ENERGY SECTOR IN MOROCCO

JICA PROGRAM

Tokyo, 26 June 2012

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OUTLINE

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2. ENERGY SECTOR IN MOROCCO
3. NEW ENERGY STRATEGY
4. MAIN BOTTLENECKS IN STRATEGY FORMULATION
5. KEY EXPECTATIONS
MOROCCO : AN EMERGING COUNTRY

A modern society

- Constitutional Monarchy
- Democratic institutions
- National Initiative for Human Development
- New family code giving women more equal opportunities
Main implemented reforms

- New commercial laws
- Labour code revised
- Liberalization of foreign trade and exchange systems
- Protection of intellectual property rights
- Establishment of commercial law courts
- Opening of all economic sectors to foreign investment
- Sector reforms: banking, insurance, transport,...
MOROCCAN ENERGY SECTOR

Characteristics

- Energy consumption in constant growth
  - Primary energy (2011) : 5.3%
  - Power consumption (2011) : 8.4%
- Limited domestic Energy resources: Imports 95.5%
- Energy Bill (2011) : 25% Total Imports
- Energy Subsidies (2011) : 3% GDB
EVOLUTION OF PRIMARY ENERGY CONSUMPTION (MTOE)

2002: 10.5 MTOE
2003: 10.9 MTOE
2004: 11.5 MTOE
2005: 12.2 MTOE
2006: 12.9 MTOE
2007: 13.7 MTOE
2008: 14.8 MTOE
2009: 15.1 MTOE
2010: 16.1 MTOE
2011: 16.9 MTOE

Annual Increase: 6.1%
EVOLUTION OF ELECTRICITY DEMAND (%)
Main Strategic Achievements

- Petroleum products distribution and Refineries Privatization
- Independent Power Production (IPP) Agreements
- Implementation of Maghreb – Europe Gas pipe and power Interconnections with Spain and Algeria
- Introduction of Natural Gas use in power production
- Program for generalization of Access to power in Rural area
- Intensification of hydrocarbon exploration
MOROCCO HAS AN INSTALLED CAPACITY OF 6405 MW IN 2011
A QUARTER RUN ON RENEWABLES

<table>
<thead>
<tr>
<th>PLANTS</th>
<th>INSTALLED CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal power plant IPP</td>
<td></td>
</tr>
<tr>
<td>&gt; JLEC (Coal)</td>
<td>1320 MW</td>
</tr>
<tr>
<td>&gt; Tahaddart (CCNG)</td>
<td>380 MW</td>
</tr>
<tr>
<td>&gt; Thermosolar power plan</td>
<td></td>
</tr>
<tr>
<td>Ain Beni Mathar (combined cycl)</td>
<td>472 MW</td>
</tr>
<tr>
<td>Thermal Coal ONE</td>
<td></td>
</tr>
<tr>
<td>&gt; Jerada (Coal)</td>
<td>165 MW</td>
</tr>
<tr>
<td>&gt; Mohammedia (Coal)</td>
<td>300 MW</td>
</tr>
<tr>
<td>Thermal Fuel ONE</td>
<td></td>
</tr>
<tr>
<td>&gt; Mohammedia (Fuel)</td>
<td>300 MW</td>
</tr>
<tr>
<td>&gt; Kenitra (Fuel)</td>
<td>300 MW</td>
</tr>
<tr>
<td>Renewables in base</td>
<td></td>
</tr>
<tr>
<td>&gt; Wind : Essaouira, Alkoudia, Tanger</td>
<td>280 MW</td>
</tr>
<tr>
<td>&gt; Hydraulic</td>
<td>1306 MW</td>
</tr>
<tr>
<td>Gas Turbines et Diesel thermal</td>
<td></td>
</tr>
<tr>
<td>&gt; Gas Turbines &amp; Diesel</td>
<td>1118 MW</td>
</tr>
<tr>
<td>(Mohammedia, Tan Tan, Dakhla)</td>
<td></td>
</tr>
<tr>
<td>ETP</td>
<td></td>
</tr>
<tr>
<td>&gt; STEP Afourer</td>
<td>464 MW</td>
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</tbody>
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**Total Installed capacity** 6405 MW

- Technologies in base
- Technologies at Peak
ENERGY STRATEGY IN MOROCCO

New Challenges

- Growing energy demand:
  - Economic and social development
  - Growth of population with better revenues
- Steady high Energy prices in international market
- Needs for huge investments to meet future demand
  - Infrastructures
  - Capacities
- Competitiveness of Moroccan economy in opened international markets
- Environmental issues.
NEW ENERGY STRATEGY IN MOROCCO

FOUR BASIC GOALS

- Security of supply and availability of energy
- Generalized Access to energy at reasonable prices
- Energy efficiency
- Preserving the Environment

4 STRATEGIC ORIENTATIONS

- Diversified Mix and optimized around reliable and competitive technology choices
- Domestic resource mobilization by the rise of renewables
- Energy efficiency built as a national priority
- Regional Integration
## Key Projects of Renewable Power Generation by 2020

<table>
<thead>
<tr>
<th></th>
<th>Integrated Wind Program</th>
<th>Integrated Solar Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>2 000 MW</td>
<td>2 000 MW</td>
</tr>
<tr>
<td><strong>Power Production</strong></td>
<td>6 600 GWH</td>
<td>4 500 GWH</td>
</tr>
<tr>
<td><strong>Investments</strong></td>
<td>3.5 Milliards $</td>
<td>9 Milliards $</td>
</tr>
<tr>
<td><strong>Avoided CO2 Emissions</strong></td>
<td>5.6 Million Tons</td>
<td>3.5 Million Tons</td>
</tr>
</tbody>
</table>

### Wind Potential
- 25,000 MW
- 6000 MW achievable in 2030

### Solar Potential
- 3000 H/Y of sunshine
- 5 kWh/m2/day of irradiation
42% of total installed capacity is from renewable sources by 2020

MOROCCO’S ADVANTAGES FOR DEVELOPING RENEWABLES

- Important Potential of renewables
- Energy infrastructure of transit well developed
- Ability to implement major projects
- attractive Legislative and institutional framework
- Significant potential for demand growth

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>29%</td>
<td>35%</td>
<td>27%</td>
</tr>
<tr>
<td>Fuel</td>
<td>27%</td>
<td>19%</td>
<td>10%</td>
</tr>
<tr>
<td>Gas</td>
<td>11%</td>
<td>8%</td>
<td>21%</td>
</tr>
<tr>
<td>Hydraulic</td>
<td>29%</td>
<td>21%</td>
<td>14%</td>
</tr>
<tr>
<td>Solar</td>
<td>0%</td>
<td>5%</td>
<td>14%</td>
</tr>
<tr>
<td>Wind</td>
<td>4%</td>
<td>12%</td>
<td>14%</td>
</tr>
</tbody>
</table>
In the coming years, Morocco will face a growing need for energy.

**The primary energy demand should:**
- Double to 2020
- Triple to 2030

**The electricity demand should:**
- Double to 2020
- Quadruple to 2030
INSTITUTIONAL REFORMS

- **Adoption of Law 13-09 on renewable energy** which allows:
  - Opening of the generation to competition
  - Access to electricity grid
  - Export of green electricity
  - Construction of a direct line for export

- **Creation of the National Agency for the Renewable Energy and Energy Efficiency Development (ADEREE)**, in charge of:
  - Promoting renewable energy projects
  - Increased energy efficiency
  - Implementation of Atlas wind and solar
  - Demo for Applied Research

- **Establishment of the "Moroccan Agency for Solar Energy"** focused on:
  - Study and design solar program
  - Promotion, investment, financing and implementing projects
  - Contribution to the development of expertise, research and solar industry
  - Management and monitoring of the implementation of solar program
 MAIN BOTTLENECKS IN POLICY FORMULATION IN MOROCCO

① Review of formulating energy policy when the context change in the perspective of:
   ➢ Integrating new issues induced by the change of the context and
   ➢ Coordinating different choices made in different periods
   ➢ Making the processus of formulating much more evolutionary

② Unbundling economic growth and energy consumption
KEY EXPECTATIONS FROM THIS PROGRAM

→ Acquire new methodological approaches and tools to:

➊ Integrate the change of context (internal and external environment) to review the National Energy Policy

➋ Declination of the national energy strategy on a regional level (subnational)

➌ Establish a system of assessment of the implementation of energy policy

➍ Evaluate the impact of the choices made in National Energy Policy on the national economy

➎ Unbundle economic growth and energy consumption for a developing country
THANK YOU FOR YOUR ATTENTION

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