Bangladesh

Md. Fazlur Rahman
Pan Asia Power Services Ltd.
Dhaka, Bangladesh

The views expressed in this presentation are those of the presenter and do not necessarily represent those of the Asian Development Bank.
Some Key Statistical Data of Bangladesh

- **Total Population**: 140 Million (170 Million Unofficially)
- **Total Area**: 147,570 square kilometer
- **Access to Electricity**: 47% (FY 2010)
- **Electricity Growth**: 7.0% in 2010
- **Total Consumer**: 11 Million (FY 2010)
- **Transmission Line**: 8000 km
- **Distribution Line**: 2,56,000 km
- **Distribution Loss**: 12 to 15%
- **Per Capita Generation**: 200 kWh /yr (FY 2010)
### Power Generation Scenario of Bangladesh

#### Present Scenario (MW)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Scenario (MW)</td>
<td>5823</td>
</tr>
<tr>
<td>Demand (MW)</td>
<td>5500 to 6500</td>
</tr>
<tr>
<td>Available (MW)</td>
<td>4200 to 4500</td>
</tr>
<tr>
<td>Maximum Generation (MW)</td>
<td>4606</td>
</tr>
<tr>
<td>Load Shedding (MW)</td>
<td>1200 to 1500</td>
</tr>
</tbody>
</table>

#### Graph

- **Max. Demand considering DSM**

<table>
<thead>
<tr>
<th>Year</th>
<th>June,09</th>
<th>FY 2010</th>
<th>FY 2011</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>FY 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Monopoly of Natural Gas in the Power Sector of BD

**FY 2009**
- Total = 5493 MW

**FY 2010**
- Total = 5823 MW

**FY 2007**
- Total = 5202 MW

**FY 2008**
- Total = 5202 MW
Mitigation Measures: Non Gas Solution

Immediate: 6-12 Months
- Rental Plants: 500-1500 MW
- Per unit cost: Tk 10 (FO) / Tk 16 (Diesel)

Short term: 18-24 Months
- Peaking Plants: 800 MW
- Per unit cost: Tk 8

Medium term: 4-5 years
- Base plants: 4X500 MW Coal
- Per unit cost: Tk 3.5

1US$ = Tk. 74.00
Future Renewable Projects

- 5% of total generation by 2015: 450 MW
- 10% of total generation by 2020: 1600 MW

**Wind**: The cheapest and the fastest growing RET

**Wind**: At least 200 MW wind by 2013

**Solar**: Existing Capacity: 15 MW – 20 MW
- Need at least 80 – 100 MW by 2013
- Still high cost; off grid solution; may compete with oil

Renewable will help in mitigating balance deficit
Prospects of Wind Power in Bangladesh

Wind: The cheapest RE Resource
Wind: The fastest growing RE Resource

Without wind energy, it is not possible to meet the RE National targets
<table>
<thead>
<tr>
<th>Month</th>
<th>Muhuri Dam, Feni (m/s) H=50m, RCL=0</th>
<th>Mognamaghat Cox’s Bazar (m/s) H=50m, RCL=0</th>
<th>Parky Saikat Patenga, Chittagong (m/s) H=50m, RCL=0</th>
<th>Kuakata Patuakhali (m/s) H=50m, RCL=0</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>5.10</td>
<td>5.30</td>
<td>4.90</td>
<td>5.80</td>
</tr>
<tr>
<td>February</td>
<td>5.30</td>
<td>4.80</td>
<td>5.10</td>
<td>5.50</td>
</tr>
<tr>
<td>March</td>
<td>7.00</td>
<td>7.30</td>
<td>7.60</td>
<td>7.70</td>
</tr>
<tr>
<td>April</td>
<td>7.70</td>
<td>7.90</td>
<td>7.80</td>
<td>8.30</td>
</tr>
<tr>
<td>May</td>
<td>8.10</td>
<td>8.20</td>
<td>8.20</td>
<td>7.90</td>
</tr>
<tr>
<td>June</td>
<td>7.20</td>
<td>8.00</td>
<td>7.60</td>
<td>6.90</td>
</tr>
<tr>
<td>July</td>
<td>7.40</td>
<td>8.40</td>
<td>8.10</td>
<td>7.70</td>
</tr>
<tr>
<td>August</td>
<td>6.80</td>
<td>7.70</td>
<td>7.40</td>
<td>7.50</td>
</tr>
<tr>
<td>September</td>
<td>6.70</td>
<td>7.10</td>
<td>6.90</td>
<td>6.90</td>
</tr>
<tr>
<td>October</td>
<td>6.20</td>
<td>6.80</td>
<td>6.40</td>
<td>6.30</td>
</tr>
<tr>
<td>November</td>
<td>5.60</td>
<td>5.90</td>
<td>5.60</td>
<td>5.50</td>
</tr>
<tr>
<td>December</td>
<td>4.90</td>
<td>5.40</td>
<td>5.10</td>
<td>4.80</td>
</tr>
<tr>
<td>Annual Average Wind Speed (m/s)</td>
<td><strong>6.50</strong></td>
<td><strong>6.90</strong></td>
<td><strong>6.725</strong></td>
<td><strong>6.733</strong></td>
</tr>
</tbody>
</table>
## Primary Indicator - 2: Positive

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>10am</th>
<th>12N</th>
<th>3pm</th>
<th>6pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patenga</td>
<td>FR</td>
<td>4.47</td>
<td>5.92</td>
<td>8.41</td>
<td>5.77</td>
</tr>
<tr>
<td>30/01/07</td>
<td>Met.</td>
<td>1.028</td>
<td>0</td>
<td>2.57</td>
<td>1.54</td>
</tr>
<tr>
<td>Moheshkali</td>
<td>FR</td>
<td>4.5</td>
<td>6.0</td>
<td>6.0</td>
<td>6.5</td>
</tr>
<tr>
<td>06/02/08</td>
<td>Met.</td>
<td>0</td>
<td>0</td>
<td>1.028</td>
<td>1.54</td>
</tr>
<tr>
<td>Kuakata</td>
<td>FR</td>
<td>10.58</td>
<td>5.0</td>
<td>6.72</td>
<td>6.32</td>
</tr>
<tr>
<td>08/06/07</td>
<td>Met.</td>
<td>1.028</td>
<td>1.028</td>
<td>1.028</td>
<td>1.028</td>
</tr>
<tr>
<td>Kutubdia</td>
<td>FR</td>
<td>4.1</td>
<td>6.8</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td>07/08/09</td>
<td>Met.</td>
<td>1.022</td>
<td>2.22</td>
<td>3.17</td>
<td></td>
</tr>
</tbody>
</table>
Monthly Wind Speeds at Kutubdia in 08-09

Wind is Maximum: March to October

Peak Wind Season

Peak Demand Season

Annual Average Wind Speed 6.18 m/s

(According to Met. Data: 2 to 3 m/s.)
12000(+) MW Installed Capacity

BB Side: 6000 MW
By 2030: 20000MW

In BD: 1.90 MW

Same Sea
Same Wind
Same Monsoon
Same Climate
Same Terrain
Wind Power Prospects of Bangladesh:
Rough and Conservative Estimates

Straight Line Coastal Line: 740km
Curvature Length of Coastal Belt: 1400km

If Only 10km inland from the Coastal Belt is considered
If Only 5% Coastal Area is available for WT Installations
Available Area will be: 70kmX10km = 700 km²
In 1 km² 20 WTs of 2 – 4 MW Capacity can be installed = 40-80MW

Rough and Conservative Potentials: >>20,000MW

Rough Potentials deserve our attentions.
Small WTs are prospective throughout the country
Wind is There (6.50m/s)
Road is There, Nearness to Grid
Adequate Land Available
Free from Tsunami

Why Feni?

10km x 5km = 50 sq.km Empty
1 WT = 1MW
10 WT/Sq. km
Total Potentials: 500 MW

The Govt. should construct a 11KV/230KV, 200MVA SS & 12km 230KV, 200MVA Transmission Line
Why No Wind Power in Bangladesh???

Main Arguments Against Wind Power

1. Too Many and Too Strong Cyclones?

2. Low Wind or No Wind?
Kutubdia Wind Farm, Bangladesh
Initial Starting Date: 23/12/2007
Cyclones and Tornados Faced by the Project

2. Tropical Cyclone Sidr : 15 Nov 2007 :: Danger Signal 10
3. Tropical Cyclone Nargis : 4 May 2008 :: Danger Signal 8
5. Tropical Cyclone Bijli : 18 April 2009 :: Danger Signal 7
6. Tropical Cyclone Aila : 25 May 2009 :: Danger Signal 7
8. More Than 20 Dangerous Local Tornados
The Met Office is located in an urban built up area.
Achievements from the Kutubdia Wind Project

- Customization SWTs in Bangladesh
- 100% Work Completed Locally
- Local Skilled Man-Power Developed
- Technology Transfer
- We can install WTs at any place
- We can install WTs at any time
- Training of Local People for Export
- Tourist Spot Created
Small Wind Turbines (SWT): The Most Appropriate Option for Remote Areas

• About 25% of total population is in the remote and isolated areas
• Worst affected by Global Climate Change
• Extension of grid is difficult, expensive, risky and vulnerable
• SWTs can be transported and installed at any site any time
• Grid Quality Power at 220 or 440VAC
• Minimum land requirement/occupation
• Minimum wastage of Agricultural Land
• SWT Electricity Cost: Tk.10 to 15/kWh
• SPV Electricity Cost: >Tk. 50/kWh
Main Barriers to Wind Energy in Bangladesh

1. Lack of policy support from the Government
2. Corruption in the public sector
3. Mind set of aged bureaucrats/policy makers (big power plants for big money)
4. Lack of adequate knowledge in the top policy makers
5. Lack of enough pilots/demo projects on wind energy
6. Lack of infrastructures for the large wind turbines
7. Anti-wind propaganda by Ph. D. holders/old consultants
Recommendations:

1. To undertake and implement some Dual Purpose (Village Electrification & Irrigation) Pilot Projects in some remote and isolated communities of Bangladesh.
2. To undertake and implement some Pilot Projects with the MagLev Wind Turbines in some tall buildings in Dhaka, Bangladesh.
3. Government should immediately announce the Green Tariffs/Feed-in-Tariffs and other incentives to attract private investment/FDI
4. The Govt. should construct a 11KV/230KV, 200MVA SS at the Muhuri Dam & also construct a 12km long 230KV, 200MVA Transmission Line from the Muhuri Dam site to the Feni SS.