Status and Outlook of the Renewable Energies in the Dominican Republic

GLOBAL WORKSHOP ON CLEAN ENERGY DEVELOPMENT: Establishing a Foundation for Low Carbon Energy Systems
December 1 - 8, 2012
Washington, DC
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Presentation Content:

- Political and Economic view of D.R.
- Overview of Energy Sector.
- Development of Renewable Energies in D.R.
  - Wind Projects.
  - Solar Projects.
  - Biofuels.
  - Biomass.
  - Hydropower.
  - Rural Communities Projects.
Political and Economic view of D.R.
Political and Economic view of D.R. (1)
Country Extension: 48,442 Km² (18,704 sq mi)
Population: 9,445,281 (Census 2010)
  - Male: 50.2 %  Female: 49.8 %
  - Urban: 74.4 %  Rural: 25.6 %
Territorial Division: 1 National District and 31 Provinces.
Capital: Santo Domingo (Aprox. 3.0 Millions people.)
Currency: Dominican Peso (Aprox. RD$ 39.80 > USD$ 1.00)
Government: Democratic, Republican and Representative.
Period of Government: 4 years.
G.D.P.: USD$ 55,666.0 Millones (BCRD 2011)
G.D.P. per Capita: USD$ 5,538.3 (BCRD 2011)
Political and Economic view of D.R. (3)

**GDP: Dominican Republic versus Latin America (2003-2010)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Dominican Republic</th>
<th>Latin America</th>
</tr>
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<tbody>
<tr>
<td>2003</td>
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</tr>
<tr>
<td>2004</td>
<td>1.3</td>
<td></td>
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<tr>
<td>2005</td>
<td>4.9</td>
<td>6.1</td>
</tr>
<tr>
<td>2006</td>
<td>10.7</td>
<td>5.8</td>
</tr>
<tr>
<td>2007</td>
<td>8.5</td>
<td>5.8</td>
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<tr>
<td>2008</td>
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<td>4.2</td>
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<tr>
<td>2009</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>2010*</td>
<td>1.8</td>
<td>6.0</td>
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</table>

- Data Central Bank of Dominican Republic (BCRD) (www.bancentral.gob.do)
- Economic Commission for Latin America & Caribbean (ECLAC)

(*) Preliminary data.
Political and Economic view of D.R. (4)

**DIRECT FOREIGN INVESTMENT 2000-2010***
**Millions USD**

<table>
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<tr>
<th>Year</th>
<th>Value (Millions USD)</th>
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<td>2000</td>
<td>952.9</td>
</tr>
<tr>
<td>2001</td>
<td>1,079.1</td>
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<tr>
<td>2002</td>
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<tr>
<td>2003</td>
<td>613.0</td>
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<td>2004</td>
<td>909.0</td>
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<tr>
<td>2005</td>
<td>1,122.7</td>
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<tr>
<td>2006</td>
<td>1,084.6</td>
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<tr>
<td>2007</td>
<td>1,667.4</td>
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<tr>
<td>2008</td>
<td>2,870.1</td>
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<td>2009</td>
<td>2,066.6</td>
</tr>
<tr>
<td>2010</td>
<td>2,839.2</td>
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</table>

(*) Preliminary data.

Source: CEI-RD Presentation (www.cei-rd.gov.do)
Data Central Bank of Dominican Republic (BCRD) (www.bancentral.gob.do)
Commercial Agreements

13 agreements to protect Foreign Investments

- In discussion: Agreements with Mexico and Canada.

Legal framework to promote the Foreign Investment according to WCO. Founder member of WCO.

5 Free Trade Agreements
(DR-CAFTA, EPA, ALC RD - CARICOM, ALC RD - Central America, AAP RD - Panama)

Source: CEI-RD Presentation (www.cei-rd.gov.do)
Overview of Energy Sector.
Overview of Energy Sector. (1)

Total Energy Consumption: 4,930 Ktep

Overview of Energy Sector. (2)

National Electrical Integrated Grid (SENI)

Año 2011

- Installed Capacity: 2,960 Mw
  - Thermo: 2,437 Mw / 82.3%
  - Hydro: 523 Mw / 17.7%
- Max. Demand: 1,800 Mw
- Energy Supplied: 13,150 Gwh
  - Thermo: 11,622 Mw / 88.4%
  - Hydro: 1,528 Mw / 11.6%

Transmission Lines

- Lines 345 Kv: 160 Kms.
- Lines 138 Kv: 1,337 Kms.
- Lines 69 Kv: 1,657 Kms.
- Territorial Coverage: 85.0%

OFF-Grid Systems

- CEPM: 70 Mw
- CEB: 4 Mw
- Punta Cana: 18 Mw
- Cap Cana: 28 Mw
- Las Terrenas: 12 Mw
- Puerto Plata: 43 Mw

Source: OC – Memoria 2011 (www.oc.org.do)
Overview of Energy Sector. (3)

National Electrical Integrated Grid (SENI)

Source: OC (www.oc.org.do)
Transportation Sub-Sector (1)

Vehicles Types

<table>
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<tr>
<th>Tipo</th>
<th>2010</th>
<th>2011 a/</th>
<th>Variación</th>
<th></th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Absoluta</td>
<td>Relativa</td>
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<tr>
<td>Automóviles¹/</td>
<td>662,633</td>
<td>678,732</td>
<td>16,099</td>
<td>2.4%</td>
</tr>
<tr>
<td>Autobuses</td>
<td>72,662</td>
<td>76,390</td>
<td>3,728</td>
<td>3.3%</td>
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<tr>
<td>Jeeps</td>
<td>254,044</td>
<td>274,810</td>
<td>20,766</td>
<td>8.2%</td>
</tr>
<tr>
<td>Carga Pesada</td>
<td>945,927</td>
<td>995,757</td>
<td>49,830</td>
<td>2.9%</td>
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<tr>
<td>Motocicletas</td>
<td>1,409,975</td>
<td>1,481,255</td>
<td>71,280</td>
<td>5.1%</td>
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<tr>
<td>Volteos</td>
<td>16,343</td>
<td>16,660</td>
<td>317</td>
<td>1.7%</td>
</tr>
<tr>
<td>Máquinas Pesadas</td>
<td>18,300</td>
<td>18,913</td>
<td>613</td>
<td>3.3%</td>
</tr>
<tr>
<td>Otros ³/</td>
<td>13,137</td>
<td>13,576</td>
<td>439</td>
<td>3.3%</td>
</tr>
<tr>
<td>Totales</td>
<td>2,795,596</td>
<td>2,917,573</td>
<td>121,977</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Source: DGII / Parque Vehicular 2011 (www.dgii.gob.do)

- **METRO System:**
  - 2008 > Line 1: 14 Kms.
  - 2012 > Line 2: Const.

Fuels Types

- Gasohol (5-10 %)
- Biodiesel (5-10%)

In Implementation Process

- Gasoline
- Diesel
- GLP
- GNC
- Electricity
Overview of Energy Sector. (5)

Transportation Sub-Sector (2)

El Caribe 15-Abr-2011
Overview of Energy Sector. (6)

Use of Wood and Charcoal

Total Energy Consumption: 4,930 Ktep

Wood: 7.4%
Overview of Energy Sector. (7)
Legal Framework for the Electrical Sector and Renewable Energies.

- 1997: > General law to Reform the Public Enterprises (Law 141-97).

- 2000: > Environment Law (Law 64-00)
  > Hidrocarbons Law (Law 112-00)


  > Law 186-07 that modified Law 125-01.

- 2008: > Presidential Decree 601-08. Creating CNCCMDL.

- 2010: > New Constitution of the Dominican Republic. (Feb.)

- 2011: > “Net Metering” Regulation. (Jun.)
  > “Distributed Generation” Regulation. (Nov.)

- 2012: > National Development Strategy (END) (Law 01-12).
Incentives Law for Renewable Energies and Special Regimes (Law 57-07). (7)

**Definitive Concessions under Law 57-07**

**Concesiones Definitivas por Fuente Alterna de Energía en R.Dominicana**

- Eólica: 453 MW
- Fotovoltaica: 30 MW
- Mini Hidro: 0 MW
- Biomasa: 1 MW

**Composición de las Concesiones Definitivas**

- Eólica: 93.6%
- Fotovoltaica: 6.2%
- Biomasa: 0.2%

Source: Renewable Energies Division. FAURE Direction / CNE
Development of Renewable Energies in D.R.

WIND PROJECTS.
Wind Potential.
Información basada en los últimos diez años (desde enero 2000 a diciembre 2009) usando un modelo de ecuación regional no hidrostático de la atmósfera.
WIND FARMS THAT STARTED OPERATION IN 2011

Los Cocos

14 Vestas V90 (23 MW)

Quilvio Cabrera

5 Vestas V88 (8 MW)

Virtual Design.
Cortesy: EGE-Haina / CEPM)
## Wind Farms to Start Operation in 2013

<table>
<thead>
<tr>
<th>Farm</th>
<th>Developer</th>
<th>Capacity (MW)</th>
<th>Investment (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matafongo</td>
<td>Grupo Eólico Dominicano S.A.</td>
<td>30</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>El Guanillolo</td>
<td>50</td>
<td>103</td>
</tr>
</tbody>
</table>

Matafongo is owned by Grupo Eólico Dominicano S.A. and has a capacity of 30 MW with an investment of US$ 62 MM. El Guanillolo is owned by Parques Eólicos del Caribe S.A. (PECASA) and has a capacity of 50 MW with an investment of US$103 MM.
Development of Renewable Energies in D.R.

SOLAR PROJECTS.
Solar Potential

Dominican Republic - Global Horizontal Solar Radiation - 1999 Annual Average

Global horizontal solar radiation is a measure of energy from the sun and the sky on a flat plate collector. Estimates of 1999 annual average daily total radiation are modeled using the visible channel of meteorological geostationary satellite imagery. Grid resolution is 10 km.

US Dept. of Energy - National Renewable Energy Laboratory

DM Heimiller 24-MAR-2000 S.4

ONRREL
Solar Potential
Solar Potential (Radiación Global [W/m²])

Santo Domingo

Santiago

Source: 3TIER Advanced Applications
Solar Farms to start operation in 2011

Monte Plata

Electronic J.R.C.

Capacity: 30 MW

Investment: $$$
Monte Plata Project

30 Mw Solar Farm
CNE Solar FV System
General Specifications

> Total Capacity Installed  22 Kwp
> Annual Estimated Generation 35,358 kw-hr
> Annual Energy Reduction Aprox. 18% of Electrical Bill
> Total CO2 Emissions Reduction Aprox. 655 Tons

Solar Panels
- Total Panels 88
- Capacity per panel 250 Wp
- Panels Brand Tenesol

Inverters
- Total Inverters 4
- Capacity per Inverter 5 kws
- Inverters Brand Kaco

System connected to the Electrical Grid by a “Net Metering” contract.
PERSPECTIVES: SOLAR PROJECTS

Sistema fotovoltaico villas en San José de Ocoa.
30 Sistemas fotovoltaicos en estaciones de telecomunicaciones al 2010.

En proyección 35 Sistemas fotovoltaicos para el 2011.
Residential PV System in Santo Domingo.

Apartments PV Systems for common areas in Santo Domingo.
Autoproducers PV Systems

Sistema 300 Kwp
1,460 paneles de 235 Wp
TOTAL SYSTEMS CONNECTED UNDER "NET METERING" REGULATION:

By Distribution Company
(July 2012)

<table>
<thead>
<tr>
<th>Empresa</th>
<th>KW</th>
<th>% Participación</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edesur</td>
<td>417,22</td>
<td>67,22</td>
</tr>
<tr>
<td>Edenorte</td>
<td>177,26</td>
<td>28,56</td>
</tr>
<tr>
<td>Edeeste</td>
<td>11,90</td>
<td>1,92</td>
</tr>
<tr>
<td>CEPM</td>
<td>6,44</td>
<td>1,04</td>
</tr>
<tr>
<td>Costasur Dominicana</td>
<td>7,90</td>
<td>1,27</td>
</tr>
<tr>
<td>Total distribuidoras</td>
<td>620,72</td>
<td>100,00</td>
</tr>
</tbody>
</table>
Development of Renewable Energies in D.R.

BIOFUELS.
Potential Areas for Biodiesel Production.

Potential to produce vegetable oil and transform it in 160 Millions gallons of Biodiesel, which is equivalent to 45% of the annual consumption of Diesel.

Fuente: IDIAF
There are 11 pilot projects in 7 provinces, where there are growing crops to produce Biodiesel.
Potential Areas for Ethanol Production.

Potential areas to produce Ethanol. Areas to grow Sugar Cane.
There are 2 projects that cover 5 provinces, where they are planting **Sugar Cane** and **Sweet Sorgum** to produce **Ethanol**.
Development of Renewable Energies in D.R.

BIOMASS.
Use of Wood / Charcoal for food cooking in rural and suburban areas (Aprox. 10%)

Use of sugar cane bagasse in Sugar Mills to produce steam and electricity.

2 fabrics manufacturing companies changed their steam boilers from Diesel to Biomass. One of them to produce electricity.

200 Kw Pilot Project for Gasification of agricultural crops residues.

Electricity generation using the Methane recovery from MSW Landfills.

In process study of potential of available BIOMASS from agricultural residues to produce electricity.

Biodigestors projects using animals waste (Cow, Chicken and Pork).
Development of Renewable Energies in D.R.

HYDROPOWER.
HYDROPOWER. (1)

Empresa de Generación Hidroeléctrica Dominicana (EGEHID)

- Big Hydro facilities in Dominican Republic (2011):
  - 25 facilities interconnected to the national grid.
  - 523 Mw total installed capacity.
  - 17.5 % of the Electrical Installed capacity.
  - 11.6 % of energy generated.
  - Big river sources already cover.

- Potential for Small, Mini and Micro Hydro
  - 500 MCH.
  - Electrification of small rural communities.
  - Private sector could support the development.
  - Incentives according to Law 57-07.
### HYDROPOWER. (2)

<table>
<thead>
<tr>
<th>Agent</th>
<th>Central</th>
<th>Technology</th>
<th>Fuel</th>
<th>Location</th>
<th>Mw</th>
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<td>EGEHID</td>
<td>Aguacate</td>
<td>Hidroeléctrica</td>
<td>Hidráulica</td>
<td>Peravia</td>
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<td></td>
<td>Aniana Vargas</td>
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<td>Hidráulica</td>
<td>Monseñor Nouel</td>
<td>0.6</td>
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<td></td>
<td>Baiguaque</td>
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<td>Santiago</td>
<td>1.2</td>
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</tbody>
</table>

**SOURCE:** OC – 2011 Memoria. (www.oc.org.do)
Development of Renewable Energies in D.R.

RURAL COMMUNITIES PROJECTS.
RURAL COMMUNITIES PROJECTS. (1)

Rural and Suburban Projects

International Organizations Programs

NGO’s
ENERGY EFFICIENCY / Rational Use of Energy.
ENERGY EFFICIENCY.

- Bulbs substitution program from incandescent lamps to **CFL**. (Aprox. 12 millions between years 2008 y 2009).
- Substitution of incandescent **Traffic Lights** with **LED** systems.
- Substitution of incandescent Public Lamps for **LED** lamps.
- **Energy Audits** in government institutions.
- Fuels substitution program (use of **NG** in industries and vehicles).
- Awareness campaigns by private companies and government institutions.
- Creation of the **Energy Manager** in government institutions and start a program to reduce energy consumption (electricity and fuels).
- Formulate the **Energy Efficiency Law**.
Thank You

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