



On-grid solar investment opportunities in Mozambique

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MOZAMBIQUE

Solar Energy Market

Presentation Overview

- Mozambique Country profile
- Solar energy resource
- Case studies
- Final remarks

Mozambique

Solar in sub-Saharian Africa



Mozambique -Country Snapshot Main Indicators

Source: World Bank

World Development Indicators database

| Indicators | |
|-------------------------------------|-------|
| Population, total (millions) | 28.83 |
| Population growth (annual %) | 2.9 |
| Surface area (sq. km) (thousands) | 799.4 |
| Population density (people per sq. | |
| km of land area) | 36.7 |
| Poverty headcount ratio at national | |
| poverty lines (% of population) | 54.7 |
| GDP (current US\$) (billions) | 11.01 |
| GDP growth (annual %) | 3.8 |

Mozambique -Country Snapshot Electricity Acess

Source: **OECD/IEA**

World Energy Outlook 2016 — Electricity Access Database

| Indicators | |
|---------------------------------|----|
| National electrification rate % | 40 |
| Urban electrification rate % | 67 |
| Rural electrification rate % | 27 |

Baseline scenario

Key ideas

- High poverty levels
- Low electrification
- Lack of infrastructures
- Dispersed population

Main entities

Key players

Ministério da Energia

http://www.minec.gov.mz/

Ministry of Energy – Governmental Office



Electricidade de Moçambique

http://www.edm.co.mz/

National Public Utility



FUNAE

http://www.funae.co.mz/

Energy Fund – Public Institution



Legal Framework

Renewable Energy

Política de Desenvolvimento de Energias Novas e Renováveis — Resolução 62/2009

- Policy guideline for renewable energies
- 3 main goals:
- 1. Improve power access and provide quality energy.
- 2. Develop renewable energies technologies.
- 3. Promote and boost public and private investment on renewable resources.

The public commitment



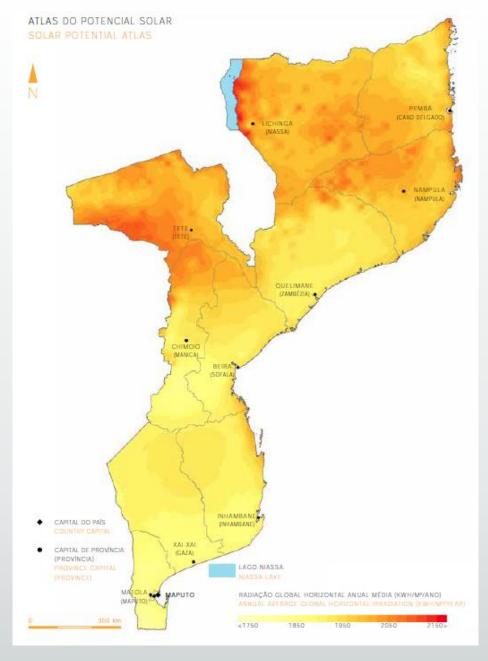
"Mozambique has always supported and will continue to support the development of its renewable energy potential." -SALVADOR NAMBURETE Minister of Energy

Renewable Energy Atlas of Mozambique



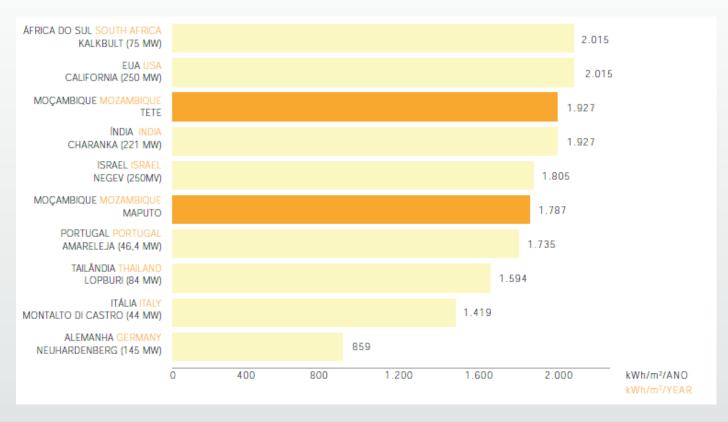
- http://atlas.funae.co.mz/en
- Partnership with Portugal (Governmental entities)
- Renewable Energy resources were mapped
- Analysis of potential production of electrical energy
- Hundreds of projects were identified
- Technical and economical feasibility

The Solar Resource



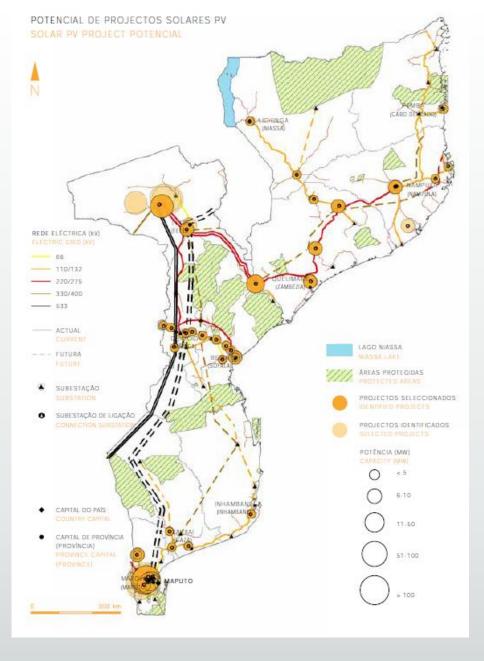
<u>Source</u>: RENEWABLE ENERGY ATLAS OF MOZAMBIQUE - RESOURCES AND PROJECTS FOR POWER GENERATION.

Solar Radiation Benchmark



<u>Source</u>: RENEWABLE ENERGY ATLAS OF MOZAMBIQUE - RESOURCES AND PROJECTS FOR POWER GENERATION.

Solar PV Project Potential

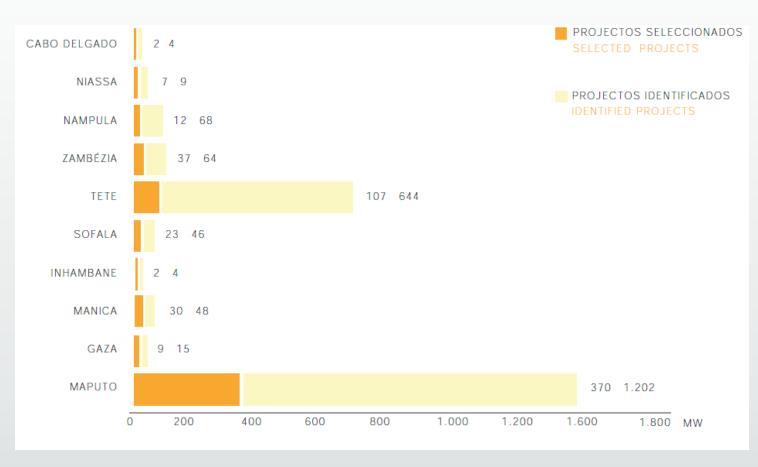


<u>Source</u>: Renewable Energy Atlas of Mozambique - Resources and Projects for Power Generation.

Solar PV Project Potential

The outcome from the report:

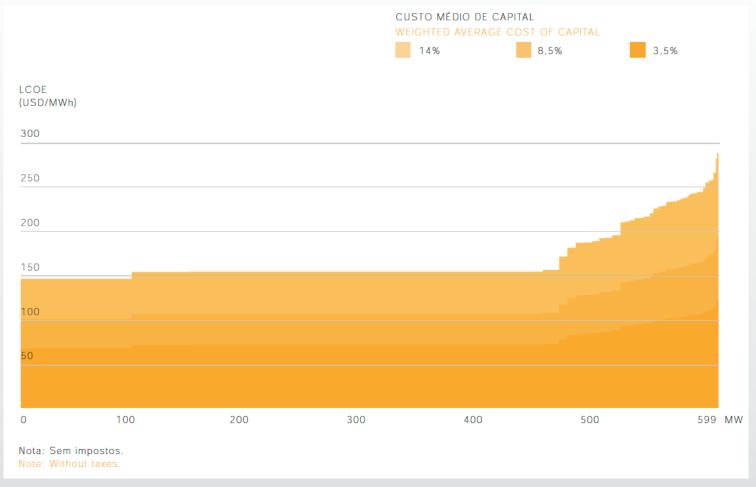
- 600 MW
- 43 projects



<u>Source</u>: RENEWABLE ENERGY ATLAS OF MOZAMBIQUE - RESOURCES AND PROJECTS FOR POWER GENERATION.

Levelised Cost of Energy

Solar Photovoltaics in Mozambique



<u>Source</u>: RENEWABLE ENERGY ATLAS OF MOZAMBIQUE - RESOURCES AND PROJECTS FOR POWER GENERATION.

Mozambique's first large scale solar plant

Mocuba Solar Farm

- 40,5 MW Solar PV project
- Energy output 77.000 MWh (175.000 homes)
- Located in Zambézia Province (center zone)
- Norwegian investment
- Expected investment USD 80 million
- Construction completed mid 2018

Financing structure -Mezzanine

Mocuba Solar Farm

• EQUITY:

Scatec Solar (52,5%)

Norfund (22,5%)

EdM (25%)

• **DEBT** - USD 55 million:

International Finance Corporation (IFC) - USD 19 million

Climate Investment Funds – USD 19 million

Syndicated loan – USD 17 million

Viability Gap Funding Grant

Private Infrastructure Development Group (multi-donor funded institution) – USD 7 million

<u>Fund Mobiliser</u>: Emerging Africa Infrastructure Fund

Financing structure - PPA

Mocuba Solar Farm

POWER PURCHASE AGREEMENT (PPA)

- ENERGY OFF-TAKER: EdM (State owned utility)
- 25 years
- Price (not disclosed)
- Annual index update inflation linked?

Titimane Project – Clean Energy Mini-Grid



- Promoted by EdP (Portuguese Utility)
- Titimane Niassa Province (NW zone)
- Village with 4.000 population
- Local economy focused on cotton cultivation
- Rural electrification project hybrid technologies

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Financing structure -Mezzanine

Titimane Clean Energy Mini-Grid

- Edp (Portuguese Utility)
- UNEP SE4ALL
- Governmental Entities of Mozambique
- FUNAE (Energy Fund)
- EdM (Moz Utility)
- SAN-JFS (Cotton company)
- EEP (Energy and Environment Partnership)
- OFID (OPEC Fund for International Partnership)
- ARE (Alliance for Rural Electrification)
- Clinton Global Initiative

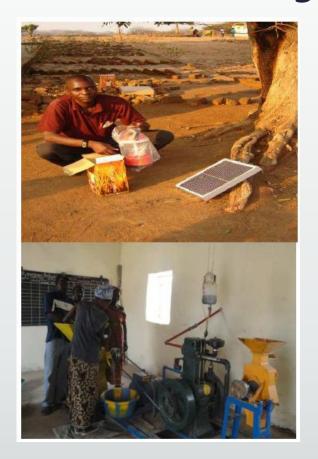
Business Model

Titimane Clean Energy Mini-Grid

- Mini-utility
- Fee-for-service
- Prepaid

Rural electrification and Off-grid – Main reality







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Closing Remarks

On-grid solar investment opportunities in Mozambique

- High electrification needs
- Solar will have a key role in this development
- All scales of development are required (on versus off grid)
- Priority to decentralised generation/rural electrification
- Market for new business models Solar Paygo, Pico Systems ...
- It's crucial the commitment of international entities such as world bank, UNEP, donors
- Good work has been developed by many entities
- This is just the beginning many opportunities!

THANK YOU FOR YOUR ATTENTION!

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