Present Status of the Coal Power Sector in Sri Lanka

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Energy Policy Elements

• Assuring Energy Security
• Providing Energy Supply at the Least Economic Cost
• Providing Access to Energy Services
• Enhancing Self Reliance
• Conserving Energy and Improving Energy Efficiency
• Caring for the Environment
• Enhancing the Share of Renewable Energy
• Strengthening Good Governance in the Energy Sector
• Securing Future Energy Infrastructure
• Providing Opportunities for Innovation and Entrepreneurship
SRI LANKAN POWER SECTOR - 2016

- Installed capacity: 4,054 MW
- Peak Demand: 2,483 MW
- Electricity Generated: 14,249 GWh
- System Losses: 10.3%
- Elec. Consumption per Capita: 603 kWh
- Level of Electrification: 98%

(June 2016)
The per capita electricity consumption in 2016 was 603 kWh/person.
SRI LANKAN POWER SYSTEM

- Until early 1990s’ Sri Lankan power system depended on Hydro power
- The available hydro generation capacity was adequate to provide the demand
- The first coal power plant of 300MW was added to the power system in year 2011
- Electricity Generation mix has shown a shift from hydropower to fossil fuel with:
  - Increasing demand
  - Unavailability of economically feasible sites for the development of major hydro resources
## Present Capacity Mix as of December 2016

### Capacity Share in 2016
- **CEB Hydro**: 34%
- **CEB Thermal**: 16%
- **CEB Coal**: 22%
- **IPP Thermal**: 15%
- **Other RE**: 13%

### Energy Share in 2016
- **CEB Hydro**: 24%
- **CEB Coal**: 36%
- **CEB Thermal**: 17%
- **IPP Thermal**: 15%
- **Other RE**: 8%

### Plant Name | Capacity (MW) | Annual Energy (GWh)
--- | --- | ---
CEB Hydro | 1390 | 3498.7
CEB Thermal - Coal | 900 | 5066.8
CEB Thermal - Oil | 606 | 2360.2
IPP Thermal | 652 | 2163.8
Other RE | 516 | 1158.1
Actual Average Unit Cost of Electricity Generation - 2016

- Average cost at selling point in 2016 = 18.09
- Average cost at selling point in 2015 = 15.06
PRESENT SITUATION OF COAL POWER SECTOR IN SRI LANKA
Only Coal Power Plant in Sri Lanka
Lakvijaya Coal Power Plant (3x300MW)
Present Situation

• CEB identified coal as an economically attractive fuel option for electricity generation in 1980’s
• No coal plants were start to built until 2009 due to several environmental and social issues
• The first 300MW Coal Power Plant commissioned in 2011
• 900MW (3x300MW) Lakvijaya Coal Power Plant is in operation since October 2014
Present Situation

- Sri Lanka does not have coal deposits

- Depending on the specifications of the coal for which the boiler is designed and environment concerns, low sulphur & low ash coal for LVPP is imported mainly from
  - South Africa
  - Indonesia
  - Russia

- Annual consumption of coal: 2.2 million metric tons
### Coal Specifications

- **Particle Size**: between 2mm and 50 mm
- **Moisture Content**: < 15 %
- **Gross Calorific Value**: 5800 - 6300 kCal/kg
- **Ash Content**: < 16 %
- **Sulphur content**: < 1 %
- **Volatile matter**: > 22.5 % and < 39.9%
- **Fixed carbon**: > 43 %
**Generation Planning Capacity Additions**

As per the Draft Long Term Generation Expansion Plan 2018-2037

Planning horizon for the next 20 years:

- **Thermal Based Power Plants**: 4500 MW
  - (Coal/LNG/GTs/Reciprocating Engines)

- **Major Hydro**: 240 MW

- **Pumped Hydro**: 600 MW

- **Other Renewable Energy (Wind, Solar, Mini Hydro and Biomass)**: 2800 MW
  - Wind: 1200 MW
  - Solar: 1300 MW
  - Mini Hydro: 220 MW
  - Biomass: 100 MW

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Energy and Peak Demand – Actual/Forecast

As per Long Term Generation Expansion Plan 2018-2037
LONG TERM GENERATION EXPANSION PLAN
2018-2037: Capacity Mix by 2037

Base Case

- **Major Hydro**: 5%
- **ORE**: 13%
- **Thermal - Coal**: 31%
- **Thermal - Oil**: 4%
- **Thermal - LNG**: 15%
- **PSPP**: 32%
## UPCOMING MAJOR THERMAL PROJECTS

<table>
<thead>
<tr>
<th>Plant</th>
<th>Year of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>100+70 MW Furnace Oil Power Plant</td>
<td>2017/2018</td>
</tr>
<tr>
<td>3 x 35 MW Gas Turbine</td>
<td>2 Units by 2019</td>
</tr>
<tr>
<td></td>
<td>1 Unit by 2020</td>
</tr>
<tr>
<td>300 MW Natural Gas Fired Combined Cycle Power Plant</td>
<td>Open Cycle – 2019</td>
</tr>
<tr>
<td></td>
<td>Combined Cycle - 2020</td>
</tr>
<tr>
<td>2 x 300MW High Efficient Eco Friendly Coal Power Plant</td>
<td>(Feasibility study in progress)</td>
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</tbody>
</table>
HVDC Link Between Sri Lanka and India

- Technical and Economical feasibility studies are carried out between CEB and Power Grid India to interconnect two Networks by DC link.
- Project to be expedite as soon as the completion of the Feasibility Studies.
Drawbacks of Coal Power Developments

• Initially planned to be built the 2nd Coal Power Plant as a joint venture between CEB and NTPC India in Trincomalee

• Capacity = 2x 250 MW and panned to start in 2016

• Estimated cost = USD 600 million

• Approval not granted by Public Utilities Commission Sri Lanka in the Long Term Generation Expansion Plan 2015-2034

• Due to a Supreme Court order
Future Plans for Coal Power Plants

• Pre-feasibility Study for 1200MW high-efficiency eco-friendly coal-fired thermal power plant was conducted at Trincomalee, Hambantota Port and Galle

• Government of Sri Lanka selected Trincomalee as a candidate site for 3rd coal-fired thermal power plant in Sri Lanka.

• Similarly, Feasibility Study for Trincomalee was conducted by NEDO (J-POWER etc.) in 2014.
Future Plans for Coal Power Plants

- All future coal power plants are proposed to be
  - highly efficient with strict emission controls,
  - Indoor coal storages enclosed coal handling

- Mitigation measures result in an additional capital cost of approximately 700USD/kW compared with conventional coal power plant

- To minimize environmental impact, Supercritical Power plants were selected instead of subcritical coal power plants’
Present Issues - Public & Environmental

- Disposal of Ash
- Spreading coal dust during the windy season
- Public awareness
- Publicity against Coal Power Plants
THANK YOU!