Renewable Energy Status in the Maldives

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1 – Country Overview
2 – Energy Sector
3 – Energy Policy
4 – Resource potential and potential technologies
5 – Past, Ongoing and Planned RE projects
6 – Barriers and Challenges
7 – Govt. Initiatives
1. COUNTRY OVERVIEW

- Maldives consist of 1,190 islands.
- 199 Inhabited Islands.
- Total land mass of the country is about 300 km²
- Size of the Islands range b/w (0.2 – 5)km²
- Total population of Maldives is 300,000 plus
- Main economic activities are Tourism and Fishing
- No proven non renewable energy resources
## Regional Utility Companies

<table>
<thead>
<tr>
<th>Province Local Name</th>
<th>English Name</th>
<th>consists of administrative atolls</th>
<th>Govt. Designated Electricity Service Provider (Utility Company)</th>
<th>Population (census 2006)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathi-Uthuru</td>
<td>Upper North</td>
<td>Haa Alif, Haa Dhaalu, Shaviyani</td>
<td>Upper North Utilities Company</td>
<td>41,672</td>
</tr>
<tr>
<td>Uthuru</td>
<td>North</td>
<td>Noonu, Raa, Baa, Lhaviyani</td>
<td>North Utilities Company</td>
<td>43,539</td>
</tr>
<tr>
<td>Malé</td>
<td>Malé</td>
<td>Malé</td>
<td>State Electric Company (STELCO)</td>
<td>103,693</td>
</tr>
<tr>
<td>Medhu-Uthuru</td>
<td>North Central</td>
<td>Kaafu, Alifu Alifu, Alifu Dhaalu, Vaavu</td>
<td>STELCO</td>
<td>31,202</td>
</tr>
<tr>
<td>Medhu</td>
<td>Central</td>
<td>Meemu, Faafu, Dhaalu Atoll</td>
<td>Central Utilities Company</td>
<td>13,442</td>
</tr>
<tr>
<td>Medhu-Dhekunu</td>
<td>South Central</td>
<td>Thaa, Laamu</td>
<td>South Central Utilities Company</td>
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</tr>
<tr>
<td>Mathi-Dhekunu</td>
<td>Upper South</td>
<td>Gaafu Alifu, Gaafu Dhaalu</td>
<td>Upper South Utilities Company</td>
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<tr>
<td>Dhekunu</td>
<td>South</td>
<td>Gnnaviyani, Seenu</td>
<td>South Utilities Company</td>
<td>25,662</td>
</tr>
<tr>
<td>Maldives</td>
<td></td>
<td></td>
<td></td>
<td>298,968</td>
</tr>
</tbody>
</table>
STELCO’S HISTORY

1949
- Electricity introduced to Maldives
- Installed capacity 1 x 14 kW diesel engine supplying 50 homes in Male’

1997
- STELCO was formed after dissolving Maldives Electricity Board by a Presidential Decree.
- Regulatory function assigned to Maldives Electricity Bureau (later Maldives Energy Authority)

2008
By the end of 2008 STELCO expanded services from North to South of the country totaling 28 islands catering 60% of the total population of Maldives.

2009
- Seven Regional Utility Companies formed.
- STELCO’s mandate limited to providing electricity to North Central Province
- Currently providing electricity in 9 islands including Male’, the capital
- 1st November 2009 Tariff was revised for the greater Male’ Region
Electricity Production For Male (Maximum Demand)

Available Capacity: 42466 kW

Available Capacity Comparison with Peak Capacity

Peak Load: 37835 kW (89%)
Spare Capacity: 4631 kW (11%)
Fuel Prices (2004 - 2009)
SPACE constraints
2. Energy Sector

- Entirely depend on imported fossil fuel in meeting energy demand
- Fuel import bill is 16% of GDP equivalent to US$ 0.24 billion (2010)
- Total primary energy consumption, 2009 - 340,311 toe
- Total GHG emissions in 2009 was 1,030,157 tons of CO2 equivalent
- Large amount of imported diesel is used for electricity generation and transportation
- Almost 42% of the diesel oil is used for electricity production at resorts
"If those with the least (pollution) start doing the most, what excuse can the rich have for continuing inaction?" President Mohamed Nasheed asked.

"We know this is not an easy step to take, and that there might be dangers along the way. We want to shine a light, not loudly demand that others go first into the dark."
Government Policies

• Provide a continuous, reliable and affordable energy supply to all islands
  ➢ Strengthen the power sector privatization program

• Promote energy conservation & efficiency without hindering the quality of the services provided
  ➢ Promote energy efficiency in electricity production, distribution and usage
  ➢ Conduct a public awareness campaign to promote energy efficient products and practices
Government Policies cont.

- Enhance national energy security by promoting renewable & environmentally sound sources of energy
  - Introduce and demonstrate sustainable solar and wind energy applications
  - Encourage and promote the use of bio-fuels

- Strengthen the institutional framework of the energy sector
3. RE Resources and potential technologies

Solar

• Maldives is located in the Equator and receives abundant solar energy.
• Maldives Receives about 400 Million MW of Solar Energy Per Annum.
• Average Sunny Days Per Annum – 280 – 300 Sunny Days
• Daily Average Global Irradiation in Maldives is 4.5-6 kWh/m2/day
3. RE Resources and potential technologies
Wind

3. RE Resources and potential technologies
3. RE Resources and potential Technologies (cont.)

Existing technology usage

• Solar PV
  – Power generation (pilot systems, resorts)
  – Telecommunications
  – Navigation lights

• Solar Thermal
  – Water heating (Resorts and hotels)

• Wind
  – Power generation (pilot systems)
Other resources and related technologies that need to be explored

- Biomass
- Landfill
- Wave
- Tidal
- Current
- OTEC
4 - Past, Ongoing and Planned RE projects

• **Adh. Mandhoo (2006)**
  • Solar-Diesel Hybrid
  • 12.8kWp PV panels + 108kWh battery + 2 x 32kW gensets
  • $180k grant
  • (EU, ADEME, UNDP)
  • Equipment – BP Solar
  • Now grid tied and contributes to 50%
5. RE Resources and potential Technologies (cont.)

- **HA. Uligamu (2008)**
  - 45kW Solar-Wind-Diesel hybrid system
  - PV(2.64kW) + Wind (24 x 1.8kW Skystream) + Diesel Gen (48kW) + Battery (96kWh)
  - Maldive Gas (Loan)

- **M. Raiymandhoo (2008)**
  - 45kW solar-wind-diesel hybrid system
  - PV (2.64kW) + Wind (18 x 1.8kW Skystream) + Diesel Gen (32kW) + Battery (96kWh)
  - Maldive Gas (Loan)
5. RE Resources and potential Technologies (cont.)

  - 25kW Solar-Wind-Diesel hybrid system
  - PV(5.28kW) + Wind (6 x1.8kW Skystream) + Diesel Gen (18kW) + Battery (96kWh)
  - Maldive Gas (Loan)

- **Goidhoo, R. Fainu (2007)**
  - 3.5kW wind + 5kW solar
  - Powering community centre
  - UNIDO grant
5. RE Resources and potential Technologies (cont.)

• **Project for Clean Energy Promotion in Male’ (Ongoing – end 2012)**
  - 395kW Solar roof top PV
  - Total 5 sites
  - Grid connected feeding in
  - Govt. owned, operated by STELCO
  - Grant Aid ($11million)– Japan
  - Project planned to be expanded to increase capacity

• **E8-ADB solar island (Formulating)**
  - 40kWp for a small island
  - ADB-E8 funding.
6. Barriers and Challenges

• Lack of financing
  – High capital costs
  – No proper financing mechanism established
  – Govt. subsidy to diesel

• Lack of proper institutional structure
  – No dedicated institution for sector planning and addressing energy issues

• Limited technical capacity
  – Limited manpower to assess, plan, implement, monitor RE technology development and implementation
6. Barriers and Challenges

- Lack of resource data availability
  - Only limited data on wind and solar
  - Detailed assessment not made on other RE sources such as wave, tidal, OTEC, landfill

- Lack of public info on RE options (for investors and public)

- Lack of regulations
  - For energy and RE sectors
  - Transport
6. Barriers and Challenges

- Limited private sector involvement
  - Lack of awareness
  - Lack of proper incentives

- Limited field demonstration of RETs
  - O&M issues – lacking capacity
  - Especially at rural areas
7. Govt. Initiatives

- Develop and implement regulations for energy sector
- Formulate Energy/RE Act(s)
- Enhance existing revolving fund for renewable energy applications and increase its utilization
- Develop sustainable financial mechanisms to promote renewable energy
- Scaling up renewable energy installations
- Promote energy efficiency and conservation
- Duty exemption for RE and Energy Efficient technologies
- Explore potential of new sources of renewable energies
Thank you