India - Sri Lanka
Electricity Grid Interconnection
Sri Lanka Power Scenario
Sri Lanka Power Supply Scenario

- Installed capacity: 2400 MW
- Peak Demand: 1840 MW
- Energy: 9820 GWh
- Capacity Mix: Hydro 55% Thermal 45%
- Energy Mix: Hydro 40% Thermal 60%
- Demand growth: 7-8%
- System losses: 15.7%
- Load Factor: 53%
Sri Lanka Power Grid - Salient Features

- **Transmission voltage levels**
  - 220kV
  - 132kV

- **Transmission lines**
  - 220kV 331 km
  - 132kV 1684 km

- **Grid Substations**
  - 132/33 kV 40 2570
  - 220/132/33 kV 6 2205
  - 132/11 kV 4 306
Transmission System in Year 2007
## Sri Lanka Power Supply Future Scenario

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>2x100 MW GT of Kerawalapitiya Combined Cycle Power Plant</td>
</tr>
<tr>
<td>2009</td>
<td>100 MW ST of Kerawalapitiya Combined Cycle Power Plant</td>
</tr>
<tr>
<td>2010</td>
<td>525 MW GT</td>
</tr>
<tr>
<td>2011</td>
<td>270 &amp; 300 MW Coal, 150 MW Upper Kotmale Hydro Power Plant</td>
</tr>
<tr>
<td>2012</td>
<td>2x300 MW Coal</td>
</tr>
<tr>
<td>2013</td>
<td>2x300 MW Coal</td>
</tr>
<tr>
<td>2014-2016</td>
<td>3x300 MW Coal</td>
</tr>
<tr>
<td>2017-2020</td>
<td>6x300 MW Coal</td>
</tr>
<tr>
<td>2021</td>
<td>2x300 MW Coal</td>
</tr>
</tbody>
</table>
Capacity Expansion

Percentage Share

Year


Hydro Coal CCY DSL GT
• Sri Lanka needs new generation to meet increasing demand

• Power exchange with India be a candidate for meeting future power demand
Background of Electricity Grid Interconnection

- Under consideration since 1970
- Pre-feasibility study conducted with assistance of USAID in 2002 by Nexant
- Review of the Pre-feasibility study with assistance of USAID in 2006 by Nexant/Power Grid Corporation of India
Unit Sizes

At present

Hydro       70 MW
Thermal 165 MW

By 2011 - Thermal 270 MW
Possibilities of Quantum of Power Exchange

2009 -10 onwards 500 MW
2011-12 onwards 1000 MW
Energy Transfer -5000GWh
Indian Power Scenario
Indian Power Scenario

- Installed Capacity - 126 839 MW
  Thermal 66%, Hydro 26%, Renewable 5% and Nuclear 3%
- Peak Demand       - 95 583 MW
- Five electrical regions
  - Northern
  - Southern
  - Western
  - Eastern and
  - North-eastern
Indian Power Scenario

- **Transmission System**
  - 765kV - 1,150 ckt km
  - 400kV - 68,000 ckt km
  - 220kV - 110,000 ckt km
  - HVDC - 8,000 ckt km

Interregional links: about 11,500 MW
Indian Power Scenario - 2012

- Installed Capacity - 203 529 MW
- Peak Demand - 150 000 MW
- Interregional links : about 39 700 MW
Indian Southern Region Power Supply Scenario

- Southern region is connected with Eastern (3150MW) and Western (1400MW) Regions through asynchronous links
  viz HVDC back-to-back and HVDC bipole links

<table>
<thead>
<tr>
<th></th>
<th>Installed Capacity</th>
<th>Peak Demand</th>
<th>Surplus/Deficit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>36936</td>
<td>23750</td>
<td>(-) 740</td>
</tr>
<tr>
<td></td>
<td>2011-12</td>
<td>46260</td>
<td>38310</td>
<td>(-)3400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Off-peak</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interconnection with India

• Possible Power Transmission Technology
  HVDC link including under sea submarine cables
• Possible Interconnection Points in Sri Lanka
  Anuradhapura, Puttalam
Interconnection Alternatives proposed in 2002 study

1. Madurai-Anuradhapura Interconnection using HVDC
2. Tuticorin-Puttalam Interconnection using HVDC
3. Madurai-Puttalam Interconnection using HVDC - length of cable 100km
4. Madurai-Anuradhapura Interconnection using HVAC with back-to-back DC conversion - length of cable 50km
Power Transmission Interconnection options: India and Sri Lanka
Proposed Interconnection

• + 400kV HVDC overhead line from Madurai - Indian Sea Coast (Rameshwaran) 185km

• + 400kV HVDC cable from Indian Sea Coast (Rameshwaran) - Sri Lankan Sea Coast (Thalaimannar) 50km

• + 400kV HVDC overhead line from Sri Lankan Sea Coast (Thalaimannar) to Anuradhapura 150km
Proposed HVDC Interconnection
Proposed HVDC Interconnection - Initial Stage
Tentative Cost

- HVDC Interconnection (2x500MW)
  Tentative cost - US$ 430 million
- Stage 1 - HVDC Interconnection
  (1x500MW)
  Tentative cost - US$ 340 million
The END