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# SECTOR REFORM AND UTILITY COMMERCIALIZATION (SRUC)

## Background Report on Mozambique's Power Sector: IPP Programs

June 2015

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**SECTOR REFORM AND  
UTILITY  
COMMERCIALIZATION  
(SRUC) PROJECT  
MOZAMBIQUE  
BACKGROUND REPORT ON  
MOZAMBIQUE'S POWER  
SECTOR: IPP PROCUREMENT**

JUNE 2015

SECTOR REFORM AND UTILITY COMMERCIALIZATION  
(SRUC) PROJECT  
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## INTRODUCTION

USAID's **Sector Reform and Utility Commercialization Program (SRUC)** aims to enhance the financial viability and long term sustainability of developing countries' electricity systems, thereby enabling their expansion and establishing the necessary preconditions for clean energy investments.

USAID wishes to use the SRUC Task Order to provide support to the power sectors of Zambia, Mozambique and/or Namibia. In August 2015, USAID and SRUC advisors will carry out a scoping mission to each of the three countries to gain a more complete understanding of the current state of their respective electricity sectors. This scoping trip will provide information that can be used to design an effective SRUC technical assistance program that will reduce system losses and/or facilitate IPP program design and implementation.

This *Background Report* has been written to provide USAID and the SRUC team with easily accessible information prior to their departure on the scoping trip. The document provides insights into the Mozambique power sector, focusing on recent and current efforts around IPP procurement programs. The Report is structured as follows:

- (a) A review of the IPP procurement programs with specific attention on renewable energy procurement, including details on current IPP procurement mechanisms, methodologies and processes (bidding processes, evaluation criteria and selection). Included are details on prior procurements and current plans for private sector participation in the energy sector moving forward. The report also discusses policies, laws and government support for private sector involvement.
- (b) To the extent desk research allows, detailed information on the IPP procurement programs will include a review of IPP program governance, past IPP transactions, national electricity strategies and generation plans including desired, IPP technology mix, details on tariff / schedule mechanisms such as feed in tariffs, metrics around the potential size of the IPP market, IPP solicitation, qualification and evaluation processes and criteria, current Power Purchase Agreement (PPA) forms and processes for negotiation.
- (c) A review of other international donors' work with IPP procurement programs in order to explore potential areas of collaboration.

# BACKGROUND

## Country Background and Economy

Mozambique is one of the world's poorest countries with GDP per capita at USD \$1,200 in 2013.<sup>1</sup> Despite being blessed with natural resources, the country is heavily reliant on foreign donor support and between 40%-55% of its budget comes from this assistance.<sup>2</sup>

Mozambique's GDP has maintained strong growth over the last decade, between 6% and 8% annually, driven by foreign direct investment in the mining, electricity, tourism, construction and telecommunication sectors.<sup>3</sup> Due to the inexpensive power provided from the 2,075 MW Cahora Bassa hydropower station, energy intensive industries such as the Mozal aluminum smelter and related activities in mining, manufacturing, and construction have seen significant growth.<sup>4</sup> The majority of investment has been driven by a few large "mega projects" or companies and there are few medium size enterprises.<sup>5</sup>

The country's economic growth is projected to continue as coal and gas reserves are developed, such as the on-shore reserves in Inhambane province of Pande Gas Field (discovered 1961/production 2004) and the Temane Gas Field (1967/2004) and the off-shore Rovuma basin in the north.<sup>6</sup> Mozambique's proven natural gas reserves are estimated to be approximately 100 trillion cubic feet (Tcf). In addition to its gas reserves, Mozambique's Tete Province is projected to hold significant unexploited coal reserves in the order of 25 billion short tons. Estimates indicate these resources could lift Mozambique's economic growth rate by two percent annually from 2015-2023.<sup>7</sup>

Its population of more than 23.5 million people are spread across more than 309,495 square miles causing significant challenges for electricity access. While most live along the coast and in the south, the population is spread across much of the vast and often challenging environment. The transportation infrastructure is underdeveloped and during the rainy season heavy flooding results in impassable roads threatening the system. Given these factors and other described below, it has been a challenge to provide electricity access across the country. The World Bank estimates 15% of the population have access to electricity. In cities, it is slightly better with 26% coverage, compared to the extremely low 5% in rural areas. While Mozambique has plenty of room to improve access rates, electrification levels are about average within the southern African context, excluding South Africa.<sup>8</sup>

Net electricity generation in Mozambique was 16.7 billion kilowatt-hours in 2011, of which almost all was from hydropower and a very small amount from natural gas. The growth in demand for electricity in the country stood on average at 10% per annum between 2000 and 2010, and from 2011 to 2013 it grew 13%.<sup>9</sup> The demand for electricity is expected to continue to grow at 8.2% annually for the next 15 years.<sup>10</sup> As a result, Mozambique will need to address its electricity infrastructure challenges to be able to meet this demand and continue to increase access.

## Electricity Sector Key Participants

The majority of the electricity sector in Mozambique is run by government owned entities, but there has been some introduction of private sector participation. There is historical precedence for why Mozambique supports state owned enterprises. After independence

<sup>1</sup> <https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html>

<sup>2</sup> <http://www.itad.com/projects/multi-donor-evaluation-of-budget-support-in-mozambique/>

<sup>3</sup> <http://www.bus-ex.com/article/hidroel%C3%A9ctrica-de-cahora-bassa-0p://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Mozambique%20-%202011-15%20CSP.pdf>

<sup>4</sup> <http://www.imf.org/external/pubs/ft/dp/2014/afr1404.pdf>

<sup>5</sup> <http://omrmz.org/index.php/biblioteca/category/165-diversos?download=2399:dfid-2011-mozambique-procurement-study-economics-institutoins-reform-challenges>

<sup>6</sup> <http://abarrelfull.wikidot.com/mozambique-oil-and-gas-profile>

<sup>7</sup> <http://www.eia.gov/countries/country-data.cfm?fips=mz>

<sup>8</sup> <http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS>

<sup>9</sup> Energy Strategy (2014 -2023) Ministry of Energy

<sup>10</sup> [http://www.iese.ac.mz/lib/publication/III\\_Conf2012/IESE\\_IIIConf\\_Paper16.pdf](http://www.iese.ac.mz/lib/publication/III_Conf2012/IESE_IIIConf_Paper16.pdf)

from Portugal in 1975, the FRELIMO party took control and established a one-party state aligned to the Soviet bloc and supportive of communism. The country faced a bloody civil war until 1994 when the first democratic elections took place. After independence, a number of institutions were nationalized and a belief that the government should own certain industries such as electricity still exists in Mozambique today.

Below is a graphic that displays the major organizations and industry structure.

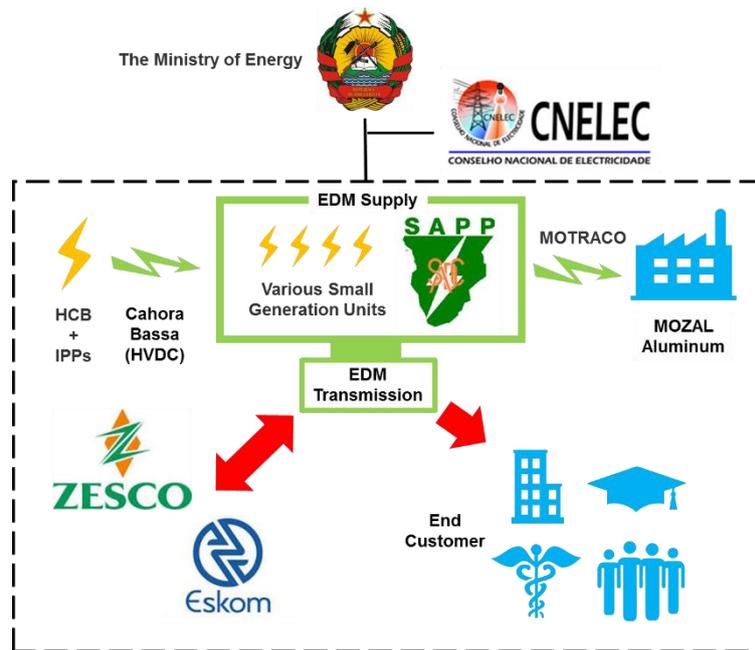


Figure 1: Electricity Sector Diagram

The chart and description below provide more detail on the value chain, role and ownership structure of the companies and organizations involved in the Mozambican electricity sector.

Agency	Primary Role	Description	Ownership
<b>The Ministry of Energy (Ministerio de Energia, hereinafter, “ME”)</b>	Policy	Overall supervision of the electricity sector	100% government
<b>National Directorate for Electrical Energy (“DNEE”)</b>	Policy	Central technical body within the ME responsible for the analysis, preparation and elaboration of energy policies	100% government
<b>The Council of Ministers</b>	Policy	Approve concessions for plants with rated capacity of >100MW	100% government
<b>Electricidade de Mocambique (“EDM”)</b>	Generation, Delivery	The state-owned, vertically integrated electricity supplier	100% government
<b>Hidroelectrica de Cahora Bassa (“HCB”)</b>	Generation	The major generator and largest hydroelectric scheme in Southern Africa	92.5% Mozambique government; REN 7.5%
<b>Mozambican Transmission Company (“MOTRACO”)</b>	Transmission	Independent transmission company (ITC) owned by EDM, Eskom and Swaziland Electricity Board. Responsible for supplying electricity to the Mozal aluminum plant in Mozambique and the wheeling of power to EDM in Mozambique and Swaziland Electricity Company	33% EDM 33% Eskom 33% Swaziland Electricity Board

<b>Fundo de Energia (“FUNAE”, The Energy Fund)</b>	Finance for Generation	Finances off-grid electrification	100% government
<b>CNELEC</b>	Regulation	National Regulatory / Advisory Board	100% government

**Table 1: Mozambique Power Sector Value Chain Breakdown**

Electricidade de Mocambique (EDM), the state-owned, vertically integrated electricity supplier, is the major player in the Mozambican electricity sector. While EDM is vertically integrated, it has limited generation capacity of its own, generating only around 6% of the total capacity it transmits, or 263 GWh.<sup>11</sup> The remainder it purchases from Hidroelectrica de Cahora Bassa (“HCB”), or on the Southern Africa Power Pool (SAPP), where EDM is an Operating Member. EDM operates 11,847 km of transmission and distribution lines (as of 2011). EDM has the highest level of employees per customer in the SADC region, a sign that there are areas for improvement in the operational efficiency of the utility.<sup>12</sup>

HCB, the major generator and largest hydroelectric dam in Southern Africa, is referred to as an IPP but is predominantly owned by the Mozambican government (92.5%), which also owns EDM. The private sector does retain a small, 7.5% ownership stake in HCB through REN (a publically traded (in Portugal) Portuguese grid operator. The president of Mozambique signed an agreement to purchase this equity interest from REN in 2016.<sup>13</sup>

The Mozambican Transmission Company (MOTRACO) is an independent transmission company owned by EDM, Eskom and Swaziland Electricity Board (each owning 33%) and is responsible for supplying electricity to the Mozal aluminum plant in Mozambique and the wheeling of power to EDM in Mozambique and Swaziland Electricity Company.

The Ministry of Energy (Ministerio de Energia “ME”) is responsible for all energy resources while the National Directorate for Electrical Energy (DNEE) is the central technical body within the ME responsible for the analysis, preparation and elaboration of energy policies. The ministry is divided into three directorates, and several “technical” units: The National Directorate for Electrical Energy (Direcção Nacional de Energia Eléctrica, DNEE), National Directorate of New and Renewable Energy (Direcção Nacional de Energias Novas e Renováveis) and the National Directorate of Fuel (Direcção Nacional de Combustíveis).

Additionally, the Electricity Law of 1997 laid the legal framework for the National Electricity Council (CNELEC). Created in 2004, it is a governmental consultative body functioning as a regulator for the generation, transmission and sale of electricity. CNELEC is a member of the Regional Electricity Regulators Association of Southern Africa (RERA).

## Electricity System Overview

Mozambique has a total installed generation capacity of 2,308 MW, with 2,075 MWs from the Hidroelectrica de Cahora Bassa (“HCB”) hydroelectric facility located in western Mozambique, and remainder small units owned by EDM.<sup>14</sup> ***There is no direct transmission line between the HCB facility and Mozambique’s main load center, Maputo.*** High voltage corridors transmit power from Tete to South Africa and then back to Mozambique through an HVDC line.

<sup>11</sup> EDM Annual Report

<sup>12</sup> Sumario Estatístico 2012 Final, 2012

<sup>13</sup> <http://www.iol.co.za/business/international/mozambique-to-own-cahora-bassa-1.1276132#.VWdKuM9Viko>

<sup>14</sup> “Executive Exchange on Developing an Ancillary Service Market.” ELECTRICIDADE DE MOÇAMBIQUE, 2012.

HCB must first sell power to Eskom, South Africa's utility, which in turn sells it back to Southern Mozambique at an increased rate. As a result, Mozambique is a net exporter of electricity. EDM receives only a small share (15%) of the plant's output which provides 90% of the electricity supplied to the country's grid. The electricity used in Maputo and Matola actually comes from the combined generation of South Africa and Mozambique. Power generated from HCB is therefore distributed as follows, South Africa (Eskom), 65%; Zimbabwe (ZESA), 19%; SAPP and Botswana (BPC), less than 1%.<sup>15</sup> As a result, the dam plays an important role in Mozambique's economy as a source of foreign revenue, particularly after the country gained majority ownership (85% of the project shares).

Since 2011, load (particularly peak load) has exceeded capacity, forcing Mozambique to import from the SAPP to satisfy the country's increasing electricity demand. In 2013, available generation capacity was 614 MW including imports of 95 MW.<sup>16</sup>



Figure 2: Mozambique's Transmission Network

Mozambique's participation in the SAPP is through EDM, which functions as an Operating Member, Hidro Electrica Cahora Bassa (HCB), which functions as an Observer Member and MOTRACO, an Independent Transmission Company (ITC), which also functions as an Observer Member.<sup>17</sup> SAPP provide an opportunity to trade power in the region. Mozambique has three cross border connections, Zimbabwe to the west and South Africa and Swaziland to the south.

HCB and Eskom jointly own the HVDC transmission line which provides connection from Cahora Bassa to South Africa.

The country's large size and significant distances cause distribution challenges and considerable line losses making grid connectivity to the whole population almost unfeasible.

## Electricity Projects

### Generation

Mozambique hopes to expand its coal and gas fired power generation capacity on the order of US\$12 billion in new developments.

**Gas-fired power plant.** Gas being extracted from the Pande and Temane fields are driving three gas-to-power projects, as shown below:

<sup>15</sup> RERA Tariff Report 2012-2013

<sup>16</sup> [http://www.speed-program.com/wp-content/uploads/2015/02/2014-SPEED-Report-042-Analysis-of-the-Power-Crisis-and-its-Impact-on-the-Business-Environment-EN\\_DRAFT2.pdf](http://www.speed-program.com/wp-content/uploads/2015/02/2014-SPEED-Report-042-Analysis-of-the-Power-Crisis-and-its-Impact-on-the-Business-Environment-EN_DRAFT2.pdf)

<sup>17</sup> RERA Tariff Report 2012-2013

1. **EDM/SASOL Central Térmica de Ressano Garcia (CTRG).** A 175 MW gas fired power plant on the border with South Africa that began operation in late 2014 and will supply electricity to more than two million Mozambicans (23% of demand) through a PPA with EDM.<sup>18</sup> A joint venture between EDM (51%) and Sasol (49%) came together to replace the current 107 MW Aggreko-Shanduka power plant.
2. **Gigawatt Park/AGGREKO** (Ressano Garcia area). A Mozambican company developed an emergency containerized power plant of 100 MW (phase I) and 130 MW (phase II), to be fueled by natural gas and operated under a PPA with NamPower, ESKOM and EDM.<sup>19</sup>

At the same site, there is discussion to convert an existing diesel power plant to gas, with finance provided by the Japan International Cooperation Agency (JICA).<sup>20</sup>

3. **Kuvaninga.** A 40 MW power plant as well as the associated gas pipeline and power transmission facilities required to connect the plant to the Republic of Mozambique Pipeline Investments Company gas pipeline and the EDM grid. Investec, Enventure Partners and Intelligence, Counselling & Research have partnered with Kuvaninga Mocambique Limitada (KDM) to co-develop the project.<sup>21</sup> Operations were expected to commence in early 2015.<sup>22</sup>

Despite the progress demonstrated by these projects, there are some noteworthy obstacles to expanding gas-fired power generation in Mozambique. The large gas deposits are in the northern areas of the country, whereas the capital city and larger electricity load centers are in the southern regions. The transmission costs to account for the location disparity between generation and demand make these projects less appealing than coal fired options from simply a price perspective.<sup>23</sup>

**Coal-fired power** prospects are also robust, with Mozambique's large coal deposits at Moatize-Minjova, Senangoe and Mucanha-Vuzi in Tete province. Mine-mouth projects are being considered by many mining companies with the intent of selling power predominantly to the South African market given the transmission line currently in place. In Tete province, Ncondezi Coal anticipates construction of a 1,800 MW coal-fired plant, with the 300 MW first phase due in 2017. Jindal Steel and Power of India aims to build a 2,640 MW coal-fired plant for domestic and export sales. Vale and Rio Tinto are separately planning 2,000 MW plants at Moatize and Benga respectively.<sup>24</sup>

**Hydroelectricity** makes up the largest component of Mozambique's renewable energy. The total hydro capacity in Mozambique is approximately 12,000 MW. It is estimated that 1,000 MW of this could come from small-scale hydro projects. Mozambique's plan is to build 4,000 MW of hydroelectricity, dominated by two projects, Cahora Bassa North Bank and Mphanda Nikuwa plants, which constitute 75% of that capacity. The Cahora Bassa North Bank has a planned capacity of 1,245 MW and was anticipated to be operational in the middle of 2015, with the Mphanda Nikuwa plant following in 2017, and adding 1,500 MW.<sup>25</sup>

<sup>18</sup> <http://www.pnnewswire.com/news-releases/sasol-edm-inaugurate-new-gas-to-power-plant-in-mozambique-273008571.html>;

<http://www.sasol.com/media-centre/media-releases/sasol-edm-inaugurate-new-gas-power-plant-mozambique>

<sup>19</sup> <http://af.reuters.com/article/mozambiqueNews/idAFL6N0P54K820140624>

<sup>20</sup> <http://www.fin24.com/Economy/Mozambiques-gas-power-station-nearing-completion-20150423>

<sup>21</sup> <http://enventurepartners.com/kuvaninga-gas-fired-power-plant-begins-construction/>

<sup>22</sup> [http://www.grupovidere.com/focus/energias/KuvaningaEnergia\\_PIM\\_MinisteriodasFinancas.pdf](http://www.grupovidere.com/focus/energias/KuvaningaEnergia_PIM_MinisteriodasFinancas.pdf)

<sup>23</sup> <http://www->

[wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/07/23/000333037\\_20140723125052/Rendered/PDF/896220WP0P1318040Box0385289B00OUO0900ACS.pdf](wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/07/23/000333037_20140723125052/Rendered/PDF/896220WP0P1318040Box0385289B00OUO0900ACS.pdf)

<sup>24</sup> <http://www.nortonrosefulbright.com/knowledge/publications/100579/investing-in-the-african-electricity-sector>

<sup>25</sup> <http://ppi-re.worldbank.org/data/project/hmnk-mphanda-nkuwa-hpp-6483>

Below is a table identifying the priority hydropower projects in Mozambique’s development pipeline:

Name	Size (MW)	Status
<b>Mphanda Nkuwa (PPP)</b>	1500	Under development, Commissioning in 2017
<b>CB North Bank (IPP)</b>	1245	Under development, Commissioning in earliest mid-2017
<b>Lupata (PPP)</b>	600	Under development, Commissioning in 2020
<b>Boroma (PPP)</b>	200	Under development, Commissioning in 2020
<b>Lurio (PPP)</b>	120	Feasibility Study Completed

Table 2: Mozambique Hydropower Pipeline<sup>26 27 28 29 30</sup>

Similar to natural gas, a major issue with these projects is the difference between the location where the power is generated and the load. The two largest projects would be developed in Tete province. With Mozambique’s significant store of fossil fuels, developers must weigh the price of additional transmission infrastructure, transmission losses, and significant development time against developing fossil fuel plants closer to population centers.

In response to the large size and disparity between electricity location and load centers, **distributed generation, particularly solar**, may provide a valuable addition to Mozambique’s energy composition. The potential resource opportunities with solar, wind, and geothermal are great, but projects have yet to mature in Mozambique. The total installed capacity of solar is only around 1 MW mainly providing electricity to rural schools, health centers and some homes. Wind and geothermal projects are largely in the research stage in Mozambique.<sup>31</sup> The installed base of renewables in Mozambique is significantly further behind other African countries and there is tremendous opportunity to leverage renewables to reach rural populations that are far from the grid.

## Transmission

The Centre-South transmission backbone project (known as CESUL), involves designing and constructing a transmission system that can evacuate approximately 6,000 MW of power to be generated in the Zambezi Valley, and to facilitate future grid expansion to meet the requirements of the Mozambican market. The project is planned to connect northern and Southern Mozambique with sufficient transmission capacity to provide access to the central region as well. Additionally, the project intends to allow Mozambique to trade the evacuated power with other members of SAPP, particularly South Africa. With 2,600 km of transmission line with 8 new substations, this project is seen as a major opportunity to facilitate private sector investment by improving Mozambique’s limited transmission infrastructure. Norway funded the feasibility studies and the rest of the project’s US\$1.8 billion is expected to be funded by the shareholders: the China State Grid Corporation (CSGC) (46%), ESKOM (25%), EDM (15%) and Portugal’s REN (14%).<sup>32</sup> The project is designed to be developed using a Build Operate Transfer (BOT) structure.<sup>33</sup>

Another high priority transmission project is the Mozambique – Malawi interconnector. The project entails constructing a 220 kV (upgradeable to 400 kV) transmission line joining Matambo substation in Mozambique to the proposed Phombeya substation in Blantyre West in Malawi. This transmission line would also result in Malawi getting connected to the SAPP

<sup>26</sup> <http://constructionreviewonline.com/2014/09/construction-of-lupata-and-boroma-dams-in-mozambique-to-start-in-2015/>

<sup>27</sup> <http://ppi-re.worldbank.org/data/project/hmnk-mphanda-nkuwa-hpp-6483>

<sup>28</sup> [http://www.iisd.org/pdf/2013/investment\\_%20incentives\\_%20mozambique.pdf](http://www.iisd.org/pdf/2013/investment_%20incentives_%20mozambique.pdf)

<sup>29</sup> [http://www.irena.org/DocumentDownloads/Publications/IRENA\\_Africa\\_CEC\\_infrastructure\\_2015.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_Africa_CEC_infrastructure_2015.pdf)

<sup>30</sup> [www.intpow.no/?id=1339&download=1](http://www.intpow.no/?id=1339&download=1)

<sup>31</sup> <http://www.irena.org/DocumentDownloads/Publications/IRENA%20Mozambique%20RRA.pdf>

<sup>32</sup> <http://www.macauhub.com.mo/en/2014/11/17/feasibility-studies-of-cesul-project-nearing-completion-in-mozambique/>

<sup>33</sup> <http://invest-tripartite.org/wp-content/uploads/2013/06/8-Mozambique-Transmission-Backbone-Project-Brief-26-05-20131.pdf>

network. Although the project is a priority for the two Governments and has been on the agenda for a long time there have been delays in its implementation. Mozambique submitted a formal request for funding the project to World Bank, Norwegian Government, African Development Bank and European Investment Bank for their consideration, while Malawi is understood as yet to submit theirs.

In addition, the ZIZABONA project connecting Zimbabwe, Zambia, Botswana and Namibia, is an important transmission project for Mozambique despite its indirect involvement. It would decrease the traffic along the north-south corridor from Zimbabwe to South Africa helping Mozambique's power transmission to South Africa. The ZIZABONA project is expected to be implemented in two phases, the first phase will cover the construction of a 120 km, 330 kV line and the second phase will involve the construction of a 300 km, 330 kV line.<sup>34</sup>

## Electricity Laws and Regulations

The Electricity Law of 1997 allows for private sector participation in the electricity sector through concession agreements granted by the government for the construction and/or operation of electricity assets. Approval by the Council of Ministers is required when rated capacity is more than 100 MW. In addition to obtaining a concession contract, the project must enter into a PPA with EDM for the sale of its capacity and electricity. There is no prescribed PPA type and as such tariffs are essentially set by contract, rather than being set through a blanket policy or regulatory authority. The Energy Law simply requires that tariffs are fair and reasonable. Given the lack of clarity on how this could be interpreted, it could be discouraging to private sector participation. The law has not been updated since its inception in 1997.

The Mozambican Energy Strategy of (2000) defines the responsibilities and regulations of the government owned institutions. It outlines the processes and regulations for: Price setting; service quality regulation and control; protection of consumer interests; awarding electricity concessions; ensuring the lowest cost, reliable power supply; quality and efficiency of power supply; and promotion of a more efficient, dynamic and competitive business sector.<sup>35</sup> The strategy was updated in 2015, establishing high level goals and guidance for electricity production, transmission, finance, prices, access, environment, and gender concerns.

The Strategy supplements Mozambique's Energy Policy by clearly outlining the role of government in the construction of programs, projects and investments. CNELEC, as a consultative body acting as the regulator, has the authority to ensure that some of the Energy Strategy components are met. Capacity building and more clearly defined regulatory authority for CNELEC would be helpful.

The 2010 Procurement Regulations apply to procurement undertaken by all state entities, including companies in which any state entity owns 100% of the equity, or where their financial activities are linked to state budgets (including funds provided from foreign governments or multilateral agencies). Electricity project bids are evaluated by the procuring authority (frequently EDM) and CNELEC.<sup>36</sup> The regulations are designed to ensure transparency, equality, competitiveness, impartiality and sound financial management by the government. However, anti-corruption institutions and the legal system in Mozambique are weak and corruption, especially in procurement continues to be rampant. It is unclear how significant an impact corruption has had on the electricity sector, but it has recently been a major discussion for extractive industries in the country.

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<sup>34</sup> [http://sadc-energy.sardc.net/index.php?option=com\\_content&view=article&id=188:south-africa-interested-in-joining-zizabona&catid=37&Itemid=143](http://sadc-energy.sardc.net/index.php?option=com_content&view=article&id=188:south-africa-interested-in-joining-zizabona&catid=37&Itemid=143)

<sup>35</sup> <http://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/mozambiqueenergyLawEnglishVersion.pdf>

<sup>36</sup> <http://www.nortonrosefulbright.com/knowledge/publications/100579/investing-in-the-african-electricity-sector>

## Electricity Tariffs and Pricing

According to Norton Rose, the price or tariff that ECM pays for electricity generation is not subject to regulatory approval, but is set by the concession contract for each project. The Energy Law says that tariffs are fair and reasonable as long as the structure ensures the minimum potential cost to customers given the service provided while allowing for a return on the capital investment of developers. Determining the minimum potential cost is relative and without a strong regulator to oversee this process this will be difficult to maintain as more IPPs come on-line.<sup>37</sup> Thus, tariff “fairness” is determined by negotiations with ECM.

EDM tariffs to customers are unified across the country. In impoverished and distant regions (central and northern parts of Mozambique), where supply and distribution are more expensive than the tariff charged due to long distances and low customer density, combined with low consumption per customer, cross-subsidy takes place from the more profitable southern region. In addition, there is a tariff subsidy extended to all customers irrespective of their location, which means that EDM operates at a loss.

Additionally, the tariff structure across user categories is progressive, the greater the domestic consumption, the higher the unit rate.<sup>38</sup> This provides a rate subsidy for the lower income users. The tariffs are broken into 4 categories, social, household, farming, and general. There is an increasing tariff based on consumption charged to all customers except the social tariff customers and pre-payment participants. The social tariff is for users who use fewer than 100 kWh/month, and is a flat rate of 107 Mt/month.<sup>39</sup> With a conversion rate of 37 metical to 1 USD, the general tariff for 0 to 100 kWh is \$0.08/kWh.

According to the Electricity Master Plan, considering current electricity tariff levels, a substantial increase is required (to about \$0.13-14 kWh) to support the development of generation and transmission upgrades to meet estimated demand growth.<sup>40</sup>

Electricity Sale Price, Metical per kWh					
Recorded Consumption (kWh)	Social Tariff (Mt/kWh)	Household Tariff (Mt/kWh)	Farming Tariff (Mt/kWh)	General Tariff (Mt/kWh) (USD/kWh)	Flat Rate (Mt/kWh)
From 0 to 100	1.07	N/A	N/A	N/A	N/A
From 0 to 200	N/A	2.50	2.68	2.97	85.35
From 201 to 500	N/A	3.53	3.81	4.24	85.35
Above 500	N/A	3.71	4.17	4.64	85.35
Pre-Payment	1.07	3.18	3.71	4.26	
Electricity Sale Price, Dollars per kWh ( at 37 Metical/\$)					
From 0 to 100	0.029	N/A	N/A	N/A	N/A
From 0 to 200	N/A	0.068	0.072	0.080	2.307
From 201 to 500	N/A	0.095	0.103	0.115	2.307
Above 500	N/A	0.100	0.113	0.125	2.307
Pre-Payment	0.029	0.086	0.100	0.115	

Table 4: EDM Tariffs

<sup>37</sup> <http://www.nortonrosefulbright.com/knowledge/publications/100579/investing-in-the-african-electricity-sector>

<sup>38</sup> [http://www.iisd.org/tkn/pdf/energy\\_security\\_mozambique.pdf](http://www.iisd.org/tkn/pdf/energy_security_mozambique.pdf)

<sup>39</sup> [http://www.edm.co.mz/index.php?option=com\\_content&view=article&id=121&Itemid=83&lang=pt](http://www.edm.co.mz/index.php?option=com_content&view=article&id=121&Itemid=83&lang=pt)

<sup>40</sup> [http://www.speed-program.com/wp-content/uploads/2015/02/2014-SPEED-Report-042-Analysis-of-the-Power-Crisis-and-its-Impact-on-the-Business-Environment-EN\\_DRAFT2.pdf](http://www.speed-program.com/wp-content/uploads/2015/02/2014-SPEED-Report-042-Analysis-of-the-Power-Crisis-and-its-Impact-on-the-Business-Environment-EN_DRAFT2.pdf)

# IPP PROCUREMENT PROGRAM

## IPP Strategy

In the Mozambican single buyer model, EDM is the sole purchaser of IPP electricity.<sup>41</sup> The GOM would prefer government ownership of power generation assets, but understanding that they do not have the capital required they have allowed IPPs to enter the country. The government differentiates between Public Private Partnerships (PPPs) and IPPs, favoring PPPs over IPPs, aside from with smaller scale renewables, where the government has an ownership stake in the asset.

The Mozambican Energy Strategy outlines an approach to generate funding for projects through PPPs more broadly, rather than IPPs specifically. The major levers outlined in the Energy Strategy to increase private sector investment are: (1) favorable tax incentives for generation that is directed towards domestic consumption and (2) rewards for Mozambique ownership of projects. It is unclear specifically how these two strategies are to be implemented. Additionally, Mozambique intends to create a fund to subsidize renewable generation so its costs are similar to the cost of natural gas production which the government is calling an “environmental fee.”<sup>42</sup> It is unclear where the funding for this will come from and it does not appear to have been included in the state budget.

Specifically for renewable generation, the National Strategy for New and Renewable Energy Development has identified the establishment of a Renewable Energy Feed in Tariff (REFIT) as key for encouraging IPP development. The REFIT design outlines tariffs for biomass, solar, wind and small hydro for capacities up to 10 MW. It is anticipated that electricity generation from the burning of biogas waste from sugar processing plants in the south of the country will dominate the first IPPs to use the REFIT mechanism. Currently, the Ministry is working on a model for the REFIT program, where certain renewable generation is provided at a different tariff than REFIT to be more cost reflective. The government has established a goal of 400 MW in new renewable energy, a portion of which is anticipated to be driven by the REFIT program.<sup>43</sup>

## Current IPP Environment

### Traditional Energy – Fossil Fuels

As previously discussed, Mozambique has significant hydrocarbon resources and industrial activity to support IPP investment, and a number of projects are under development. Electricity demand is also expected to increase even without large industry presence. Additionally, Mozambique’s interconnections to South Africa and to SAPP provide export opportunities to other countries.

The first project-financed IPP initiative to reach financial close in Mozambique (operational late 2015/early 2016) was an 118 MW gas-fired power plant developed, designed, constructed, financed and operated by Gigawatt, illustrating both the government and the private sector are serious about IPP developments.<sup>44</sup> The plant also has an additional 250 MW planned in expansions over the subsequent 48 months. See the other generation projects above for more details on natural gas power plant IPPs.

In addition to gas-fired generation, coal is also driving growth in IPPs. ACWA power has signed a 25 year PPA with the GoM to provide a 300 MW coal-fired plant called the Moatize

<sup>41</sup> [https://energypedia.info/images/c/cb/EN\\_Support\\_for\\_Wind\\_Power\\_Development\\_in\\_Mozambique\\_report\\_DNER.pdf](https://energypedia.info/images/c/cb/EN_Support_for_Wind_Power_Development_in_Mozambique_report_DNER.pdf)

<sup>42</sup> Energy Strategy (2014 -2023) Ministry of Energy

<sup>43</sup> <http://www->

[wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/12/04/000442464\\_20141204085121/Rendered/PDF/918670PGD0P146010Box385385B00OUO090.pdf](https://wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/12/04/000442464_20141204085121/Rendered/PDF/918670PGD0P146010Box385385B00OUO090.pdf)

<sup>44</sup> <http://www.gigawatt.co.mz/en/news/power-plant-construction-advances/>

IPP Project. Only one sixth of this generated capacity is going to be provided to the grid because the coal mine which drives the plant will consume the majority.<sup>45</sup>

## Renewables

FUNAE has conducted a study, the Renewable Energy Atlas, of the potential for all renewable energy resources within Mozambique, and will be utilized to drive future investment in smaller hydro, solar, wind, and biomass. Additionally, this study will support the REFIT model that is being developed with financial and technical assistance from USAID.

As previously discussed, Mozambique's potential hydropower capacity will account for a significant percentage of future additions to the country's generation composition. There are two significant IPP projects in the generation plan for the near future, the HCB Dam and the Cahora Bassa North Bank dam.

HCB is often described as an 'IPP' in Mozambique, and the region. However, it is nearly 100% owned by the Mozambique government (and was previously partially owned by the Portuguese government). However HCB's business model does provide food for thought for future potential IPP transactions. The dam sells a large portion (up to 60% in some quotations)<sup>46</sup> of its power to Eskom, at a significantly discounted rate (although this is slightly buoyed by a South African green tariff).<sup>47</sup> The remaining allocations are sold to the Zimbabwe Electricity Supply Authority (35%) and a small portion is provided to Mozambique. This structure is left over from Portugal's sale of HCB to the GoM, where Eskom held a long term PPA with HCB. Additionally, during the acquisition, the tariff Eskom paid was renegotiated only slightly higher, and remains at a very low level. Adding to the difficulty of the situation, transmission issues have been plaguing the HCB, due to challenges regarding the reliability of the high-voltage direct current transmission lines running from the plant. This concern will be partially alleviated by the construction of the Centre-South transmission backbone project.<sup>48</sup>

The Cahora Bassa North Bank Dam is a much speculated over high priority (for both GoM and SAPP) 'IPP' procurement, also anticipated to have majority Government of Mozambique ownership, through EDM and HCB. Initial pre-feasibility studies have been conducted, but the construction of the dam relies heavily on the investment in the Centre-South transmission backbone project which is not anticipated to be operational until 2019.<sup>49</sup>

A small wind pilot project called the Inhambane Wind Project is being developed and supported using USAID funding, under the Africa Infrastructure Program (AIP). The MOE is seeking bank financing for the project.<sup>50</sup>

## Legal & Organizational Structure around Power Purchase

The Investment Law of 1993 installed the Minister of Planning and Finance to ensure the coordination and promotion of investment, as well as the rendering of advisory services on government matters. The Law also determines which areas are specifically for government investment, with or without the private sector, along with the rules and deadlines for the presentation, analysis, evaluation and decision-making on investments. The electricity sector was the first to be identified as an area reserved for the public sector.<sup>51</sup>

The Electricity Law of 1997 promotes private sector participation in the electricity sector. Under a concession agreement granted by the government of Mozambique, construction and operation of power plants are made legal. Granting concessions requires public

<sup>45</sup> <http://www.acwapower.com/project/16/moatize-ipp.html>

<sup>46</sup> <http://www.waterpowermagazine.com/news/newsmozambique-strikes-deal-on-cahora-bassa>

<sup>47</sup> Ncondezi Coal, Edison 2013

<sup>48</sup> <http://www.waterpowermagazine.com/news/newsmozambique-strikes-deal-on-cahora-bassa>

<sup>49</sup> <http://invest-tripartite.org/wp-content/uploads/2013/06/8-Mozambique-Transmission-Backbone-Project-Brief-26-05-20131.pdf>

<sup>50</sup> [http://www.iisd.org/pdf/2013/investment\\_%20incentives\\_%20mozambique.pdf](http://www.iisd.org/pdf/2013/investment_%20incentives_%20mozambique.pdf)

<sup>51</sup> [http://www.wipo.int/wipolex/en/text.jsp?file\\_id=180735](http://www.wipo.int/wipolex/en/text.jsp?file_id=180735)

procurement, and in the event of a single entity with power output of more than 100MW, approval of the Council of Ministers is required. In addition to entering into a concession contract, the project company will need to enter into a PPA for the sale of its capacity and energy. There is no prescribed PPA form and as such tariffs are set by contract, rather than being subject to regulatory approval. The Energy Law only requires that tariffs are fair and reasonable.

The 2010 Procurement Regulations apply to procurement undertaken by all state entities, including companies in which any state entity owns 100 per cent of the equity, or where their financial activities are linked to state budgets (including funds provided from foreign governments or multilateral agencies).<sup>52</sup> The system protects large enterprises by creating challenges for small to medium enterprise in the form of significant bureaucratic hurdles, complex labor legislation, and high construction costs<sup>53</sup>. This is reinforced by the Public-Private Partnerships Law which provides a framework for contracting, implementation and monitoring of public-private partnerships for large scale projects and company concessions.<sup>54</sup>

## DONOR IPP INITIATIVES

### USAID

Under the **Africa Infrastructure Program (AIP)**, USAID is working to support the final-stage development of the Inhambane Wind Project, and the development of the Renewable Energy Feed-in-Tariff (REFIT) for Mozambique's Ministry of Energy. The wind project is currently in the process of reaching financial close, under a follow on contract issued earlier in 2015. The REFIT support program (mainly transaction advisory services to the GoM) is moving past planning stages and is in the process of developing a model project under the REFIT program.<sup>55</sup>

**Support Program for Economic and Enterprise Development (SPEED)**. SPEED is a USAID project to improve the business environment through better trade and investment policies.<sup>56</sup> SPEED created a report on the electricity industry in Mozambique (“Analysis of the Electricity Crisis and its Impact on the Business Environment”), providing insights into improvements in the energy space needed to encourage and support private sector investment.

### World Bank

The World Bank's Second Climate Change Development Policy Operation Project is a proposed credit and grant for \$50 million USD, with an aspect dedicated to promoting energy efficiency and access to renewable energy. The previous grant under the same name provided a review of Mozambique's electricity law, as well as support to the Council of Ministers to develop the REFIT program.<sup>57</sup>

Energy Development and Access Project (EDAP). EDAP focuses on the increased development of electricity connections in non-urban areas, encouraging renewable energy resources and technologies, building capacity and capabilities of the Ministry of Energy (ME), Electricidade de Mozambique (EDM) and Fundo Nacional de Electrificacao (FUNAE), and creating a comprehensive donor partnership framework for coordinated and sustained

<sup>52</sup> <http://www.nortonrosefulbright.com/knowledge/publications/100579/investing-in-the-african-electricity-sector>

<sup>53</sup> <http://omrmz.org/index.php/biblioteca/category/165-diversos?download=2399:dfid-2011-mozambique-procurement-study-economics-institutos-reform-challenges>

<sup>54</sup> [http://www.iisd.org/pdf/2013/investment\\_%20incentives\\_%20mozambique.pdf](http://www.iisd.org/pdf/2013/investment_%20incentives_%20mozambique.pdf)

<sup>55</sup> [https://www.fbo.gov/index?s=opportunity&mode=form&id=97a225a5efdce0e16d374ae4acf3e8a5&tab=core&\\_cview=0](https://www.fbo.gov/index?s=opportunity&mode=form&id=97a225a5efdce0e16d374ae4acf3e8a5&tab=core&_cview=0)

<sup>56</sup> <http://www.speed-program.com/our-work/by-sector/energy-mineral-resources>

<sup>57</sup> [http://www-](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/12/04/000442464_20141204085121/Rendered/PDF/918670PGD0P146010Box385385B000UO090.pdf)

[wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/12/04/000442464\\_20141204085121/Rendered/PDF/918670PGD0P146010Box385385B000UO090.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/12/04/000442464_20141204085121/Rendered/PDF/918670PGD0P146010Box385385B000UO090.pdf)

financing.<sup>58</sup> The project is assisting the procurement of solar panels for a variety of public buildings (250 schools, 242 health clinics, and 30 villages).<sup>59</sup> The project has fallen behind on its timeline for physical procurements, and has requested an extension of the closing date by 18 months.<sup>60</sup>

### **Economic Development Cooperation Fund**

The South Korean Government provided \$32 million of funding, interest free for the next 40 years with an additional grace period of 15 years, to develop photovoltaic stations with a capacity of 400-500 kW of power. The construction contract of the stations includes the construction of low-voltage power distribution grids, training of national technical teams, technical assistance and maintenance of the plants within 12 months after provisional acceptance. The implementing company is the South Korean Hyosung Corporation, with FUNAE accepting the funds.<sup>61</sup>

### **African Development Fund (ADF)**

A \$15.3 million loan for technical assistance to the Government of Mozambique including to support the financial closure of three mega projects: (1) Electricity transmission line for Sociedade Nacional de Transporte de Energia, (2) Hydropower development project of Mpanda Nkuwa, (3) Liquid natural gas trains. Consultants are engaged on a short term basis until 2017 to provide training to help to finish these megaprojects. The AfDB's technical assistance is consistent with the objectives of Mozambique's long-term development strategy, Visão 2025 (Vision 2025), and its five-year Medium-Term Plan (PQG 2010-2014), where the expansion of electricity infrastructure is a top priority.<sup>62</sup>

### **Japan International Cooperation Agency (JICA)**

In 2014, JICA signed a loan agreement with the GOM to provide a Japanese ODA loan of up to 17,269 billion yen (around \$140 million USD in 2015) for the Maputo Gas Fired Combined Cycle Power Plant Development Project.<sup>63</sup>

## **REVIEW**

### **Strengths**

There are a variety of aspects which are strong positives for Mozambique's IPP environment, most notably Mozambique's significant resources of both traditional and renewable energy with which to support generation assets.

In terms of policy, Mozambique has begun to develop some foundational documents to drive a unified approach to the energy sector through energy policy and strategy declarations. While much of the strategy currently developed focuses more on the creation of PPPs, the documents still provide investors with some understanding, albeit limited, of how the sector may develop in the coming years. There is room to provide more detail behind this strategy as well as clear processes and procedures for IPPs to enter into the market.

Through FUNAE, Mozambique has begun to develop a baseline understanding of their renewable capacity under the Renewable Energy Atlas program in combination with a tariff

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<sup>58</sup> [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/01/15/000104615\\_20090116152222/Rendered/PDF/EDAP010Project10Stage010Rev01112109.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/01/15/000104615_20090116152222/Rendered/PDF/EDAP010Project10Stage010Rev01112109.pdf)

<sup>59</sup> <http://www.worldbank.org/projects/procurement/noticeoverview?id=OP00014937&lang=en>

<sup>60</sup> [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/02/23/000442464\\_20150223092853/Rendered/PDF/RES140500PJPR00385422B00PUBLIC00ACS.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/02/23/000442464_20150223092853/Rendered/PDF/RES140500PJPR00385422B00PUBLIC00ACS.pdf)

<sup>61</sup> [http://www.pv-magazine.com/news/details/beitrag/south-korea-to-fund-mozambiques-solar-plants\\_100001404/#axzz3bYG97XW1](http://www.pv-magazine.com/news/details/beitrag/south-korea-to-fund-mozambiques-solar-plants_100001404/#axzz3bYG97XW1);  
[http://www.funae.co.mz/index.php?option=com\\_content&view=article&id=338%3Aconstrucao-de-tres-centrais-fotovoltaicas-em-niassa&catid=36%3Asolar&Itemid=2&lang=en](http://www.funae.co.mz/index.php?option=com_content&view=article&id=338%3Aconstrucao-de-tres-centrais-fotovoltaicas-em-niassa&catid=36%3Asolar&Itemid=2&lang=en)

<sup>62</sup> <http://www.afdb.org/en/news-and-events/article/afdb-technical-assistance-aims-to-optimize-development-of-mozambiques-energy-resources-12719/>

<sup>63</sup> [http://www.cnbcfrica.com/news/resources/2014/01/14/japan-funds-\\$174-mln-new-mozambique-gas-fired-power-plant/](http://www.cnbcfrica.com/news/resources/2014/01/14/japan-funds-$174-mln-new-mozambique-gas-fired-power-plant/)

structure to support small scale renewable IPP generation. While FUNAE only looks at generation under 10MW, with Mozambique's large size and distribution difficulties, the small scale production model may prove a strength. There appears to be room to continue to develop a strong program built on this foundation for larger renewable energy.

## Improvement Areas

While HCB is often described as an IPP, the fact remains that Mozambique does not have much of a track record in privately financed and / or operated power plants. Given the government's stated policy is to promote private participation, the status quo suggests there are multiple areas for improvement. Some examples are presented below.

**IPP transparency and a clear tariff negotiation procedure.** There appears to be no clear process for an IPP to negotiate the tariff with the GoM and EDM. This lack of transparency may be a deterrent to a private sector investor. In addition, the tariff calculations are not clear given the regulation only states that they have to be the lowest cost with reasonable return, where reasonable is not defined.

**Renewable energy** roadmap and tariff structure for projects **greater than 10MW**. There is no technology specific renewable energy tariffs unless they are specified in the new REFIT tariffs. In addition, there does not seem to be a huge focus on renewables that are greater than 10MWs, with the exception of large hydropower projects. Currently, wind power is the only technology being seriously considered for large scale production, as it is the only technology considered mature enough for development.

**Transmission lines.** One of Mozambique's electricity difficulties arises from the distance between its main generation sources in the Northern Tete province and the main load centers in the South. There is currently no direct transmission between these two points, and power must be exported to travel south in Zimbabwe and South Africa to then be reimported in the southern parts of Mozambique. The Cahora Bassa North Bank Dam, the largest IPP currently being considered in Mozambique, requires the co-construction of the Centre-South transmission backbone project that will provide a direct linkage to the load in the south, as well as smaller loads along the coast. Without this backbone project, the timeline for the Cahora Bassa North Bank dam has seen its commissioning move further into the future.

In addition, the construction of transmission lines for any IPP use will need to be accompanied by expansion of the IMO. MOTRACO has this capability currently, but there may be a need for MOTRACO to expand for further wheeling within Mozambique.

**Rural electrification.** While a focus on improving high voltage transmission is important, there is also a need to focus on rural electrification. Expanding access and determining how the transmission and distribution can be expanded in other regions and harder to reach locations. Currently, the Ministry is considering a program of establishing Solar Cities in rural areas not currently served properly by the electrical network. Supporting this program could reach 25% of the population.<sup>64</sup>

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<sup>64</sup> Energy Strategy (2015-2023) Ministry of Energy