



REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO DOS RECURSOS MINERAIS E ENERGIA

Gabinete de Implementação do Projecto  
Hidroelétrico de Mphanda Nkuwa

# Mphanda Nkuwa Hydropower Project

## Investment Teaser





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## **OPENING REMARKS**

By H.E. Max Tonela, Minister of Mineral Resources and Energy of Mozambique

**Dear All,**

*In my capacity as Minister of Mineral Resources and Energy of Mozambique, I would like to thank you all for joining this important event.*

*Along with the team at my Ministry, the National Power Utility, the Cahora Bassa Hydroelectric corporation and the Mphanda Implementation Office (GMNK), I would like to welcome all of you to this plenary session on the 1,500 MW Mphanda Nkuwa Hydropower Project and associated transmission facilities.*

*The Ministry took the decision to relaunch this Project last year and, shortly thereafter, we established and tasked an independent technical team under the GMNK, to lead on the selection of a strategic partner to implement the project.*

*The Project will be located downstream from the existing Cahora Bassa Dam and is of paramount importance for Mozambique, as a reliable source of clean low-cost electricity.*

*We consider this project to be a pre-requisite to accelerate economic growth & improve the living standards of all our citizens.*

*Mphanda Nkuwa is an integral part of the Electrical Infrastructure Integrated Masterplan. It is poised to support the achievement of the Government's vision of universal access of electricity by 2030, stimulate industrialization and boost growth through reliable transmission infrastructure. The project will also create power exporting opportunities to strengthen Mozambique's position as a regional power hub while ensuring security of domestic supply.*

*This session is being conducted to introduce the project to potential Strategic Partners, prompt feedback on key transaction terms and obtain the interest of strategic partners in the project.*

*We are fully committed to an open and transparent process and this meeting marks the beginning of this course of action.*

*The major focus of this exercise will be on project structuring, project financing, tender process design and Government support and approvals to design steps with regards to Strategic Partner Selection Process.*

*It is my sincere hope that we shall see more of you in the future; as part of this project and as part of Mozambique's own future.*

*Thank you.*

# EXECUTIVE SUMMARY


Mphanda Nkuwa is the largest hydropower project under development in Mozambique. Its low electricity generation costs, projected to be among the lowest in the region, combined with relatively minimal environmental and social implications, make the 1,500 MW project a top Government and attractive investment proposition. While predominantly a flow of the river development with a mere 100 km<sup>2</sup> reservoir, Mphanda Nkuwa's benefits from the 2,675 km<sup>2</sup> Cahora Bassa reservoir located 60km upstream.

As a member of SAPP and one of the largest power exporters in the region with a track record of exports dating back over 20 years, Mozambique offers an ideal location to develop a large-scale renewable energy plant that can fuel the country's industrial transition, export power to neighbouring countries such as South Africa, Eswatini and Zimbabwe and competitively produce green commodities such as green hydrogen,

green aluminum and green ammonia for global markets.

The Government of Mozambique seeks a strategic investor to develop the Mphanda Nkuwa project under a BOOT agreement and in partnership with the national utility (EDM) and the owner/operator of upstream Cahora Bassa hydropower plant (HCB) representing the Public sector. The strategic investor is expected to hold a majority equity position in the project and the concession will be 30 years with the option to renew for an additional 10 years. The project also requires the development of associated transmission infrastructure of 1,300 km which could, depending on the outcome of existing transmission studies and outcome of the market sounding, be developed through a separate tender.

The following prospectus is intended to provide information to interested strategic and financial investors in preparation of the upcoming market

An aerial photograph of a lush green wetland or mangrove area. The landscape is dominated by vibrant green vegetation, with several winding, light-colored water channels or canals that meander through the land, creating a complex, organic pattern. The water appears calm and reflects the surrounding greenery. The overall scene is a dense, natural ecosystem.

sounding and subsequent project development activities. The prospectus is provided solely for the purposes set out in this document and is not intended to form any part or the basis of any investment decision by a strategic and/or financial investor. Each strategic and/or financial investor must make its own independent assessment of the project taking such advice (whether professional or otherwise) as it deems necessary. While reasonable care has been taken in preparing the prospectus, it does not purport to be comprehensive. Neither MIREME nor any of its advisors accept any liability or responsibility for the adequacy, accuracy, or completeness of any of the information or opinions stated herein and no representation or warranty (whether express or implied) is or will be given by MIREME or its advisors with respect to information or opinions stated herein. A revised version of this prospectus will be made available together with the RfP documents.



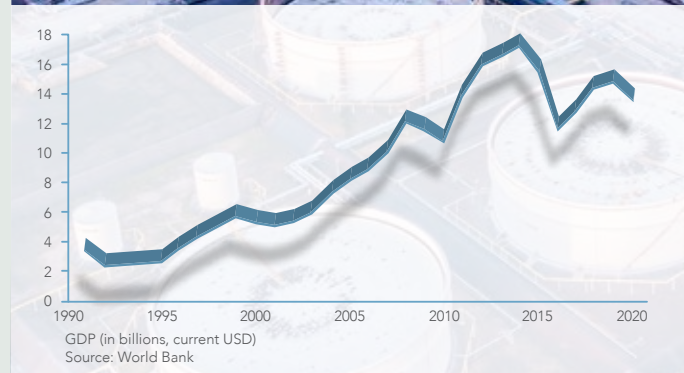
# 1. BACKGROUND & CONTEXT

## 1.1 COUNTRY & ECONOMY OVERVIEW

The Republic of Mozambique is located in South-Eastern Africa bordered by the Indian Ocean to the east, South Africa to the south, Malawi, Zambia, Zimbabwe and Eswatini to the west and Tanzania to the north. It has a total land area of 801,590 km<sup>2</sup> and a population of 30,832 million<sup>1</sup> (INE, 2021). The official language is Portuguese.

Mozambique achieved independence from colonial rule by the Portuguese in 1975. Following structural reforms in 1987 and the end of several conflicts that plagued the region in the early 1990s, Mozambique's economy experienced remarkable economic growth. From 1995, GDP grew fivefold to USD 15.3bn in 2019, resulting in GDP per capita of USD 504 (both nominal, current USD, World Bank).

<sup>1</sup>Instituto Nacional de Estatísticas (INS), Moçambique, 2021





The economic outlook for Mozambique is bright. Fueled by its vast energy potential, Mozambique stands on the cusp of a transformation from what today is a largely agrarian and rural economy to an industrialized and globally integrated powerhouse. Mozambique does not only hold the largest hydropower potential in Southern Africa but recently discovered natural gas resources off its coast that resulted in tens of billions in investment commitments by companies such as ExxonMobile and TotalEnergies. Driven by the minerals boom and investment in the gas sector, Mozambique became one of Africa's fastest growing economies. Combined with a long-standing track record as a reliable electricity exporter to the region (including South Africa), the energy sector has seen significant investor interest overall and accounts for over a quarter of all FDI coming in to the country.



## 1.2 ENERGY SECTOR

### 1.2.1 MOZAMBIQUE'S VAST ENERGY POTENTIAL

Mozambique boasts the greatest potential for electricity generation of any country in Southern Africa. With its solar, hydro, coal, gas, and wind resources, the country could generate up to 187 GW of electricity.

With an estimated hydroelectric potential of 12,5 GW, Mozambique's hydropower potential is the largest in Southern Africa and among the highest on the African continent. More than 80% of this potential is located in the Zambezi Valley, which is home to the Cahora Bassa dam (2,075 MW), one of the largest hydroelectric dams in Africa.

The discovery of natural gas in the Rovuma basin has fundamentally changed Mozambique's economic outlook and opened unprecedented



development pathways for the country and its people. Projected LNG investments of US\$ 55 billion, equivalent to four times the size of the country's GDP, constitute the largest foreign direct investment in Africa. The combined output of the two concessions already granted will produce 30 million tons of LNG per annum. Up to a quarter of the gas has been set aside for use in Mozambique to fuel its industrialization process. Simultaneously, LNG exports are expected to increase annual GNP by \$10 to \$14 billion and make Mozambique a global energy player.

## 1.2.2 GOVERNMENT VISION

The Government of Mozambique has a dual ambition for the energy sector:

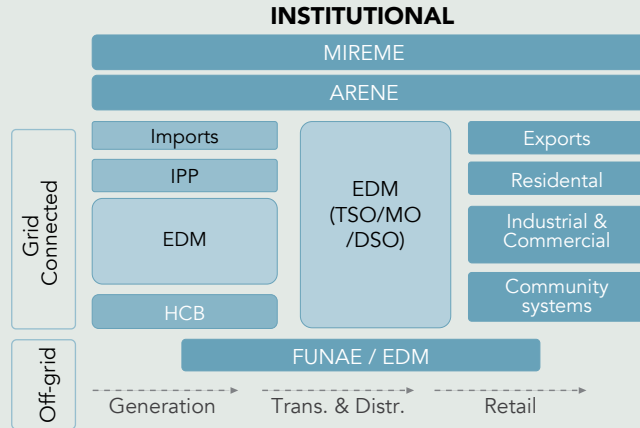
(1) As a major component of human development, the government is committed to providing all Mozambicans with high-quality, affordable and sustainable electricity by 2030. This is in line with the UN sustainable development goals and the country's leading strategy document, the Agenda 2030. With this end in mind, in 2018 the Government launched the "Energy for All" ("Energia para Todos") Program through which it increased electrification rates from 28% in 2018 to 34% in 2020.

(2) The Government further identified the Energy sector as a major promoter of Mozambique's sustainable economic growth through regional power exports, global gas exports and large-scale industrialization that is underpinned by the country's low-cost renewable and clean energy with vast natural gas resources.





### 1.2.3 INSTITUTIONAL SETTING



- Electricity Law 21/97;
- Decree N° 08/2000, Concession regulation;
- Decree N° 29/2003, 29 de June (Tariff Decree);
- Decree N° 42/2005, creates the GNRT (SO & MO);
- Decree N° 43/2005, regulation that nominates EDM as SO & MO;
- Law PPP N° 15/2011, Public Private Partnership;
- Ministerial Dispatch, N° 184/2014, approving the Transmission Grid Code;
- Law N° 3/2018, which regulates SoE.

The energy sector in Mozambique is regulated and supervised by the **Ministry of Mineral Resources and Energy (MIREME)**. MIREME formulates Energy Policy and monitors policy implementation. However, there are other key institutions within the government structure whose functions and objectives have a direct impact on the sector and on the implementation of relevant measures concerning its development. For access to energy, the most relevant institutions are the Energy Regulatory Authority (ARENE), and the Fundo de Energia (FUNAE).



The **Energy Regulatory Authority (ARENE)** was established in 2017 with the mission to supervise, regulate, represent, control and sanction all electricity operators. Its regulatory functions extend to Economic Regulation (Tariff-Setting), Technical Regulation (Quality of Service), Institutional Capacity, and Energy Efficiency Development. ARENE has a website that provides public access to key regulatory documents such as license application procedures, laws, tariff methodology, providing a first comprehensive overview of the sector to prospective investors.

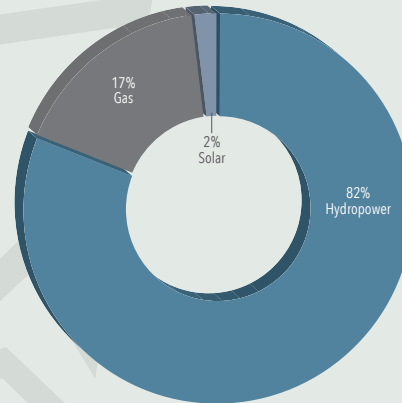
The **Energy Fund (FUNAE)** was established in 1997 and amended in 2002 and has administrative and financial authority. Its objective is to promote the development, generation and use of several forms of energy at low-cost to supply rural and urban areas inhabited by low-income households and to ensure a rational and sustainable management of energy resources.

In Mozambique there are three main electricity companies: **Electricidade de Moçambique (EDM)** is the public utility responsible for transmission and distribution as well as a large share of the country's generation capacity; **Hidroeléctrica de Cahora Bassa (HCB)** is Mozambique's hydropower generation company. It manages and operates (under a concession agreement granted by the Government of Mozambique) assets from the Cahora Bassa scheme. These comprise the dam, one of the biggest hydropower systems in Africa with an installed capacity of 2,075 MW, the HVDC transmission system, the Matambo substation and additional transmission lines and finally **Mozambique Transmission Company (MOTRACO)** which is an Independent Transmission Company responsible to wheel power to Eswatini, Mozambique and supply the power to Mozambique Aluminum factory in the industrial Park of Bebeluane in the Maputo Province. MOTRACO is equally owned by Mozambique (EDM), Eswatini (SEC) and Eskom by 33,3% each.

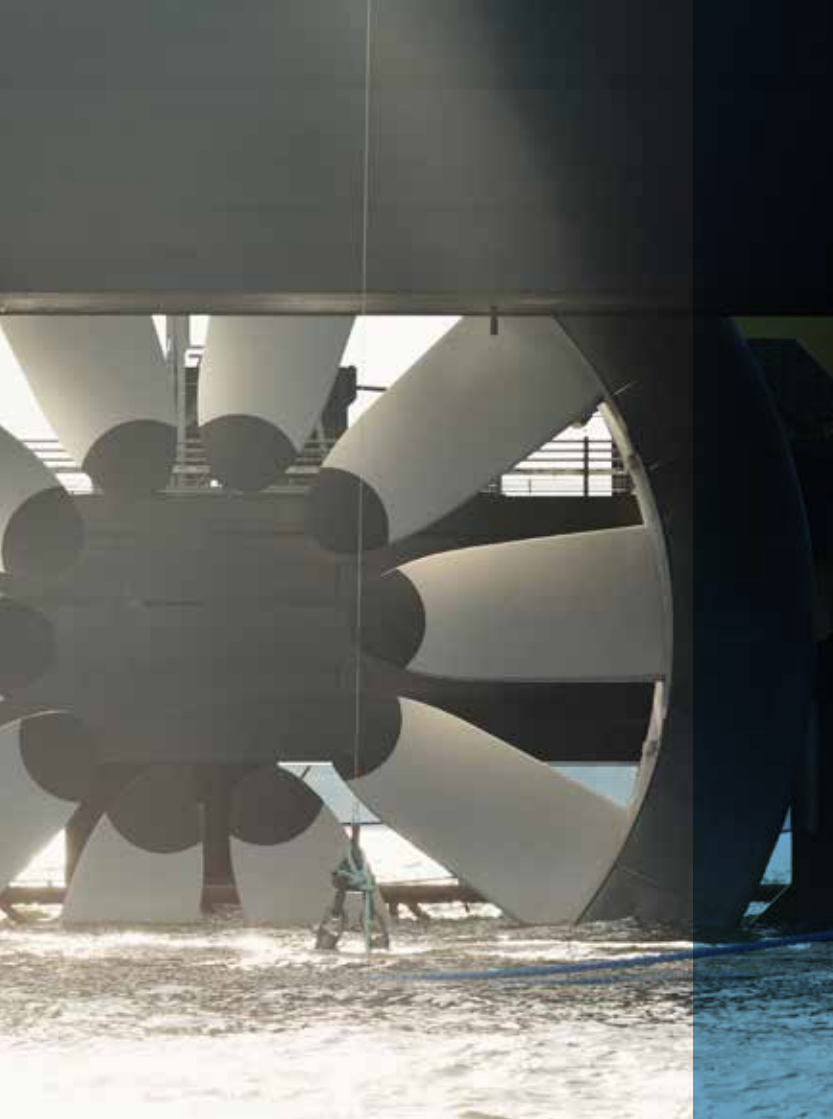
## 1.2.4 GENERATION

To date, Mozambique has an installed capacity of around 2,700 MW of which 82% is based on hydropower, 17% on gas and 2% on solar.

**Hydropower:** There are six main hydroelectric facilities supplying the national grid. The largest, Cahora Bassa, is owned and operated by Hidroelectrica de Cahora Bassa (HCB), an independent power producer, and has an installed capacity of 2,075 MW. Of this, 500 MW are dedicated to the national utility while the rest is being exported to South Africa under a long term PPA that will end in 2029. HCB is a public private joint venture, with the government holding 82% of the shares. The national utility, Electricidade de Moçambique (EDM), operates five smaller plants: Mavuzi (52 MW), Chicamba (38.4 MW), Corumana (16.6 MW), Cuamba (1.9 MW) and Lichinga (0.73 MW).







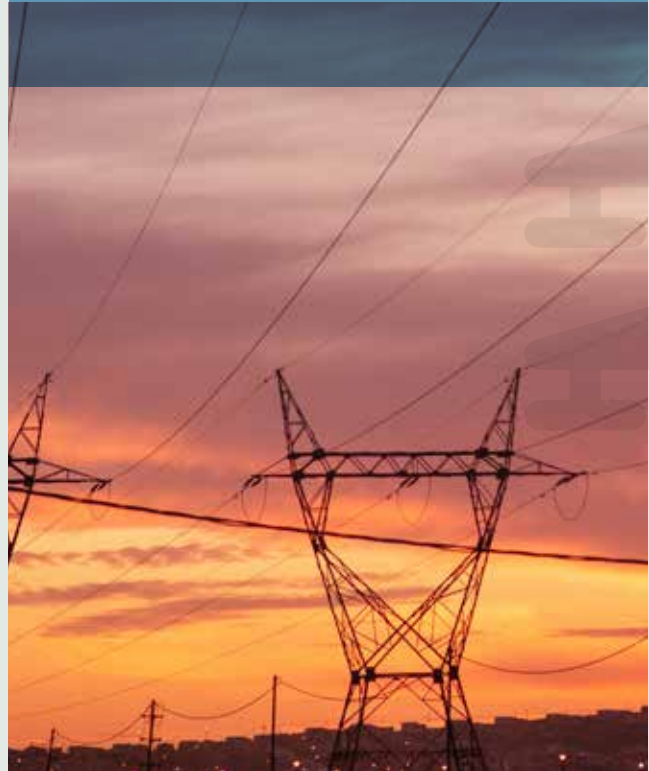
**Gas:** There are four operational gas thermal power plants: 175 MW Central Térmica de Ressano Garcia (**CTRG**); 120 MW Central Térmica de Gigawatt (**CTG**); 110 MW Central Térmica de Maputo (**CTM**) and 40 MW **Kuvaninga** plant. All of them are located around Maputo province in the southern part of the country. As with hydroelectric power, the private sector plays an important role in the development of gas-based electricity generation. While EDM owns 100% of CTM and 51% of CTRG, CTG and Kuvaninga are fully owned by private investors. Since 2014, IPPs have developed on-grid private generation projects in Mozambique.

**Solar:** The first large-scale solar power development in Mozambique is the 41 MW Mocuba plant. It is located in the northern region and was commissioned in 2019. Scatec is the majority shareholder while EDM holds a minority position in the project.

## 1.2.5 TRANSMISSION

Mozambique is a member of the Southern African Power Pool (SAPP), which boosts a common power grid for all 12 member states and allows the countries to trade energy among each other. As one of the group's main energy exporters, Mozambique is continuously investing in strengthening both its domestic transmission and distribution system as well as the linkages to its neighbour countries. Today, Mozambique's transmission grid is interconnected with South Africa, Zimbabwe and Eswatini. The interconnectivity levels within the SSA region will increase substantially with the interconnection project between Mozambique and Malawi, a 218 km long transmission line. Construction will start in 2021 with the objective to commission in the first half of 2023. The Mozambique-Zambia Interconnector, in the technical studies phase, is also progressing well and will consist of a high voltage transmission line from Chipata substation to Cataxa substation in Mozambique, with a length of 286 km of which 77 km is in Zambia and the rest in Mozambique.

The objective of the project is to enable the evacuation of power from Cahora Bassa Hydro Power Station and Mphanda Nkuwa through Zambia to the Southern African electricity market.



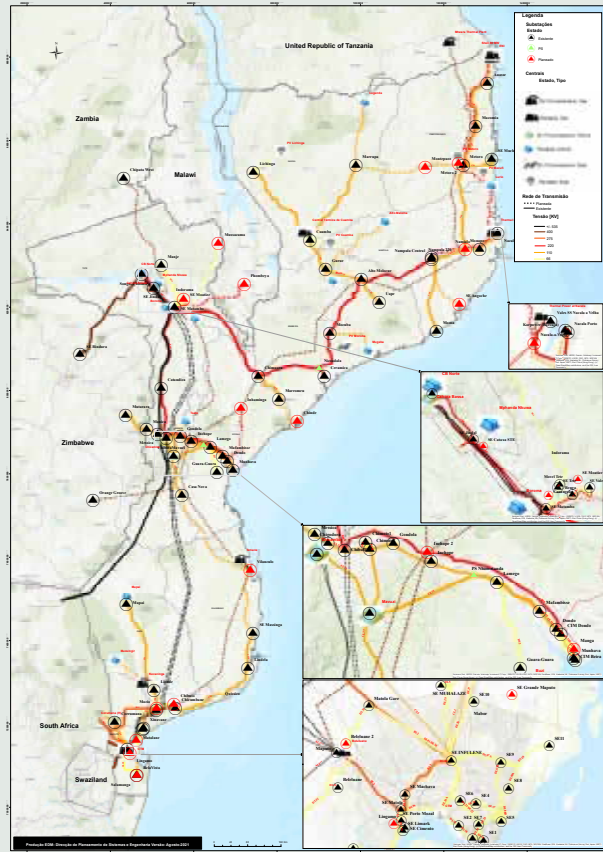
Mozambique's main national electricity transmission grid is operated by EDM and is subdivided into three parts:

1. The **northern region** has a 220 kV transmission system covering approximately 1,000 km from the Songo substation to Nampula and continuing at 110 kV to the city of Nacala. A separate 220 kV system (operated at 110 kV) runs from Tete to the central region at Chibata.
2. The **central region** has a 110 kV system linking the Chicamba and Mavuzi hydroelectric plants to the load centres of the Beira-Manica corridor.
3. The **southern region** has a 110 kV system extending from Maputo to XaiXai, Chokwe and Inhambane, as well as a 275 km single circuit line from Komatipoort to Maputo and expanded to Nzimbene in Chockwe.



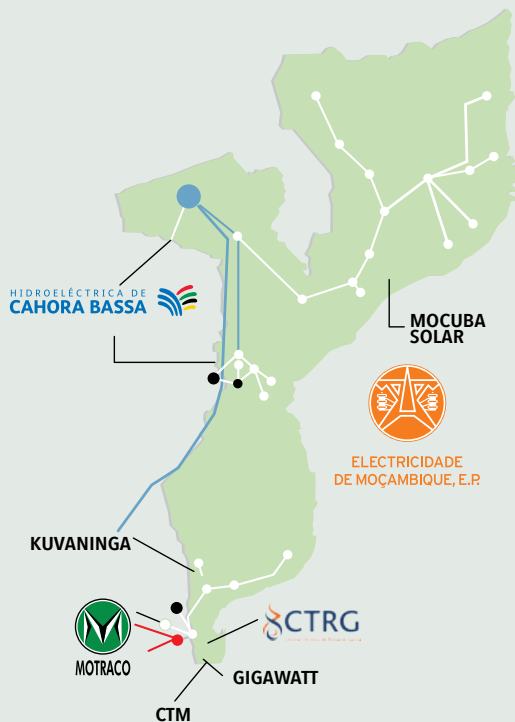


By 2024, these three regions will be fully interconnected by a high voltage transmission lines at 400 kV, that have already been financed to evacuate power from the 450 MW gas powered Temane plant (under construction). A 536 km long 400 kV transmission line connecting Temane to Maputo is under construction which is estimated to be concluded in 2024, and the first phase of the 400 kV connection from Chimuara (Caia) to Nacala in the northern part of the country, connecting it to power produced by Cahora Bassa and in the future the Mphanda Nkuwa. The first section of 367 km is estimated to be concluded in 2023. Furthermore, this year the construction of Mozambique – Malawi interconnection will start to be build and is expected to be concluded by 2023. This infrastructure will enable for Mozambique to start export initially 50 MW and it will growth to stabilize the power security in Malawi.





In addition to the EDM operated transmission system, two private entities operate transmission infrastructure. First, Hidroelectrica de Cahora Bassa (HCB) operates part of the transmission network transporting power from Songo substations to the Matambo substations, near the city of Tete as well as 1,400km long, 533 kV HVDC transmission line connecting Songo substation in Mozambique with Apollo substation in South Africa, of which 900 km runs within Mozambique along the border with Zimbabwe. Second, The Mozambique Transmission Company (MOTRACO) transports power from South Africa to the Mozal aluminium smelter.



- **Electricidade de Moçambique (EDM):** The national power utility wholly owned by the state responsible for the **generation, transmission, distribution and commercialization of electricity** throughout the country.

- **Mozambique Transmission Company (MOTRACO): Independent Transmission Company (ITC),** Owned 33.3% by EDM, 33.3% ESKOM and 33.3% SEB with the responsibility to supply electricity to MOZAL and wheel power to EDM and SEB of Swaziland

**1974** • **Hidroeléctrica de Cahora Bassa (HCB):** Owned by EDM / Moçambique (92,5%) and REN / Portugal (7,5%) is the **Independent Power Producer (IPP)** responsible for the generation of electricity in Cahora Bassa (2075 MW)

**2015 - 2016** • **Central Térmica de Ressano Garcia (CTRG): Independent Power Producer (IPP),** Owned 51% by EDM, 49% by SASOL, responsible for the generation of electricity in region south (175 MW)

• **Central Térmica de Gigawatt: Independent Power Producer (IPP),** Owned Old Mutual, Gigajoule, MGC, responsible for the generation of electricity in region south (120 MW)

• **Kuvaninga Gas fire power Plant: Independent Power Producer (IPP),** Owned by Investec, Eventure and SPI for the generation of electricity in region south (40 MW)

**2018 - 2019** • **Central Térmica de Maputo (CTM): Gás fire Power generation,** Owned 100% by EDM, responsible for the generation of electricity in region south (110 MW)

• **Mocuba Solar Plant: Independent Power Producer (IPP),** Owned 25% by EDM, Scatec 52,5% and Norfund 22,5%, responsible for the 41 MW generation of electricity in northern region

**2024** • **Central Térmica de Temane (CTT): Gás fire Power generation,** Owned 20,4% by EDM, Globeleq 64,6% and SAOL 15%, responsible for the generation of electricity in region south (450 MW)

## Selected projects with EDM participation & financing partners



Motraco 400 kV  
US\$ 130 M  
33.3% EDM shares



Mocuba 41 MW  
US\$ 70 M  
25% EDM shares



CTRG 175 MW  
US\$ 270 M  
51% EDM shares



Temane 400 kV (TX)  
US\$ 530 M  
100% EDM shares

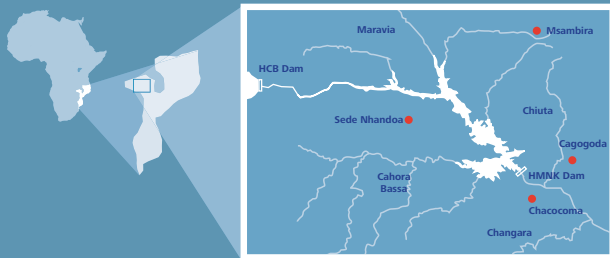


Temane 400 MW  
US\$ 700 M  
20% EDM shares



## 1.2.6 REGIONAL EXPORTS

Mozambique is one of the top electricity exporters in Southern Africa, the country's long track record of successful power export from the 2,075 MW Cahora Bassa Hydroelectric Dam to South Africa position the country as a reliable trading partner. Market access is provided through interconnectors, both those that exist to South Africa, Eswatini and Zimbabwe and those planned to Malawi and Zambia over the coming 5 years.







## 1.2.7 ENERGY OUTLOOK UNDER THE EIIM

The **Electrical Infrastructure Integrated Master Plan 2018-2043 (EIIM)** is the government's main planning tool to build the necessary generation, transmission and distribution capacity to meet domestic and regional demand. It is periodically updated to accommodate new forecasts and trends but consistently applies the least-cost approach to the identification and sequencing of new generation, transmission and distribution infrastructure. The EIIM is guided by key objectives to increase energy access, boost regional energy exports and ensure stability, quality and reliability of the national electricity system.

In its 25-year outlook, the EIIM forecasts national energy demand to increase to around 8,000 MW in 2043, which is 10 times above current levels and represents an average annual growth rate of around 8.6%. Exports to the region are expected to reach levels upwards of 7,000 MW compared to today's 1,500 MW. This is in line with the 2017 SAPP Masterplan which, in a least cost investment scenario, identified Mozambique as the region's largest power exporter and Mphanda Nkuwa as a priority least cost investment for the region<sup>2</sup>. It will add 1,500 MW to the SAPP and further cement Mozambique's position as an energy hub.

<sup>2</sup>[http://www.sapp.co.zw/sites/default/files/SAPP%20Pool%20Plan%202017%20Main%20Volume\\_0.pdf](http://www.sapp.co.zw/sites/default/files/SAPP%20Pool%20Plan%202017%20Main%20Volume_0.pdf)

### 1.2.8 TEMANE

Mozambique has experience securing private and DFI finance for major investments in power generation. Most notable, the Temane gas plant, an IPP that reached financial close in May 2021. The USD 1.2 billion project encompasses a 450 MW gas-fired power project located at Temane in Inhambane Province of Mozambique and is being developed in a public-private partnership between EDM and Globeleq as the lead developer, who were selected as part of a competitive bidding process in 2017. The project will supply reliable power to EDM through a 25-year tolling agreement using natural gas supplied from the Pande-Temane fields operated by Sasol and ENH, the state-owned hydrocarbon company. This private investment is being developed in parallel with a new 561 km long 400 kV HVAC transmission

line between Vilanculos and Maputo which is being funded through concessional lending and grant finance provided by multilateral institutions.

The recent experience around Temane will inform the government approach to develop Mphanda Nkuwa. Amongst others, the successful projects highlights: (i) the government's capacity to structure and run an efficient, transparent competitive process; (ii) the confidence of reputable financiers (including African Development Bank (AfDB), Development Bank of Southern Africa (DBSA), Norwegian Trust Fund, Islamic Development Bank and OPEC Fund for International Development) in the country and its energy sector; (iii) the possibility to obtain a partial risk guarantee through The World Bank Group / MIGA.

## 1.3 INVESTMENT ENVIRONMENT

With its attractive opportunities and beneficial investment environment, Mozambique has an impressive track record attracting foreign direct investment.

The economy is driven by large investments, as gross capital formation (total investments) accounts for 40% of the GDP and additional large-scale projects are expected in the near future: French TotalEnergies recently announced that it will make the largest private investment in Africa with its \$25 billion investment in the development of Golfinho and Atum natural gas fields and the construction of a two-train liquefaction plant with a total capacity of 13.1 million tons per annum.

While FDI driven by large projects is naturally volatile, the rolling five-year average of net FDI inflows grew by an average of 16% from USD 180 million in 2000



to USD 2.8 billion in 2019. In 2015, Mozambique even ranked second-highest in Sub-Saharan Africa in 2015.

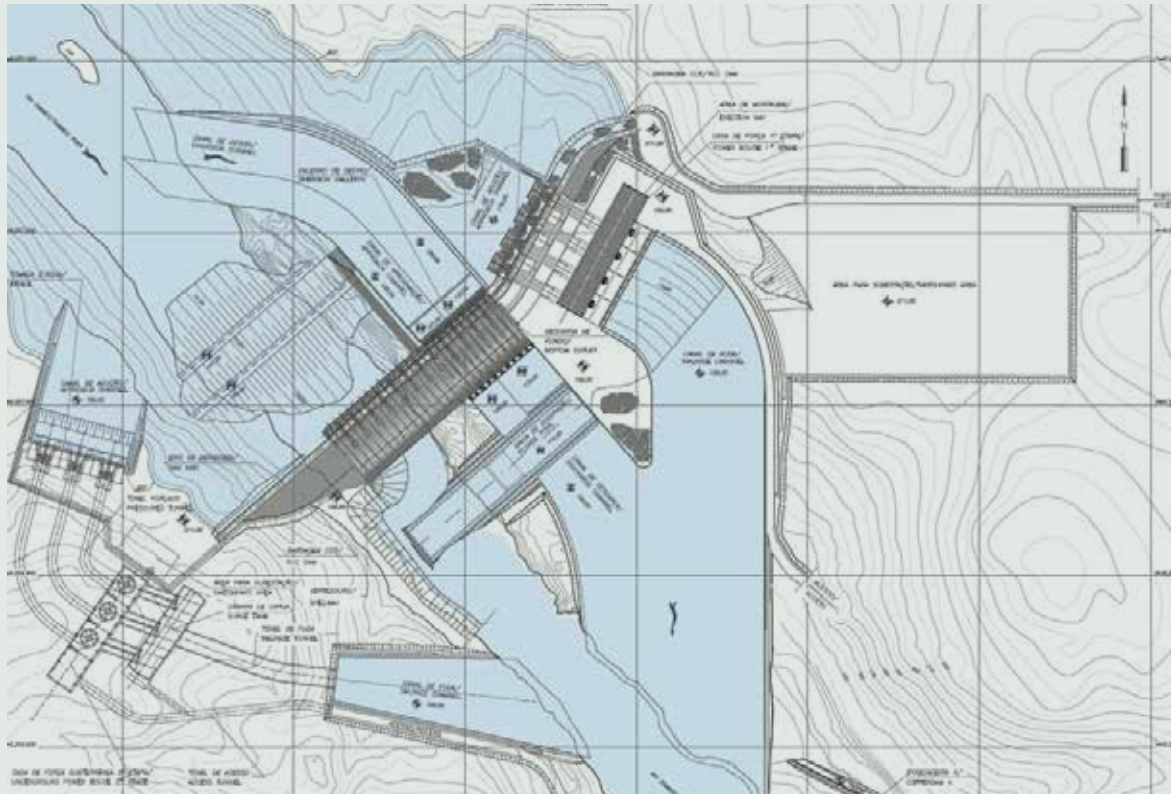
Foreign investments are facilitated and secured by law no. 3/93 introduced in 1993. APIEX, the agency responsible to facilitate investment and exports, constantly strives to further improve the investment environment and assists all foreign investors to obtain the necessary authorizations for their investments as well as the applicable tax incentives. The Government also assures the investors the security and legal protection of ownership over goods and rights in connection with the investments made, export of foreign investors' profits and repatriation of capital upon liquidation or sale.

In addition to the overall attractive investment environment and in order to accelerate the development of the area, the Government of Mozambique declared the Zambezi valley, where the Mphanda Nkuwa site is situated, to be a special fiscal and customs region with extensive exemptions from import duties and taxes.





## 2. PROJECT OVERVIEW



<sup>3</sup>Figures in this section are based on previous studies, most of which are currently in the process of being updated. Numbers are therefore expected to change and should only be considered indicative.



## 2.1 PROJECT SUMMARY

The Government of Mozambique, through the Mphanda Nkuwa Hydropower Project Implementation Office (GMNK), is seeking a strategic investor to build, own, operate and transfer (BOOT) the Mphanda Nkuwa hydropower plant.

The strategic investor is expected to be the majority shareholder and invest alongside the national utility (EDM) and the Cahora Bassa Hydroelectric company (HCB) who are both expected to be minority shareholders due to their strategic importance in the implementation of this project.





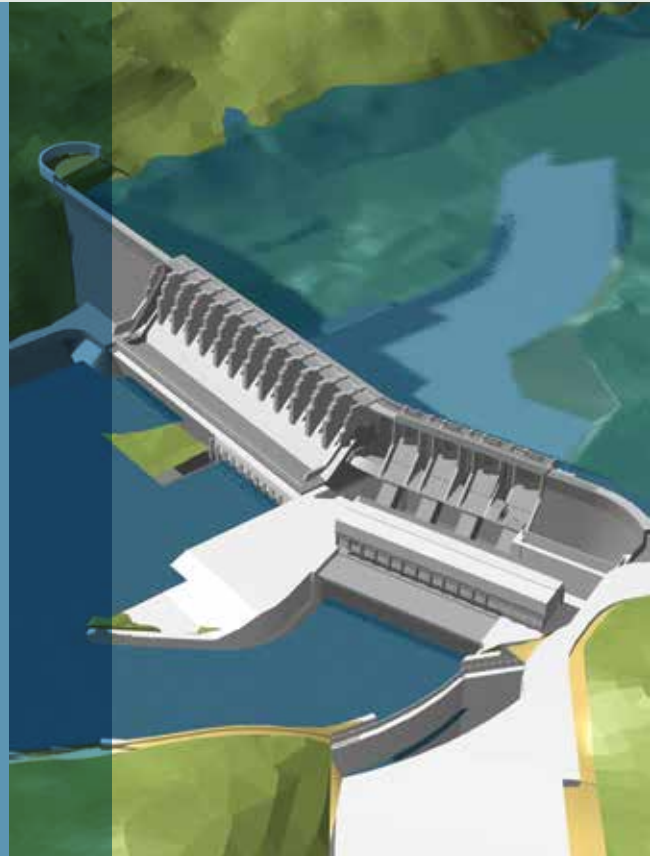
The Mphanda Nkuwa Hydropower Project includes development of a dam, a hydropower station and long-distance high voltage transmission lines from the project site to Maputo. It is yet to be decided if the transmission line will be developed under the same consortium as the power plant or through a separate tender.

Overall, the 1,500 MW hydropower plant is estimated to have the lowest electricity production cost of all existing power plants in Mozambique and the region and hence offers an attractive investment proposition.

## 2.2 PROJECT SPECIFICS

Mphanda Nkuwa Hydroelectric Power Plant will be located on the Zambezi River in the Province of Tete, in the north west of Mozambique, 61 km downstream of Cahora Bassa Hydro Power, 60 km from the city of Tete and 1,500 km from Maputo.

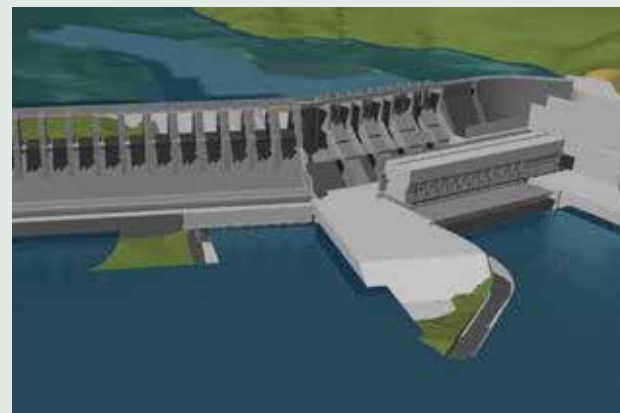
It is a run-of-river hydroelectric power plant, with 1,500 MW capacity. Studies undertaken between 2006 and 2007 by Worley Parsons suggest the optimal design is a 700-meter-long and 86-meter-high dam; a spillway with 13 crest gates and an engineering solution for river diversion through 10 sluiceways constructed below the dam structure. The reservoir will have an area of about 100 km<sup>2</sup>. The small dam is made possible by the fact that the project is situated downstream of Cahora Bassa and will benefit from the regulation of water HCB provides.





## Mphanda Nkuwa

Installed capacity	1,500 mw (4x375)
N.A Máx.	207.0 m
Peak	211.00 m
Maximum Height above the Foundation	86.00 m
Volume of Rolled Concrete	763.000 m <sup>3</sup>
Volume of Conventional Concrete	611,000 m <sup>3</sup>
Volume of Soil Excavation	1,463,000 m <sup>3</sup>
Volume of Rock Excavation	6,609,000 m <sup>3</sup>
N° of Spillways	13 openings (14,90x19,50 m)
N° of Flood-gates	10 flood-gates (12,00x5,95 m)
Maximum Flow - Decamillenary	33,000 m <sup>3</sup> /s
Volume of the Reservoir	2,510 x 10 m <sup>3</sup>
Surface of the Reservoir	96,50 Km <sup>2</sup>







## 2.3 TECHNICAL STUDIES UPDATE

As indicated above, several high-quality technical studies for the project exist. All information in this version of the prospectus is taken from the said studies. However, as most of them require updates, all figures are subject to change and should be viewed as solely indicative. The below lists the additional and updated studies currently being commissioned and their respective timelines.

The Mphanda Nkuwa implementation office is currently in the process of updating existing technical studies. The competitive procurement process for updating the studies has been following the best international practices, with the involvement of external stakeholders in the phases of peer review of the terms of reference, as well as in the evaluation of procurement processes. Members of the South African Power Pool, the Tony Blair Institute, bilateral and multilateral entities have provided support in this regard.

STUDY	2021		2022				2023
	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Transmission							
Market							
Alternative Markets (Hydrogen & Green Ammonia)							
Socio Environmental Impact							
Hydrology							
Economic Feasibility - Update							





**Transmission** - The EOI was launched in August 2021, in September the RFP will be released where it is also expected to select the winning bidder. The Transmission study will take 15 months and is expected to be concluded in Q4 of 2022.

**Market** - The EOI was launched in August 2021, in September the RFP will be released where it is also expected to select the winning bidder. The Market study will take 8 months and is expected to be concluded in Q2 of 2022.

**Alternative Markets / Hydrogen & Green Ammonia**

- To explore additional markets, a parallel study into hydrogen and green ammonia will be conducted. The RFP will be launched in October and the study concluded in Q2 of 2022.

**Socio Environmental Impact Study** - The EOI phase was already launched on July 2021, during October 2021 the RFP process will start, until December 2021 the winning bidder will be selected and the study will be concluded in Q1 2023.

**Hydrology** - The EOI phase will be launched in October 2021, until December 2021 the winning bidder will be selected and the study will be concluded in Q2/Q3 2022.

**Economic Feasibility Study Update** - The EOI phase will be launched in November 2021, until December 2021 the winning bidder will be selected and the study will be concluded in Q2 2023.



## 2.4 DEMAND OVERVIEW

Offtake for the produced power is expected to come from several sources, including domestic demand, regional demand from SAPP countries and from

global markets in the form of “green commodities” such as green hydrogen or green ammonia.

## 2.4.1 DOMESTIC DEMAND

The market study will determine Mphanda Nkuwa's energy profile and amount of power dedicated to supply the domestic demand (expected to be between 40% and 60%), with the remaining power to be dedicated to exports.

Given its low production cost, it is expected to reduce the blended cost of electricity and facilitate Mozambique's ambition to industrialize through energy intensive industry. Mozambique's peak demand was 1,850 MW in 2018 and is expected to reach 2,752 MW in 2025.

To ensure the financial sustainability of the sector, GoM and EDM, with support of the World Bank, have developed a Financial Strengthening Plan for EDM aimed at strengthening financial sustainability and governance of the sector, including measures to improve operational efficiency, raise tariffs towards cost recovery, and restructure EDM's balance sheet.<sup>4</sup>

<sup>4</sup><https://documents1.worldbank.org/curated/en/603941561341688507/pdf/Mozambique-Temane-Regional-Electricity-Project.pdf>

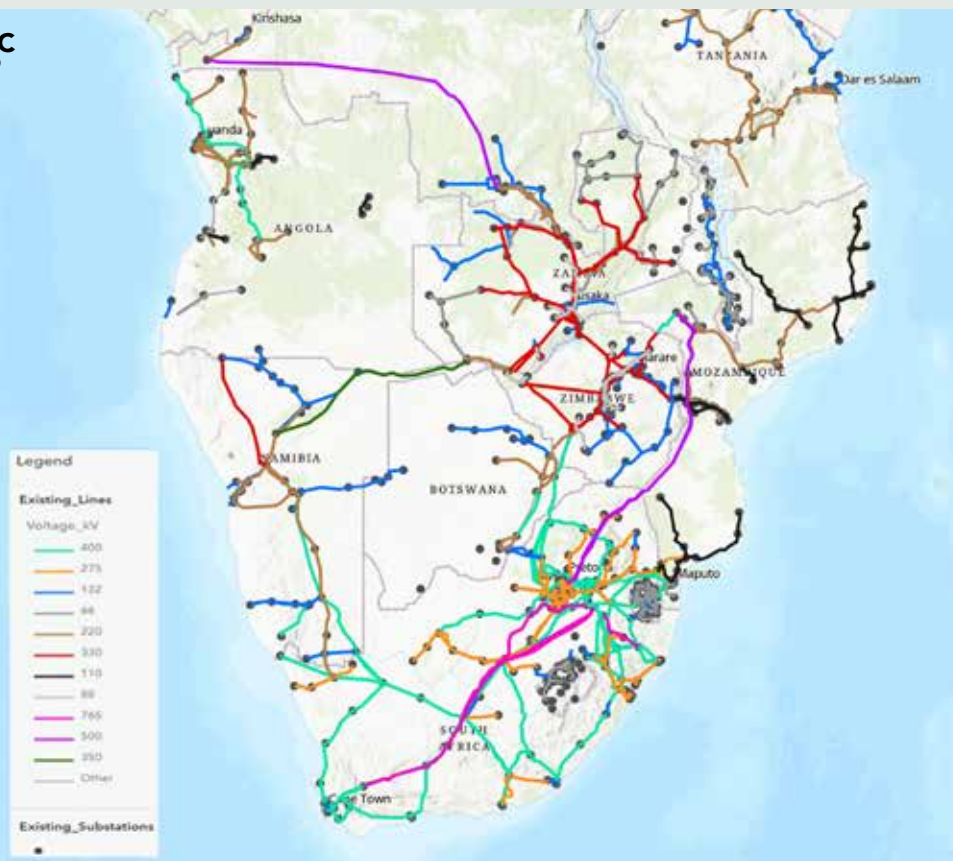


## 2.4.2 REGIONAL ELECTRICITY DEMAND

Many of the SAPP countries do not have sufficient generation capacity, translating into 8 of the 12 SAPP countries having a shortfall in meeting their current demand (2019, World Bank). Furthermore, in the medium to long term, the demand is expected to increase and is projected to increase by 2.5 times by 2040, driven primarily by industry, as well as through households (electrification efforts ongoing in the countries of the region). With higher demand growth expected in low-electricity access countries (Angola, Malawi, Mozambique, and Tanzania), without proper action to unlock new generation and greater power trade, the SSA region will face serious development constraints.



# SAPP SADC GRID MAP

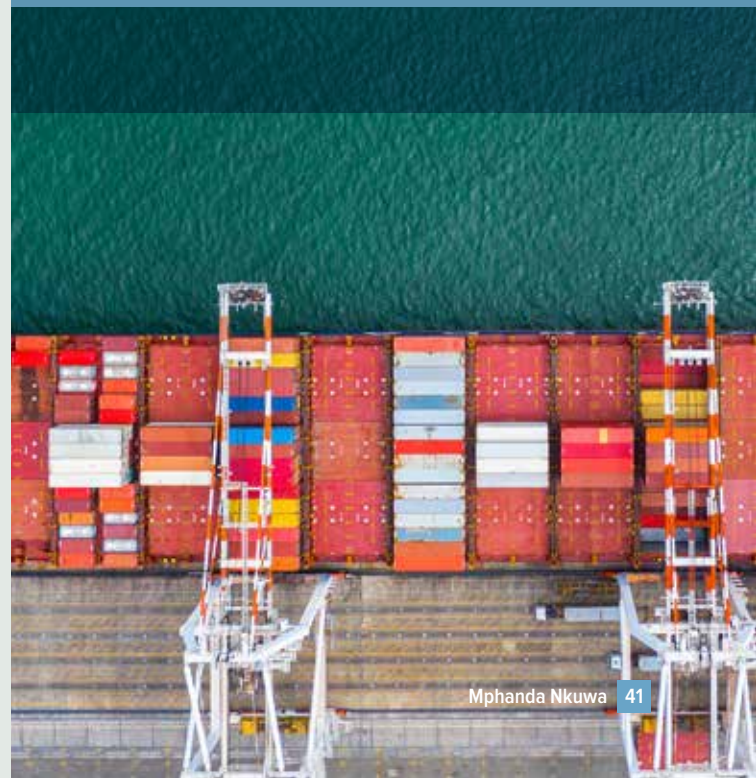




The strongest demand will likely come from South Africa where the expected decommissioning of approximately 24,100 MW of coal power plants in the period beyond 2030 to 2050 further increases their energy generation gap. In light of their forecasted average annual electricity demand growth of 2.0% until 2030 and 1.66% between 2030 and 2050, the South African government explicitly lays out their “support of regional electricity interconnection including hydropower and gas” and clarifies that “South Africa will participate in strategic power projects that enable the development of cross border infrastructure needed for the regional energy trading” (South Africa Integrated Resource Plan, 2019).

Mozambique has a strong track record exporting power to South Africa’s ESKOM. Its Cahora Bassa hydroelectric power plant has dedicated 1,500 MW for exports to South Africa, using a 533 kV DC transmission line to transport the power over 1,400 km.

Furthermore, Mozambique has an existing interconnection with South Africa, Zimbabwe and Eswatini with transfer capacity to the regions of more than 4000 MW from HVDC and HVAC transmission Systems.



### 2.4.3 GREEN COMMODITIES

Beyond providing green electricity to Mozambique and the SAPP region, Mphanda Nkuwa might be able to capitalize on the growing global demand for green commodities such as green hydrogen and green ammonia. This is particularly attractive in light of South Africa's petrochemical industry which is under pressure to further decarbonize.



## 2.5 PROJECT STRUCTURE

The Project will be developed under a Build, Own, Operate and Transfer (BOOT) model and with a concession agreement of 30 years with the possibility to extend by another 10 years.

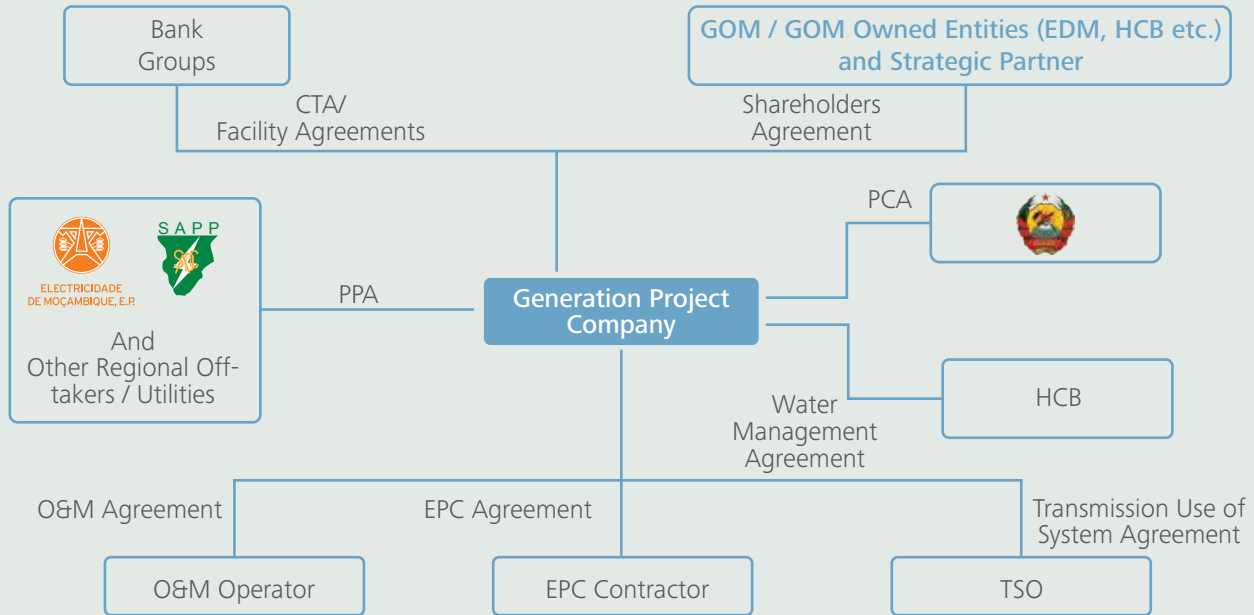
The Mphanda Nkuwa Hydropower Project includes development of a dam and a hydropower station. Power will be evacuated via a high voltage transmission line from the Project site to Maputo; a decision on the optimal approach to financing this line will be made after “market sounding” for the project and engaging potential financiers.

The strategic partner is expected to hold a majority share with the Government of Mozambique owning a minority share through its national utility company (EDM) and the Cahora Bassa operating company (HCB) who will bring additional implementation and operation experience to the project.

The CAPEX for generation and transmission infrastructure is expected to total around USD 4.5 billion.

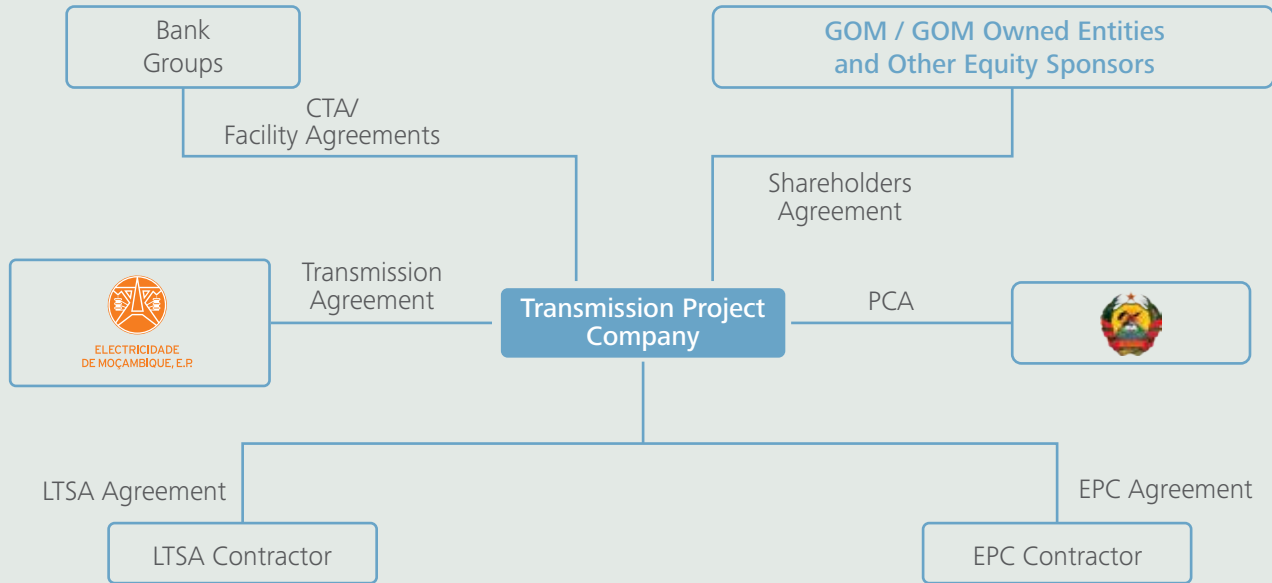


## INDICATIVE CONTRACTUAL OVERVIEW - GENERATION PROJECT



- The project is proposed to be developed as an IPP Project, jointly owned by the GoM / GoM-owned entities (like EDM, HCB) and a Strategic Partner (SP). The project offtake will be through execution of a long-term PPA with EDM, along with direct / indirect offtake agreements with other potential regional Off-takers, including Industries.
- A comprehensive and detail market study will be conducted for MNK Project.

## INDICATIVE CONTRACTUAL OVERVIEW - TRANSMISSION PROJECT



- The new transmission lines to join the north and south of Mozambique will form part of the Sociedade Nacional de Transporte e Energia ("**STE**") project
- The STE project consists of two phases; **Phase I** (Developed along with the Temane project): A new line being built between Maputo and Vilanculos. **Phase II** (To be developed with the MNK project): The Transmission line to be developed include a 1,300 KM 550kV from Cataxa to Maputo.



## LEVERAGING EDM, HCB AND PRIVATE SECTOR EXPERTISE



- Experience in structuring investment projects (project finance), including in strategic partner selection processes;
- System operator and market operator mandate under current legislation;
- Regional experience in commercial transactions with regional energy companies such as Eskom, ZPC, EC, BPC, Nampower and others, capitalizing on bilateral agreements in SAPP and in the SPOT market (DAM); and
- Experience in structuring and implementing transmission assets under a long-term concession regime. For example: Temane Transmission Project, MOTRACO.



- Experience in operation and maintenance of transmission Infrastructure and Large Power Production;
- Experience and knowledge of electricity export transactions through bilateral trade agreements;
- Financial capacity with solid balance sheet and cash flows;
- Reversion of ownership of HCB to Mozambique in 2007 Transmission; and
- Familiarity with HVDC line technology.

### STRATEGIC PARTNER

- Experience in technical and financial capacity for structuring the investment needed for the project;
- To provide lower cost debt financing for the MNK project from international lenders.

## 2.6 PRELIMINARY RISK ALLOCATION MATRIX

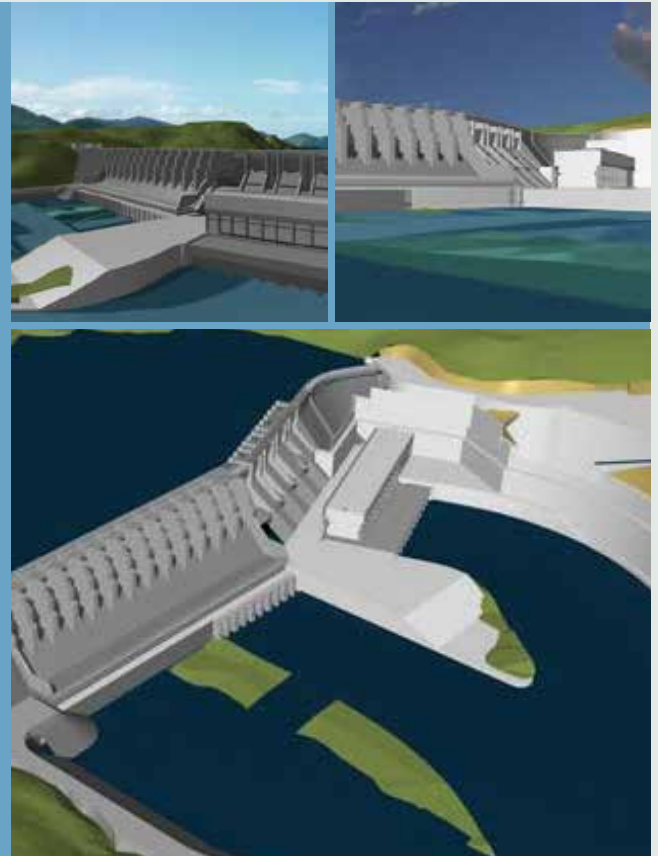
Risk	Project Co	GoM	GoM Considerations
<b>Development</b>	✓		Private party to take development risk
<b>Financing</b>	✓		Private party to take financing risk
<b>Hydrology</b>	✓	✓	To be ascertained during the technical studies.
<b>Payment (Including Credit Enhancement)</b>		✓	Enhancement & Risk Mitigation options (MDB, DFI Guaranteed LC Structure, PRG, PRI, Liquidity Escrow Accounts)
<b>Market / Dispatch</b>		✓	Structure of the PPA will determine the extent of the dispatch and Off-taker risk
<b>Regulatory / Change in Law</b>		✓	Relief will be required to maintain the economic position of the Project Co
<b>Construction</b>	✓		Private party to take Construction Risk
<b>Operational</b>	✓		Private party to take Operation Risk

Risk	Project Co	GoM	GoM Considerations
<b>Force Majeure</b>	✓	✓	GOM to take political force majeure risk. Project Co. to take natural force majeure risk.
<b>Termination</b>	✓	✓	Identity of breaches that lead to immediate termination/breaches with cure periods to be covered.
<b>Hydrology</b>	✓	✓	To be ascertained during the technical studies.
<b>Currency</b>		✓	Currency depreciation of local currency payments paid by off-taker to Project Co. to be protected by GoM.
<b>Environment</b>	✓		Private party to take Environmental Risk
<b>Transmission</b>	✓	✓	Transmission licenses and right-of-way may be primarily ensured by GoM.
<b>Choice of law &amp; Dispute Mechanisms</b>	✓	✓	Project Co. may seek to operate under a neutral law. Use of internationally accepted arbitration mechanisms.

## 2.7 TECHNICAL FINDINGS

### 2.7.1 HYDROLOGY

Hydrologic data from 1907 through 2000 were used to determine the main parameters of the project, such as flood levels and firm power. Unlike previous studies, the full data set was used, which includes two major dry periods, one at the beginning and one in the 1980s. This approach ensures that the calculations are conservative and the hydrologic risk is reduced to a minimum. For a more refined production calculation (in particular during the first years of operation), stochastic models were employed. Since the Project will be part of a major interconnected grid, 95 % reliability was adopted for energy calculations. The existence of Cahora Bassa upstream ensures that there is a robust set of hydrological data beyond the 2000 study.



## 2.7.2 GEOLOGICAL

Extensive geological studies were conducted to assess the geological suitability: Drillings, water pressure and laboratory tests were conducted on 36 boreholes at Mphanda Nkuwa, ranging from 30 to 70m depth. The two deepest holes were inclined to pass under the riverbed and two boreholes (150m and 210m) were drilled at CBN. In addition, the existing data on many earlier geologic campaigns at this site were evaluated. In conclusion, the studies found excellent geological conditions at both sites.

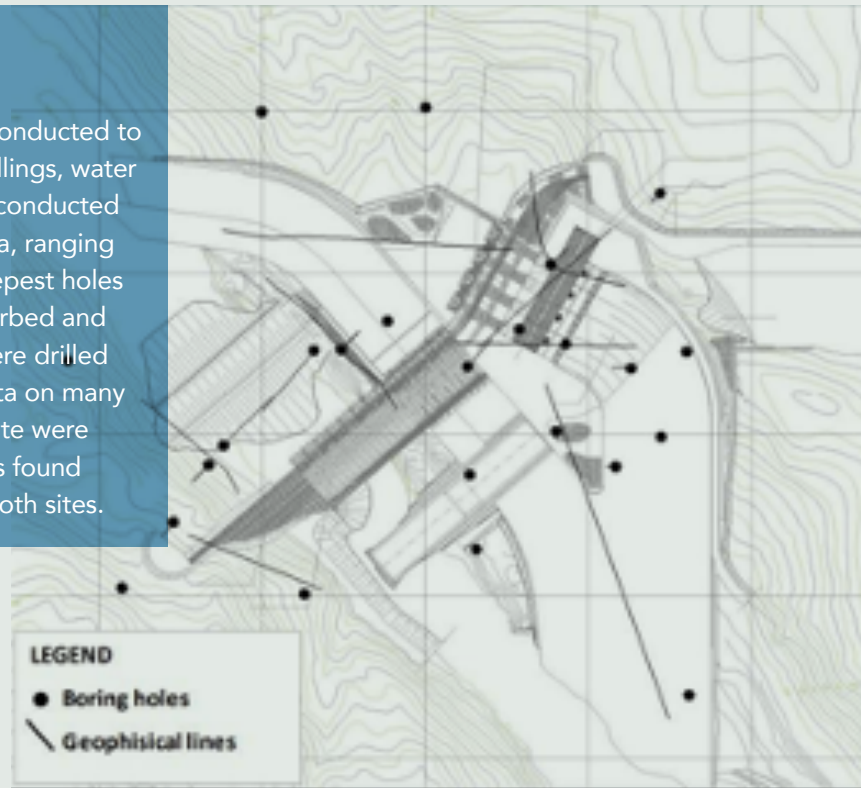


Figure 5.3.01 – Distribution of drilling holes and geophysical lines

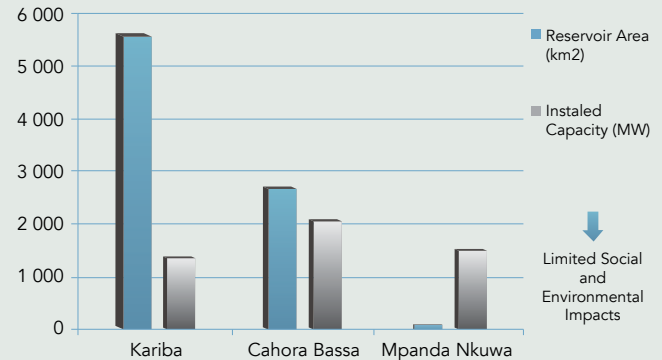
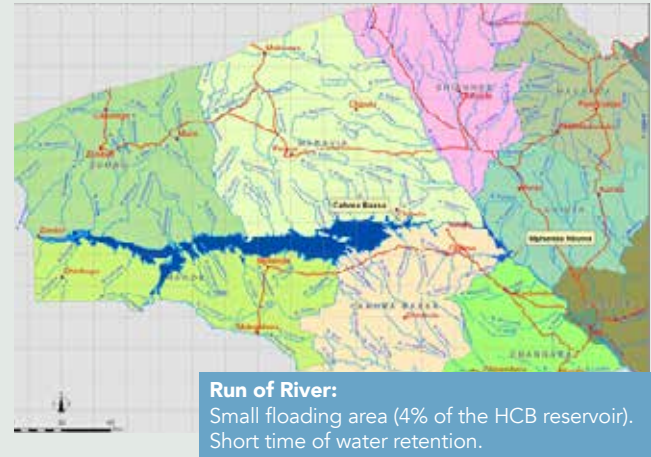


## 2.8 ENVIRONMENTAL & SOCIAL IMPACT

Preliminary assessments indicate that the Mphanda Nkuwa development will fare very favourably on social and environmental impact compared to industry standards.

Due to its run-of-river nature the reservoir is, with a mere 100 km<sup>2</sup>, a lot smaller than other hydropower plants of a similar size. For example, the existing Cahora Bassa Lake has a reservoir of 2675 km<sup>2</sup> - more than 26 times that proposed for Mphanda Nkuwa reservoir area but merely 35% higher capacity.

Similarly, the Mphanda Nkuwa development fares well when it comes to social impact as comparatively few people live on the steep hills to be flooded and they are today mainly used for grazing. According to a 2011 full Environment Social Impact Studies, the number of people likely to be displaced by the Mphanda Nkuwa reservoir is evaluated at about 460 households.



Equally important to those initial assessments, the GMNK is committed to ensure that the Mphanda Nkuwa Project is implemented within the highest social and environmental sustainability standards and tools. It places particular emphasis on opportunities for the local communities and on minimizing adverse impact on biodiversity heritage.

The first activity of the GMNK new mandate was signing a cooperation agreement with the International Hydropower Association, under Norad's programme 'Developing Countries Sustainable Hydropower Initiative'. The aim of the programme is to increase the developmental impact and sustainability of hydropower in Mozambique, by strengthening institutional capacity to adopt international good practice to inform regulatory decisions and contractual agreements. GMNK is further collaborating with the initiative to perform a complete HESG assessment of the project, including recommendations for updating potential gaps in the feasibility studies and environmental and social impact assessment.

The above-mentioned activities do not substitute the update of the Environmental and Socio Environmental Impact, but guarantee that those will be updated according to the best international practices.

In addition, GMNK will develop a Communication Strategic Plan of the Environmental and Social Impacts, as well as Community Development Plan and a Stakeholders Engagement Plan in coordination with International Hydropower Association.

For the generation infrastructure part of the project a full ESIA was undertaken in 2011 as part of the Feasibility Study. The ESIA study concludes that *"the Mphanda Nkuwa Hydropower Project is environmentally and socially feasible and the benefits associated with the project outweigh the negative impacts, provided all environmental and social mitigation measures are implemented by GMNK throughout the various phases of the project."*

# 3. PROCESS & TIMELINES

## 3.1 TENTATIVE TIMELINES



## 3.2 PROPOSED EOI & RFP STRUCTURE

<p><b>Market Sounding</b> (Sep '21 – Oct '21)</p>	<ul style="list-style-type: none"><li>• Plenary session with wide audience to showcase key project features and solicit market feedback</li><li>• Areas of particular interest:<ul style="list-style-type: none"><li>- Overall project attractiveness</li><li>- Proposed commercial structure (incl risk allocation)</li><li>- Process timelines &amp; selection criteria</li></ul></li></ul>
<p><b>EOI</b> (Dec '21 – Jan '22) 6 to 8 weeks</p>	<p>Interested parties will be asked to submit expressions of interest; it is proposed they are assessed against the following criteria evaluated on a pass or fail basis:</p> <p><u>Generation Technical Criteria:</u></p> <ul style="list-style-type: none"><li>• <i>Experience and knowledge of the Generation projects.</i></li><li>• <i>Preferably experience in conducting projects in Sub-Saharan Africa and developing countries.</i></li><li>• <i>Relevant experience in development and construction of Hydroelectric Power Plant projects with at least two or more units with a capacity of 100 MW each with a minimum of 20% shareholding in each such project.</i></li><li>• <i>Must have relevant experience in power generation system (for a minimum cumulative capacity of 200 MW) as following, at least:</i><ul style="list-style-type: none"><li>- <i>10 years of experience for negotiating and selecting EPC contractors.</i></li><li>- <i>10 years of experience as an operator.</i></li><li>- <i>10 years of experience for negotiating and selecting O&amp;M contracts.</i></li></ul></li></ul>

- *The Company must have prior developer experience in the completion of similar assignments within the past five years.*
- *Proven capacity to be held accountable for ensuring project deliverables and for the professional conduct and integrity of the team.*
- *Experience with CAPEX/OPEX studies related to Hydropower plant over 200 MW cumulative capacity.*

*Generation Financial Criteria:*

- *The Applicant must demonstrate a minimum tangible net worth of USD 650 million (or currency equivalent) in each of the three (3) previous fiscal years as evidenced by audited accounts of the Applicant.*

*Transmission - Technical Criteria:*

*The Minimum Eligibility Requirements for Transmission include but not limited to:*

- *Experience and knowledge of the Transmission projects.*
- *Preferably experience in conducting projects in Sub-Saharan Africa and developing countries.*
- *Experience with Transmission Lines and Substations operating in voltages equal or above 220 kV (AC) and 400 kV (DC) with a minimum of 20% shareholding in each such project.*
- *Experience with CAPEX/OPEX studies related to Electrical Systems over 220 kV.*
- *Must have relevant experience in power transmission system as following, at least:*
- *10 years of experience for negotiating and selecting EPC contractors.*
- *10 years of experience as an operator.*
- *The Company must have prior developer experience in the completion of similar assignments within the past five years.*
- *Proven capacity to be held accountable for ensuring project deliverables and for the professional conduct and integrity of the team.*

**EOI**  
(Dec '21 – Jan '22)  
6 to 8 weeks

Note: The MER for Generation would be the same as mentioned on the previous slide.

Transmission – Financial Criteria:

- Tangible Net Worth
- The Applicant must demonstrate a minimum tangible net worth of USD 950 million (or currency equivalent) in each of the three (3) previous fiscal years as evidenced by audited accounts of the Applicant.

**RfP**  
(Feb '22 – May '22)  
12 to 14 weeks

Following an evaluation of expressions of interest, qualifying companies will be invited to submit proposals and, in return for an application fee, an RFP package will be shared.

Bidders will need to submit the following:

**Bid Bond:** To both signal that developers have the financial capacity to develop the project and provide some protection for the Government of Mozambique against bidders failing to honor their bids, a bid bond will be required alongside the submission of a proposal which will be returned to unsuccessful bidders (and contribute towards a performance bond for the selected bidder).

**Evaluation criteria: The strategic partner selection will be based on the evaluation criteria, which shall consist of weightage for both technical and financial parameters. Below are some of the technical and financial submission requirements, which shall be used as part of evaluation**

A Technical Proposal: Which will include:

- a) The bidder / bidding consortium's experience of similar projects and also in development, financing and O&M
- b) The development plan (timelines, proposed modifications, development approach).
- c) A commitment to the terms set out in the Project agreement documents or highlight any areas in which their proposal would deviate.



**RfP**  
(Feb '22 – May '22)  
12 to 14 weeks

- A Financial proposal: In the form of a financial model; key selection criteria will be:
- a) The level of equity they can underwrite and the portion of this that they wish to retain.
  - b) Required Equity return
  - c) IRR
  - d) Tariff
  - e) Level of Free carry equity participation they will provide for the Government of Mozambique.
  - f) Confirmation of acceptance of Project Agreements provided as basis for development
  - g) Overall attractiveness of the Commercial proposal

**Negotiation**  
(Jun '22 – Sep '22)

*Following the evaluations and clarification of bids the successful bidder is chosen and the Joint Development Agreement (JDA) negotiated based on their bid.*

*Once legal documentation is finalized, the strategic partner selection process is closed.*





