

# India –Sri Lanka Cross Border Electricity Network Interconnection

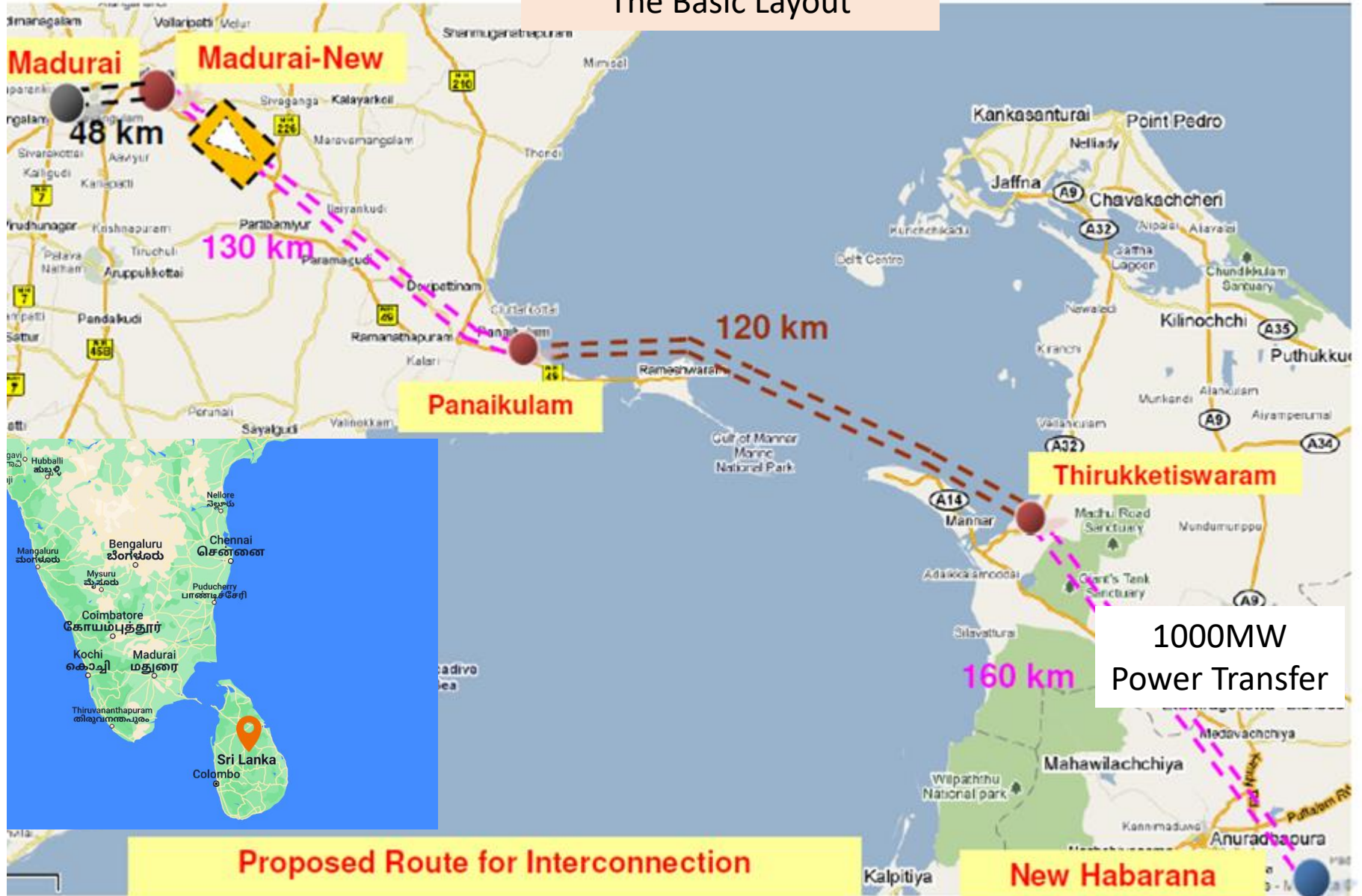
## The History and the Way Forward

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**Sri Lanka**

16<sup>th</sup> February 2023

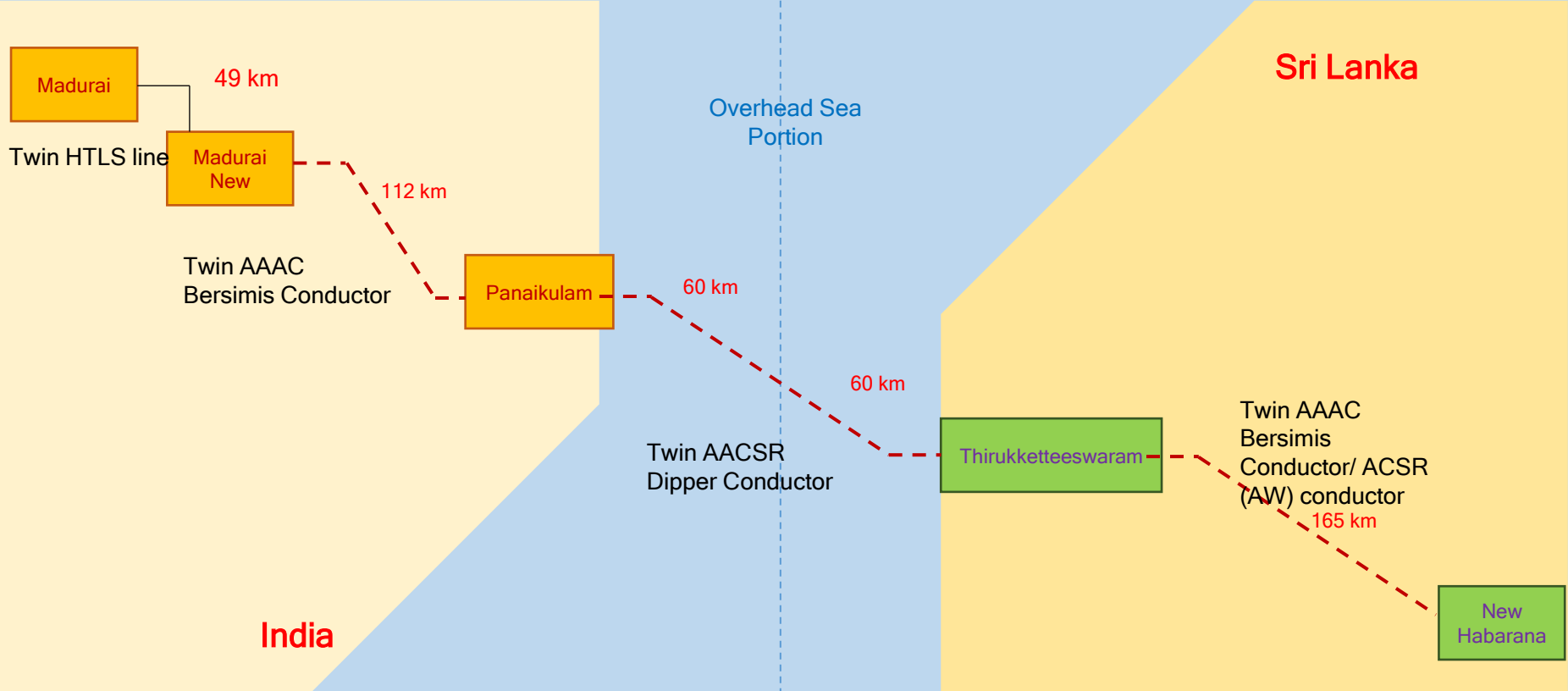
# India – Sri Lanka Grid Interconnection

## The Basic Layout



# Madurai (India) - New Habarana (SL) ±320 kV VSC HVDC Bi-pole Line

## Scope of work



## **HISTORICAL BACKGROUND**

In 2002, **NEXANT**, with the assistance of United States Agency for International Development (**USAID**) carried out a **Pre-feasibility** study for Electricity Grid Interconnection between India and Sri Lanka.

In 2006, Power Grid Corporation of India Ltd (**PGCIL**) with **USAID assistance** reviewed and updated the **pre- feasibility** study done previously.

In December 2006, Cabinet of Ministers of Sri Lanka approved in principle to study the feasibility of a power interconnection between two countries and to appoint a Steering Committee **Co- Chaired by Secretaries of Power Ministries of SL and India** and to appoint a Task Force to look after technical, commercial, regulatory and legal aspects.

In June 2010, an MOU was signed between GOSL, GOI, CEB and Power Grid Corporation of India (PGCIL) to carry out a **detailed feasibility study**.

On December 2011, CEB and PGCIL has jointly concluded the techno-economic feasibility studies on the interconnection.

Supplementary Studies for the Feasibility Study on  
**India-Sri Lanka  
Grid Interconnection Project**

December 2011

Prepared by



**Institute of Policy Studies of Sri Lanka**

in association with

**RMA** Resource Management Associates  
Energy Consultants (Pvt) Ltd

**T** TIRUCHELVAM  
**A** ASSOCIATES

**Tiruchelvam Associates**

# India – Sri Lanka Grid Interconnection

## Summary of the FS



- OPTION I - 4x250MW in two stages
- OPTION II - 2x500MW in two stages
- OPTION III - 2x500MW in single stage

under sea cable  
Option

**UNVIABLE**

Project cost: 780 MUSD to 933 MUSD

Proposed Route for Interconnection

New Habarana

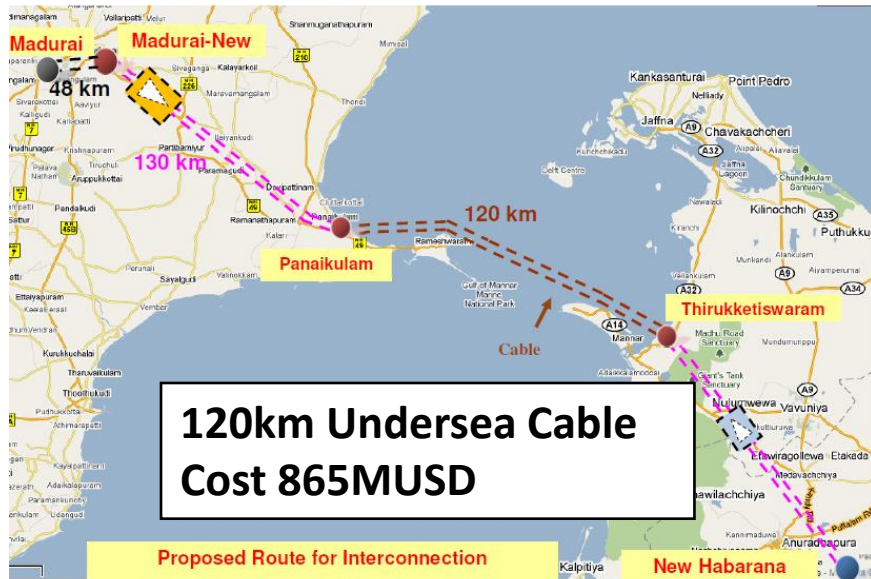
# Summery of Results of Economic Analysis

| Transfer Model       | Construction Options | EIRR                                 |           |
|----------------------|----------------------|--------------------------------------|-----------|
|                      |                      | Calculated values                    | Benchmark |
| Power from:IND to SL | Option I             | 1.9%                                 | 10%       |
|                      | Option II            | 1.2%                                 |           |
|                      | Option III           | Not considered<br>(due to high cost) |           |
| Power from:SL to IND | Option I             | Negative                             |           |
|                      | Option II            | Negative                             |           |
|                      | Option III           | Negative                             |           |

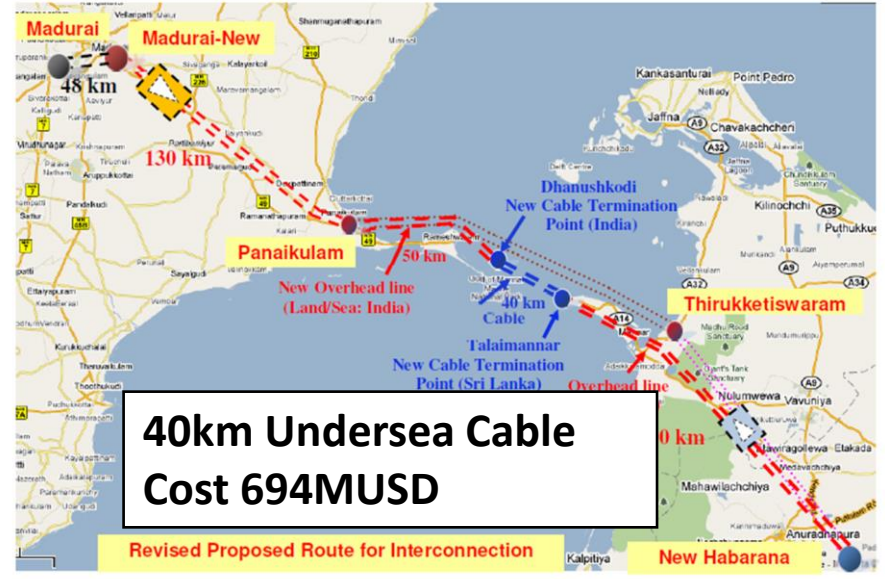
Explore Further Technical Options to reduce cost

Option-1: India – Sri Lanka Grid Interconnection

Exhibit-1

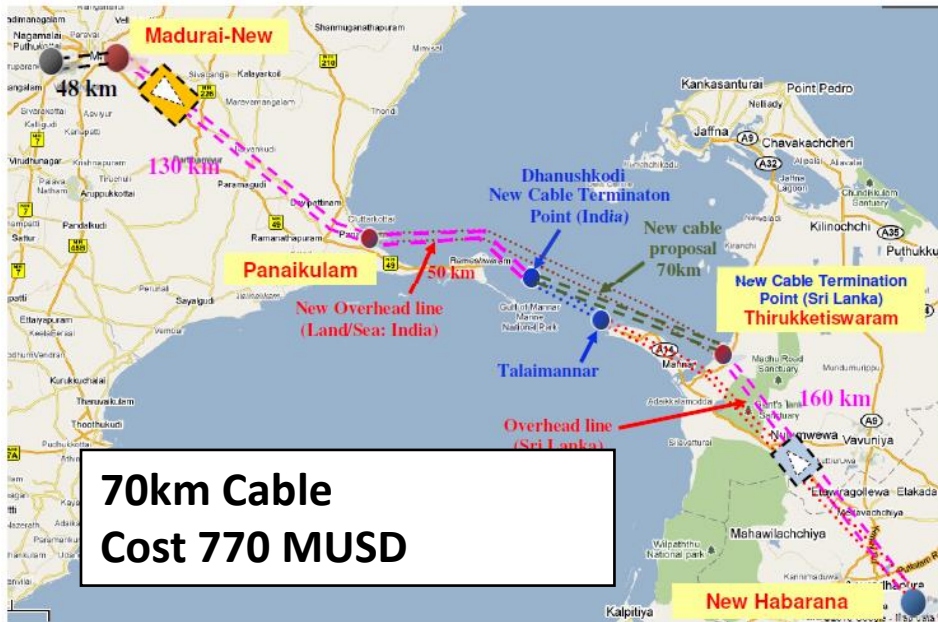


Option-2: India – Sri Lanka Grid Interconnection



Option-3: India – Sri Lanka Grid Interconnection

Exhibit-3



Even with these three options, the total project cost remained high. *“possibility of additional options like the entire interconnection line as overhead line without any cable also be carried out by the JTT”*



## **HISTORICAL BACKGROUND – Continued ...**

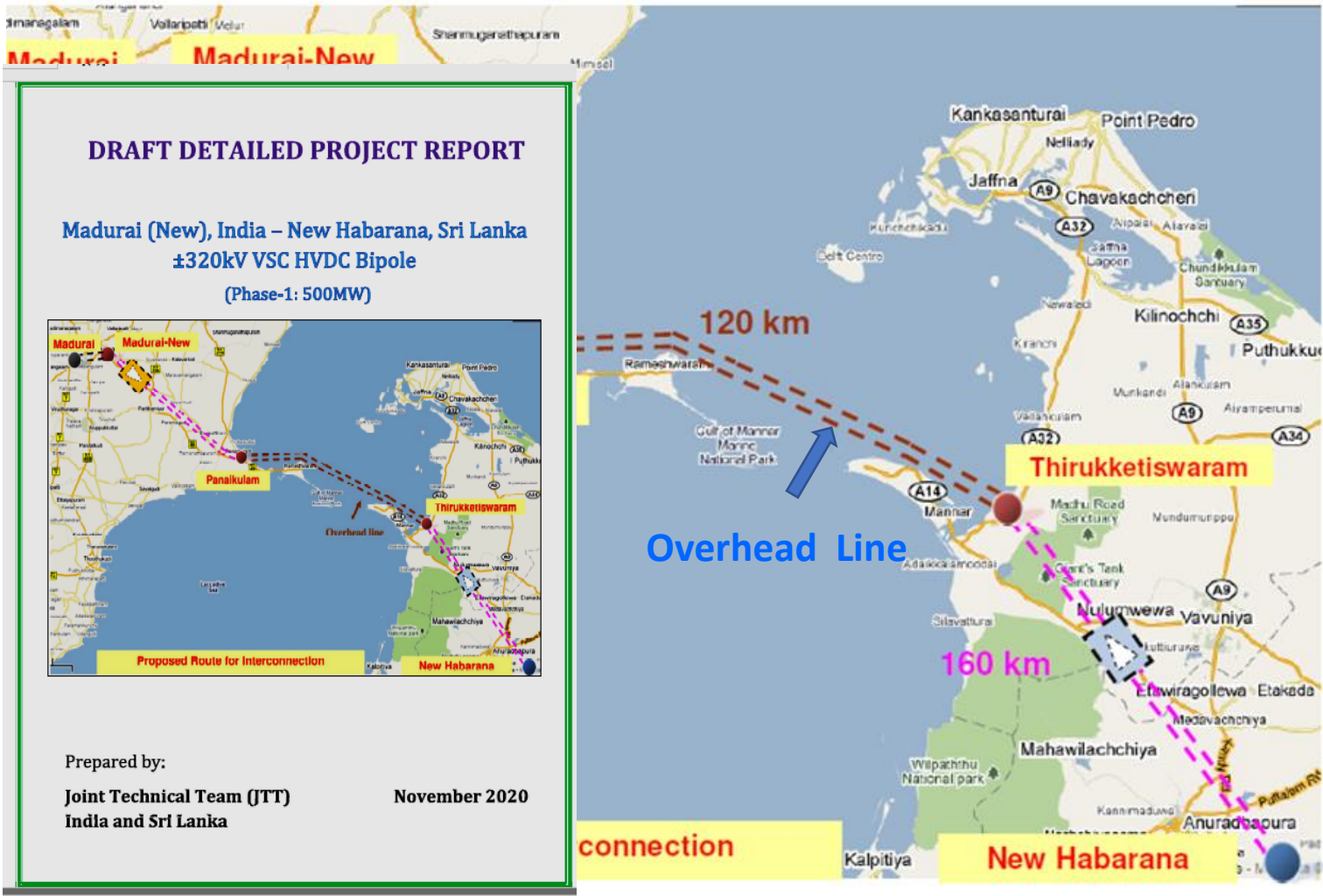
On 7<sup>th</sup> November 2016, during the 1<sup>st</sup> meeting of the Joint Working Group (JWG) on “Cooperation on Power Sector Between India and Sri Lanka” it was **decided to appoint a Joint Technical Team (JTT)** comprising of members from CEA, PGCIL of India and Ceylon Electricity Board to pursue the Indo Lanka interconnection.

Between 2016-2018, a series of meeting held between JWG and JTT **where it was agreed to improve the project viability by considering alternate construction options to lower the project cost.** This includes changing the undersea cable portion to a 120km overhead line across the sea.

On June 2019, 4<sup>th</sup> meeting of the Jt. Working Group (JWG) was held where it was **decided to prepare a Detailed Project Report (DPR) by a Join Technical Team (JTT) from India and Sri Lanka.**

In November 2020 the draft Detailed Project Report (DPR) was jointly prepared by CEB and PGCIL and is currently under Last stages of reviewing by either party.

# India – Sri Lanka Grid Interconnection



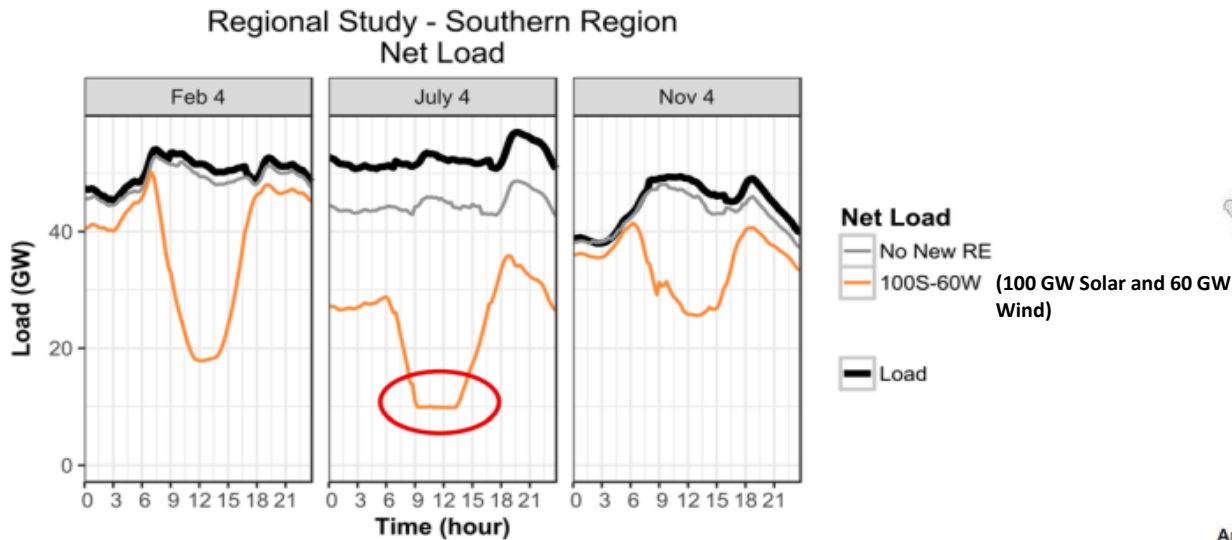
Total cost is 460MUSD for complete overhead Line option

# Things to Consider and way forward

**CONDUCT A FRESH FINANCIAL AND ECONOMIC  
FEASIBILITY STUDY CONSIDERING CURRENT  
AND FUTURE TRENDS.**

# Indian MARKET must be understood first to see opportunities to buy/sell

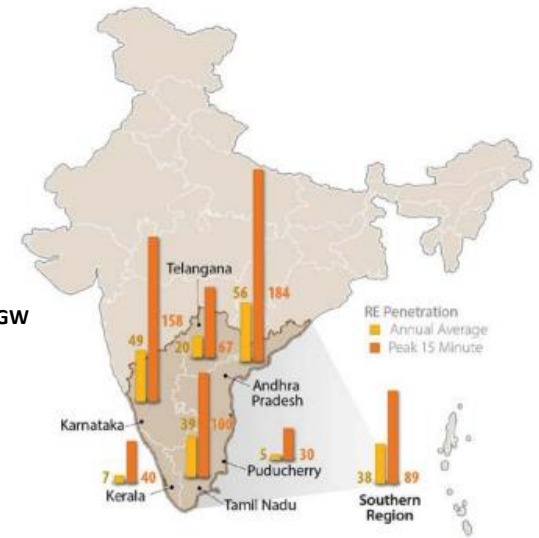
## Projected Net Load Curves in Southern India in 2030



### Comparison of net load by season, No New RE and 100S-60W, Southern region

On 4 July, system constraints prevent further reductions to midday net load, and excess RE generation is curtailed (red circle).

Note: Net load is load minus wind and solar generation postcurtailment.

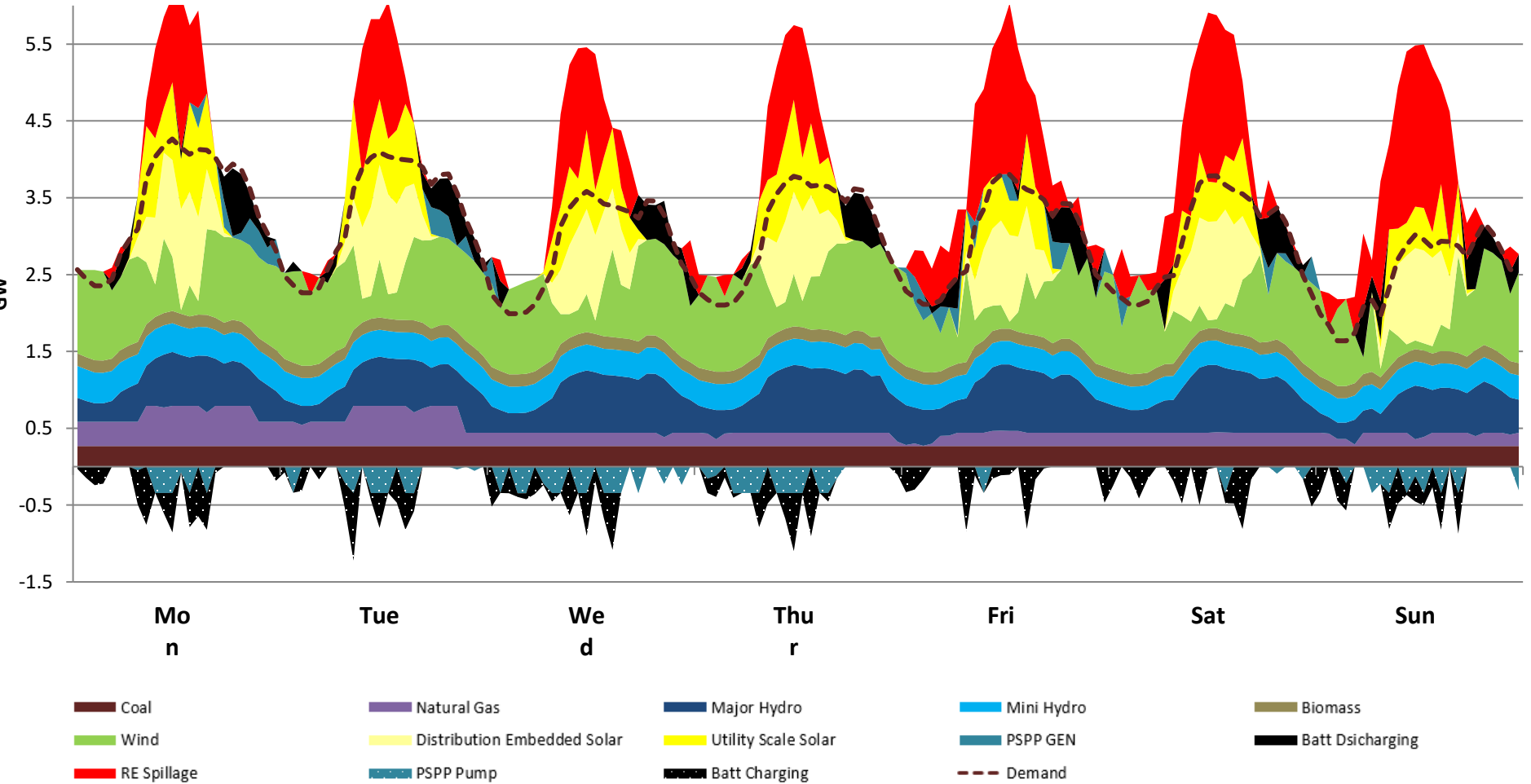


Annual and 15-minute peak instantaneous penetration of RE generation as a percent of load, 100S-60W, Southern region

India too is in a very ambitious renewable drive and may have excess renewable at the same time slots where Sri Lanka has excess of it

# Future Sri Lanka's Energy Mix as dictated by policy must be factored.

## Sri Lanka too will have RE excess Typical Weekly Load Curve (Mon-Sun) September 2030



## **PRESENT STATUS OF THE FINANCIAL & ECONOMIC FEASIBILITY STUDY**

As previous feasibility studies done in 2011 concluded that the project was financially and economically unviable, **Services of PricewaterhouseCoopers (PWC) was obtained** under ADB assistance to do a fresh Financial & Economic Feasibility Study. **Work commenced in October 2022.**

**A one day workshop was held on 31<sup>st</sup> January 2023** with the participation of all stakeholders from Sri Lanka to share interim results of the study.

Report is expected by end March 2023.

# SCOPE OF THE ONGOING FEASIBILITY STUDY

Under the feasibility study, PWC is to carry out economic and financial viability of the project for Sri Lanka, including reviewing of initial cost estimates and suggest different business models for ownership and operation.

Scope includes,

- 1) Power market assessment and asses potential for Cross Border Electricity Trade
- 2) Different Business Models for the interconnection including,
  - 1) Project Structuring – Who develop, who owns, who operates.
  - 2) Financial structuring –
  - 3) Commercial Structuring – Off Take Arrangement
  - 4) Operation & Maintenance

## WAY FORWARD

- 1) Agree on Regulatory, legal arrangements for power trade
- 2) Make required legal changes

## DECISIONS NEEDED TO BE TAKEN

Two possible options of implementing Indo-Lanka Connection

- 1) If the project is found to be financially and economically viable, carry it out as **financially/economically viable project** under a suitable business model.
- 2) Carry it out as a **strategic initiative** between the two governments (in which case, economic/financial viability is only a secondary aspect).



Thank You