

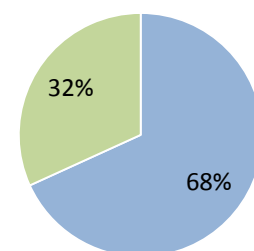
# Country: Mozambique



## Socio- economic framework

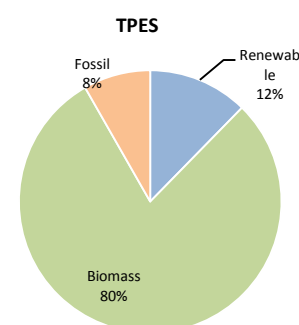
	Year	Unit	Value
Population	2014	million	27.22 <sup>1</sup>
Demographic growth	2015	%	2.79% <sup>1</sup>
Surface	2014	km <sup>2</sup>	799 380 <sup>2</sup>
GDP	2014	M US\$	16 390 <sup>1</sup>
GDP per capita	2014	US\$ per cap	602 <sup>1</sup>
GDP growth	2014	% /year	7.37% <sup>3</sup>
Fragile country status	2014	Index	No - n.a. <sup>4</sup>
Governance	2014	Index	52.2 <sup>5</sup>
Governance variation over 5 years	2014	Index	-2.2 <sup>5</sup>
Human development	2013	Index	0.393 <sup>6</sup>

■ Rural Population  
■ Urban Population



## Consumed Energy (million toe=11.65 MWh)

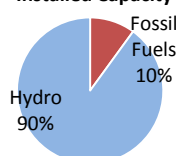
	Year	Unit	Value
Total Primary energy Supply	2013	Million toe	10.78 <sup>7</sup>
Primary energy Supply - Biomass	2013	Million toe	8.6 <sup>7</sup>
Primary energy Supply - Fossil	2013	Million toe	0.99 <sup>7</sup>
Fraction of Non-Renewable Biomass	2003	%	39% <sup>8</sup>
Primary energy Supply - Renewable (incl.hydro)	2013	Million toe	1.25 <sup>7</sup>
Primary energy - Net Import electricity	2013	Million toe	-0.06 <sup>7</sup>
Primary energy - Net import hydrocarbon	2013	Million toe	-4.04 <sup>7</sup>
Total Final Energy Consumption	2013	Million toe	9.53 <sup>7</sup>
Final energy - Modern BLEN <sup>(*)</sup>	2013	Million toe	1.05 <sup>7</sup>
Final Energy - Electricity	2013	TWh	11.28 <sup>7</sup>



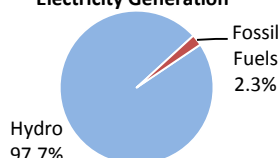
## Electricity

	Year	Unit	Value
Peak demand	2012	MW	706 <sup>9,10</sup>
Installed connected capacity	2013	MW	2533 <sup>11</sup>
Thermal installed capacity (fossil fuels)	2013	MW	350 <sup>11</sup>
Hydro installed capacity	2013	MW	2180 <sup>11</sup>
Renewable installed capacity (ex.hydro)	2013	MW	3 <sup>12</sup>
IPP/installed capacity	2013	%	90% <sup>11</sup>
Total Electricity production	2013	GWh	14895 <sup>7</sup>
Electricity generation from fossil fuels	2013	GWh	349 <sup>7</sup>
Electricity generation from hydro	2013	GWh	14546 <sup>7</sup>
Electricity generation from renewable	2013	GWh	0 <sup>7</sup>
Electricity consumption including self-consumption and losses	2013	GWh	14143 <sup>7</sup>
Average consumption per capita	2013	kWh per cap	450 <sup>7</sup>
Total losses (technical and non-technical) as a production % (**)	2013	%	17.8% <sup>7</sup>
Total losses (technical and non-technical)(**)	2013	GWh	2647 <sup>7</sup>
Imports (+) exports (-)	2013	GWh	-719 <sup>7</sup>
Global electrification rate	2012	%	20.2% <sup>1</sup>
Urban electrification rate	2012	%	54.5% <sup>1</sup>
Rural electrification rate	2012	%	5.4% <sup>1</sup>
HV lines <sup>(+)</sup>	2012	km	5285 <sup>9</sup>
MV lines <sup>(+)</sup>	2012	km	12922 <sup>9</sup>
LV lines <sup>(+)</sup>	2012	km	To be confirmed
Renewable energy/global electricity production	2013	%	97.7% <sup>7</sup>
Connections to the LV network	2012	Thousands	1140 <sup>9</sup>
Average tariff/social	2012	US\$/kWh	8.08 <sup>10</sup>
Ratio cost/tariff	2012	%	1.13 <sup>10</sup>

### Installed Capacity



### Electricity Generation



## Legal, regulatory and institutional framework

Energy policy	<ul style="list-style-type: none"> <li>- National Energy Strategy 2015-2024 prepared by the Ministry of Energy (Not yet approved by Council of Ministers, as of March 2015).</li> <li>- Strategy for New and Renewable Energy Development 2011-2025.</li> <li>- National Policy and Strategy for Biofuels, 2009</li> </ul>
Energy laws	<ul style="list-style-type: none"> <li>- The Electricity Law or Act: Law 21/97, 1st October 1997.</li> <li>- The New Petroleum Law: Law no.21/2014, 18th August 2014.</li> </ul>
Enforcement texts	<ul style="list-style-type: none"> <li>- Decree No. 8/2000, of 20 April 2000 - Regulations on the Powers and Procedures for the Award of Concessions, and the Import and Export of Energy</li> <li>- Decree No. 25/2000, of 3 October 2000 – Electricity National Council (CNELEC) Statutes</li> <li>- Decree No. 48/2007, of 22 October 2007 - Licensing Regulations for Electric Facilities</li> <li>- Resolution No.62/2009 14th October 2009 for the Strategy for New and Renewable Energy Development 2011-2025.</li> <li>- Resolution No. 22/2009 21st May 2009 for the National Policy and Strategy for Biofuels.</li> <li>- Council of Ministers Resolution no. 63/2009 2th November 2009 “Strategy for the development of a Natural Gas Market”.</li> <li>- Decree no. 45/2012 28th December 2012 “Regulation on Import, Sale and Distribution of Petroleum Products”.</li> <li>- Decree no 58/2014 17th October 2014 on the Establishment of feed in tariffs for renewable electricity (REFIT).</li> </ul>
Electricity/energy regulator	A dedicated entity does not exist – de facto the Ministry of Energy (MoE) and EDM are regulating the sector. The National Electricity Council CNELEC was established as a legal entity with administrative and financial autonomy serving as a consultative body to the Ministry and a conciliation, mediation and arbitration authority for disputes between concessionaires and consumers.
Electricity operators	Electricidade de Moçambique (EDM), Hidroeléctrica de Cahora Bassa (IPP), Aggreko (IPP).
Rural electrification body	Fundo de Energia (FUNAE): National Energy Fund.
Renewable energy body	Directorate of New and Renewable Energies within MIREME.
Energy conservation body	None.
Energy objectives	<p>According to the National Energy Policy 2015-2025: RE installed capacity objectives: 200MW in small and mini-hydro; 150MW wind; 50MW solar and 50MW biomass until 2023. Promote the large hydropower project adding 3.5GW of new large hydropower.</p> <p>According to the National Policy and Strategy for biofuels: mandatory blend of up to 10% ethanol and 3% biodiesel by 2015 with a target of 20% bioethanol and 10% biodiesel after 2021.</p> <p>SE4All Goals: Access to electricity: 38% of households by 2020 and 56% by 2030. Access to modern fuels: above 20% by 2020 and above 30% in 2030. Reduce total losses in electricity to 17% in 2020 and 10% in 2030. Share of renewable energy in the total electricity generation above 50% throughout 2030.</p>
Feed-in tariff policy	Yes, approved by Council of Ministers by Decree no 58/2014 17th October 2014 and entered into force in April 2015, awaiting implementation guidelines (PPA etc., in progress as of March 2015).
Metering policy for billing	EDM uses pre-paid meters extensively (over 80% of consumers <sup>9</sup> ) and has plans to replace them with split meters, to reduce non-technical losses.
Public procurement (auctions)	No.
Unbundling	No. EDM is a vertically organised company, but has taken the first steps internally by separating the responsibilities of the grid manager from its generation, transmission, distribution and trading activities.

## Private sector environment

Sector private bodies	Confederação das Associações Económicas de Moçambique, CTA (Mozambique Economic Association Confederation); APAMO Association of Sugar Producers.
Public incentives	There is legislation on incentives (Law No 3/93, 24th June 1993) managed by the Centre for Promotion of Investments (CPI) which is more oriented towards large-scale projects. Issues related to rural electrification are not well covered. FUNAE should provide financial guarantees to projects that support its goals.
Financial grants	FUNAE provides funding for rural electrification (installation of PV systems, mini-hydro etc) and for the use of efficient stoves.
IPPs	Yes: currently Aggreko (n. gas 222 MW); HCB (hydro, 2072MW), other gas and hydro IPPs are currently being developed.
PPPs	Law nº 15/2011 10th August 2011 on Public Private Partnerships, Large projects and Business Concessions (“Mega-Projects” Law).
Business index	Listed 127 out of 189 countries by the WB for 2014 <sup>13</sup> (improved by 15 places from 142 in 2013).

## International Cooperation in the energy sector

Joint Declaration EU-country	No.
Energy as a focal sector for 11th EDF	No (but it is included in the “Rural Development” component).
Donors active in the country	EU, French Development Agency (AFD), African Development Bank (AfDB), Belgium Technical Assistance, European Investment Bank, GIZ, JICA, KfW, Norway / NORAD, Sweden / SIDA, USAID, World Bank.
Coordination among donors	Energy Sector Working Group (ESWG) meets periodically, donors participate.

## Main issues and opportunities<sup>14</sup>

- Increase access to modern energy fuels for cooking.
- Increase access to electricity in an affordable way, with an emphasis on rural electrification.
- Ensure the financial sustainability of the electricity service operators, namely EDM.
- Respond to the increasing demand for electricity (making electricity available, via new generation or improving system efficiency) for the well-being, industrialization and socio-economic development of the country.

- Include energy efficiency in the agenda, starting with minimising electricity transmission and distribution losses.
- Utilise the country's abundant energy resources (hydro, coal, gas and oil reserves) to strengthen Mozambique's economy and its role in the region.

(\*) BLEN includes Biogas, LPG, Electricity and Natural Gas.

(\*\*) IPP capacity excludes the hydro capacity owned by Hidroeléctrica de Cahora Bassa (HCB).

(\*\*\*) The reported losses include only technical losses according to the IEA definitions. According to the EDM Resenha historica 2009-2013 total losses including non-technical reached 24% for the electricity consumed within its network and excluding the consumption of MOZAL.

(+) HV (66-275kV) , MV (6.6-33kV), LV (240V-400V).

#### Sources:

- 1 World Bank, Available: <http://data.worldbank.org/country/mozambique>, [Accessed on 13/11/2015]. The source of the share of rural and urban population is the Instituto Nacional de Estatística available: <http://www.ine.gov.mz/> [Accessed on 24/08/2015].
- 2 CIA World Factbook, Available: [https://www.cia.gov/library/publications/the-world-factbook/geos/print/country/countrypdf\\_mz.pdf](https://www.cia.gov/library/publications/the-world-factbook/geos/print/country/countrypdf_mz.pdf), [Accessed on 24/08/2015]
- 3 World Bank, Available: <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/countries/MZ?display=graph>, [Accessed on 24/08/2015]
- 4 There are no data available on Mozambique in WB Country Policy and Institutional Assessment (CPIA) Score, <http://www.worldbank.org/content/dam/Worldbank/document/Fragilityandconflict/FY14FragileSituationList.pdf>, [Accessed on 24/08/2015]
- 5 Ibrahim Index of African Governance (IIAG), Available: [www.moiabrahamfoundation.org/interact](http://www.moiabrahamfoundation.org/interact), [Accessed on 24/08/2015]
- 6 UNDP - Human Development Reports, Available: <http://hdr.undp.org/en/countries/profiles/ERI>, [Accessed on 24/08/2015]
- 7 International Energy Agency (IEA), Available: <http://www.iea.org/statistics/statisticssearch/report/?country=MOZAMBIQUE&product=balances&year=2013>, [Accessed on 13/11/2015]
- 8 Bailis, R., Drigo, R., Ghilardi, A. & Masera, O. "The carbon footprint of traditional woodfuels", Nature Climate Change 5: 266-272, 2015.
- 9 EDM Sumario Estatístico 2012, Available: [http://www.edm.co.mz/index.php?option=com\\_docman&task=doc\\_download&gid=177&Itemid=41&lang=en](http://www.edm.co.mz/index.php?option=com_docman&task=doc_download&gid=177&Itemid=41&lang=en) [Accessed on 25/08/2015]. – Only for EDM's grid (excluding Mozal consumption), 2013
- 10 Electricidade de Moçambique (EDM), Resenha historica 2009-2013 – Only for EDM's grid (excluding Mozal consumption), 2013
- 11 Electricidade de Moçambique (EDM), Electricity Masterplan, 2013
- 12 Estimated from data published by Fundo de Energia (FUNAE), Available at [http://www.funae.co.mz/index.php?option=com\\_docman&task=cat\\_view&gid=45&Itemid=48&lang=en](http://www.funae.co.mz/index.php?option=com_docman&task=cat_view&gid=45&Itemid=48&lang=en) [Accessed on 25/08/2015].
- 13 World Bank, Available: <http://data.worldbank.org/indicator/IC.BUS.EASE.XQ>, [Accessed on 25/08/2015].
- 14 The main issues are identified from the "EU TAF for SE4All Initiative in Eastern and Southern Africa. Mozambique Energy sector projects identification field missions" report, July 2013

## ANNEX 1 – PRIMARY DATA STATISTICS AND ACCESS TO MODERN ENERGY SOURCES

SE4ALL Objectives	Indicators	Unit	Statistics						Target
Universal access to modern energy	Electricity access	% of population	Total				Rural	Urban	Total
			1990	2000	2010	2012	2010	2010	2030
	Non-solid fuels access	% of population	6	7	15	20	5	55	56
Doubling energy efficiency	Improvement rate of Primary energy intensity	CAGR %					1990-2010	2010-2012	2025
							-3.76	-4.28	
	Cumulated energy savings	PJ					1310	381	
	Ratios primary energy/final energy		80.3		80.6	( <sup>1</sup> )			
	Primary energy intensity level	MJ/\$2011 PPP	42.1		19.5	17.9			
Doubling the renewable energy share	Total final consumption	PJ	1990	2000	2010	2012			2030
					344	312			
	RE share in the total consumption	%	93.1	92.5	89.6	88.4			
	RE share in the total electricity generation	%			99.9	99.9			>50
	RE share in the total electricity production capacity	%			89.7	89.8			

Source:

SE4ALL Progress towards Sustainable Energy 2015, Global Tracking Framework (GTF), Available: <http://www.se4all.org/tracking-progress/> [Accessed on 24/8/2015]

SE4ALL Global Tracking Framework 2013, Available: <http://www.se4all.org/tracking-progress/> , [Accessed on 24/08/2015].

*Note: Figures used in this annex are those of the GTF which uses the same definitions for all countries. However, these definitions are not always those used in the other parts of the fiche.*

<sup>1</sup> This indicator is not available in the GTF 2015 publication.

## Country: Mozambique

### ANNEX 2 – INSTITUTIONAL AND POLITICAL FRAMEWORK

**N** : not achieved    **F**:foreseen    **D** : drafted    **AP** : Approval national process    **A**: adopted    **I** : implemented    **S** : Success story

POLICY ASPECTS		N	F	D	AP	A	I	S	COMPLEMENTARY ASSESSMENT ELEMENTS	
<b>1</b>	<i>Energy sectore</i>									
Political objectives Energy laws						✓			Law No. 21/97, of 1 October 1997 - Electricity Law. Resolution No. 22/2009, of 21 May 2009 - Biofuels Policy and Strategy. Resolution No. 62/2009, of 14 October 2009 – Renewable Energy Policy. Resolution No. 64/2009, of 2 November 2009 – Natural Gas Market Development Strategy. Law no.21/2014, 18 <sup>th</sup> August 2014 - The New Petroleum Law.	
Energy regulation authority			✓						A dedicated entity does not exist – de facto the Ministry of Energy (MoE) and EDM are regulating the sector. The National Electricity Council CNELEC was established as a legal entity with administrative and financial autonomy serving as a consultative body to the Ministry and a conciliation, mediation and arbitration authority for disputes between concessionaires and consumers.	
Partnership agreement with the EU	✓								The Cotonou Partnership Agreement regulates the relations between Mozambique and the EU. The 10 <sup>th</sup> EDF did not have dedicated budget for the energy sector. The 11 <sup>th</sup> EDF does not have dedicated budget for the energy sector but is included under the “Rural Development” component.	
Fragile country status									Mozambique is not included in the World Bank list for Country Policy and Institutional Assessment as a fragile state. According to a report by IMF Mozambique became “resilient” in the period 2011-13 <sup>2</sup> .	
<b>2</b>	<i>Engagement and preparation for SE4ALL</i>									
Opting-in						✓				
Gap analysis					✓				Completed in 2012.	
Action Agenda			✓						Under preparation. Mozambique is one of the first phase focus countries.	
NREAP	✓								There is a Strategy for New and Renewable energy development 2011-2025 (2009), but no updated RE action plan.	
NEEAP	✓									
Investment Prospectus	✓								Will follow after the National Action Agenda. ESMAP will provide technical assistance.	
SE4ALL Secretariat	✓									
<b>3</b>	<i>Private sector participation</i>									

<sup>2</sup> “Building Resilience in Sub-Saharan Africa’s Fragile States”, IMF 2015, available at <https://www.imf.org/external/pubs/ft/dp/2015/afr1505.pdf> [Accessed on 25/08/2015]

## Country: Mozambique

Investment and concession laws					✓	Centre for Promotion of Investments (CPI) is coordinating incentives for investments foreseen in Law No. 3/93 24 <sup>th</sup> June 1993. Petroleum and gas exploration and exploitation concessions are given to private companies generally through a public tender process. In the electricity sector concessions are foreseen for generation, transmission and distribution companies according to the electricity Law no 21/97.
Private sector activities					✓	At least two IPPs operational for electricity generation. More IPPs will come into the market with gas fired, hydro and in the future coal fired power plants according to the current planning. Concessions are foreseen in the new petroleum law no 21/2014 for exploration/exploitation of hydrocarbons.
Investors protection			✓			The country is ranked 91 out of 189 countries in the “protecting investors” topic according to the World Bank “Doing Business” analysis <sup>3</sup> .
National financial incentives					✓	The investment Law No. 3/93, 24 <sup>th</sup> June 1993 foresees certain tax and customs benefits depending on the amount of investment, location and sector of activity.
Institutional support to private sector					✓	The Centre for Promotion of Investment (CPI) coordinates the incentives. Guarantees to investments in the form of protection on property and rights, no restriction of borrowing and payment of interest abroad, transfer of dividends abroad, arbitration according to the International Centre for the Settlement of Disputes (ICSID) or International Chamber of Commerce (ICC) rules for resolutions of disputes, Multilateral Investment Guarantee Agency (MIGA) and Overseas Private Investment Corporation (OPIC) services on issues related to investment risk insurance.
<b>4 Energy access</b>						
Energy access policy and targets					✓	According to the « Rapid assessment gap analysis » (2012) <sup>4</sup> the targets are: access to electricity for lighting is at least 38% of the households by 2020 and 56% by 2030; access of the households to modern fuels for cooking above 20% in 2020 and above 30% in 2030. EDM is involved in on-grid rural electrification and FUNAE in the off-grid electrification.
Agency / Rural energy fund					✓	Fundo de Energia (FUNAE) is a rural electrification fund that reports to the Ministry of Energy, responsible for promoting off-grid electricity access and fuel distribution to remote locations. FUNAE should facilitate and provide guarantees for investment and not only install equipment as it happens currently.
Rural electrification master plan	✓					There is no rural electrification Masterplan, only the overall targets set for energy access.
Increasing EA investment plan	✓					
EA decentralized initiatives					✓	FUNAE installs off-grid electricity generation plants (mainly PVs), provides fuel to remote locations and provides improved biomass stoves to rural areas.
Traditional fuels replacement					✓	Part of FUNAE's activity for the provision of improved stoves and fuel to remote areas.

<sup>3</sup> World Bank available at <http://www.doingbusiness.org/data/exploreeconomies/mozambique/> [Accessed 08/09/2015]

<sup>4</sup> Mozambique : Rapid Assessment and Gap Analysis, SE4ALL, rev 6, September 2012

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Independent distribution networks		✓				There are 72 diesel-based mini grids implemented by FUNAE and managed by local management committees <sup>5</sup> .
Electricity distribution master plan			✓			EDM Masterplan update 2012-2027 (published in April 2014) includes a distribution system masterplan with new electrification, rehabilitation and reinforcement projects.
Specific measures for the poor		✓				EDM has a social tariff for electricity which applies to households with low income and consumption below 100kWh.
Microfinance instruments				✓		There is a number operating microfinancing institutions and the Mozambican Association of Microfinance Operators (AMOMIF). The operation is regulated by the Bank of Mozambique. Ranked as the 20 <sup>th</sup> country with the largest number of active borrowers out of 32 countries in the African microfinance sector <sup>6</sup> .
Pre-electrification		✓				FUNAE is providing small off-grid PV systems to Health centres, schools etc.
<b>5 Renewable energy (RE)</b>						
RE Policy				✓		The New Energy Strategy 2015-2025 aims are: promoting large hydropower in order to add 3.5GW of new hydro plants; install 400MW of other RES by 2023; a “Solar Villages” programme to cover 25% of the population; develop the feed-in tariff for RE. The Strategy for New and Renewable energy development 2011-2025 (2009) promoting the development of on-grid and off-grid RE. National Policy and Strategy for biofuels (2009) setting targets for local biofuels production and shares in the consumption.
Agency / RE Fund		✓				There is no independent RE Agency or RE fund. The National Directorate of New and Renewable Energies is a directorate within the MoE dealing with RE. It is focusing on the establishment of the legal and regulatory framework for the integration of RE. FUNAE is the only fund that covers RE.
RE master plan				✓		Strategy for New and Renewable energy development 2011-2025 (2009). National Policy and Strategy for biofuels (2009)
Biofuels regulatory frameworks				✓		National Policy and Strategy for biofuels (2009). However there is very little production of biofuels locally.
Wood energy regulations	✓					
Solar/wind regulations	✓					
RE resources mapping					✓	The Renewable Energy Atlas (2011) identified potential sites for RE generation, covering solar energy, wind, hydropower, biomass and geothermal plants (available at: <a href="http://www.atlasrenovaveis.co.mz/en/conteudo/renewable-energy-atlas-mozambique">http://www.atlasrenovaveis.co.mz/en/conteudo/renewable-energy-atlas-mozambique</a> ).
RE Promotion				✓		RE is promoted as an important part of the electrification of the country (large hydro projects operated by IPPs, PV projects funded by FUNAE, wind projects foreseen by IPPs).

<sup>5</sup> Subsector Analysis: Solar Business in Mozambique, GIZ 2014, available at: <https://www.giz.de/fachexpertise/downloads/giz2014-en-project-development-programme-subsector-analysis-pv-mozambique.pdf> [Accessed on: 26/08/15]

<sup>6</sup> “Country Survey Mozambique. Promoting transparent pricing in the microfinance industry” available at <http://www.mftransparency.org/wp-content/uploads/2012/05/MFT-RPT-104-EN-Country-Survey-Mozambique.pdf> [Accessed 26/08/2015].



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RE long-term funding	✓						The feed in tariff mechanism was approved by the Council of Ministers by Decree no 58/2014 17 <sup>th</sup> October 2014 and came into force in April 2015. Implementation guidelines are not in place yet (PPAs etc.).
Green Energy Fund	✓						The only fund related to RE is FUNAE.
Network connection studies	✓						There is no grid connection code for RE.
<b>6 Energy Efficiency (EE)</b>							
EE Policy	✓						There is no energy efficiency action plan and the only target for EE refers to the reduction in losses in the electricity system. There are no EE regulations, energy audits regulations.
EE national action plan	✓						The need for an EE action plan was identified in the National Energy Strategy but it has not been developed yet.
EE Standards and labels	✓						There are no national standards or labels.
EE Promotion	✓						The promotion of EE is rather limited.
Electricity losses reduction programme		✓					This is identified as target for SE4All and is included in the EDM Masterplan Updated 2012-2027. It is achieved through the installation of new more efficient generation and through rehabilitation actions to reduce technical losses in the electricity network.
Improved stoves programs					✓		FUNAE has a programme of supplying improved biomass stoves to remote households.
Ban on non-efficient appliances	✓						
Incentives for efficient appliances	✓						
Demand-side management		✓					EDM is in the process of designing DSM actions in order to address the morning and evening peaks that require expensive imports in the system. A TV campaign is planned targeting peak reduction in these hours. EDM is negotiating voluntary actions with industrial consumers for peak reduction. EDM has installed some smart meters with funding from WB and installed has a limited Advanced Metering Infrastructure providing real time consumer load profiles.
<b>7 Electricity sector</b>							
Legal definition of the institutional players					✓		The Electricity Law No. 21/97 1 <sup>st</sup> October 1997 defines the institutional players in the electricity sector.
Tariff policy		✓					There are no tariff setting methodologies and structures. Customer tariffs are set by the MoE, while IPPs negotiate their selling tariffs directly with EDM. 'Transit tariffs' for the use of the electricity transmission system are also negotiated and not regulated.
Interconnection rules					✓		The existing regulations include: Decree No. 42/2005, of 29 November 2005 - Regulations on the National Power Transmission Network Regulations. Decree n° 46847 - Regulation of safety of high voltage power lines and distribution networks of low voltage power Decree n° 46847 - Regulation of safety of substations and stations of transforming and sectioning



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						Decrees 29782, 30308 and 37823 - Regulation of safety of low voltage power facilities. The AC system of Mozambique consists of two separate systems. The southern system is interconnected to South Africa and Swaziland (2x400kV lines, 275kV and 110 kV lines). The central system which is interconnected to Zimbabwe (110kV). The northern system which is interconnected to Zimbabwe (330kV) and South Africa (400kV).
Isolated networks rules		✓				FUNAE is developing isolated mini-grids operating with diesel engines and PV systems. The only existing regulations are those described above.
Feed-in tariff policy				✓		The feed in tariff study was finalised in 2013 and the feed in tariff system (REFIT) was approved by the Council of Ministers Decree no 58/2014 and came into force in April 2015. Implementing guidelines are not in place yet (PPAs etc.).
RE minimum % imposed to producers	✓					
RE certificates trade	✓					
Free access to the domestic network					✓	The electricity law no 21/97 foresees the access of generators to the transmission grid. On the distribution level EDM is the only company which supplies electricity to consumers. MOTRACO is a transmission company created to supply electricity to the MOZAL aluminium smelter through a dedicated line.
Net metering	✓					
Unbundling		✓				EDM is a vertically organised company, but has taken the first steps internally by separating the responsibilities of the grid manager from its generation, transmission, distribution and trading activities.
Decentralized transport networks	✓					
Least cost development plan					✓	A least cost development plan is presented in the EDM Master Plan Update 2012-2027 (2014) developed by Norconsult and Vattenfall with funding from EDAP/AFD.
Electricity master plan					✓	The EDM Master Plan Update 2012-2027 (2014) developed by Norconsult and Vattenfall with funding from EDAP/AFD.
Privatization / commercialisation					✓	EDM is a state owned company which is also responsible for the operation of the transmission grid. IPPs operate and more are expected to enter in the system with new generation capacity. EDM is the only distributor of electricity.
Utility management contract	✓					
Utility financing plan			✓			The EDP Master Plan includes estimates of the required investments in generation capacity, transmission system development and upgrade and distribution system extension and rehabilitation.

## ANNEX 3 – ELECTRICITY SECTOR ASSESSMENT

CRITERION	INFORMATION
<i>Electricity sector policy</i>	
Electricity sector laws	<p>Law No. 21/97, of 1 October 1997 - Electricity Law</p> <p>Decree No. 8/2000, of 20 April 2000 - Regulations on the Powers and Procedures for the Award of Concessions, and the Import and Export of Energy.</p> <p>Decree No. 42/2005, of 29 November 2005 - Regulations on the National Power Transmission Network.</p> <p>Decree No. 43/2005, of 29 November 2005 - entrusting the role of National Power Transmission Network Operator to EDM.</p> <p>Decree No. 45/98, of 25 September 1998 – Regulations on management of power facilities built or renovated with own funds in the Districts which has not been assigned to a public company.</p> <p>Ministerial Diploma No. 31/85, of 31 July 1985 - Regulations on Technical Skills for preparing, implementing and operating power facilities.</p> <p>Decree No. 48/2007, of 22 October 2007 - Licensing Regulations for Electric Facilities.</p> <p>Decree No. 25/2000, of 3 October 2000 – Electricity National Council (CNELEC) Statutes.</p> <p>Decree n° 46847 - Regulation of safety of high voltage power lines and distribution networks of low voltage power.</p> <p>Decree n° 46847 - Regulation of safety of substations and stations of transforming.</p> <p>Decrees 29782, 30308 and 37823 - Regulation of safety of low voltage power facilities.</p>
Unbundling	EDM is a vertically integrated company, with own production facilities, with the role of the Transmission Network operator and distribution network operator. At least two IPPs exist, and more are expected to enter the market with new installed capacities.
Regulation of the sector	A dedicated entity does not exist. The National Electricity Council CNELEC was established as a legal entity with administrative and financial autonomy serving as a consultative body to the Ministry and a conciliation, mediation and arbitration authority for disputes between concessionaires and consumers. The Ministry of Energy (MoE) and EDM are regulating the sector.
Master Plans / Least cost development plans/ Capacities expansion plan	A Generation Masterplan for the power sector of Mozambique was developed in 2009 and a Masterplan update project 2013-2027 was finalised in 2014. The Masterplan includes a generation expansion plan, a transmission system plan and a distribution system plan with a time horizon until 2027. The Masterplan foresees the development of large hydro plants by EDM reaching 2.6GW, and thermal capacity by EDM reaching 1.4GW (including gas fired and coal fired power plants).
Networks and access development	The EDP Masterplan update 2013-2027 foresees the major reinforcement of the transmission grid in order to integrate the Northern, Central and Southern systems and to evacuate the power from the large power plants planned in the Tete area. Upgrade of the existing 110kV substations is needed in order to extend their technical lifetime. On the distribution system level there are actions needed for increasing the electrification, for rehabilitation and reinforcement of the existing grid.
IPPs	HCB 2075MW hydro; AGGREKO 222MW gas currently operating. Four new gas fired stations owned by different IPPs are planned to start operation in 2016 (total 475MW). Most of the new planned large hydro and thermal plants are expected to be operated by IPPs.

## Country: Mozambique

CRITERION	INFORMATION
RE based electricity production objectives	<p>Currently almost all of the electricity generated in Mozambique comes from large hydro plants (total capacity of around 2200MW). The RE Atlas identified the potential of 128MW for electricity generation from biomass sources. The EDM Masterplan includes a potential of up to 4GW of hydro plants that can be built. Smaller hydro projects are also identified in the RE Masterplan that can contribute to distributed generation without the need of building transmission lines. PV installed capacity is estimated at 3MW, which are mainly systems installed by FUNAE. There are no wind farms currently, but a project of 30MW is in the procurement phase.</p> <p>The Energy Strategy 2015-2025 includes the following objectives: promotion of large hydro plants up to almost 3.5GW (Cahora Bassa Northern Basin project 1245 MW; Mphanda Nkuwa 1500MW; other hydropower sites, especially in the Zambeze valley like Boroma 200 MW and Lupata 600MW and Lurio 100MW). Furthermore the Energy Strategy set a target of 200MW of small and mini-hydro, 150 MW of wind farms, 50MW of solar and 50MW of biomass plants.</p>
Power purchase agreements, feed-in tariffs	<p>There is no standard Power Purchase Agreement, but the IPPs negotiate with EDM for the agreement. The following items should be included in an agreement: tariffs, payment and invoice procedures and anti-corruption provisions.</p> <p>Feed in tariffs were approved by the Council of Ministers in October 2014 and are effective since April 2015. Implementing guidelines (model PPAs etc) are not developed yet.</p>
Access to transport networks regulations	<p>Decree No. 42/2005, of 29 November 2005 on "Regulations on the National Power Transmission Network" states that the transmission system operator should grant access to any power producer as well as any final consumer who requires access. Access to transmission and distribution grids must be made in a non-discriminatory fashion regarding the quality of service and the tariffs<sup>7</sup>.</p>
Sector reforms	<p>The electricity law of 1997 (Law No. 21/97) laid the foundations of the opening of the electricity market in Mozambique. It created the notion of concessionaires in the generation, transmission and distribution sectors. However, currently EDM is the only concessionaire and the operator of the transmission system and the only concessionaire of the distribution system. CNELEC which was established to become a regulator, currently only has advisory role and arbitration authority for disputes.</p>
<i><b>1Enterprises and services</b></i>	
<b>PRODUCTION</b>	
Main companies and shareholders	<p>State Owned: Electricidade de Moçambique EDM, granted a quasi-monopoly in generation, transmission and distribution by Decree Law No.38/77 in 1977. After the Electricity Law No.21/97 EDM was granted concessions in generation and was set to be the operator of the transmission system and was granted the only distribution concession.</p> <p>Private: Hidroeléctrica de Cahora Bassa (HCB) (2075MW hydro) started in 1975; Aggreko (222MW of gas fired plants) started in 2012.</p> <p>New IPPs will start the operation of gas fired power plants in 2016.</p>
Production (GWH)	In 2012 the total electricity generation was 15166GWh

<sup>7</sup> "The Energy Regulation and Markets Review Chapter on Mozambique" Law Business Research, Ed. D. Shwarz, 2013, available at: [http://www.hrlegalcircle.com/xms/files/Publicacoes/2013/Mozambique\\_The\\_Energy\\_Regulation\\_and\\_Markets\\_Review.pdf](http://www.hrlegalcircle.com/xms/files/Publicacoes/2013/Mozambique_The_Energy_Regulation_and_Markets_Review.pdf), [Accessed on 26/08/15]

## Country: Mozambique

CRITERION	INFORMATION
Installed capacity (MW)	In 2012: 2180MW hydro; 350MW thermal power plants (22MW of gas fired and the remaining diesel fired); 3MW of PVs.
Production mix (GWh)	In 2012: 15145GWh Hydro power (99.9%) 21GWh N. Gas (0.1%)
Peak demand (MW)	In 2012: 706MW (only in the network of EDM excluding the demand of the 900MW aluminium smelter MOZAL). In 2011: 610MW (only in the network of EDM excluding the demand of the 900MW aluminium smelter MOZAL).
<b>TRANSPORT</b>	
Enterprises	EDM is the single concessionaire and operator of the transmission and distribution system (State owned). MOTRACO is owned by the power utilities of South Africa, Swaziland and Mozambique and is a transmission company registered in Mozambique created in order to supply electricity via a dedicated 2x400kV line to the MOZAL aluminium smelter.
HV lines length and capacity	EDM: High Voltage 5285km.
Exports/Imports	In 2012 exports were 9791GWh and imports were 8304GWh. (The imports include the electricity consumption of MOZAL).
<b>DISTRIBUTION</b>	
Enterprises (s)	EDM is the single concessionaire and operator of the transmission and distribution system (State owned).
MV and LV lines length and capacity	EDM: Medium Voltage 12922km. EDM: Low voltage n.a.
Clients	In 2012 the total number of EDP clients was 1 140 835.
Total sales and tariff categories	The total invoiced electricity by EDM was 2724GWh in 2012 <sup>8</sup> . EDM has different tariffs for social, household, farming, general in the low voltage and for major consumers in the low voltage, medium voltage, and high voltage.
Demand forecast on the interconnected network (MW)	The EDM Masterplan update 2012-2027 (published in April 2014) includes a demand forecast which for the medium case is 1589MW in 2016, 3072MW in 2021 and 3072MW in 2026.
<i>Tariff / cost recovery / subventions</i>	
Electricity tariffs	The retail electricity tariff is calculated based on the methodology defined in Decree no. 29/2003 23rd June 2003. It makes provisions for automatic annual adjustment. Currently there is a block tariff structure for household, farming and the general low voltage tariff. Major consumers have a flat price per kWh, which is different for low, medium and high voltage connections.

<sup>8</sup> EDM Sumario Estatístico 2012, available at [http://www.edm.co.mz/index.php?option=com\\_docman&task=doc\\_download&gid=177&Itemid=68&lang=pt](http://www.edm.co.mz/index.php?option=com_docman&task=doc_download&gid=177&Itemid=68&lang=pt), [Accessed on 28/08/2015]

## Country: Mozambique

CRITERION	INFORMATION
Social tariff	A social tariff exists for households that have a recorded consumption less than 100kWh. However the process of qualification for this tariff is complicated requires certification for the low income of the household and assurance that the electricity will be only for residential uses. As a result only 1% of the connected households have access to the social tariff <sup>9</sup> .
Cost coverage through tariffs Planned tariffs adjustments	The current tariffs do not recover the costs for EDM. According to EDM data the average purchase price in 2012 was 9.15 USc/kWh while the average selling price was 8.33 USc/kWh. In 2013 the corresponding values were 9.11 USc/kWh and 8.08 USc/kWh respectively. There are no planned tariffs adjustments, although this is needed in order to ensure the financial viability of EDM. According to IMF <sup>10</sup> , a tariff study has suggested a restructuring and increases of the tariffs, ensuring low costs to low-income consumers. The proposals were expected to be presented to the Council of Ministers. A specific mention of “progressively adjusting the electricity prices” exists in the National Energy Strategy 2015-2025.
Level and subsidies sources	EDM's average selling price is lower than the average purchase price. The difference is covered by the state budget, since EDM is a state owned company.
Financial situation of the main enterprises	The financial situation of EDM remains difficult due to the difference between purchase/selling tariffs. IPPs are operating without financial issues and most of them are exporting power to the neighbouring countries.
<i>Performance: losses / efficiency/ service quality</i>	
Production performance	Out of the 233MW installed capacity of EDM only 135MW (90MW hydro and 45MW thermal) are available because some units are out of service <sup>11</sup> . Rehabilitation of the existing installed capacity is necessary. IPPs generate at good efficiency.
Transport losses, evolution and objectives Distribution losses (technical and non-technical)	According to EDM data <sup>12</sup> the total transmission losses in 2013 were 6% and the total distribution losses were 18%, on the network operated by EDM (excluding MOTRACO). In 2009 total losses (technical and non-technical) were 27% on EDM's network. The target for the SE4All goals is to reduce total losses to 17% in 2020 and 10% in 2030.
Revenues	According to the statistical data of EDM the total technical and non-technical losses for 2012 were 900GWh, which corresponds to a loss of revenues for EDM of the order of 75million USD per year (assuming the average selling price of 8.33US cents/kWh in 2012).
Shutdowns and improvement objectives	System Average Interruption Duration Index (SAIDI): 2010 38:30hours; 2011 43:13hours; 2012 33:46hours <sup>13</sup> .
<i>Off-grid electrification and electricity access</i>	
Electrification rate (urban/rural)	According to the World Bank data in 2010 15% of the population had access to electricity and in 2012 the share was 20%. The

<sup>9</sup> OECD Investment Policy Review: Mozambique, OECD 2013, available at [http://www.oecd-ilibrary.org/finance-and-investment/oecd-investment-policy-reviews-mozambique-2013\\_9789264203310-en](http://www.oecd-ilibrary.org/finance-and-investment/oecd-investment-policy-reviews-mozambique-2013_9789264203310-en) [Accessed on 26/08/2015]

<sup>10</sup> “Staff report for the 2013 article IV consultation, Republic of Mozambique”, International Monetary Fund, July 2013, available at <http://www.imf.org/external/pubs/ft/scr/2013/cr13200.pdf> [Accessed on 27/08/2015]

<sup>11</sup> EDM Masterplan 2009-2030, Volume I (2009).

<sup>12</sup> EDM Resenha historica 2009-2013 (2014).

<sup>13</sup> EDM Sumario Estatistico 2012.

## Country: Mozambique

CRITERION	INFORMATION
	access to electricity in rural areas is very low 1.7% in 2010 and 5.4% in 2012, while the access rates in urban areas were 45% in 2010 and 55% in 2012.
Electrification objectives	The GoM goal is 38% of the households to have access to electricity for lighting by 2020 and 56% by 2030.
Rural electrification agency	Fundo de Energia (FUNAE) is the agency that deals with rural electrification (on-grid and off-grid) as well as with the distribution of fuel to remote areas.
Off-grid electrification situation and programmes	FUNAE is active in financing off-grid electrification projects and mini-grids powered by diesel generators, mini/micro-hydro and PVs. A registered CDM project by FUNAE <sup>14</sup> foresees the installation of 1096 off-grid PV systems and one mini-hydro of 631kW.
Off-grid operators	Information to be obtained.
Isolated networks regulations	Information to be obtained.
BoP Policy (Bottom of the Pyramid)	Information to be obtained.
<i>Energy Efficiency (EE)</i>	
Demand-side management	EDM focuses on behavioural and technological options to reduce the inefficient use of electricity that creates the morning and evening peaks, creating the need for importing expensive electricity during these hours. A communication campaign is planned in order to raise awareness and reduce the evening peak demand. Voluntary actions are negotiated with large industrial users to reduce peak demands.
EE activities	EDM has procured 150000CFLs to replace incandescent light bulbs (but the progress is very slow). EDM has installed smart meters with funds from the World Bank in a pilot application. Split prepayment meters are installed to reduce non-technical losses. EDM identified cases of customers with very low power factor and forced its improvement.
<i>Other aspects</i>	
Regional electricity market	The EDM transmission system is connected to the South African Power Pool (SAPP) through the MOTRACO network via Swaziland and Republic of South Africa and to Zimbabwe. The huge hydro potential of Mozambique, when developed, will provide green energy in the SAPP market. The Mozambique-Malawi interconnection project is also being revived. IPPs in Mozambique (HCB, Aggreko) export power to consumers in neighbouring countries.

<sup>14</sup> Component Project Design Document form for small-scale component project activities: "Off-grid renewable energy for rural electrification in Mozambique managed by FUNAE", available at: [https://cdm.unfccc.int/filestorage/D/2/5/D257NVXAJBYL1MIG4CFZPK603USQH8/CPA%20DD%20version%201.0?t=Y2J8bnRxZ2NfDDNIUTMWN0GWvA9C\\_He0bt4](https://cdm.unfccc.int/filestorage/D/2/5/D257NVXAJBYL1MIG4CFZPK603USQH8/CPA%20DD%20version%201.0?t=Y2J8bnRxZ2NfDDNIUTMWN0GWvA9C_He0bt4), [Accessed on 27/08/2015]

## ANNEX 4 - NATIONAL TARGETS FOR ENERGY ACCESS, RENEWABLE ENERGY AND ENERGY EFFICIENCY

Country	Sector	Policies and objectives	Source
SADC - Southern African Development Community <sup>15</sup>	Access	At the high level SADC Regional Energy Access workshop held in Maseru on November 4, 2009, the following SADC Energy Access goals were agreed: <ul style="list-style-type: none"> <li>Member States have as a strategic goal the harnessing of regional energy resources to ensure, through national and regional action, that all the people of the SADC Region have access to adequate, reliable, least cost, environmentally sustainable energy services.</li> <li>The operational goal is to endeavour to halve the proportion of people without such access within 10 years for each end use and halve again in successive 5 year periods until there is universal access for all end uses.</li> </ul>	SADC Regional Energy Access Strategy and Action Plan (March 2010) <sup>16</sup>
	Renewable Energy	The draft Renewable Energy Strategy and Action Plan (February 2012- it is not approved yet) included ambitious targets for the deployment of renewable energy technologies : <ul style="list-style-type: none"> <li>RE grid connected share: 21% in 2015, 33% in 2020, 39% in 2030.</li> <li>Off-grid share of renewable energy: 2.5% in 2015, 5% in 2020 and 7.5% in 2030.</li> <li>Biofuels: Ethanol 10% share of total fuels in 2020 and 20% in 2030; Biodiesel 5% in 2020 and 10% in 2030.</li> </ul>	Regional Infrastructure Development Master Plan: Energy Sector Plan. (August 2012) <sup>17</sup>
	Energy efficiency	The draft Renewable Energy Strategy and Action Plan (February 2012- it is not approved yet) included ambitious targets for the Energy Efficiency: <ul style="list-style-type: none"> <li>Energy efficiency savings achieved of grid use: 5% in 2015, 10% in 2020 and 15% in 2030.</li> <li>Penetration of efficient cooking/heating devices: 5% in 2015, 10% in 2020 and 15% in 2030.</li> <li>Efficient charcoal production share 5% in 2020 and 5% in 2030.</li> </ul>	Regional Infrastructure Development Master Plan: Energy Sector Plan. (August 2012).
Mozambique	Oil and gas	Promote the use of LPG and Natural Gas (where it will become available) for residential uses. Install CNG filling stations and promote the use of CNG in transport (10% of the fleet by 2023).	National Energy Strategy 2014-2024.
	RE	Share of renewable energies in the total electricity production to be above 50% throughout the period up to 2030 and production of biofuels as percentage of the total volume of liquid fuels consumed in Mozambique to be more than 5% in 2020 and more than 15% in 2030.	Rapid Assessment and Gap Analysis, Mozambique (rev06) (15 September 2012)
	Access	Access to electricity for lighting to at least 38% of the households by 2020 and 56% by 2030; access of the households to modern fuels for cooking to be above 20% in 2020 and above 30% in 2030.	idem
	Energy efficiency	Total losses of electricity reduced from 27% in 2009 to 17% in 2020 and to 10% in 2030 and the share of households with access to an improved biomass stove increased to 3% in 2020 and 5% in 2030.	idem

<sup>15</sup> Mozambique is a member state of the Southern African Development Community (SADC). The SADC objectives are presented for comparison with the objectives of Mozambique.

<sup>16</sup> Available at [http://www.sadc.int/files/5713/5791/7436/EUEI\\_PDF\\_SADC\\_Regional\\_Energy\\_Access\\_Strategy\\_Mar\\_2010\\_EN.pdf](http://www.sadc.int/files/5713/5791/7436/EUEI_PDF_SADC_Regional_Energy_Access_Strategy_Mar_2010_EN.pdf) [Accessed on 27/08/2015]

<sup>17</sup> Available at [http://www.sadc.int/files/5413/5293/3528/Regional\\_Infrastructure\\_Development\\_Master\\_Plan\\_Energy\\_Sector\\_Plan.pdf](http://www.sadc.int/files/5413/5293/3528/Regional_Infrastructure_Development_Master_Plan_Energy_Sector_Plan.pdf) [Accessed on 27/08/2015]