

Long Term Generation Expansion Plan 2015-2034

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Personal Profile

- B.Sc. Electrical Engineering – UOM 2010
- LTL Electrical Engineer, UOM EE Probationary Lecturer 2010-13
- M.Sc. Electric Power Engineering – NTNU, Norway 2013-15
- Motivation – Progressive Electricity sector

Proposed candidate energy supply technologies

- Energy Supply Option – Tie Line to India
- Possibility of HVAC instead of HVDC
 - Possibility of Overland connection
 - Only 40 km – Cable
 - Example : 132 kV Sherinham Shaol Wind Farm in the North Sea - 132 kV / 40 km / 320 MW – Feasible even with the associated low plant factor of the wind farm

HVDC Option

- Cost – 12,760 mn USD (Base Case 12,960)
- Further supports grid ancillary services (the savings which is not included in this)
- Example Skagerak Denmark-Norway HVDC
 - 230 km/ 250 kV/ 500 MW -1977
 - Increased competition – decreasing prices

Advantages on tie line to India

- Diversification of energy mix
- Access to Indian Coal, LNG, Nuclear Generators
- Future possibility to access Hydro generators of Nepal and Bhutan
- Technical advantages –
 - Increase system inertia
 - Possibility of increasing limit for NCRE integration (>20%)

Use of indigenous resources and renewable technologies

- Technical innovations have increased the possibility to integrate more wind power
 - Full Converter Based interface
 - Synthetic Inertia (update studies)
- Option to have semi dispatchable tariff for Wind
 - Successfully implemented in UK , Norway

Use of indigenous resources

- Gross Conflict of interest - “Therefore, CEB plans to develop all three phases (phase I, phase II & phase III) of Mannar wind farm, to pass the maximum benefit to the electricity consumers of the country” - page 5-10
- Level playing field – Single Buyer Open bidding - CEB Generation licensee can bid with other competitors
- Example : S. buyer - (20 /18) - sell 25

Proposed (Base case)

generation plan/ plant addition

- Significant decrease in power addition 2017 - 2020 for 2015 plan when compared to 2013 plan, Why?
- Unacceptably low reserve margin and high LOLP (eg: 2019)
- Change Plan to address this problem - add generation! Reserve Margin should be a constraint for the optimization program!

Discount Rate

- Take in to account technology maturity
- Hydro and Coal should be different from Nuclear or HVDC

Remarks

- Well Presented and a highly professional LTGEP
- Propose to include some stake holders in the whole process of LTEGP – Single buyer – to create a level playing field!
- **Paradigm Shift**