Annexure-XXVII

Procedure adopted by POSOCO to calculate TTC/ATC

Input Data for Base Case Preparation

Network Topology:

- As per network data obtained from CTU and STUs.
- New transmission elements considered only after commissioning of that asset and duly considering their reliability during initial period.

Unit Availability:

- As per the maintenance schedule finalized by RPC.
- New generating units considered only after commissioning of the new units and duly considering their reliability during initial period.

Coal Fired Thermal Despatch:

As per the anticipated ex-bus generation of the thermal generating units

Gas/ Nuclear Despatch:

As per past trend of Plant Load Factor available

Hydro Despatch:

- As per the past trend available at RLDCs/ SLDCs.
- The day corresponding to the median value of daily consumption of the same month last year would be chosen.
- The current inflow pattern is also considered.

- **Reactive power capability of generating units**:

- As per the generator capability curve or based on the assumption recommended in CEA's Manual on Transmission Planning Criteria.

- **Nodal MW demand** :
  - As per the anticipated load provided by SLDCs or Load Generation Balance Report (LGBR) prepared by CEA or past trend available at RLDCs/ NLDC.

- **Nodal MVAR demand**:
  - As per the anticipated power factor provided by SLDCs.

Input Data and Source

S No.	Input Data	Suggested Source
1	**Planning Criteria**	**Manual on Transmission Planning Criteria issued by CEA**
2	**Network Topology**	**Existing network with full elements available** **Planned outages during the entire assessment period**
3	**Transmission line limits**	**Minimum of thermal limit, stability limit and voltage limit**
4	**Thermal unit availability**	**Load Generation Balance report, Maintenance schedule**
5	**Thermal despatch**	**Ex bus after deducting the normative auxiliary consumption** **Output could be further discounted by the performance index of generating units of a particular size as compiled by CEA**
6	**Gas based thermal despatch**	**Past trend**

7	**Hydro despatch**	**Peak and off peak actual hydro generation on median consumption day of same month last year** **The current inflow pattern to be duly accounted**
8	**Load**	**Anticipated load**
9	**Credible contingencies**	**Planning criteria**

Power System model considered for simulation studies

- EHV transmission network normally modelled down to 132 kV
- All generating units greater than 50 MW and connected at 132 kV and above are modelled
- Load is generally lumped at 132 kV or below
- Separate base cases are prepared for calculating the
  - export and import capability corresponding to both peak and off- peak load

TTC Assessment

- Total Transfer Capability between two areas assessed by
  - increasing the load in the importing area and increasing the generation in the exporting area or vice versa till the constraints are hit for a credible contingency.

Limiting constraints for various corridors

- Thermal limit under N-1 hit for most of the corridors
  - ER-NER: 220 kV Salakati-BTPS-Agia section
  - WR-SR: 400 kV Parli-Solapur section
  - S1-S2 : 400 kV Kolar-Hosur section
  - ER-SR : HVDC Talcher-Kolar capacity
  - Punjab: 400/220 kV ICTs/220 kV intra state system
  - ER-NER: 400kV Farakka-Malda section

- Thermal limit under normal operating condition
  - WR-NR: 400kV Singrauli-Anpara S/C leading to restrictions on HVDC Vindhychal
  - India-Bangladesh: 400kV Farakka-Behrampur S/C leading to restriction on HVDC Bheramara

Credible contingencies considered while assessing TTC

- Outage of single transmission element (N-1) in the transmission corridor or connected system
- Outage of a largest unit in the importing control area station
- Violation of grid voltage operating range
- Violation of transmission element loading limit in n-1 contingency case
- Violation of emergency limit in the n-1-1 contingency case
- Stability under n-1-1 contingency of a temporary single phase to ground fault on a 765 kV line close to the bus or a permanent single phase to ground fault on a 400 kV line close to the bus
- Angular difference of 30 degrees between adjacent buses under n-1 contingency

Transmission Reliability Margin (TRM)

- Two percent (2%) of the total anticipated peak demand met in MW of the control area/group of control area/region (to account for forecasting uncertainties)
- Size of largest generating unit in the control area/ group of control area/region.