REPUBLIC OF MOZAMBIQUE

Overview of bioenergy resources, technologies and policies in Mozambique

Expert workshop for the How2Guide for Bioenergy

"Waste-to-energy and Biogas"

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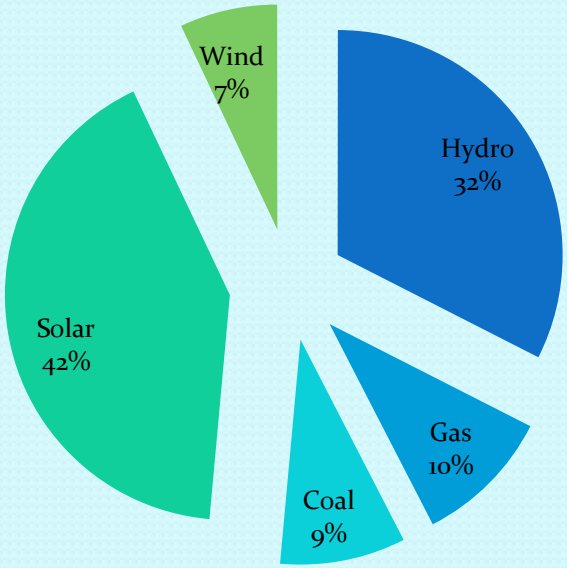
1. ENERGY POTENCIAL

- Mozambique is very rich country in energy resources. In hydropower the potential is estimated on 18,000 MW. Approximately 5,500 MW based on natural gas, 10,000 MW based on coal, 23,000 MW based on solar (only 7,5 MW will be exploited in short term) and 3,900 MW based on wind.

Energy Resources Potential, "excluding biomass"



2. BIOMASS RESOURCE

Mozambique has different biomass resources for electricity generation:

- **Forest biomass:** Of woody residues from conventional logging or from dedicated plantations.

- **Biomass from industrial and agro industrial wastes:** Agro industrial waste from farms, waste materials from manufacturing industries of wood and plant materials.

- **Cogeneration in the pulp industry:** Waste materials from the wood firing process referred to as “black liquor”.

- **Sugar industry:** Residual bagasse resulting from the sugarcane crushing process is used to produce energy in cogeneration. Sugar cane foliage could also be used for power generation.

2. BIOMASS RESOURCE – *Cont*.

- **Municipal Solid Waste** (MSW): Through incineration with power generation or by deposition in landfills for the production of biogas.

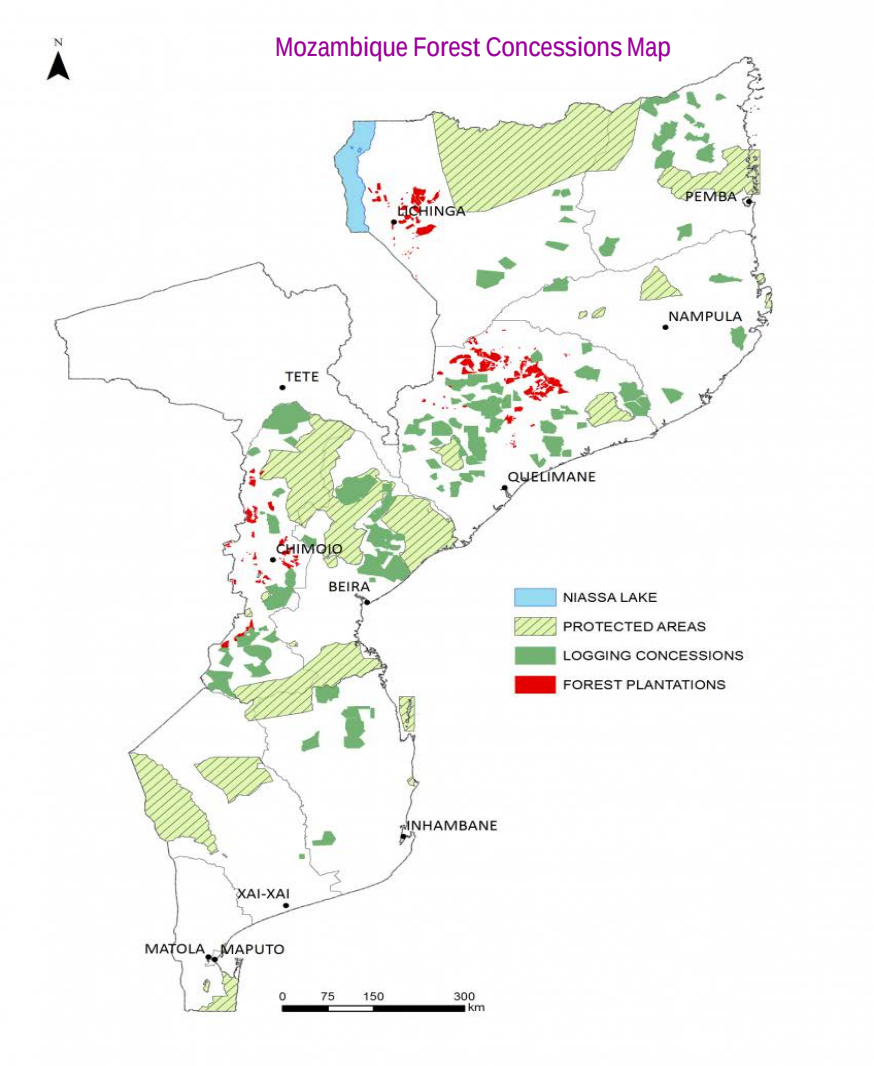
- **Other for off grid:** Biogas from small and medium livestock holdings. Also the utilization of vegetable oils extracted for coconut or jatropha in dedicated engines.

2. BIOMASS RESOURCE – *Cont.*

Forest Biomass currently has more than 1.7 million hectars of forest plantation concessions awarded;

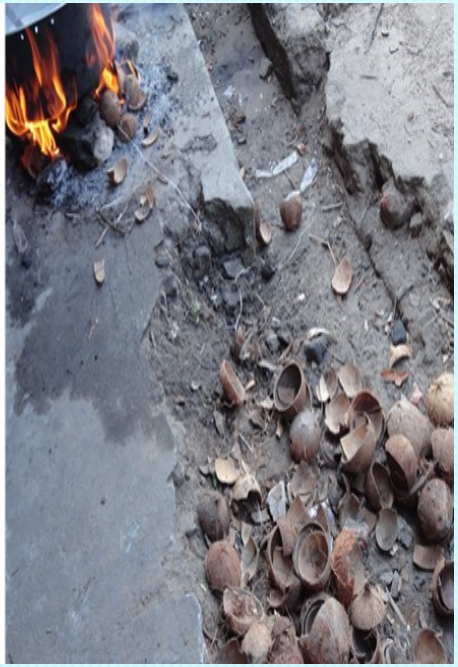
The forest biomass, used as an energy source to produce electricity or heat, can be derived from conventional logging woody surplus or residues

Its use as an energy source usually occurs in electricity power plants by burning it in boilers to produce steam that once expanded, generates electricity.



2. BIOMASS RESOURCE – *Cont*.

Paper Pulp Industry Cogeneration



Waste materials from the cooking process called “black liquor”, which are burned in recovery boilers to produce steam to be used as thermal energy source, are used for the process and for power generation.

Industrial and Agro industrial Biomass

Out the residues from agro industries (rice husk, coconut shell and other materials), waste from wood manufacturing industries can be considered.

2. BIOMASS RESOURCE – *Cont.*

Sugar Industry

Mozambique has a strong tradition in sugar production with 4 industrial units currently in operation and a total plantation area of more than 40.000 hectars.

The bagasse (waste material resulting from the sugarcane crushing process) is used to produce energy in cogeneration, providing steam for the manufacturing process and for the electrical power production.

It is possible to almost double the power advantage of the foliage that nowadays is burned in the fields, safeguarding security issues.

Municipal Solid Waste (MSW)

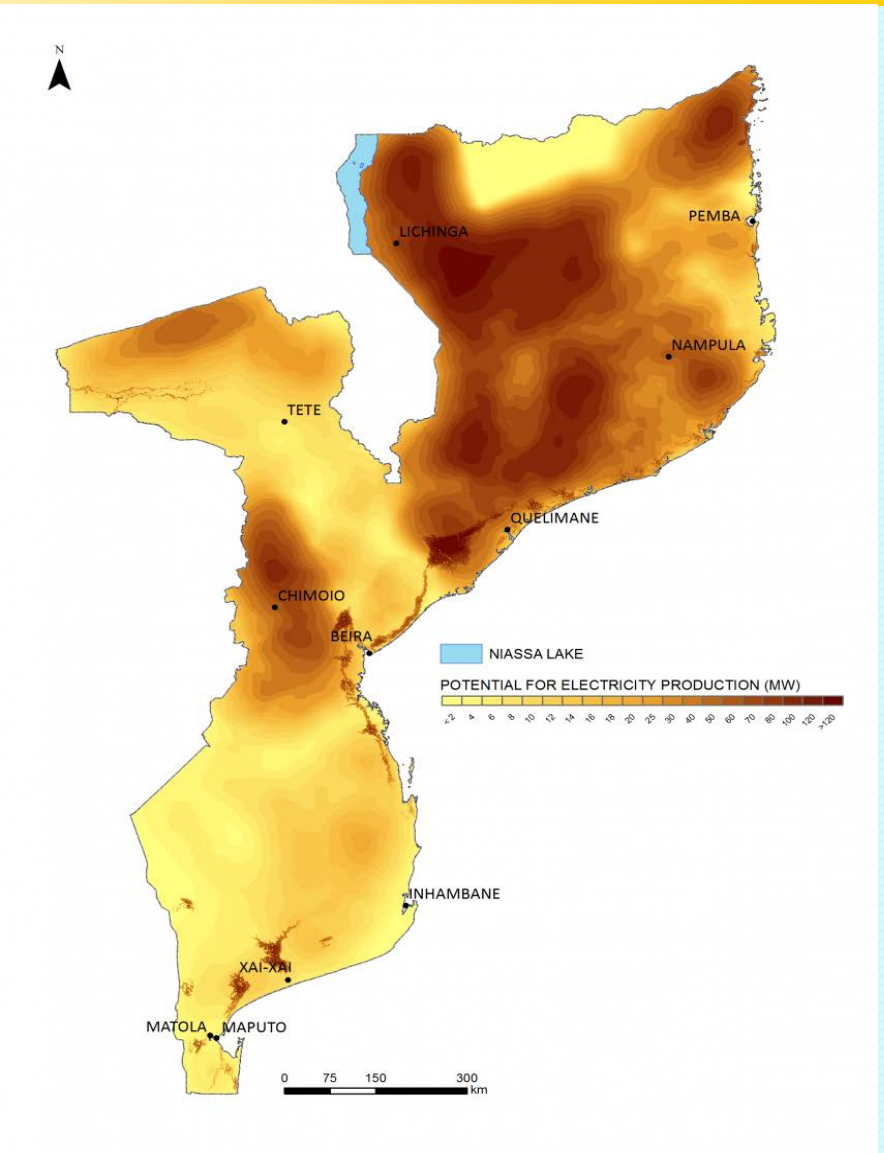
There is no selective waste collection system. MSW is currently deposited in open-air dumps without any energy recovery.

Its energy recovery can be achieved through its incineration with electricity production or by deposition in landfills for the production of biogas.

3. MOZAMBIQUE BIOMASS POTENTIAL

The main energy resources:

- Forest biomass
- sugarcane industry



3. MOZAMBIQUE BIOMASS POTENTIAL – *Cont.*

The country has a potential of 2 GW from which only 128 MW will be exploited in the short term.

The distribution of potential:

- 1.006 MW of residual forest biomass with some potential for development of agro industrial waste;
- 831 MW in sugar;
- 280 MW in the pulp;
- 63 MW in MSW.

4. SELECTED BIOMASS PROJECTS

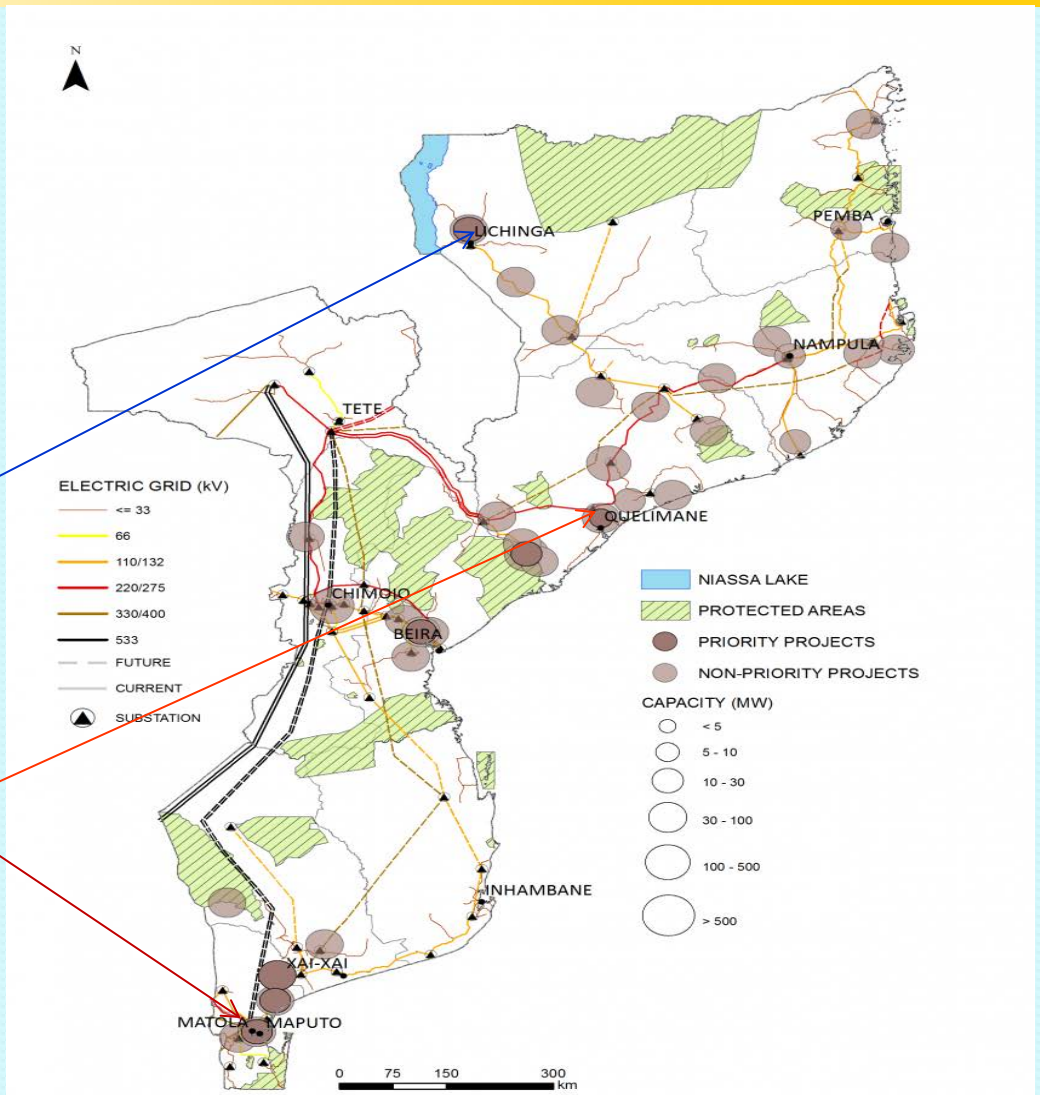
Biomass projects are those with the highest variable costs and lower sensitivity to financing costs.

The exception are the MSW projects. Installation of an incineration plant of 30 MW in Matola with an adequate funding strategy can offer competitive costs.

The two priority forest biomass projects have higher costs but high interest to the electric grid and to the regions in which they are located:

In Niassa, the project would allow to take waste out of the forest creating jobs and reducing the risk of fire;

In Quelimane, burning the coconut trees with disease would accelerate its recovery and the use.



5. TECNOLOGY APPLICABLE ON ENERGY SECTOR

No specific tecnology required on development or implement project on energy, specific on bioenergy.

We take care on environment aspects and evidence of sustainability of the project. Technology proposed for specific project is important on evaluation process.

We also look on:

- Social and economic impact for the community;
- Environment impact;
- Pollution (air, water, etc);

6. POLICIES ON ENERGY

To rum the projects the country are engaged on revising legal documents and adopt legislation according to our national plan. The revising is essencial because the natural resources like coal and gas was discovered and it change the energy scenario in Mozambique.

Therefore we have:

a) Energy Strategy – in revising process → will be approved very soon

b) Electricity Law – in revising process and will be approved very soon

c) Master Plan of Electricity

d) ATLAs of Renewable Energy

e) Gas Master Plan - approval in 2014

f) Coal Master Plan –in progress

6. POLICIES ON ENERGY – *Cont*.

g) **Biofuel Strategy Police** – approved in 2009;

h) **Renewable Energy Police** – approved in 2009;

i) **Renweable Energy Strategy** – approved in 2011.

j) **Land Law** – in force

The instruments listed above shows that the Govermment is commited on supplying energy focusing in rural ares. It will facilitate usage of diversificatin of electricity generation.

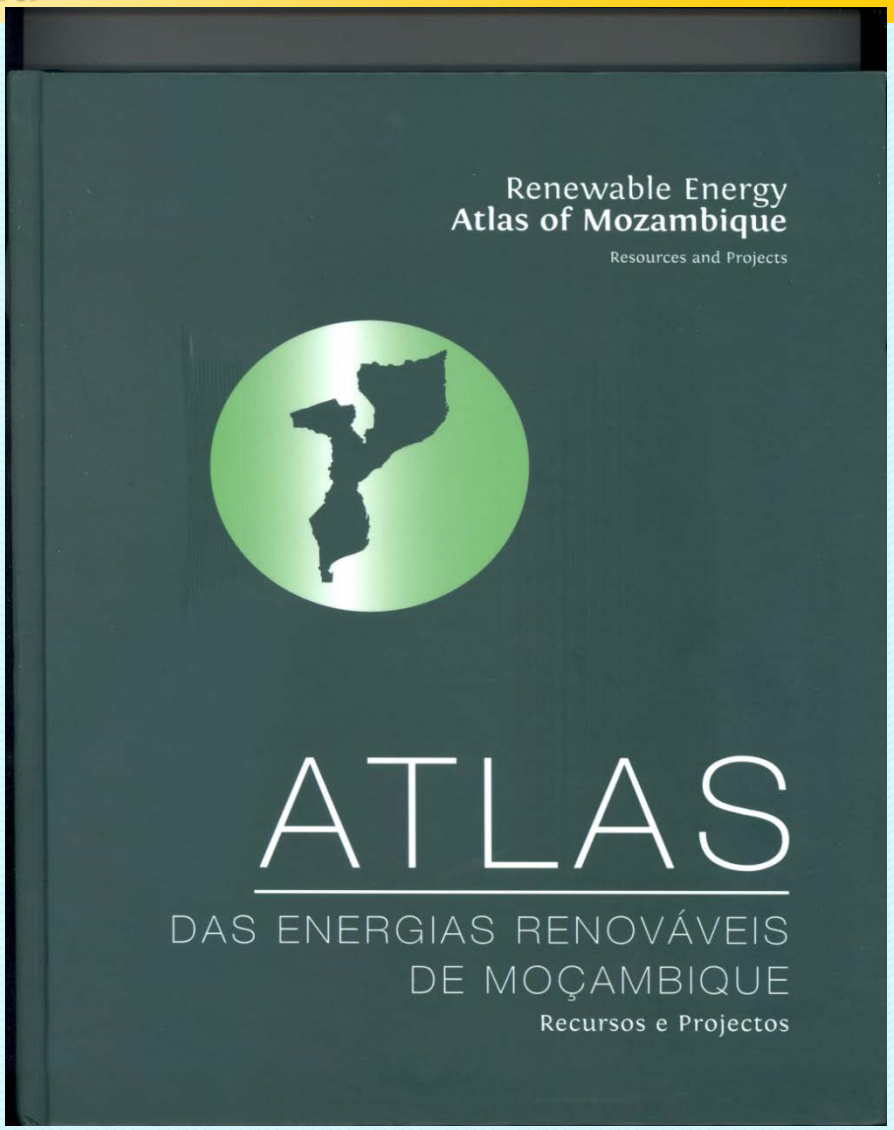
Note that the legal instruments is linkage with investment law (is very attractive and flexible) and other relevant areas such as environment law and trade law.

6. POLICIES ON ENERGY – *Cont.*

The Renewable Atlas of Mozambique provides a broader view of renewable energy resources, their location and potential.

For more Information go to:

www.atlasrenovavais.co.mz



Thank You!

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