REPUBLIC OF MOZAMBIQUE
MINISTRY OF ENERGY

2009 U.S. TRADE AND INVESTMNET CONFERENCE

Presentation by Ministry of Energy

Maputo, the 15th of July 2009

Conductive Political Environment

- In Mozambique enjoys political and macroeconomic stability, democracy and democratic institutions are consolidating,;
- In Mozambique, like elsewhere in Sub-Saharan Africa, we are endowed with abundant energy resources in hydropower, coal and natural gas reserves, as well as in renewable energy resources; our choice of development strategy is based upon the strengthening of public private partnerships (ppp) and cooperation at different levels;
- Mozambique is a member of Southern African Development Community (SADC), a region implementing a Free Trade Area since January 2008, 260 million consumer market;
- SADC established the Southern African Power Pool (SAPP) in 1995, which has been in successful operation, with sound economic, social and environmental practices for a competitive regional energy market to attract power intensive investments, and ensure a sustainable energy development;
- Mozambique has been growing at an average of 7 to 8% for more than a decade; in 2008, it grew by 6.7%, despite the crisis;
- Demand for electricity is growing at a steady rate of 6% per annum.



Visible government support - Legal Framework

- Government is committed to harmonizing its rules and regulations to support regional integration;
- Mozambique has a clear legal framework enshrined in its Electricity Law, which defines how the investment must be conducted and the concession contacts granted;
- The legislation provides for equal treatment to both national and foreign investors;
- A set of guarantees and incentives is provided for in this legislation, which includes the special treatment granted to Special Economic Zones, Industrial Free Zones, Large Scale Projects (over $500 million) and Rapid Development Zones;
- We equally attach high value to the important role of regulation; that is one of the reasons why an Advisory Body, known as CNELEC (National Electricity Council) has been in place for some time as part of the overall energy sector reform undertaken by the Government, with the aim of establishing a modern legislation, and a more predictable and transparent licensing system.

Sector Policy

- Creation of an independent Ministry of Energy in 2005;
- Adoption of Electricity Master Plan in 2005 defining the priorities in electricity transmission and distribution;
- Adoption of a new Energy Strategy and Implementation Strategy for 2009-2013, covering Electricity, Renewable and Liquid Fuels;
- A Power Generation Master Plan is being finalized, with the aim of meeting the growing domestic demand and contributing to the mitigation of the regional crisis;
- The main objective of These instruments aim to increase the rate of access to electricity from the current 14% to 23% by 2013, contribute to poverty reduction through employment, self-employment and income generation; to this end, the Government is investing an average of US$100 million per year;

Ability to perform

- We still have a long way to go; major constraint is the lack of financial and limited domestic savings, as well as shortage of technical skills;
- Stronger cooperation at regional and African levels, as well as with development partners is essential to achieve effective technology transfer, raise poorest countries productivity, consolidate national and a regional economic integration, and address the challenge of poverty eradication;

Interconnection North - South

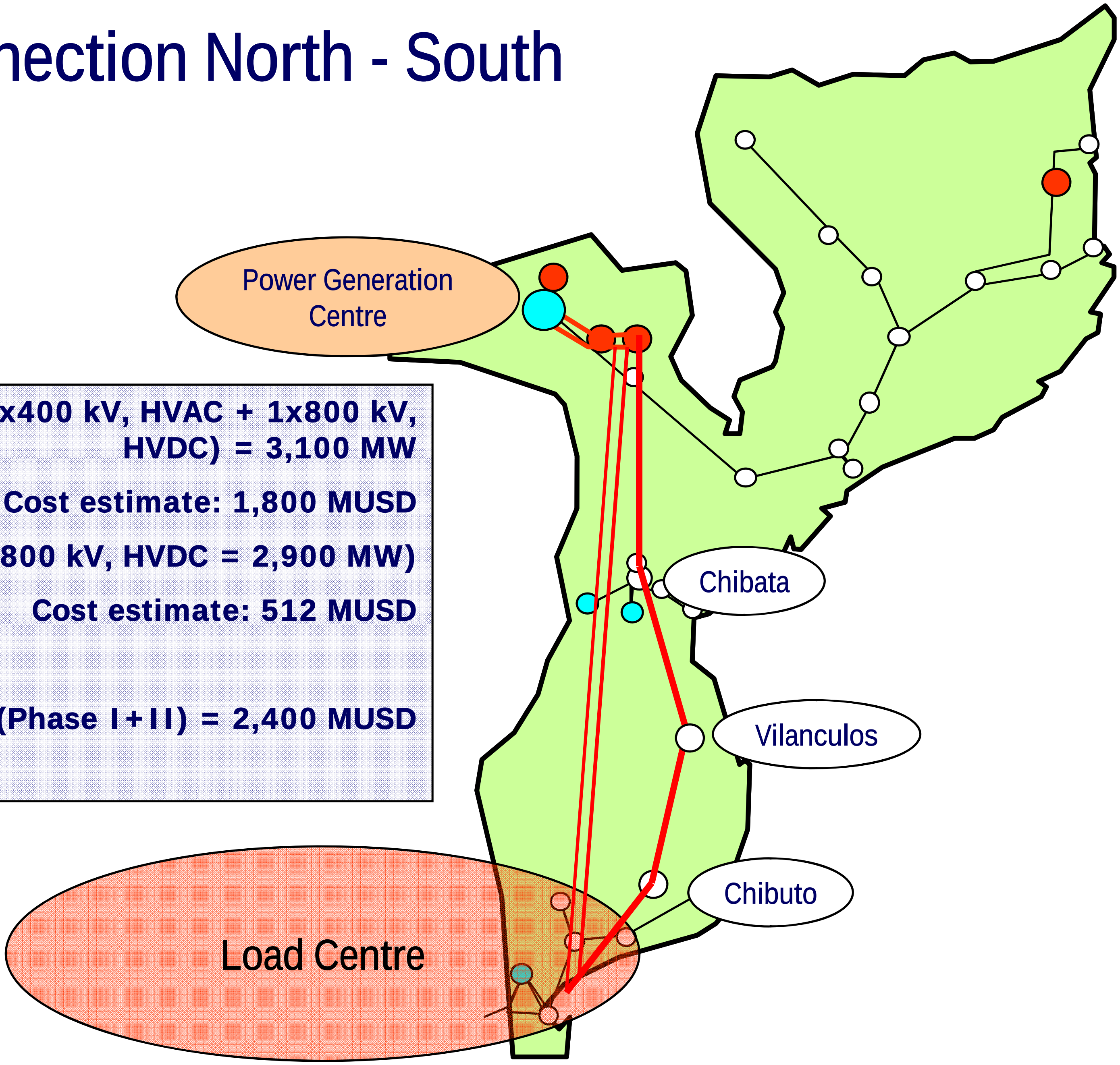
Phase I: (1x400 kV, HVAC + 1x800 kV, HVDC) = 3,100 MW

Cost estimate: 1,800 MUSD

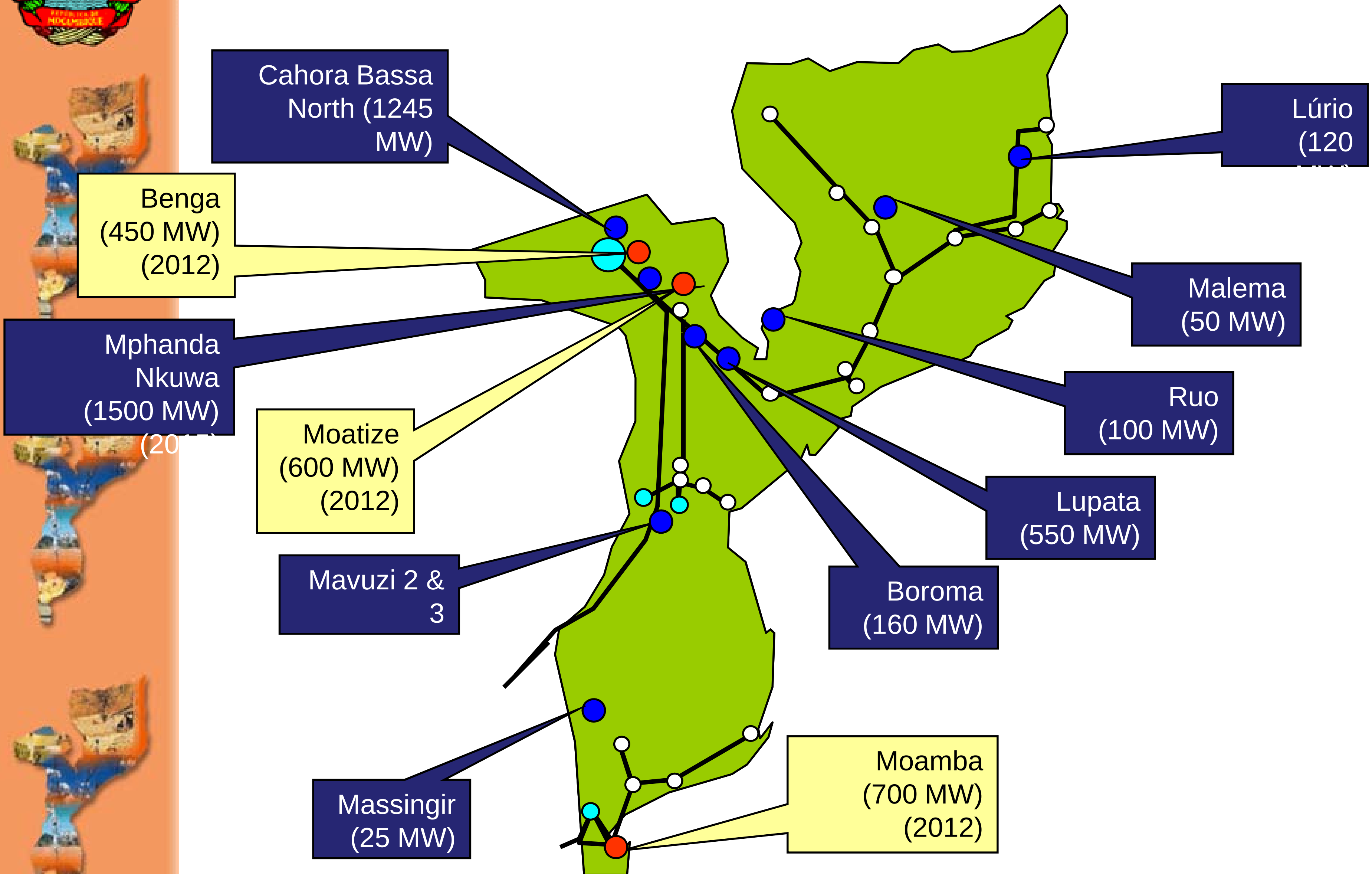
Phase II: (1x800 kV, HVDC = 2,900 MW)

Cost estimate: 512 MUSD

Total cost (Phase I+II) = 2,400 MUSD



ONGOING PRIORITY POWER GENERATION PROJECTS



Project Protefolio Status

- A number of important regional projects in electrical power have been planned with the implementation well underway, namely:

I. <u>In Electricity:</u>

- **The Tete-Maputo 1,500km (400 kV, HVAC + 2x800 kV, HVDC) Transmission System**, also known as the Backbone Transmission Line (CESUL), with a total capacity of over 6,000MW, to be developed in two phases as a PPPs on a BOOT basis. Phase 1 with a total capacity of 3,100MW comprising of 1x400 kV, HVAC + 1x800 kV, HVDC with a cost estimate of **US$ 1,800 Million,** and a Phase 2 comprising an additional 1x800 kV, HVDC for a total transfer capacity of 6,000 MW with an additional investment estimated at **US$ 512 Million.** The total investment scheme will be **US$ 2,300 Million** for the Phase 1 and 2. This configuration was defined based on the optimisation of the least cost System Planning study which was recently concluded.

Update on Project Status

- **The Mozambique - Malawi Interconnection**, is a joint project being implemented by the two countries, consisting of a construction of 200km of transmission line from the Tete Substation (Mozambique) to Phombeya in Malawi to supply power from HCB. The total investment is **US$ 93 million**. Feasibility study to extend the line back into Mozambique to reinforce the capacity of the northern power system is currently underway. We expect new impetus with political developments in Malawi;

- **A number of Independent Power Producers (IPPs) to be developed as PPPs**, is currently under structuring and development, with a view of meeting the growing power demand in Mozambique and the deep and severe shortage of power in Southern Africa. Our national electricity utility, Electricidade de Moçambique (EDM) participates in the development of these projects as a minority shareholder. They are regional projects by nature. Their joint generation capacity will be 6,000MW, and the combined investment is estimated at **US$ 7,000 Million**. The power generation projects are:

Update on Project Status

- **The Mphanda Nkuwa Hydroelectric Power Project**, 60km downstream of Cahora Bassa, with a total capacity of 2,400MW to be developed in two phases. Phase 1, with a total capacity of 1,500MW, is now being implemented by the Consortium with which the Government of Mozambique has signed a Framework Agreement in December 2007. The project development is in a critical phase of discussions with potential offtakers. The basic technical engineering design is concluded and ESIA is underway. Its cost is estimated at **US$ 1,800 million.**

- **The Moatize Coal Fired Thermal Power Project**, with a total capacity of 2,400MW, is being developed in two phases, next to the site of the Moatize Coal Mine Project. Phase 1, with a total capacity of 600MW, is now being implemented by the Consortium with which the Government of Mozambique had signed a Framework Agreement in last March. Discussions with EDM for power off taking are underway and potential EPC suppliers will submit the technical and commercial proposal's by August 2009. The ESIA is under development. Its total cost is estimated at **US$ 1,300 million.**

Update on Project Status

- The **Cahora Bassa North Bank Power Plant,** with the total capacity of 1,250MW, will be constructed at the site of the existing Cahora Bassa Hydropower Project facilities (Cahora Bassa South Bank) and would comprise of construction almost wholly underground. The focus of this development will be a substantial power house cavern complex. Its cost is estimated at **US$ 700 million,** for generation only. It is expected to be a mid-merit power project. The update of the existing technical studies including a full feasibility study will be initiated and expedited.

- The **Combined Cycle Natural Gas Fired Thermal Power Project** for 500-750MW in Maputo Province is estimated at **US$ 1.300 million** and the commissioning of it is expected to take place in early 2012/13. The project has finalized the technical and economic studies and the negotiation of the PPA with potential offtakers is well advance and soon to be concluded. This project includes SASOL on the shareholding structure which is the gas concessionaire and the gas supplier for the project.

Update on Project Status

- The **Massingir Hydroelectric Project,** with the total capacity of 27MW, to be implemented in the existing Massingir dam, located in Gaza Province, South of Mozambique. Negotiations of Concession Contract are ongoing and the project will be developed as a PPP, on a BOT basis. The developer is proceeding with contacts to establish the PPA with EDM, towards the financial close. The estimated cost is **US$ 38 Million.**

- The **Majawa Hydroelectric Plant and Berua Hydroelectric Plant,** with the total capacity of 25MW and 42 MW, respectively, are located in Zambézia Province (Central Mozambique), to be developed as a PPP, on a BOT basis. The implementing Consortium is elaborating the Joint Development Project and its total cost is estimated at **US$ 120 Million**. The feasibility study has been concluded and a project implementation plan is under development.

Update on Project Status

- The **Lúrio Hydroelectric Project**, with the total capacity of 120MW, is located in Cabo Delgado Province (Northern Mozambique). Its feasibility study was completed in September 2007, and now is under process of identifying strategic partners to develop the project. Its cost is estimated at **US$ 400 million.** This project is very important for the stabilisation of the northern grid

- Other Identified Hydroelectric Projects, include about 60 locations where they can be developed, where reconnaissance studies have already undertaken. Examples of these locations include: the Malema, in Northern Mozambique, with a potential for 60MW; Lupata (520MW) and Boroma (165MW), both on the Zambezi River, downstream Mphanda Nkuwa just to mention but a few. All the mentioned above projects are under pre-feasibility phase selected for feasibility studies.

Investment framework

- **Generation** is open to private sector participation, and measures to enable a continuous effective participation of foreign or domestic investors will be ensured. The Government is recognizing the existence of vast possibilities for new power generation in Mozambique. This resource is not just of value to the electrification program but also represents business opportunities.
- **Transmission,** Government gives preference to public public partnership in the infrastructures, and it is open to private participation on a BOOT basis. The legislation designates our national electricity utility (EDM) to operate the National Transmission Grid, and to ensure its expansion, security and reliability of power supply to the entire country.
- Taking this matter into account, it is equally important to strengthen the role of regulation, through a gradual operationalisation of the National Electricity Council (CNELEC) and its upgrading into a full-fledged regulator.

Investment framework

- SADC has already set regional priorities and needs, focusing on regional integration programmes; major challenge is how to expedite implementation to keep pace with the demand growth, and tackle the current deficit;
- Joint efforts by implementing agencies to get the programmes moving are taking place, at the same time that constraints and weakness are analyzed to provide development assistance to supplement capacity gap, achieve the MDG, and use energy productively to fight poverty.

NATURAL GAS

GAS BACKGROUND

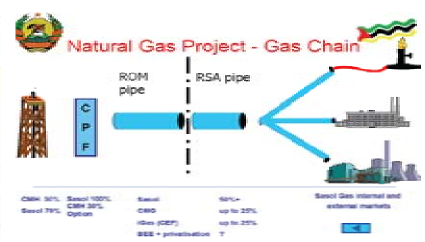
- In 2004, the commercial production of natural gas from the Pande and Temane gas fields started.
- More than 5,1 trillion cubic feet (TCF) (equivalent to 5,8 billion GJ) of natural gas reserves discovered since 1961, in Pande, Buzi, Temane and Inhassoro, a major part of which is contracted to SASOL for export to South Africa, at a rate of **120 MGJ** per year, through an 800km pipeline, for manufacturing of synthetic liquid fuels and for distribution by pipeline to industrial, commercial and other users within South Africa.
- Along the pipeline there are five tape-off points inside Mozambique, to allow the use of gas in the country.

GAS POTENTIAL AND USE

- A small quantity of condensate (about 0,6 million barrels per year out of a proved reserve of 20 million barrels for export) is being produced;
- Around 3.5 MGJ of royalty gas (5% of total production) is being pumped into Mozambique through a 75 km pipeline from the tape-off point of Ressano Garcia and being used in a number of industries, replacing heavy oils, diesel and coal (Aluminium smelter, food + drinks plants, cement industries), in electricity generation (an isolated grid in northern Inhambane), as well as in CNG for vehicles in Maputo and Matola, and a small community kitchen in the Municipality of Matola;
- The Central Processing Facility (CPF) and transportation facilities expansion and upgrading is already taking place, to increase gas production to 280 MGJ per year, on the basis of recent discoveries.


PRS-1 Ressano Garcia


PRS-1Ressano Garcia



GAS MARKET

- The Government has so far granted distribution concessions to contracts have been granted in Vilankulo/Inhassoro and Govuro (near the gas fields) and in Matola/Machava (the country's main industrial area) and new concession for Maputo City was recently approved by GoM, on the basis of a recent gas market study;
- The Government is studying other opportunities to marked royalty gas for industrial, commercial and domestic use as well as for power generation in Mozambique;
- A market study is currently being undertaken to identify areas with viable consumption of this resource and provide opportunities for business.
- Depending on future discoveries we would be looking into producing Liquefied Natural Gas (LNG) and synthetic liquid fuels for local consumption and export to regional and international markets.

Biofuels

INTRODUCTION

- Energy security and sustainability today call for efforts (national, regional and international) to identify and develop alternative energy supply options;
- No country today can stay away from the current challenge of energy supply security and sustainability. This is particularly true for the vast majority of countries located in Sub-Saharan Africa (SSA);
- Sub-Saharan African countries, whether oil importers or exporters, are severely affected by the international oil price volatility and unpredictability;
- All countries, irrespective of their level of energy potential, must share common and individual responsibilities to overcome the challenges facing the energy sector.

THE MOTIVATIONS

The main motivations for the adoption of Biofuels Policy and Strategy were:

a. The international oil price instability, unpredictability and volatility;
b. The need to enhance energy security and reduce dependency on imported fossil fuels;
c. The contribution to the mitigation of the global warming phenomenon, through the development and use of clean energy sources;
d. The promotion of the agricultural sector, an important factor to reduce poverty, especially in rural areas;
e. The promotion of appropriate technologies and methodologies for environmentally friendly agricultural and industrial production to mitigate the effects of the global warming phenomenon.

SOME BIOFUELS MERITS

a. The reduction of dependency on imported fossil fuels;

b. The income and employment generation potential, including self-employment in rural areas;

c. The promotion of the upgrading and use of existing infrastructures and facilities (deep water ports, railways, roads, storage tanks and pipelines) to store and supply biofuels to the SADC region (a fast growing 260 million consumers market), a consolidating Free Trade Area;

e. A favorable climate (similar to Brazil) for the development of a sound biofuels programme;

f. A firm political commitment at the highest level of the national leadership: H.E. President Armando Emilio Guebuza launched personally, in 2005, the national campaign for the cultivation of *jatropha curcas* in the country, as one of the main feedstock for biodiesel;

g. An opportunity for the small growers to add value to their agricultural raw materials by processing them into biofuels to cater to their own energy needs, instead of acting as mere feedstock producers;

BIOFUELS DEVELOPMENT CHALLENGES

The major challenges are:

i. How to ensure a correct use of allocated land preventing land conflicts with local communities;

ii. How to strike an adequate balance between bio-fuels and food production, and prevent excessive development of single crops (monocultures), and systemic food shortage and chronic food insecurity;

iii. How to secure the sources and availability of seeds and fertilizers at affordable prices, especially for the small and medium size growers;

In response, the Government of Mozambique adopted, in March 2009, the National Biofuels Policy and Strategy for 2009-2013;

BIOFUELS POLICY AND STRATEGY OBJECTIVES

a. Stimulate sustainable use of local energy resources;

b. Reduce dependency on imported fossil fuels;

c. Promote rural development through investment in biofuels production;

d. Diversify the energy matrix;

e. Reduce fuel costs, without creating other financial impacts like subsidies;

f. Protect the economy and the consumer against the high volatility and unpredictability of fuel prices and against energy insecurity;

POLICY AND STRATEGY OBJECTIVES (cont)

g. Stimulate development of indigenous or community-based technologies;

h. Promote the involvement of national research and education institutions, as well as the scientific community in technology design and development;

i. Promote food and nutritional security;

j. Create the necessary conditions for biofuels projects to contribute to the stimulation of local economies, including food production, especially in rural areas; commercial producers to support small growers and secure food production.

BIOFUELS POLICY AND STRATEGY PRINCIPLES

The Biofuels Policy and Strategy principles are:

i. **Inclusiveness** – The establishment of private sector business opportunities to include rural communities, in particular the small producers;

ii. **Transparency** – To ensure a transparent biofuels pricing mechanism, and the participation of all stakeholders in the management of the National Biofuels Programme;

iii. **Environmental and Social Protection** – The establishment of an appropriate mechanism to enhance the environmental and social benefits of biofuels production and use, while mitigating any negative impacts;

BIOFUELS POLICY AND STRATEGY PRINCIPLES

iv. **Gradualism** – The development of biofuels in the country should be gradual and flexible, allowing for all stakeholders to develop their institutional capacity as the process unfolds;

v. **Fiscal Sustainability** – The development of the biofuels sector should pose the shortest term financial burden possible to the State, and in the long run it should make a positive fiscal and macroeconomic contribution;

vi. **Innovation** – Includes the promotion of research and development of innovative initiatives aimed at simplifying the establishment of Small and Medium-Sized Enterprises (SMEs), through the attraction of appropriate biofuels production and consumption technologies into Mozambique;

BIOFUELS STRATEGIC ACTIONS

Market Creation

i. **Demand Promotion** – Ensure a mandatory gradual blending and a growing use of *flexfuel* vehicles;

ii. **National Supply Development** – Promotion of biofuels production and use through the intensification of: land mapping, provision of agricultural inputs, basic infrastructure and equipment for processing and refining;

iii. **Environmental Impact Management** – The establishment of a regulatory framework which assures that the biofuels sector takes the responsibility to mitigate all negative impacts;

iv. **Institutional Organization** – **i)** Establishment of the National Biofuels Programme to support financially the activities and specific projects; **ii)** Establishment of a National Biofuel Commission, to supervise the implementation of the Strategy;

BIOFUELS FEEDSTOCK

The study on biofuels production in Mozambique identified several crops and selected the suitable ones for Mozambique, namely:

- **Ethanol Production :**
  - Assessed crops: *a) sugar cane; b) sweet sorghum; c) cassava; d) maize;*
  - Selected crops: *a) sugar cane; b) sweet sorghum*
- **Biodiesel Production:**
  - Assessed crops: *a) jatropha curcas; b) coconnut; c) sunflower; d) soya; e) peanut;*
  - Selected crops: *a) jatropha curcas; b) coconnut*

BIOFUELS STRATEGY IMPLEMENTATION

Legal Framework:

- Renewable Energy Legislation defining:
  - The level of blending, the transition period, the establishment of the National Biofuels Commission, the National Biofuels Development Programme, the biofuels sustainable production criteria and the guidelines for land allocation and biofuels project approval;
- National legislation on biofuels quality and certification;
- Regional agreements covering the establishment of common guidelines and standards, as well as sustainability criteria.

ACTION PLAN

- **Creation of Biofuels Domestic Market:**
  - Promotion of biofuels purchase for domestic market;
  - Phased mandatory blending:
    - Pilot Phase (2009-2015) – Reach blending level of 10% ethanol (E10) and 5% biodiesel (B5);
    - Operational Phase (2015-2021) – Blending level increase up to E20 e B20;
    - Expansion Phase (2021-....) : development of paralel distribution network for blending above E75- E100 e B100;

THANK YOU !

Ministry of Energy

www.me.gov.mz

Address: Av. 25 de Setembro 1218,
Caixa Postal 1381
Tel: +258 21 303 265
Fax: +258 21 313 971
E-mail: me@me.gov.mz