Powering Bangladesh's Growth:
PGCB's Forward-Thinking Approach to Transforming the Transmission Grid

Presented By
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Managing Director
Power Grid Company of Bangladesh Ltd.
- **Official Name**: People’s Republic of Bangladesh
- **Political System**: Parliamentary Democracy
- **Area**: 148,460 square km
- **Population**: 169 million
- **Total Exports**: USD 64.60 billion (2022-23)
- **Total Imports**: USD 104.41 billion (2022-23)
- **GDP Per Capita**: USD 2,657 (2022-23)
- **Per Capita Electricity Consumption**: 602 kWH

* Bangladesh Economic Review 2023
Structure of the Bangladesh Power Sector

**Power Cell**

**Power Division**
(Ministry of Power, Energy & Mineral Resources)

**BERC**

**Generation**
- BPDB
- APSCL
- NWZPGC
- EGCB
- RPCL
- IPP
- RPP
- QRPP
- IMPORT
- SIPP

**Transmission**
- PGCB

**Distribution**
- DPDC
- DESCO
- NESCO
- WZPDCO
- BPDB
- BREB
- PBSs

**Abbreviations:**
- **BERC**: Bangladesh Energy Regulatory Commission
- **BPDB**: Bangladesh Power Development Board
- **APSCL**: Ashuganj Power Station Company Ltd.
- **NWZPGC**: North-West Power Generation Co. Ltd.
- **EGCB**: Electricity Generation Company of Bangladesh
- **RPCL**: Rural Power Company Limited
- **IPP**: Independent Power Producer
- **RPP**: Rental power Plant
- **QRPP**: Quick Rental power Plant
- **PGCB**: Power Grid Company of Bangladesh Ltd.
- **DPDC**: Dhaka Power Distribution Company Limited
- **DESCO**: Dhaka Electric Supply Company Limited
- **NESCO**: Northern Electricity Supply Company Ltd.
- **WZPDCO**: West Zone Power Distribution Company Ltd.
- **BREB**: Bangladesh Rural Electrification Board
- **PBSs**: Dhaka Palli Bidyut Samity
- **IMPORT**: Import from Neighboring Country
- **SIPP**: Small Independent power producer
Major Activities of PGCB

Operational Related Activity:

- Operation and maintenance of grid substation and transmission line.
- Load despatching (Overall Grid System Operation).
- Operation & maintenance of SCADA & Communication System.
- Protection and relay coordination

Transmission System Development Related Activity:

- Transmission network planning.
- Design & quality control of Grid Substation and Transmission line
- Development projects Implementation.

OPGW Related Activity:

- Optical fiber leasing.
Power System at a glance

- Generation Capacity: 27,054 MW
- Maximum Generation: 16,477 MW (30th April, 24)
- Per Capita Generation: 602 kWh
- Access to Electricity: 100%
- Grid Capacity: 68,324 MVA
- Dispatch Capacity: 31,786 MW
- Transmission Line: 15,508 Ckt. km
- Distribution Lines: 6,43,167.54 Km
- Consumers: 47 M
- RE Energy Penetration: <3.0%
### Installed Capacity & Type of Generation (May 2024)

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Capacity</th>
<th>Percentage</th>
<th>Cycle Type</th>
<th>Capacity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>11880</td>
<td>43.9%</td>
<td>Steam Turbine</td>
<td>5108</td>
<td>18.8%</td>
</tr>
<tr>
<td>HFO</td>
<td>6035</td>
<td>22.3%</td>
<td>Gas Turbine</td>
<td>626</td>
<td>2.3%</td>
</tr>
<tr>
<td>HSD</td>
<td>626</td>
<td>2.3%</td>
<td>Combined Cycle</td>
<td>519</td>
<td>1.9%</td>
</tr>
<tr>
<td>Coal</td>
<td>5108</td>
<td>18.9%</td>
<td>Reciprocating Engine</td>
<td>230</td>
<td>0.85%</td>
</tr>
<tr>
<td>Hydro</td>
<td>230</td>
<td>0.85%</td>
<td>Power Import</td>
<td>2656</td>
<td>9.8%</td>
</tr>
<tr>
<td>*On-grid Solar Power Import</td>
<td>27,054</td>
<td>100%</td>
<td>Combined Cycle</td>
<td>34.3%</td>
<td>25.8%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>Steam Turbine</td>
<td>22.8%</td>
<td>9.8%</td>
</tr>
</tbody>
</table>
Interconnections between Bangladesh & India

Radial Connection of Load (2016)
160-180 MW

Asynchronous Connection
HVDC 1st block: 500 MW (2013)
HVDC 2nd block: 500 MW (2018)

Radial Connection of Generator
Adani: 2x800MW (2023)

Total: 2,656 MW
Power System of Bangladesh (2009 to 2024)

Growth of Installed Capacity (2009 base) = 466%
Growth of Max Generation (2009 base) = 383%

<table>
<thead>
<tr>
<th>Year</th>
<th>Installed Capacity</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>5803</td>
<td>4295</td>
</tr>
<tr>
<td>2010</td>
<td>6488</td>
<td>4699</td>
</tr>
<tr>
<td>2011</td>
<td>8033</td>
<td>5244</td>
</tr>
<tr>
<td>2012</td>
<td>8931</td>
<td>6350</td>
</tr>
<tr>
<td>2013</td>
<td>10213</td>
<td>6675</td>
</tr>
<tr>
<td>2014</td>
<td>10648</td>
<td>7418</td>
</tr>
<tr>
<td>2015</td>
<td>12071</td>
<td>8177</td>
</tr>
<tr>
<td>2016</td>
<td>13179</td>
<td>9036</td>
</tr>
<tr>
<td>2017</td>
<td>13846</td>
<td>9507</td>
</tr>
<tr>
<td>2018</td>
<td>17685</td>
<td>11623</td>
</tr>
<tr>
<td>2019</td>
<td>19428</td>
<td>12893</td>
</tr>
<tr>
<td>2020</td>
<td>20595</td>
<td>12892</td>
</tr>
<tr>
<td>2021</td>
<td>22066</td>
<td>13792</td>
</tr>
<tr>
<td>2022</td>
<td>23175</td>
<td>14782</td>
</tr>
<tr>
<td>2023</td>
<td>25809</td>
<td>15648</td>
</tr>
<tr>
<td>2024</td>
<td>27054</td>
<td>16477</td>
</tr>
</tbody>
</table>
Demand Forecast and Generation Plan (IEPMP-2023)

- Forecasted Demand (GW)
- Generation Capacity (GW)

- 2023: 16.4 GW
- 2026: 20.6 GW
- 2030: 27.1 GW
- 2035: 36.7 GW
- 2041: 50.4 GW
- 2050: 70.5 GW

- 2023: 20.0 GW
- 2026: 37.0 GW
- 2030: 39.0 GW
- 2035: 54.0 GW
- 2041: 74.0 GW
- 2050: 111.0 GW
Renewable Power Plants (Existing, Under Construction, LOI Issued & Proposed as of May 2024)

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of VRE Plants</th>
<th>Generation Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In Operation</strong></td>
<td>12</td>
<td>594</td>
</tr>
<tr>
<td><strong>Under Construction</strong></td>
<td>13</td>
<td>509</td>
</tr>
<tr>
<td><strong>Negotiation Completed</strong></td>
<td>47</td>
<td>4,594</td>
</tr>
<tr>
<td><strong>Under technical review</strong></td>
<td>30</td>
<td>3,756</td>
</tr>
<tr>
<td><strong>Proposed/Tendering</strong></td>
<td>21</td>
<td>3,094</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>123</strong></td>
<td><strong>12,170</strong></td>
</tr>
</tbody>
</table>
Year wise Solar Penetration (Approx.)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>EXISTING</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW</td>
<td>0</td>
<td>594</td>
<td>1,103</td>
<td>1,737</td>
<td>3,739</td>
<td>4,709</td>
<td>8,885</td>
<td>9,887</td>
</tr>
</tbody>
</table>

- **New Addition**
- **Cum. Total VRE**
## Comparative Scenarios Solar Power Plants

<table>
<thead>
<tr>
<th>Year</th>
<th>Peak Load (MW)</th>
<th>Day Peak Load (MW)</th>
<th>Capacity (MW)</th>
<th>Assumed Dispatch (MW)</th>
<th>Dispatch from VRE (MW)</th>
<th>Total Dispatch (MW)</th>
<th>VRE contribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2026</td>
<td>20,613</td>
<td>16,490</td>
<td>27,634</td>
<td>13,530</td>
<td>2,960</td>
<td>16,490</td>
<td>18%</td>
</tr>
<tr>
<td>2028</td>
<td>23,676</td>
<td>18,941</td>
<td>37,140</td>
<td>11,833</td>
<td>7,108</td>
<td>18,941</td>
<td>38%</td>
</tr>
<tr>
<td>2030</td>
<td>27,087</td>
<td>21,670</td>
<td>37,140</td>
<td>11,934</td>
<td>9,736</td>
<td>21,670</td>
<td>45%</td>
</tr>
</tbody>
</table>
PGCB’s Present Initiatives to Transforming the Transmission Grid

- Regional connectivity using **Back to Back HVDC** since 2013
- Introduction of HTLS (High Temperature Low Sag) Conductor
- Introduction of Enterprise Asset Management System (**EAMS**) and Reliability Centered Maintenance (**RCM**)
- Installation of **STATCOM, SVC** and **Switched Shunt Capacitor** to improve dynamic reactive power management capability
- **TCSC** in long distance high-capacity transmission lines to increase the dynamic performance of the system
- **Fault Current Limiter (FCL)** to enhance security and reliability of the system
- Upgradation of the country’s Transmission Voltage level to Ultra High voltage **765 kV**
PGCB’s Present Initiatives to Transforming the Transmission Grid (Contd.)

- **Grid Studies and Innovation Facility (GSIF)** with assistance from GIZ to study next generation transmission grid
- **Upgradation and Modernization** of NLDC & ALDCs with advance *cyber secure* SCADA and *AI based* EMS
- **Centralized Renewable Energy Management (CREM)** Center to monitor and manage VRE generation efficiently
- **Introduction of Unmanned Aerial Vehicle (UAV- Drone)** in monitoring & maintenance of transmission line
- **Installation of cyber secure PMU** and *AI based* WAMS system
- **Introduction of Battery Energy Storage System (BESS)** with Solar power plant
- **Human Resource Development** to manage next generation grid
Thank you!