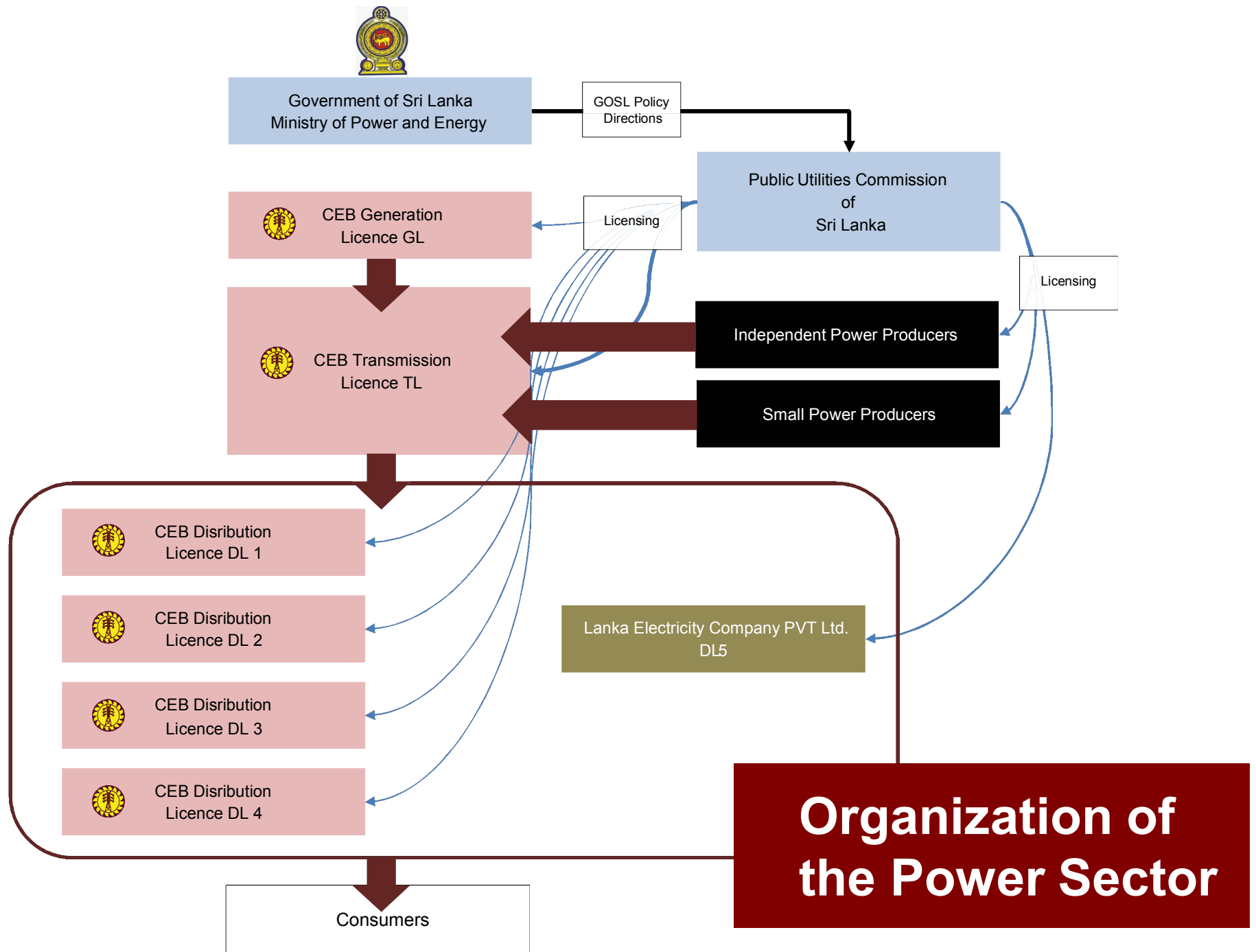


Issues and challenges regarding exchange of power and harmonization of regulations& policies

**SAARC Workshop on
“Harmonizing Regulations and Policies for Cross
Border Power Trade, Risk Sharing and Financial
Settlement Issues”**

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Sri Lanka Economy and Electricity

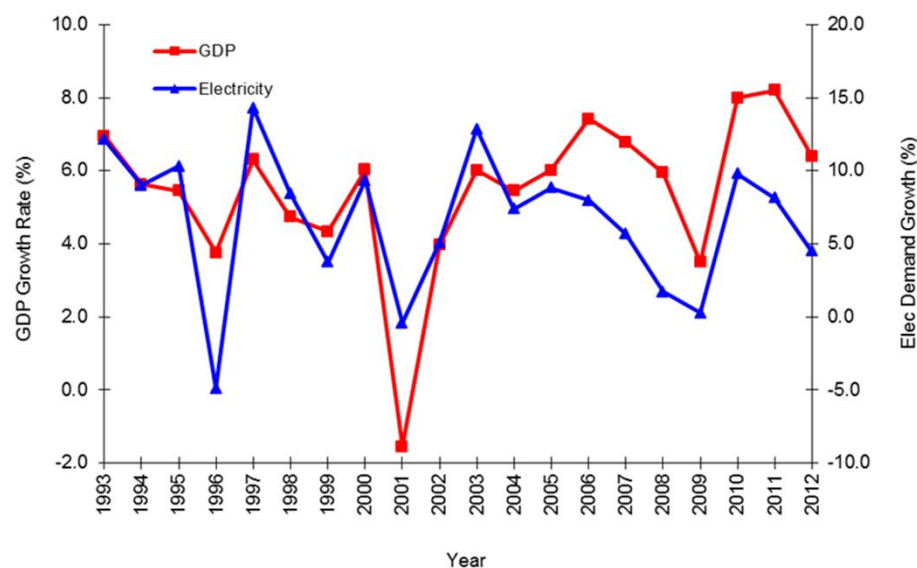
Sri Lankan Economy

Demographic and Economic Indicators of Sri Lanka

	Units	2006	2007	2008	2009	2010	2011	2012
Mid-Year Population	Millions	19.89	20.01	20.22	20.45	20.65	20.87	20.32
Population Growth Rate	%	1.1	1.1	1.0	1.1	1.0	1.0	n.a
GDP Real Growth Rate	%	7.7	6.8	6.0	3.5	8.0	8.2	6.4
GDP /Capita (Market prices)	US\$	1,421	1,634	2,014	2,057	2,400	2,836	2,923
Exchange Rate (Avg.)	LKR/US\$	103.96	110.62	108.33	114.94	113.06	110.57	127.60
GDP Const 2002 Prices	Mill LKR	2,090,564	2,232,656	2,365,501	2,449,214	2,645,542	2,863,854	3,047,277

Source: Annual Report 2012, Central Bank of Sri Lanka

Electricity and Economy



Forecast of GDP Growth Rate in Real Terms

Year	2012	2013	2014	2015
GDP Growth Rate (%)	7.2	8.0	8.3	8.5

Source: Annual Report 2011, Central Bank of Sri Lanka

Electricity Data for 2013

- ❖ **Installed capacity** - 3334 MW
- ❖ **Peak Demand** - 2160 MW
- ❖ **Electricity Generated** - 11955 GWh
- ❖ **Generation Mix** (2012) - Hydro 28% Thermal 72%
(2013) - Hydro 57% Thermal 43%
- ❖ **Capacity Mix** - Hydro 46% Thermal 54%
- ❖ **System losses** - 10.6%
- ❖ **Load Factor** - 62.8%
- ❖ **Access to Electricity** - 96%
- ❖ **Elec. Consumption per Capita** - 515 kWh
- ❖ **Avg. Cost per unit (at selling point)** - 17.70 Rs/kWh
- ❖ **Avg. selling price** - 18.27 Rs/kWh

EXISTING GENERATING SYSTEM

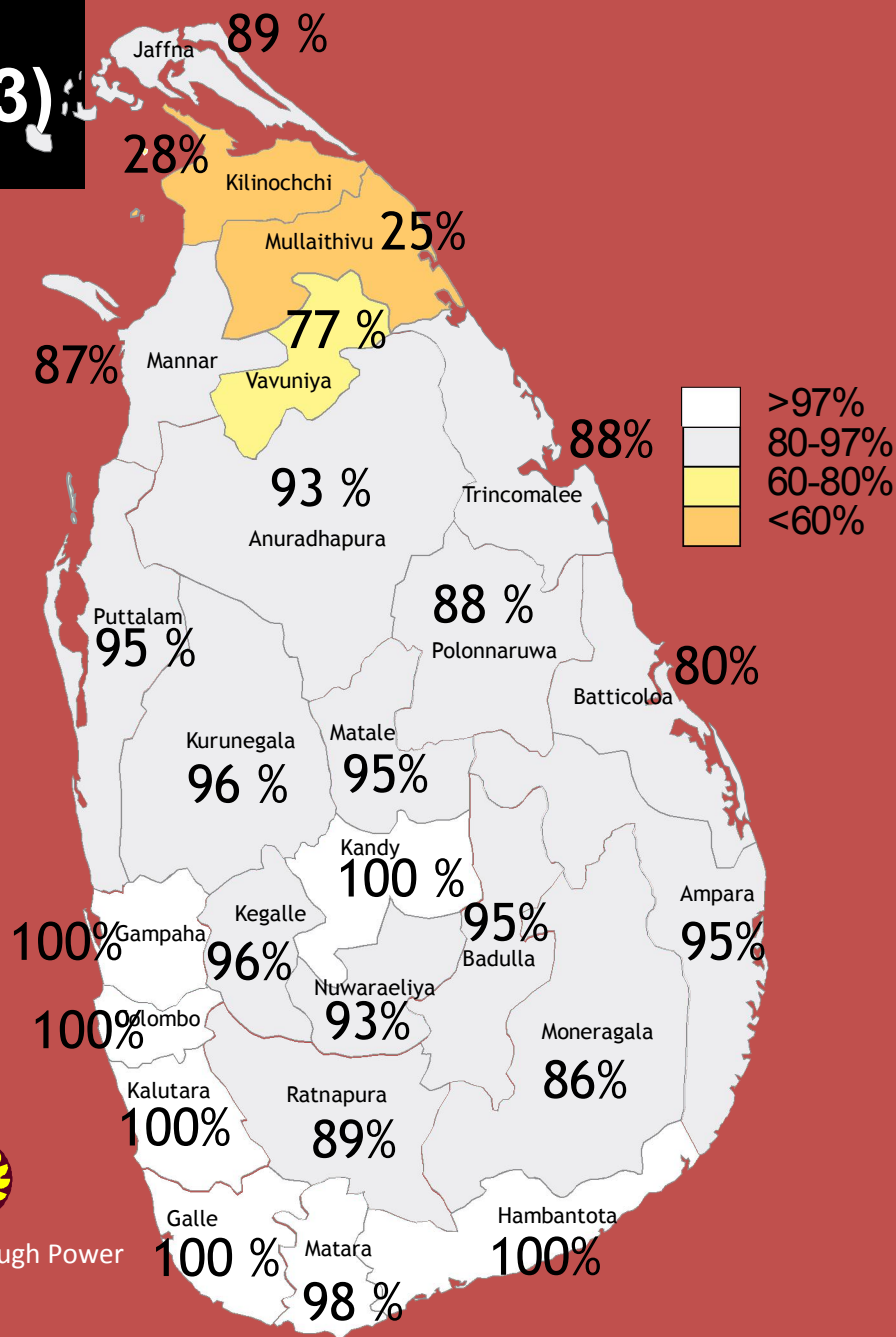
Type	Capacity (MW)	Expected Annual Energy (GWh)
Hydro	1355	4874
CEB Thermal	848	3390
IPP Thermal -	820	2605*
NCRE	311	1200
Total	3334	

*Min. Guaranteed Annual Energy

Enhanced accessibility(2013)

**Electrification Level in
December 2013**

96%



Enrich Life through Power

PRESENT TRANSMISSION NETWORK -2013

❖ Transmission voltage levels

- 220 kV
- 132 kV

❖ Transmission Lines/Cables – 2348 km

- 220 kV 502 km
- 132 kV 1846 km

- OH 1796 km
- UG 50 km

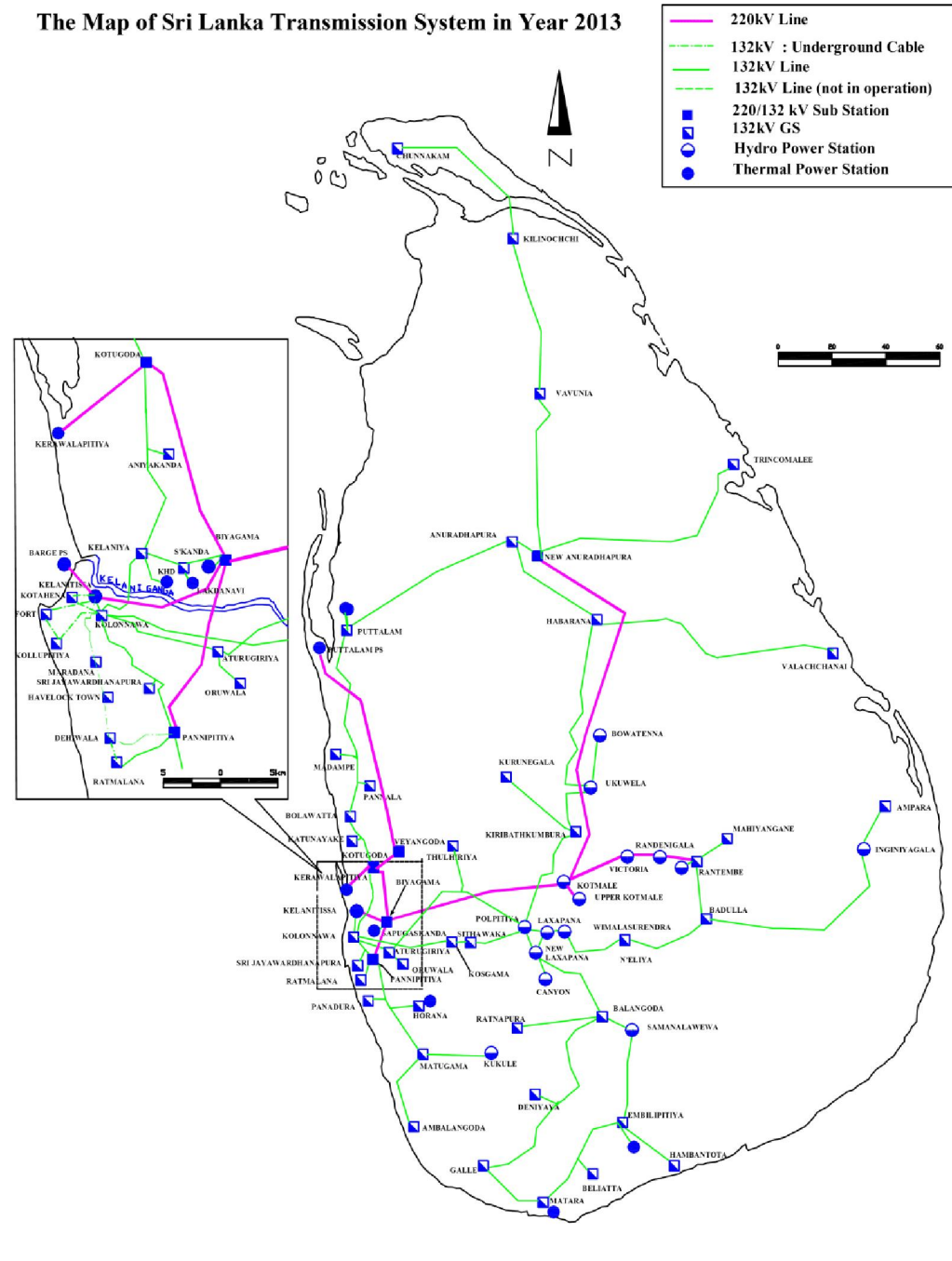
❖ Grid Substations

	No	MVA
--	----	-----

- | | | |
|-----------------|----|------|
| ▪ 132/33 kV | 48 | 3045 |
| ▪ 220/132/33 kV | 5 | 2100 |
| ▪ 220/132 kV | 2 | 405 |
| ▪ 220/33 kV | 1 | 70 |
| ▪ 132/11kV | 5 | 369 |



The Map of Sri Lanka Transmission System in Year 2013



**Cross Border Interconnection with India &
Exchange of Power and Harmonization of
regulations and Policies**

Trans-border Electricity Exchange

- ❖ South Asia Region is very rich in energy resources which are unevenly distributed among the countries of the region.
- ❖ The advantages of a South Asian Regional Electricity grid are appreciated by almost all countries in the region.
- ❖ For Sri Lanka to get access to a South Asian Regional Electricity Grid, the only feasible connection is with India through a HVDC marine cable. This interconnection would be different from any other electricity interconnections planned in the South Asia Region.

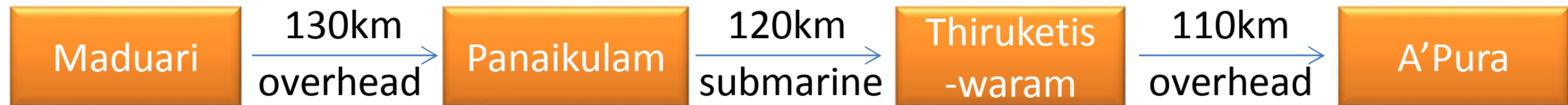
Background

- ❖ Pre-feasibility study conducted with the assistance of USAID in 2002 by Nexant Inc.
- ❖ Review of the Pre-feasibility study with assistance of USAID in 2006 by Nexant/ Power Grid Corporation of India
- ❖ Bilateral discussions by Secretary , Ministry of Power and Energy Sri Lanka and Secretary Ministry of Power, India in Dec 2006.
- ❖ Cabinet of Ministers approved in principle in Dec 2006, to study the feasibility of power interconnection and to appoint a Steering Committee Co- Chaired by Secretaries of Power Ministries and to appoint a Task Force for technical, commercial, regulatory and legal aspects.

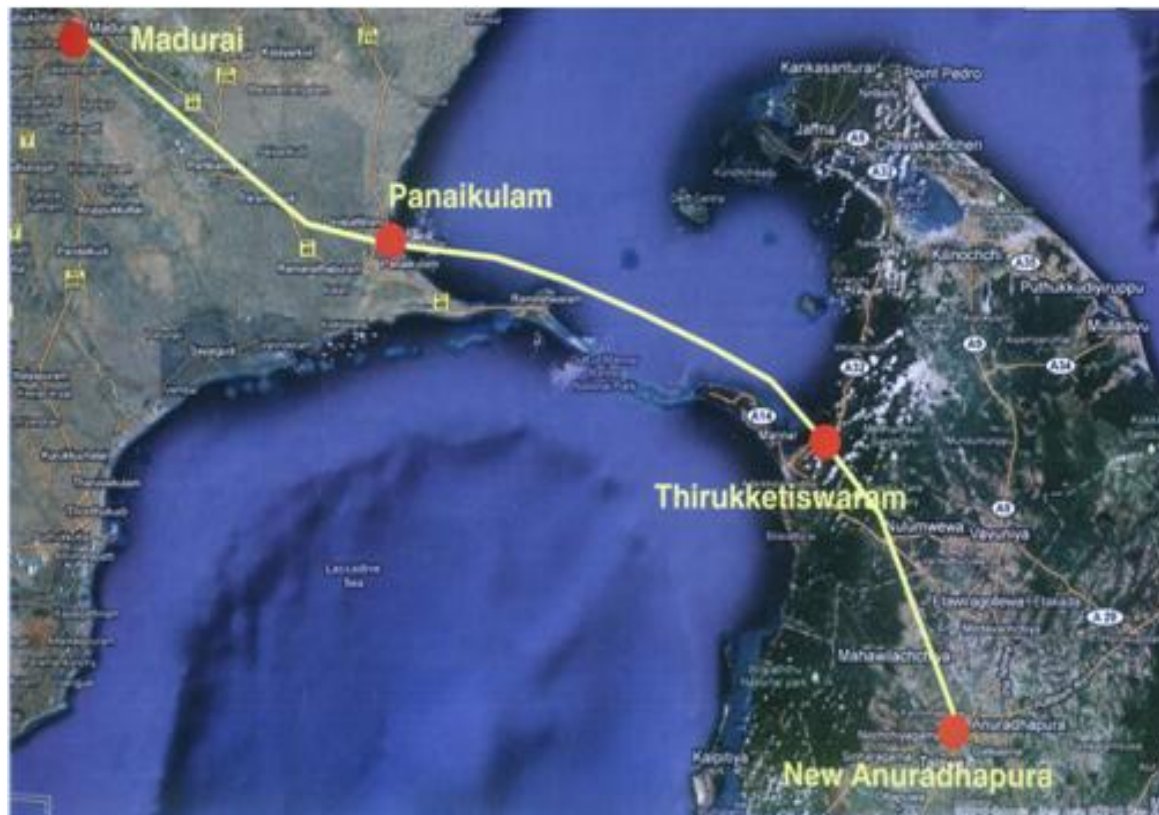
Background Conts.

- ❖ A MOU on Feasibility Study for India- Sri Lanka Electricity Grid Interconnection was signed among GOSL, GOI, CEB and Power Grid Corporation of India Limited (PGCIL) on 9th June 2010.
- ❖ Executing Agencies; CEB and PGCIL are jointly carrying out the feasibility study

Line Route



- ❖ High voltage direct current (HVDC), operating at ± 400 kV
- ❖ Total interconnection capacity will be 1000 MW



Potential for Power Exchange Contracts

- **Short term contracts**

- Monthly average prices reported in Indian short term market are in the range of 6.68 to 9.52 UScts/kWh (capacity + energy)
- monthly average purchase prices forecast for Sri Lanka are in the range of 6.50 to 13.46 UScts/kWh (energy only)
- During peak hours, Sri Lanka can make use of the lower cost Indian short term market
- During off peak, the excess coal based generation in Sri Lanka could be sold to the Indian short term market

- **Long term contracts**

- Owing to economies of scale, Sri Lanka signing up with an Indian UMPP could be cheaper than building own plants
- Similarly, if Sri Lanka can build an UMPP, it can also serve the Indian base load, owing to the persistent shortfall in India

Power Transfer Costs

- **Following costs will further reduce any apparent benefits of power exchange between India and Sri Lanka**
 - Investment and operational costs of the interconnection
 - transmission fees of about 0.52 UScts/kWh require to be paid to the Indian grid for transfers within southern grid (based on current regulatory determinations in India)
 - energy loss attributed to power transfers between India (southern region) and Sri Lanka (Anuradhapura) amounting to at least 6%

Legal and Regulatory Issues

- CEB needs to be empowered to enter into cross-border power transfers
- The Transmission and Bulk Supply license held by CEB is required to be amended
- Dispute resolution in the Sri Lanka Electricity Act requires to be further strengthened
- CEB Act has to be amended to enable the functions of trader or broker, as relevant

To achieve project viability

- The project must be structured as a 1x500 MW monopolar interconnection with no specific assets or commitments now to raise the capacity to 1000 MW
- If the project costs are further reduced by reconsidering the routing options, the 1x500 MW monopolar option has the potential to be viable
- Target project cost for a POWERGRID-CEB joint venture to be profitable is 372.4 MUSD (excluding customs duty and taxes), which at present is estimated to be 554 MUSD
- Both Sri Lanka and India be allowed participation in the wholesale market in each others' country, with full options and freedom to participate in the short-term, day-ahead and unscheduled interchanges market
- Sri Lankan power system shall relax its maximum load share condition and allow the interconnection to supply at the optimal capacity level

Revised Electricity Grid Interconnection



Thank You

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