembly* related to the energy transition in Pemba.
- Work with the municipal/provincial authorities, and the private sector (particularly the LNG operators), in the process of raising awareness, helping communities to understand the practical challenges of affecting an energy transition alongside other priorities.
- Facilitate the development of a joint municipality / CSO energy diversification plan for Pemba, taking into account urban and infrastructure development plans being produced by other authorities / /agencies (e.g. ADIN, FNDS etc).
- Establish the metrics and process for a monitoring programme, to ensure ongoing assessment of the progress (or otherwise) of the energy transition.
- Assist in building the capacity of the *Citizens' Assembly* to advocate at the national level for a fair and effective energy transition, in line with the joint energy diversification plan and local priorities.



# V. CONCLUSIONS AND RECOMMENDATIONS

This report aimed at presenting the fundamental economics and the social nuances of the possibility of an energy transition in Mozambique and Pemba in particular. It has done so by analysing Mozambique's energy profile as well as the opportunities and challenges for accelerating the energy transition, highlighting the role of natural gas.

The analysis demonstrated that while Mozambique's energetic matrix has historically been dominated by renewable sources, particularly hydro power, the growing availability of gas-fired electricity plants may impair this status in the long-term. However, taking into account that natural gas is considered a transition resource of choice and the enormous challenges the country still faces to ensure reliable energy access for all, just energy transition for Mozambique means that the use of natural gas to solve issues of access cannot be underestimated.

Currently, only 39% of the population has access to electricity through the national grid, mostly in urban areas. This means that more than half of the population, particularly in rural areas in the centre and north regions of the country, still do not have access to electricity. In Cabo Delgado, there is a need to provide power not only for Pemba but also for the entire logistic corridor created by the oil and gas projects, other mineral explorations in the province as well as industry, commerce and, old and expected new services.

There have been added challenges to basic service provision, including energy access, due to the internal displacements in the province with growing numbers of the population relocating to Pemba and adjacent districts.



Limited access to energy in Mozambique is explained by the massive costs associated with investing in the appropriate power generation and distribution network to connect the dispersed population in rural areas across the country.

Within this context, the potential gas and revenues from the oil and gas explorations can have an impactful role in supporting the massive latent potential for clean energy production including hydro, solar, wind, biomass and geothermal to boost rural electrification and support economic development. Nevertheless, the link between gas production as well as increased fiscal revenues and investment in energy access and diversification cannot be taken for granted.

Both resource and revenue allocation are dependent on a range of factors that need to be advocated for and planned accordingly. Therefore, there is a need for setting up the agenda for effectively achieving universal energy access by 2030 as the government has stipulated and the role of oil and gas reserves and revenues.

In terms of resource allocation, the main challenge in establishing gas to power plants appears to be ensuring that foreign concessionaires in the oil and gas sector allocate part of the production to the domestic market. Legal provisions have incorporated domestic use of resources, and

concrete energy projects that can consume such resources need to be created, particularly as other projects that could demand gas and are part of government priorities include fertilisers, urea, methanol and liquified gas.

In terms of revenue allocation, it is still not possible to deduce how increasing government revenues will directly impact infrastructure development and, in particular, energy access. The recently proposed establishment of a Sovereign Fund stipulates that, during the first 20 years, 50% of the revenues must be channelled to the State Budget and rural electrification, will be targeted through the State Budget allocation to these sectors.

However, resources in the State Budget can be channelled into recurring expenses instead of investment, including servicing debt. Therefore, improving electricity access and diversifying energy sources requires ensuring that it remains relevant in the country's state budget allocation and reflected through the continued expansion of domestic investment in the sector. In other words, extended expansion of energy access will require strengthened advocacy for increasing the share of investment in the electricity sector over time.

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# ANNEXES

## LIST OF INSTITUTIONS INTERVIEWED PEOPLE

Fundo Nacional de Energia (FUNAE).

Electricidade de Moçambique (EDM).

Empresa Nacional de Hidrocarbonetos (ENH).



The Centre for Democracy and Development (CDD) is an influential public interest, non-profit civil society organization advocating for accountable democratic governance which serves the citizenry, including the most marginalized communities. As a think & do tank, CDD combines political economy analysis, rights-based approach and participatory methodologies to co-create programmatic priorities, enhance local ownership and ensure sustainability for both short- and long-term changes to contribute to the building of resilient, inclusive, democratic and rights respecting Mozambique society. To achieve this strategic agenda, CDD's work is organized in five pillars: i) **Youth Leadership and Gender Justice**; ii) **Democracy and Human Rights**; iii) **Economic Justice**; iv) **Peace and Security**; and v) **Just Energy Transition**.



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