Republic of Mozambique

COAL POTENTIALITIES AND CHALLENGES IN MOZAMBIQUE

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National Directorate of Mines

Japan – Clean Coal Symposium
Tokio, 6th September 2011
**Geographical location:**
- Southern part of Africa:
- Meridian 30° and 42° East
- Parallel 11° and 27° South
- Total area: 799 390 Km²

**Population:** ~21 million:
- 80% live in the countryside
- 20% live in urban area

**Political Independence:** 1975
- Multiparty Political system
- Democratic Government
- Official Language: Portuguese
- English is widely spoken
- President of Republic is elected by universal suffrage for 5 years
MINERAL RESOURCES IN MOZAMBIQUE

Our Policy

- Ensure a sustainable exploration and development of mineral resources
- The industrial development of the country and the local utilization of its mineral resources
- Add value to the mineral resources through in country processing
- Promote partnerships including the participation of Mozambican private enterprises in the Sector
- Periodic update of the legal and fiscal framework to keep the investment attractiveness in Mozambique
- Training and institutional strengthening
The industrial development of the country and the local utilization of its mineral resources

Mozambique to become self-sufficient in energy and export surplus of natural gas and petroleum products

A strong involvement of nationals and local enterprises in the mineral resources sector
Legal Instruments available:

- Mining Law nº 14/2002, of June 26;
- Environmental Regulation for the Mining Activity Decree 26/2004, of June 30;
- Mining Regulation Decree nº 62/2006, of December 26;
- Mining Safety Regulations Decree nr. 61/2006, of December 26;
- Fiscal Regime Law nº 11/2007, of June 27, for mining operations;
- Fiscal Incentives Law nº 13/2007, of June 27, for mineral and petroleum operations;
- Petroleum Law nº 3/2001
TYPES OF MINING LICENSES

- Reconnaissance License valid for maximum of two years, non-renewable (non-exclusive);
- Exploration License, with a maximum duration of five years and renewable for the same period (with exclusivity);
- Mining Concession, with a maximum duration of twenty-five (25) years, and renewable for a maximum of 25 years;
- Mining certificate, with a duration of two years;
- Mining Pass, granted for a term of twelve months and renewed for the same period (artisanal mining).
MINING CADASTRE
PRINCIPLES BASIC FUNCTIONS

• **PRIORITY**
  - Principle of “first come, first served” in the awarding of the mineral titles

• **TRANSPARENCY**
  - Security of tenure and transparency treatment in the process of awarding of mineral titles and permits

• **NO DISCRIMINATION**
  - Application of the equal rules and criteria's for all people

• **OBJECTIVITY**
  - Without subjective criteria's of evaluation
AVAILABLE GEOLOGICAL DATA

- Geological maps at scale 1:1,000,000, 1:250,000 and 1:50,000 scale of some areas (hardcopy, pdf and shape ArcGis format) and they explanatory geological reports;

- Magnetic and radiometric – regional and high density;

- Geochemical data set (stream sediments and soils) and Industrial mineral reports;

- Geochronological data set, mineral thin sections and samples (jpg format);

- Seismic, gravit and magnetic data;

- Technical reports on hydrocarbons;

- Bibliographic data base-PANGIS with 75% of field work reports scanned (pdf format).
Surface Tax, variable by size and time frame ($10 to $100 / sq km).

Royalty – 10% Diamonds, gold and precious metals; 6% Gemstones; 5% Base metals; 3% Coal and other minerals.

Income Corporate Tax – 32%.

Exemption for 5 years on import duties and VAT for specific mining goods and equipment.
MOZAMBICAN COAL BASINS

- Tete
- Manica
- Niassa
- Cabo Delegado
Location
- Minjova River, 60 km from Moatize Village (ENE of Moatize)

Qualitative data
- Ash content: 35-38%
- Volatile matter: 25-35%
- Sulphur: 0.8-1.5%
- Swelling Index: 4.5-6.0
- Calorific power: 5440-7800 kcal/kg
**Location**

- 200 km from Moatize Village

**Estimated reserves (by CPRM, brazilian comp.):**

- Vúzi $216 \times 10^6$ t
- Mucanha $1.663 \times 10^6$ t
- Bohozi $1.684 \times 10^6$ t

*The total resources of the Mucanha-Vúzi coal area are more than indicated here.*
TETE PROVINCE
Mutarara Coal Basin

Location
- Border with Malawi (S of Moatize)
  (called Salambíduè Coal area)

Surface
- 100km²

Two occurrence
- Nhacali
- Goma

Some qualitative data
- Ash content 35%
- volatile matter 14%

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**Location**
- 50 km from Moatize Village (NE of Moatize)

**Some qualitative data**
- Ash content 35%
- Volatile matter 14%
- Sulphur 1.8-2%
- Colorific power is high than Moatize coal

**Estimated resources**
- $2.0\times10^9$ t
**NIASSA PROVINCE**

Maniamba/Metangula Coal Basin

- **Location**
  - Normally called Lunho Coal Basin, it's situated in NE of Niassa

- **One deposit**
  - Lufetiche
  - Maped area-750 km²

- **Qualitative data**
  - Ash content: 25-35%
  - Clorific power: 7680-7710 cal/g
  - Volatile matter: <35%

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CABO DELGADO PROVINCE
Coal deposits/Occurrences

Location
- Along of the Lugenda Valley
- The basic structure is similar to the Lunho coal basin

Qualitative data
- Lached ashes 22-35%
- Volatile substances 26-36%

Estimated reserves
- 100 millions of tones, in a layer coal of Luângua deposit – 100 m deep
- More studies must be done to evaluate the real coal potential reserves.

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**Location**
- South of Manica, in the end of Save and Limpopo hydrographic basins

- **Coal basin area**
  - 80km²

- **Deposit**
  - Mepotepote

- **Qualitative data**
  - Leached ashes 19-35%
  - Volatile matter 14-19%

- In laboratory a coke of good quality was obtained.

- The basin calls for more studies

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HISTORIC DATA ON COAL MINING ACTIVITIES

• 1920 – beginning of coal exploration activities by the Société Geologique et Minière du Zambeze.

• 1948 – Companhia Carbonífera de Moatize created.

• 1978 – CARBOMOC created

• 1981 – Coal production reached 575,000t

• 1983 – CARBOMOC ceased its mining activities

• 2004 – The GOM invited mining companies to participate in the competitive international bidding process to develop Moatize coal project.

• November, 2004 – CVRD (now Vale) was the winning bidder
• Effective revitalization begins in 2004 with the concession of the Moatize Coal Mine, carried out from Carbomoc EE which extinguished by structural reasons;

• At present, there are in the country over than 100 coal records issued, with several companies presenting positive results in research and development of projects;

### Coal Resources in Million Tones

<table>
<thead>
<tr>
<th>Companies</th>
<th>Measured/Indicated</th>
<th>Inferred</th>
<th>Sub-Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vale</td>
<td>1,870</td>
<td>416</td>
<td>2,286</td>
</tr>
<tr>
<td>Riversdale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>•Benga</td>
<td>1,072</td>
<td>2,960</td>
<td>4,032</td>
</tr>
<tr>
<td>•Zambeze</td>
<td>2,365</td>
<td>6,680</td>
<td>9,045</td>
</tr>
<tr>
<td>•Sub-Total</td>
<td>3,437</td>
<td>9,640</td>
<td>13,077</td>
</tr>
<tr>
<td>ENRC</td>
<td>672</td>
<td>362</td>
<td>1,034</td>
</tr>
<tr>
<td>Eta-Star</td>
<td>-</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Essar</td>
<td>-</td>
<td>31.8</td>
<td>31.8</td>
</tr>
<tr>
<td>JSPL</td>
<td>898</td>
<td>754</td>
<td>1,652</td>
</tr>
<tr>
<td>Ncondezi</td>
<td>644</td>
<td>1,164</td>
<td>1,808</td>
</tr>
<tr>
<td>Revuboe</td>
<td>-</td>
<td>-</td>
<td>798</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>10,958</strong></td>
<td><strong>22,037.8</strong></td>
<td><strong>33,793.8</strong></td>
</tr>
</tbody>
</table>
• In the second semester of 2011, started the mining phase of two companies with estimated global production at ramp-up of about 46 million ton ROM;

• In the next 3 - 6 years, should begin the development phase of some new coal projects (Revuboe, Ncondezi, ENRC, Changara, Zambezi);

• The expectation of the Coal Export Capacity is in about 5 millions of tons for starting projects in 2011
COAL PROJECTS UNDER DEVELOPMENT

- **Moatize Project (Vale)**
  - *26 million tons/yr*, starting in 2011.
  - Coking coal, steam coal and
  - power generation (*2,400MW*).
  - Mining investment: US$1.320 million

- **Benga Project (Riversdale)**
  - *20 million tons/yr*, starting in 2011
  - Coking coal, steam coal and
  - power generation (*2,000MW*).
  - Mining Investment: US$ 850 million
### Coal Mining Projection in Million Tones

<table>
<thead>
<tr>
<th>Company</th>
<th>2011</th>
<th>2012</th>
<th>2015/17</th>
<th>&gt;2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vale</td>
<td>1.2</td>
<td>5.3</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Riversdale</td>
<td>0.75</td>
<td>2.0</td>
<td>27</td>
<td>39.5</td>
</tr>
<tr>
<td>Ncondezi</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>10.0</td>
</tr>
<tr>
<td>JSPL</td>
<td>0.3</td>
<td>0.75</td>
<td>7.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Revuboè</td>
<td>-</td>
<td>-</td>
<td>3.4</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2.25</strong></td>
<td><strong>8.05</strong></td>
<td><strong>51.4</strong></td>
<td><strong>90.5</strong></td>
</tr>
</tbody>
</table>
Logistics

- The building of infrastructures for the transportation of coal (railways, possibly barge river transport, port facilities) constitute one of the main challenges.

Addition of coal value in Mozambique

- Gas Production (Coal Bed Methane);
- Coal transformation into fuel;
CHALLENGES FOR THE COAL SECTOR

• Promote the internal market for mineral resources and the development of its derivative production Industry
  – Implantation of thermal power stations;
  – Siderurgy for steel Production;

• Encourage the participation of the private national company managers in the mining geological activities in Mozambique;

• Ensure the training of specialized professional in the mining industry.
Mozambique is endowed with mineral resources and offers:

- Good prospectivity for exploration
- Favorable legal, regulatory and fiscal framework
- Political stability
- Investment opportunities
Thank You!
Muito Obrigado!