ELECTRICIDADE
DE MOÇAMBIQUE, E.P.

MOZAMBIQUE ENERGY POLICY

NOVEMBER, 2020

PRESENTED IN ENERGY POLICY (B) COURSE - 2020

By: Henriques Senda, Gil Vilanculo and Isac Tsamba

“

TOPICS

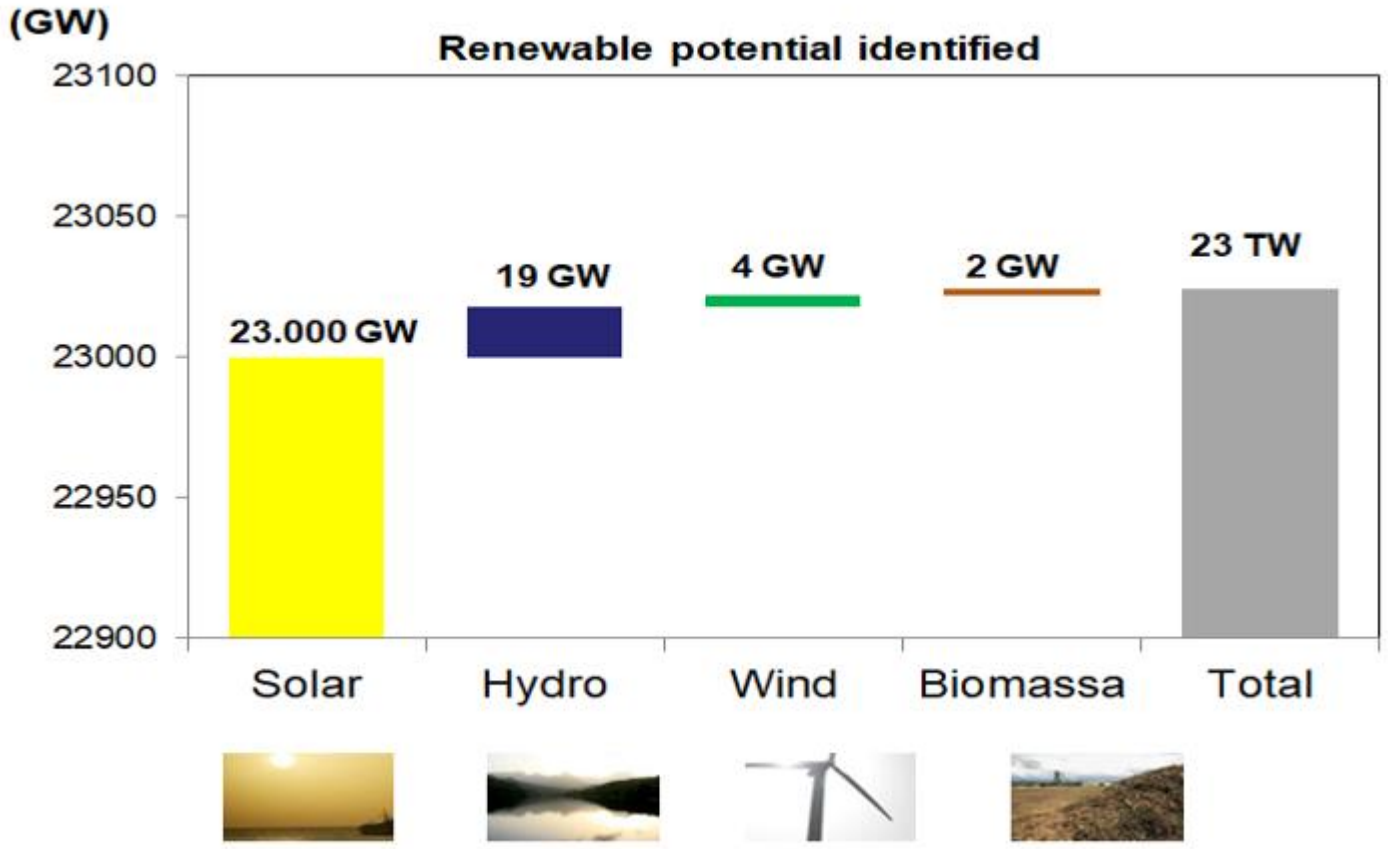
1. *COUNTRY CONTEXT*
2. *ENSURING UNIVERSAL ACCESS BY 2030*
3. *EDM'S RE PROJECTS OUTLOOK*
4. *CURRENT ENERGY POLICY AND MEASURES*
5. *PAST ENERGY DEMAND AND SUPPLY STATISTICS*
6. *CONVENTIONAL POWER PLANTS EXISTING IN 2019*
7. *RENEWABLE ENERGY SOURCES POWER PLANTS EXISTING IN 2019*
8. *OUTLOOK OF ENERGY DEMAND AND SUPPLY*
9. *DIFFICULTIES AND BOTTLENECKS*
10. *PRIORITIES FOR THE GROUP*

1. COUNTRY CONTEXT

- MOZAMBIQUE is a low income country with a population of almost 26 Million;
- The economy grew at an average rate of 7.4% over the past two decades
- Large part to sound macroeconomic management, large-scale foreign investment in projects and support from development partners;
- 70% of Mozambique's population lives in rural areas
- Access to electricity remains low, 33% of population have access to electricity
- Mozambique has abundant energy resources, including an estimated 19.000 MW of Hydropower, 277 trillion cubic feet of natural gas, 20 billion tons of coal, 23.000GW of solar and significant potential of biomass and wind potential, as follows:

1. COUNTRY CONTEXT (cont.)

The solar resourse is the most abudant source of RE in the country



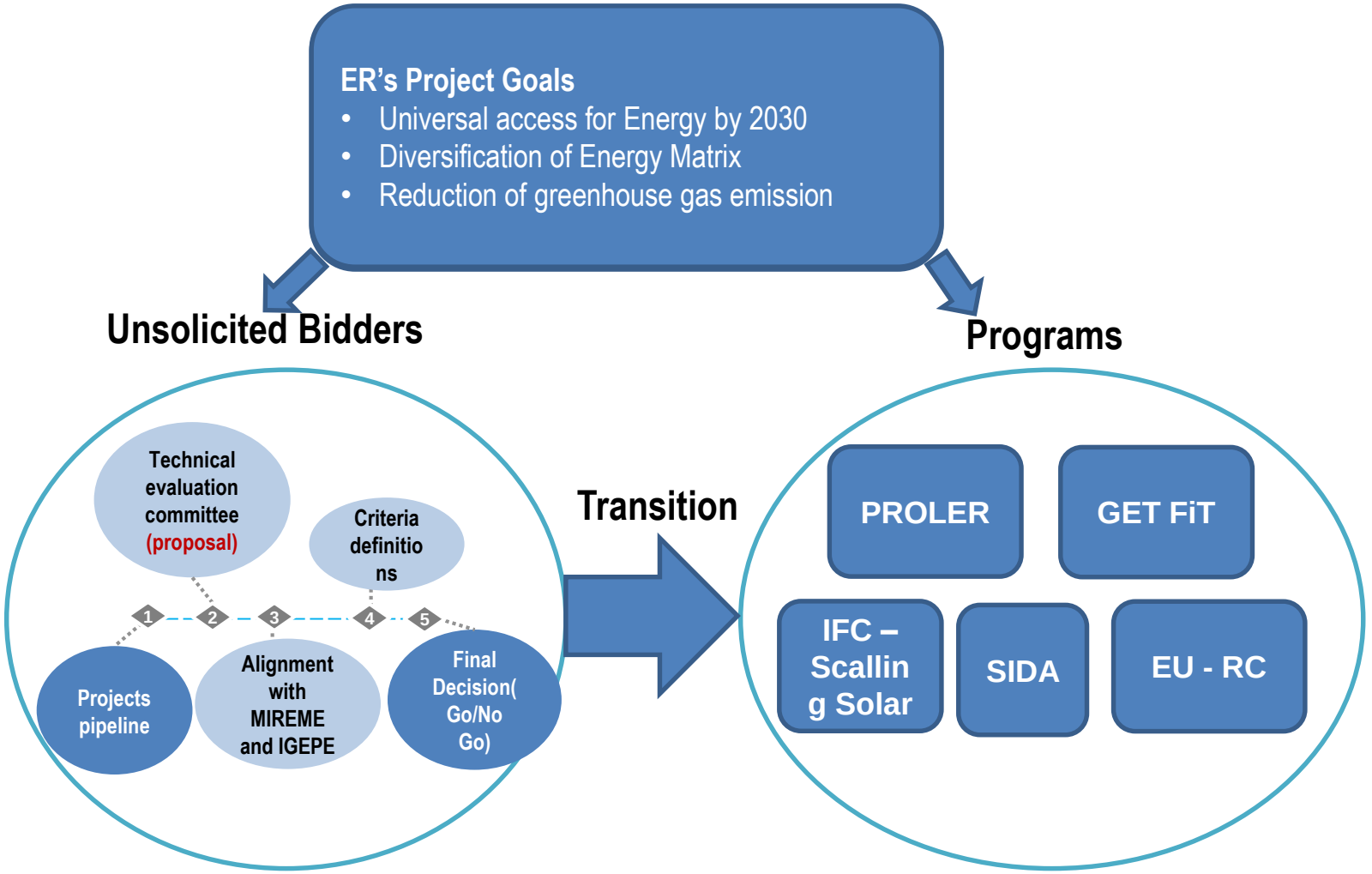
2. ENSURING UNIVERSAL ACCESS BY 2030

Government	Public Sector	Private Sector	Regulatory Authority (ARENE)
• Policy framework • Regulatory framework • Concession granting • Affordability orientation	• Promote Auctions • Promote PPPs • Sign PPAs • Improve the business environment • Investments on RE • Sustainability orientation	• Investments on RE • Attractive returns • Competitive prices • Profit Orientation	• Verify transparency of concessions • Ensure compliance with the laws • Arbitration • Ensure cost-reflective tariffs • Compliance

PRINCIPLES OF ENGAGEMENT:

MEDIUM TO LONG TERM VIEW. TECHNOLOGY TRANSFER. SKILL DEVELOPMENT. FOCUS ON LEAST COST AND QUALITY OF SUPPLIES. DEVELOP DISTRIBUTION AND RETAIL NETWORKS FOR RETs

3. EDM'S RE PROJECTS OUTLOOK



4. CURRENT ENERGY POLICY AND MEASURES

- The Mozambique's Energy Policy approved March 3rd 1998 by the Council of Ministers Unver Resolution 5/98 established with the following main objectives:
- To ensure reliable energy supply at the lowest possible cost so as to satisfy current levels of consumption and the needs of economic development;
- To increase the availability of energy for the domestic sector, particularly coal, kerosene, gas and electricity;
- To promote reforestation in order to increase the availability of firewood and charcoal;
- To strengthen the institutional capacity of the main agencies that supply energy in order to improve their performance;
- To promote economically viable investment programs with a view to the development of energy resources (hydroelectricity, forests, coal and natural gas)
- To increase exports of energy products;
- To increase efficiency in the use of energy;
- To promote the development od conversion technologies and environmentally friend energy uses (solar power, wind power and biomass) and
- To promote a more efficient , dynamic and competitive business sector

4. CURRENT ENERGY POLICY AND MEASURES (Cont.)

2. In August 1997 the new electricity law 21/97 was approved by parliament to define:

The general policy for the organization of the electrical sector and the administration of the supply of electrical energy; and

The general legal framework for electrical energy generation transmission, distribution and sale within the country, as well as export to and importation from outside of the national territory, and the granting of concessions for such activities;

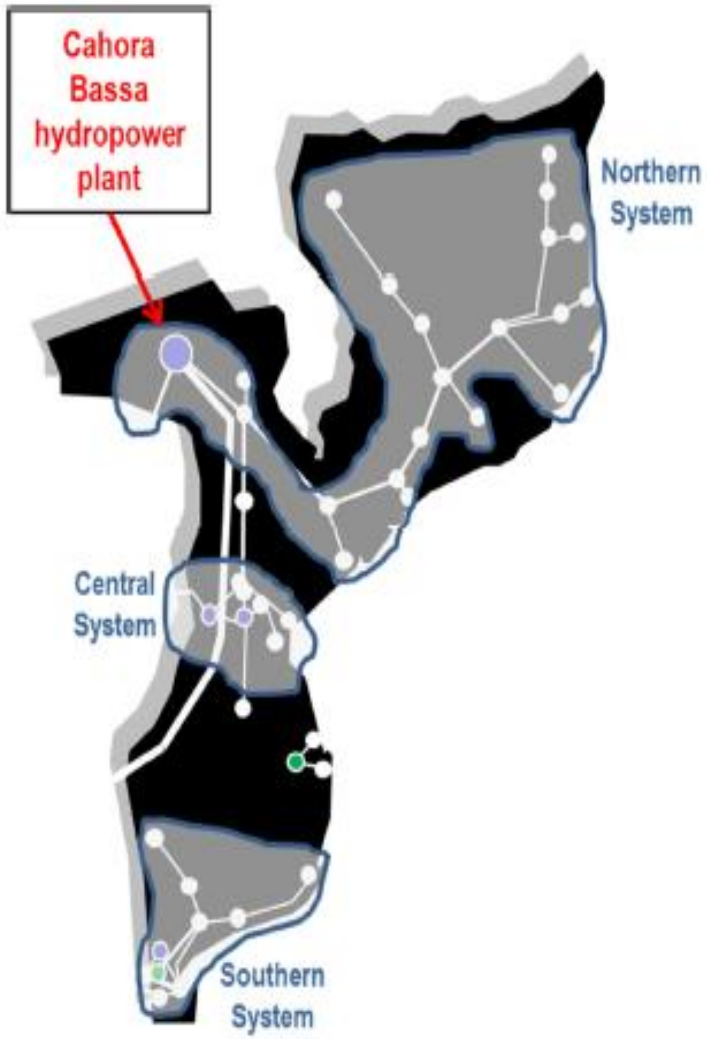
3. In March 2009 the Policy for Renewables was defined with the following objectives

- Increase the access to modern energy services of high quality and accessible prices,
- Reduce poverty and contribute to the Millennium Development Goals,
- Contribute to the generation of local and national income and employment.

4. Integrated Master Plan comprising 25 years (previous: 2018-2043);
5. Electrification National Strategy 2018 – 2030, which defines 40% of contribution for Renewable Energy
6. Renewable Energy ATLAS (Mapping renewables energy resources) concluded, launched in 2013;
7. Energy For All Programme linked to the universal acess by 2030, it was launced in 2019.

4. CURRENT ENERGY POLICY AND MEASURES (cont.)

- The Mozambique Power system actually developed as three separate systems;
- The transmission system does not cover all areas of the country;
- EDM is already acting as the Central /Single buyer of all generation. Current legislation does not forbid the Principal Buyer Model.
- The Master Plan indicates an electrification access target of 4.6 mil of HH by 2025:
  - ❖ 2.8 mil Grid-connected HH (45,6%) vs 1.8 mil HH off-grid solutions (24,4%).
- The objective to reach 70% electricity access by 2025 (from 27%in 2017) is ambitious, especially in the light of the historical incremental growth in energy access (linear rather that asymptotic).



5. PAST ENERGY DEMAND AND SUPPLY STATISTICS

Peak load of 2019 broken down per region

Region	Peak load (MW)
EDM_S	510.4
EDM_C	200
EDM C-N	211.3
Total MZ	922

The Demand by customer type (GWh) between 2011-2014

Customer	2011	2012	2013	2014
Transmission connected customers	122	253	310	371
Residential customers	1,052	1,233	1,416	1,536
Commercial	245	258	322	345
Agriculture	1	0	25	27
Large Customers LV	150	169	170	182
Large Customers MV/HV Tariff based	890	1,007	1,080	1,159
Exports	670	328	260	160
Total	**3,130**	**3,248**	**3,583**	**3,780**

5. CONVENTIONAL POWER PLANTS EXISTING IN 2019

Name	Type	Installed Capacity (MW)	Available Capacity to EdM (MW)	Owner	Commissioned
HCB Cahora Bassa Firm	Hydro	2075	300	HCB. Mainly for export	1974
HCB Cahora Bassa Non-firm	Hydro		200	HCB. Mainly for export	
Corumana	Hydro	16.6	14	EdM	1987
Chicamba	Hydro	44	38	EdM	1960 rehab 2017
Mavuzi	Hydro	52	36	EdM	1950 rehab 2016
Cuamba	Hydro	1.09	0.9	EdM	1989
Lichinga	Hydro	0.73	0.5	EdM	1983
GTG1 Maputo	Jet A1	17	0	EdM	1968
GTG2 Maputo	Diesel	36	0	EdM	1973
GTG3 Maputo	Diesel	24	0	EdM	1991
GTG Beira	Gas	14	14	EdM	1988
Térmica de Temane	Gas	11.2	11.2	EdM	
Gigawatt MZB	Gas	100	100	IPP	2016
Kuvaninga Energia power plant	Gas	40.03	40	IPP	2017
CTRG: Central Termoeletrica de Ressano Garcia	Gas	175	175	IPP (Sasol and EdM)	2014
Karpower Nacala	Diesel	108	108	Karpowership	2011
Inhambane	Diesel	4.8	4.8	MTU units	2015
Quelimane	Diesel	6.8	6.8	Mirrlees units	1980
Pemba G	Diesel	1.46	1	Communs unit	2012
Sub-Total		2727.2	1050.2		
Aggreko 1	Gas	15	15	Temporary IPP	
Aggreko 2	Gas	32	32	Temporary IPP	
Aggreko (Nacala)	Diesel	18	18	Temporary IPP	
Sub-Total		65	65		
Total		2792.2	1115.2		

6. RENEWABLE ENERGY SOURCES POWER PLANTS EXISTING IN 2019

Name	Type	Installed Capacity (MW)	Available Capacity to EdM (MW)	Comment	Commissioned
Mocuba Solar Plant	PV	40	40	IPP-Scatec	2019

Renewable Energy Sources power plants planned from 2020 to 2025

Project	Location	Technology	Size	Commissioning
Mocuba PV	Mocuba (Zambézia)	PV	40 MWc - 30 MW	2019
Metoro PV	Metoro (Cabo Delgado)	PV	41 MWc 30 MW	2020
Cuamba PV	Cuamba (Niassa)	PV	30 MW	2021
Pemba PV	Pemba (Cabo Delgado)	PV	20 MW	2022
Manhiça WP	Manhiça (Gaza)	WP	60 MW	2023
Dondo PV	Dondo (Sofala)	PV	30 MW	2022
Nacala PV	Nacala (Nampula)	PV	30 MW	2023
Lichinga PV	Lichinga (Niassa)	PV	30 MW	2023
Gurue PV	Gurue (Zambezia)	PV	30 MW	2025
Salamanga Biomass	Salamanga (Maputo)	Biomass	20 MW	2025
Mocuba Biogás	Mocuba (Zambézia)	Biogas	7.5 MW	2025
Namahacha WP	Namaacha (Maputo)	WP	60 MW	2024
Tofo	Lindela Inhambane	WP	30 MW	To be defined
TBD	Beira or Chimuara	Wind	30 MW	2025
Monapo PV	Monapo (Nampula)	PV	15 MW	To Be Defined
Pemba PV to confirm	Pemba (Cabo Delgado)	PV	15 MW	To Be Defined
Manje PV	Manje (Tete)	PV	15 MW	To Be Defined
Lindela/Massinga	Inhambane	PV	15 MW	To Be Defined
Salamanga PV	Salamanga (Maputo)	PV	15 MW	To Be Defined
Beira PV	Beira (Sofala)	PV	15 MW	To Be Defined
Angoche	Nampula	Pv	5 MW	To Be Defined
Balama	Nampula	PV	15 MW	To Be Defined (hyp : 2025)
Lagoa Pathi Wind farm	Lagoa Pathi	WP	60 MW	2024
Nicoadala PV	Nicoadala (Zambezia)	PV	30 MW	2025

Renewable Energies are foreseen to have a total generation of 600MW by 2025

7. Outlook of Energy Demand and Supply

Electricity	total	Mozambique per capita	Compared to Europe per capita
Own consumption	11.57 bn kWh	381.02 kWh	5,511.05 kWh
Production	18.39 bn kWh	605.61 kWh	5,925.27 kWh
Import	9.93 bn kWh	326.94 kWh	729.94 kWh
Export	12.88 bn kWh	424.16 kWh	707.85 kWh

Natural Gas	Cubic meters	Mozambique per capita	Compared to Europe per capita
Own consumption	1.84 bn m³	60.63 m³	903.40 m³
Production	6.00 bn m³	197.69 m³	456.61 m³
Export	4.16 bn m³	137.06 m³	398.75 m³

Energy source	total in Mozambique	percentage in Mozambique	percentage in Europe	per capita in Mozambique	per capita in Europe
Fossil fuels	3.68 bn kWh	16,0 %	49,2 %	121.21 kWh	8,115.37 kWh
Nuclear power	0.00 kWh	0,0 %	7,0 %	0.00 kWh	1,154.29 kWh
Water power	19.09 bn kWh	83,0 %	24,1 %	628.77 kWh	3,977.20 kWh
Renewable energy	230.04 m kWh	1,0 %	19,7 %	7.58 kWh	3,274.42 kWh
Total production capacity	23.00 bn kWh	100,0 %	100,0 %	757.55 kWh	16,489.87 kWh

8. DIFFICULTIES AND BOTTLENECKS

- The Ministry of Mineral Resources and Energy needs stronger capacity to drive system planning and competitive processes to improve the efficiency of the sector while also helping to drive it towards the government's access targets. This requires that the government develop a Least Cost Plan for meeting demand and export needs, while meeting diversification and security of supply requirements.

- ARENE's mandate should be clarified and its regulatory role strengthened, particularly in the area of tariff setting as a means to institutionalize financial sustainability for EDM and the need for tariff adjustment. To help with this process, fuel and PPA elements of EDM's costs could be passed through to consumers as an automatic tariff adjustment.

- There is a need for clear guidance for how the private sector can obtain feed in tariffs for renewables – especially when this supports off-grid and mini-grid access to electricity as part of the National Electrification Plan.

- Increasing access in line with Government targets will require major investments. The Government needs to consider the trade-offs between the ambition of the access targets imposed upon EdM and the sector's broader financial viability for carrying out operations, maintenance and investment.

9. PRIORITIES FOR THE GROUP

- Key aspects for developing a sustainable energy policy in developing countries ;
- Development of Feed in Tariff mechanism for both off grid and mini-grid systems;
- Viable financing mechanisms and business model for Off grid and Mini-Grid Projects;
- Development of sustainable PPA's for Renewable Energies and gas power plants;
- How to integrate renewables and gas power in Mozambique Energy matrix;
- The Mozambican Electricity Law is under revision, and we expect to pay an important role in this document;
- Technology about electricity market and role of an independent dispatch center.

Thank You!

ELECTRICIDADE DE MOÇAMBIQUE, E.P

ELECTRICIDADE DE MOÇAMBIQUE, E.P.

ELECTRICIDADE DE MOÇAMBIQUE, E.P.

Iluminando a Transformação de Moçambique

Contact: report@tky.ieej.or.jp