CABO VERDE Energy Future: Needs for Innovation and Strategic Partnerships

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DG Energy Cabo Verde
CABO VERDE OVERVIEW

Area: 4,033 km²

Population: ~500,000

GDP per capita: ~3,800 US$

10 islands, 9 inhabited – 9 Energy Systems

Production: ~400 GWh, 25% from Renewables

Installed Capacity: ~150 MW of which 35 MW Renewables (~23%)

Access to Electricity: ~95%

Access to Modern Energy for Cooking: ~65%

Life Expectancy: 76 years

Literacy Rate: 87% for adults, 99% for young

Active Population with Medium/Higher Education: ~15%

Poverty Rate: ~20%
### Energy Systems in Cabo Verde: Power Sector

#### Installed Capacity (MW)

<table>
<thead>
<tr>
<th>Island</th>
<th>Population</th>
<th>2010</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santo Antão</td>
<td>43,915</td>
<td>6,0</td>
<td>6,0</td>
</tr>
<tr>
<td>São Vicente</td>
<td>76,107</td>
<td>19,4</td>
<td>19,4</td>
</tr>
<tr>
<td>São Nicolau</td>
<td>12,817</td>
<td>2,2</td>
<td>3,2</td>
</tr>
<tr>
<td>Sal</td>
<td>25,765</td>
<td>16,9</td>
<td>20,4</td>
</tr>
<tr>
<td>Boavista</td>
<td>9,162</td>
<td>4,5</td>
<td>17,0</td>
</tr>
<tr>
<td>Maio</td>
<td>6,952</td>
<td>1,4</td>
<td>1,0</td>
</tr>
<tr>
<td>Santiago</td>
<td>273,919</td>
<td>46,9</td>
<td>69,7</td>
</tr>
<tr>
<td>Fogo</td>
<td>37,051</td>
<td>3,8</td>
<td>3,2</td>
</tr>
<tr>
<td>Brava</td>
<td>5,995</td>
<td>1,1</td>
<td>0,9</td>
</tr>
</tbody>
</table>

**THE NUMBER:** > 30 Cents per kWh + Taxes
Cabo Verde and Renewables

Windmills for Water Pumping

Wind on the Salt mine in Sal islands

In 1970: More than 100 in the Dry Islands of São Vicente
Cabo Verde and Renewables

1975: Independence

1977: Division of Renewable Energy created in the Rural Development Ministry

1989: Experimental Wind Park 10x10 kW in Sao Vicente

1994: First Modern and Commercial Wind Park
   2x300 kW in Sal islands
   3x300 kW in Sao Vicente and
   3x300 kW in Santiago.

2011: Cabeolica Wind Park (25,5 MW)
   9x850 kW in Sal islands
   7x850 kW in Sao Vicente
   11x850 kW in Santiago
   3x850 kW in Boavista

Avg. wind turbine capacity factor %

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>
Cabo Verde and Renewables

Since 2012

2,5 MW Solar Park in Sal Islands
(10 MW Load Peak)

5 MW Solar Park in Santiago Islands
(30 MW Load Peak)
Cabo Verde and Renewables

ELECTRA Energy MIX

Mix de Produção Electra

- WIND
- FUEL OIL
- GASOIL

2011
Cabo Verde and Renewables

2,5 MW Solar Park

7,6 MW Wind Park

11 MW Diesel Park

SAL ISLANDS

RE Penetration > 30%

➢ Half of the Potential wind production is wasted

STORAGE
Cabo Verde National Energy Targets

ENERGY ACCESS

1. To achieve **100% Electricity Access** by 2017 (from more than 90%)!
   - Grid Extension
   - Renewable micro-grids
   - Individuals Energy Systems (Solar Homes Systems)
2. To achieve **100% Access to Sustainable Cooking Services**
   - *Eradicate Use of Three Stones* + Universalization of *Improved Stoves*
   - Promotion of *Butane* Gas

ENERGY EFFICIENCY

1. *Efficient Electricity Distribution Grid*: distribution losses reduced to 8%
   - More than 30% of Distributed Electricity (15% technical+15% Commercial)
2. *Petroleum Products* (excepts Butane): 10% reduction/Baseline
3. *Final Electricity Consumption*: 15% reduction/Baseline
   - Promoting *Energy Efficient Building*
   - *Energy Standards and Labelling* for Appliance and Equipment's
   - Promoting Energy Efficient *Intensive Consumers* (like Hotels)

RENEWABLE ENERGY

1. 100% Electricity from Renewables in 2020!
2. New buildings: **Mandatory use Solar Water Heaters** (link to Energy Efficient Building)
The Energy Future: The Road Towards 100% Electricity from Renewables

**MARKET PULL**

**LEARNING BY DOING PROCESS**

More than 30% grid penetration need **Storage and Grid Control**

**Storage**: Few Mature Technologies Available
Test and diversify Storage Technologies

**PUBLIC PUSHER**

- Institutional Framework
- Preliminary Studies & Planning
- Capacity Building
- Small Storage Demonstration Projects

2015 - 2020

1 Island 100%
Cabo Verde Energy Efficiency Strategy

The Renewable Energy Strategies call for an huge effort in Energy Efficiency:

Reduce Grid Losses;
Improve grid Management
Improve Public Lighting Efficiency.

Energy Efficiency Strategy based on Three Axes:
1. Promoting Energy Efficiency in Buildings
2. Promoting Energy Efficiency in Appliance and Equipment's
3. Promoting Energy Efficiency for Intensive Consumers

- Create a National Certification System for Buildings, Appliances and Equipment's;
- Certification of Technicians and Installers;
- Discourage High Energy Consumption Appliances and Equipment's
- Mandatory Solar Thermal Water Heating in new Buildings and Hotel;

Promoting ESCO: private leadership
The Energy Future: Creating a Dynamic and Innovative Market

Legal and Institutional Framework: Complete and Transparent; Clear Responsibilities, Duties and Rights; 

Supporting Institutions and Agents: Promote and Strengthen the Necessary Institutions;

Promoting Independent Power Producer and ESCO: private leadership

- Competitive Market for Independent Power Production
- Competitive Market for Micro-Grids
- Competitive Market for Microgeneration
- Competitive Market for Energy Efficiency
- Competitive Storage Market;

Create Confidence in the Energy Market

- Simplified Procedures for Licensing (one stop shop);
- Public and competitive Auction based on least cost offer;
- Standard Power Purchase Agreement;
- Creation of a National Certification System for Buildings, Appliances and Equipment's;
- Certification of Technicians and Installers;
WE ALL ARE PRODUCERS ↔ NOTHING IS LOST, EVERYTHING IS STORED

Buildings are Consumers and Producers

Grid Transport but also Store Energy
Challenges

**STORAGE TECHNOLOGIES**

- Batteries
- Synthetic Fuels
- Biodiesel
- Flywheels

*Diversification*

**FINANCING**

**HUMAN RESOURCES**

**TECHNICAL & KNOWLEDGE TRANSFER**
The Energy Future: Renewable Energy Cluster

Supporting Framework

- Centre for Training and Certification
- Energy Agency
- Clean Energy Business Incubator
- Renewable Energy and Energy Efficiency Technological Park
- Advanced Studies and Research & Development

RENEWABLE ENERGY CLUSTER
Private leadership

CABO VERDE:
Show Room
Export Services
Competitive Advantages

1.- Educated Population
   15% Active Population with Medium/Higher Education

2.- Democracy and Political Stability
   ➢ 4 Prime Minister in 40 years

3.- Special Partnership wit European Union
   EU Market entry facilitate

4.- AGOA: African Growth and Opportunity Act
   Offers incentives and benefits for African countries to export to USA.

5.- Part of the West Africa Common Market ECOWAS

6.- Infrastructures
   4 International Airport
   2 International Port
   Very good telecommunication infrastructure
Competitive Advantages

INTERNATIONAL BUSINESS CENTRE IN SÃO VICENTE ISLANDS

Tax Benefits (Corporate Tax)

- 5.0% applicable to entities that create 5 (five) jobs;
- 3.5% applicable to entities that create 20 (twenty) jobs;
- 2.5% applicable to entities that create 50 (fifty) jobs.

Customs Duties Exemption

VAT Exemption
Daily Regular fly to Europe

West Africa, Brazil and Europe within 4 hour fly
Weakness

Bureaucracy and Multiple Agents – (Gov Create Cabo Verde Investment – www.cvinvest.cv - as the One Stop Shop)

Small Market

Time for decisions – (Within the Cabo Verde Investment One Stop Shop Investment decision should be made in less than 70 days)

Cultural
OBRIGADO!!

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