Overview of the Energy Sector and Effort Towards Smart Grid Technology

1 October 2019
COUNTRY OVERVIEW

- 1192 beautiful tropical islands
- 190 inhabited islands
- 107 Tourist Resorts
- Population of 350,759
- Land area: 300 km²
- 6-8% GDP growth annually
- Only 1-2% of the country is land
SECTOR HIGHLIGHTS

- Depend almost entirely on foreign imports
- Oil imports
  - USD 487M in 2013 and USD 487M in 2018
- Most oil vulnerable country
  - Close to 31% of GDP spent in 2018
- 2018 CO2 emissions was
  - 1.3 Million tCO2eq & 4.0 tCO2eq/person/year
**ELECTRICITY INSTALLED CAPACITIES**

- **Industrial**: 20 MW
- **Resorts**: 105 MW
- **Inhabited**: 141 MW
- **Renewable**: 2 MW

Total Installed Capacity: 268 MW
STATE ELECTRIC COMPANY LIMITED was incorporated in 1997

- Initial Capacity: 14kW
- Current Capacity: 129,776kW
- Customers: 61,455
- Power Systems: 35
- Water Networks: 4
- Bottling Plant: 1
POWER GENERATION

Our principle power is derived from diesel generator sets. Depending on island load profile, multiple generator sets are used in combination with synchronization panels to deliver the power.

- Total Capacity is 129MW
- Male’ Capacity is 78MW
- Solar PV in Grid is 3.3MW
Male' Generation Capacity Vs Load Demand
MALE' LOAD PROFILE

Load kW

Time

0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00

0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00

Load kW
DISTRIBUTION SYSTEM

Voltages- 400V, 11,000V, 132,000 V

113 Substations
RE POLICY INITIATIVES

- Feed-in Tariff was introduced in 2011
- Net metering introduced in December 2017
- Duty exemption for RE products
- Low interest finance opportunities

CHALLENGES

- Current tariff rate lower than production cost - low incentive to adopt RE
- Space constraints
- Grid Limitation (only 30% penetration level set)
- Low awareness
Journey towards Renewable Energy and Smart Grid in Maldives
MALE’ THE CAPITAL CITY
LOCATIONS FOR PV INSTALLATION IN MALE’

1. President’s Office (20kW)
2. Maldives Center for Social Education (100kW)
3. STELCO Building (45kW)
4. Thaajuddeen School (130kW)
5. Hiriya School (100kW)
1. Maldives Centre for Social Education
2. Hiriya School
3. Thaajuddeen School
STELCO BUILDING
45 kWp
Greater Male’ Central PowerStation & Transmission Grid
(Note: Map elements not to scale).
UPCOMING PROJECTS

- Smart Metering
  - Automated Meter Reading
  - Prepaid services
  - Remote service cutoff

- Distribution Substation Automation
  - Reduce power restoration time
  - Real-time load monitoring
  - Battery system for peak shaving

- ERP system
SMART GRID - CHALLENGES

- Lack of skill and knowledge in utilities
- Testing and Communication of Smart Meter
- Lack of preparedness from the Industry
- Integration with existing IT System
- Adoption of Smart Grid Regulations
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