

Fifth Annual Conference on  
**Power Transmission in India:**  
*Requirements, Plans, Technologies and Regulation*

**April 30 - May 1, 2012**  
**Recap of Day 1**

# POSOCO Perspective

## Emerging system requirements

- Need to set up reliability standards for improving quality of power supply
  - Around 200 system specialists/reliability specialists are required
- Further tightening of frequency band: Plans to change UI vector from .02 Hz to .01 Hz
- Synchronisation of SR grid by 2014: Clear plan for functioning in a synchronous mode is under development by various task forces
- Requirement for integration of renewable energy:
  - Large grid footprint to absorb RE fluctuations
  - Existence a vibrant market. India with double-side bidding, 4 dozen traders and wide range of markets products is meeting these requirements
  - Need to adopt clear definitions of transmission, distribution and generation
- Ancillary services will also be important market in the next 4-5 years
- Preparing for future load curve: By 2020 load curve will be peaking and kinky
  - Need peaking power plants to meet this load
- Adoption of new technology: PMUs and WAMS help in visualisation of the grid, create situational awareness, and help take corrective action
  - Three pilots already implemented, so far
  - 50 PMUs to be installed during 2012-13
  - Over 1,000 PMUs to be set up across the country; every substation to have a PMU
- Creation of a an extensive communication network for the well functioning power sector
- Upgradation of all control centres across states is already underway

# Private Perspective

## **Sterlite Technologies Limited**

- STL has bagged 3 projects worth Rs 40 billion, 3,000 km across 8 states
- Project pipeline has not been able to satisfy private sector appetite. Need to create liquidity in the sector as only Rs 20-30 billion worth of projects have been bid out every year
- Need to develop better methodology for periodic tariff revision
- To rationalise corridors and use better technology to address RoW and land issues
- Recent years have seen wide ranging bids and a desperation on part of developers to bag projects. Government should accept only viable bids and not just the lowest bid
- States need to circumvent the issues of payment security (through use of escrow mechanism) to be as attractive as central transmission projects
- Shortage of skilled manpower for construction works such as erection of lines is an issue

## **Reliance Power Transmission**

- Bidding process: Against a 240 day bid process, 442 days taken by PFC/REC
  - Need to reduce bid cycle time; Make BPC accountable for time taken
  - Bid process to include license, tariff adoption, 164 clearances etc
- Project pipeline: Since amendment in Tariff Policy, only two projects have been bid out while one Rs 5 billion project under bidding
- Risk sharing: RoW, land clearances issues and high RoI results in poor project economics
  - Allow commodity project variation as pass through; low cost transmission project funding to be made a priority; allow for window shifting of tariff
- Technology: Micro specifications restrict developers from adopting latest technologies
  - Performance focused specifications is essential; allow flexibility for design/technology
  - Involve private sector in specification development and policy making

# State Initiatives

## Rajasthan

- Focus on creation of evacuation facilities for 15 GW capacity to be added during the 12<sup>th</sup> Plan
- 12<sup>th</sup> Plan investment in transmission pegged at Rs 126 billion; Rs 28 billion in 2012-13 alone
- Creation of 765 kV and 400 kV evacuation system for large power plants and renewable energy underway
- Adoption of compact hybrid GIS/GIS and EHV XLPE cables in urban centres such as Jaipur and Jodhpur
- Telecom tower infrastructure provider has been selected through competitive bidding route
- Large-scale plan comprising OPGW for data communication is also underway
- Adoption of energy efficient technologies such as LED, CLF, star rating equipment
- Installation of PV panels in office buildings; use of solar power for substation auxiliary consumption
- Encouraging private sector participation: Three projects already awarded and two more to be offered soon

## Maharashtra

- Focus on reducing interruptions/occurrences as well as improving system availability
- Undertaking modernisation of protection system, adopting predictive maintenance and hot-line maintenance practices, and implementing of life extension schemes
- 2012-13 Plan: 8,500 MVA capacity, 1,585 ct. km of lines, at a cost of Rs 48.9 billion
- Establishment of 765 kV corridor for evacuation of 8 GW power from Koradi, Mauda & Adani plants
- Completed JICA-funded project for replacement of 180 transformers at 108 substations at Rs 7.32 billion
- Pilot Smart Grid Project involving WAMS to enhance operation and monitoring capability is planned
- Setting up of comprehensive optic fibre communication network over EHV lines through JV with STL
- Modernisation of SLDCs at Kalwa and Ambazari, with 140 nos. of SCADA at RTUs is underway
- Training centres at 7 locations and a Power System Learning Centre at Aurangabad to create skilled manpower are being set up

# State Initiatives (continued)

## Gujarat

- Focus on maintaining consistency and long term sustainability through modernisation of network
- 12<sup>th</sup> Plan: 14,500 ct. km of lines, 380 substations at an investment of Rs 141.2 billion
- R&M activities of aged equipment has reduced equipment failure rate to below 0.25 per cent
- Successfully reduced transmission losses to around 4.4 % through reactive power management
- Pilot project on optical communication technology and digital substation is underway
- Implementation of PMUs and WAMS in cooperation with IIT Mumbai has been taken up
- Initiative of 1,000 km of OPGW for communication and unmanned substation operation is ongoing
- Other initiatives include adoption of hybrid substation switchgear technology, advanced condition monitoring equipment, GIS for mapping of transmission assets, monopole design for transmission towers, high ampacity conductor etc.

## Issues and concerns

- RoW issues for lines
- Issues in land acquisition for GSS and land availability in urban areas
- Delays in forest clearance
- Paucity of contractors
- Issues with timely supply of equipment by manufacturers
- Lack of skilled manpower
- Ageing assets, requiring R&M

- Making grid ready for renewable energy integration
- Lack of compact and good solutions for smart grid
- Lack of interstate network for RE flows
- Several issues to be addressed before competitive bidding at state level can take off such as selection of BPC, responsibility of R&M of assets etc.

# Competitive Bidding

## Experience so far

- Eight interstate transmission projects have been awarded under competitive bidding: 3 to Sterlite; 2 to Reliance; 2 to Powergrid and 1 to JV of Patel Engg, Simplex and BS Transcom
- Two projects are in the process of being awarded; three more projects have been identified
- Several issues rose during implementation
  - In case of ENIP, change in start and end points of the project led to escalation in cost
  - In case of North Karanpura and Talcher II, non-issuance of approval under section 164 resulted in extension of CoD
- Creation of nodal agency to coordinate between NHA, railways etc to address RoW issues
- To enable proper planning of construction activities, the bidders need to be properly informed about clearances and government agencies need to set definite time period for clearances
- Bidding documents and TSA to have provisions for escalation of transmission charges arising on account of these delays
- BPCs to keep watch on bidders who bid aggressively but are unable to construct the projects
- Adoption of PoC mechanism
  - Changes have been identified in the bidding documents for transition from Postage Stamp to PoC regime
  - Need to create a centralised coordination agency for faster implementation of projects
  - CTU could play a major role in competitive bidding, as it is doing in case of PoC

# Regulatory Update

## PoC implementation and other concerns

- PoC implementation
  - STUs need to expedite steps to undertake capacity building to capitalise on benefits of PoC
  - Entities who have never done load flow studies are likely to face difficulties in implementing the new regime
  - Methodology for use of intra-state system for interstate power and vice versa yet to be finalised
- State-level issues
  - Lack of independence of STUs has prevented professional operation
  - Legal issues preventing the use of funds raised from congestion fee and UI charges
  - While open access rules are in place in most states, issues pertaining to bilateral agreements in states like UP is preventing open access implementation
- Renewable energy integration issue
  - Stringent load forecasting requirement for wind generators
  - Joint forecasting is expected to resolve this issue
  - Metering is also an issue as several wind farms are connected through joint stations
- Competitive bidding issues
  - Long bidding process: Modified TSA sets timelines for its timely completion
  - Variance between SBD and CERC regulations results in tariff recovery gap of one month
  - For intra-state projects: STU could undertake bid process while CEA could help in load flow studies

# Economics and Financing

## Past Trends

- Most of the bids show a front loading of charges in the initial 5-10 years
- The average escalable component in the bid has been negligible (of only around 4 per cent)
- L1, L2, L3 bids have been very close in most bids, except in case of last to bids won by Powergrid
- Typical levelised tariff has varied from 10-16% of the project cost. However for bids without substation, the range of levelised tariff is around 10-11% only

## Transmission Financing Trends

- Typically transmission projects are being financed with a debt-equity mix of 70:30
- Financing rates observed over past have ranged between 10.5% to 12% (depending on the interest rate scenario)
- Refinancing at lower rates 2-3 years post commissioning is a possibility for project developers

## 12<sup>th</sup> Plan Requirements

120,000 ct. km of lines and 295,000 MVA will be added  
Central Sector: Rs 1,400 billion  
State Sector: Rs 1,000 billion