

## **MINUTES OF THIRD MEETING OF “TECHNICAL COMMITTEE FOR IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL”**

Venue : CERC, New Delhi

Date : 10-2-2016

List of Participants : At **Annexure I (Enclosed)**

1. The third meeting of Technical Committee on implementation of framework for renewable at State level was held under chairmanship of Mr. A. S Bakshi, Member, CERC on 10<sup>th</sup> February 2016. Mr. Bakshi welcomed all the members and appreciated the hard work done by the sub-groups.
2. Dr. S K Chatterjee, JC (RA), CERC presented a summary of conclusions of the last meeting. He also updated about the efforts made towards exploring the possibility of engaging consultants for supporting the Committee. That various agencies viz., USAID under the Greening the Grid programme, have offered to support with a technical Consultant.

### **Discussion**

3. Mr. S.K. Soonee, CEO, POSOCO presented the experience and learning of the sub group's visit to SLDC-Kalwa on 23<sup>rd</sup> January, 2016 and SLDC-Chennai on 30<sup>th</sup> January, 2016. He appreciated the excellent cooperation from both SLDCs. He emphasized that the problems of SLDCs need to be understood. The nuances of both States were discussed in depth. The presentation is enclosed as **Annexure-II**.
4. Mr. Soonee emphasized that there is a huge scope of better utilization of Hydro plants as they provide the flexibility in generation which is a pre requisite to the integration of renewables given its infirm nature. It was agreed after discussion that State level regulations on hydro tariff should follow the CERC principles (viz., the principles of two part tariff and recovery of capacity charge based on providing 3 hours peak). This will encourage peak support.
5. He also focused on the need of proper energy accounting and metering. It was also proposed that India should adopt a 5 minute settlement period

instead of 15 minutes for better granularity and ramp monitoring. Mr. P Rama Mohan, Member, APERC expressed the importance of proper testing and calibration of the meters.

6. Mr. Deepak Lad, Member, MERC, assured that MERC will issue the DSM regulation after analysing the recommendations made by the Committee. He also expressed that the Consultant, as proposed, must be able to provide a guaranteed support in the various facets involved in the implementation.
7. Mrs. A Axilium Jayamary, Director, TNTRANSCO expressed the concern over the source of funding of the proposed activities. Mr. Lad suggested the cost can be incorporated in ARR and PSDF can also be utilised. Mr. Bakshi suggested that 50% of funding may be used from PSDF in order to ensure seriousness amongst the SLDCs. Mr. Soonee emphasized the funds must be released only after certifying that order for equipments has been placed.
8. Mr. A. B Bajpai, Member, MPERC informed that MP has already issued draft Ancillary Services regulations in January 2016 and stakeholder comments have been invited.
9. It was felt that functions of QCA need more clarity. Dr. S K Chatterjee assured that a joint presentation shall be soon made to address the questions pertaining to QCA.

### Decisions

1. It was agreed that Chairperson, FOR, shall be requested to authorize the Committee to hire a Consultant to support the Committee in accomplishing the tasks assigned to it. Furthermore, it was discussed that one Consultant per State shall be ideal to work through the entire process of planning and implementation of ABT/DSM at the State level.
2. It was agreed upon that the sub group needs to interact with more States to understand the specificities of implementation for every State. In continuance, it was proposed that Karnataka SLDC shall be visited on 15<sup>th</sup> February, 2016.
3. All intra-State entities (for instance, the generators) are not subject to deviation settlement at present even in States where ABT has been implemented. It was agreed that the causer pays principle should be followed and all entities responsible for deviation should be accounted for separately.

4. There is an urgent need for putting in place interface meters for intra-State entities. Losses in intra-State transmission should be computed. 15 minute accounting is a pre-requisite for seamless integration of RE. Meter should be the starting point of the exercise and the magnitude of investment required to put in place suitable meters should be identified immediately.
5. SERCs should direct the STUs to prepare metering/telemetry plan and send the proposal for part funding from PSDF.
6. Knowledgeable experts could be called for presentation in the next meeting, especially on QCA criteria and de-pooling arrangements for implementation of State level RE forecasting and scheduling.
7. The next meeting of the Committee shall be held on **18<sup>th</sup> March, 2016 at CERC.**

The meeting ended with a vote of thanks to the Chair.

**ANNEXURE - I**

**LIST OF PARTICIPANTS ATTENDED THE THIRD MEETING OF THE  
TECHNICAL COMMITTEE FOR “IMPLEMENTATION OF  
FRAMEWORK ON RENEWABLES AT THE STATE LEVEL” HELD ON  
10.02.2016 AT THE CERC OFFICE, NEW DELHI**

1	Mr. A. S Bakshi, Member	CERC
2	Mr. S. K Soonee, CEO	POSOCO
3	Mr. S Akshaykumar, Chairperson	TNERC
4	Mr. A. B Bajpai, Member	MPERC
5	Mr Deepak Lad, Member	MERC
6	Mr. P. Rama Mohan, Member	APERC
7	Mr. Raghuvendra S. Rathore, Member	RERC
8	Dr. Sushanta K. Chatterjee, JC(RA)	CERC
9	Ms. Shruti Deorah, Advisor (RE)	CERC
10	Ms. A. Axilium Jayamary, Director	TNTRANSCO
11	Mr. S.C. Shrivastav, JC(Engg)	CERC
12	Mr. Vivek Pandey	POSOCO
13	Mr. S.C. Saxena	POSOCO
14	Ms. T. Nirmala Mary, EE	TNTRANSCO
15	Mr. Saurabh Garg, RO	FOR
16	Mr. Tanay Tarany, RA	FOR

Ver-2, dated 10<sup>th</sup> Feb 2016

# Progress Report-1 of the

Sub-committee under the Technical  
Committee on Implementation of  
Framework on Renewables at the  
State level

10.02.2016

# Members of the Committee

## Technical Committee

- Member (T), CERC-Chairman
- Member (T), TNERC
- Member (T), GERC
- Member (T), RERC
- Member (T), MERC
- Member (T), APERC
- Member (T), KERC
- Member (T), MPERC
- CEO, POSOCO
- Joint Chief (RA), CERC

## Sub-Committee

- CEO, POSOCO- Chairman
- One representative from concerned SERC
- One representative from concerned SLDC
- One representative from RLDC
- One representative from the FOR secretariat- Observer

# Technical Committee- Terms of Reference

The Committee would interalia evolve a roadmap for implementation and ensure timely action on the following:

- a) Deployment and implementation of framework on forecasting, scheduling and deviation settlement of wind & solar generating stations at the state level
- b) Introduction /implementation of Availability Based Tariff (ABT) framework at the State level as mandated in the National Electricity Policy and Tariff Policy
- c) Introduction of Ancillary Services and Reserves at the State level
- d) Implementation of Automatic Generation and primary control within States
- e) Provide periodic reports to the FOR

# Sub-committee- Terms of Reference

(as per FOR letter dated 20<sup>th</sup> Jan 2016)

- Evolve detailed action plan with time lines for implementation of ABT/DSM at State level
- Suggest modification of all technical and accounting procedures as may be necessary for rolling out ABT/DSM framework
- Assist in drafting of requisite State regulations, or amendments to existing regulations, as the case may be
- Submit report on the progress of the sub-group to the Technical Committee of States every two months



# Chronology

- Model Regulations for Forecasting, Scheduling, Deviation Settlement of Wind/Solar at the State level endorsed by FOR
- Technical Committee under Chairmanship of Member(T) CERC constituted
  - 1<sup>st</sup> meeting: 16<sup>th</sup> December 2015
  - 2<sup>nd</sup> meeting: 08<sup>th</sup> January, 2016
- Subcommittee under Chairmanship of CEO, POSOCO constituted
  - Visit to SLDC-Kalwa: 23<sup>rd</sup> January, 2016
  - Visit to SLDC-Chennai: 30<sup>th</sup> January, 2016

# Observations during SLDC Visit

# Status of RE-Forecasting

	Tamil Nadu	Maharashtra
Whether RE forecasting is done in the State	Yes	No
Forecast done by	IWPA/NIWE	NA
Periodicity of the forecast	Day-ahead	NA
Forecast Interval	15-min	NA
Frequency of forecast update	3-hours	NA
Quantity that is forecast	Peak MW	NA
Software application used	NA	NA
Geographical Area Covered	Pooling Stations	NA
Number of pooling Stations	106	Wind: 43, Solar:10

# Status of Load Forecasting

	Tamil Nadu	Maharashtra
Whether load forecasting is done in the state?	Yes	Yes
Load forecasting is done by	SLDC	Discoms
Periodicity of the load forecast	Day-ahead	Day-ahead
Whether any Load forecasting Software is Used	NA	Yes
Are weather parameters used in the load forecast	No	No
Forecast interval	15-minute	Hourly
Daily average load forecast error	Not computed	5-10%

# Power procurement and Generation Tariff

	Tamil Nadu	Maharashtra
Agency responsible for bulk power purchases in State	Discoms	Discoms
Number of Discoms	One	4
How is the State Generating Company's generation allocated between different DISCOMs within the State?	Single Discom	PPA agreements
Structure of Generation Tariff	Two part	Two part
Is generation tariff linked to the Station availability ?	No	Yes
Are LT generators accountable for deviations	No	No
Do the State GENCOs declare their availability in terms of MW and MWh to the SLDC a day in advance for the purpose of scheduling	No	Yes
Is Intra State transmission tariff linked to availability ?	No	Yes

# Scheduling and Accounting

	Tamil Nadu	Maharashtra
Resource allocation done by	SLDC	Discoms
Notification of the Regulations for deviation or imbalance settlement	Draft	Yes
Computation of deviations from the schedule worked out by SLDCs through the boundary meter readings every week?	No	Yes
Preparation of the 'State Energy Account' by SLDC	No	Yes
Members of the intra State Deviation Pool	Does not exist	Discoms + Open Access Customers
Settlement Period	Weekly	15-minute
Settlement Cycle	Monthly	Weekly
Average amount handled per week in the intra-state Deviation Account during the financial year 2014-15	NA	20 Crore

# Provider of Last Resort, Reserves

	Tamil Nadu	Maharashtra
Provider of Last Resort	State pool as Unscheduled or Imbalance power	Discom
Have 'Reserves' including 'Spinning Reserves' been mandated by your SERC for your state	No	No
Has the estimated reserve requirement for your State been computed by the SLDC	No	No
Does the SLDC have reserves within the state would which it may call up for handling variability in demand (e.g. on account of variation in RE generation or variation in load)	No	2500 MW Hydro + 250 MW Pumped Storage

# Intra State ABT in Maharashtra-Chronology

- Dec-2004: Consultant (POWERGRID) report to MERC
- Nov-2006: ABPS-Deloitte -Discussion paper
- May-2007: MERC Order in Case No. 42 of 2006 for Interim BSM
- Aug-2009: MERC Approval for Final BSM
- May-2012: SLDC-Kalwa Petition in MERC for Removal of Difficulties
  - IBSM: from October 2006 – July 2011
  - FBSM: Aug 2011 onwards
- Mar-2013: MSPC appointed Deloitte to analyze difficulties and suggest remedy
- Sep-2013: Report of the Expert Committee constituted by MERC
- MERC Order for adopting Deviation Mechanism of interstate system



# Settlement and Accounting- Maharashtra

- Multi-seller – Multi Buyer
- Multi-part generation tariff
- Boundary metering in place, Net Settlement, Weekly cycle
- Centralized despatch but Operators' dilemma
  - *Adhoc real-time SMP*
  - *Despatch on Merit Order based on Energy Rate*
  - *Deviation settlement on post facto weighted average SMP*
- Several intra State entities *exempt from deviation accountability*
- Pool is balanced in energy & charges-*Circular-referencing with ISTS charges*
- Pro rata allocation of 'actual' Transmission loss – *Truing up every 15-min*

# Settlement and Accounting- Tamil Nadu

- Multi Seller - Single Buyer
- Gross Settlement ?
- Scheduling started on trial basis
- Centralized despatch
- Intra State boundary metering yet to be in place

# Operators' Wishlist

- Market Design that complements Reliability
- Real-time signals for ease of Decision Making in real-time
- Adequate Telemetry, IT infrastructure, Human resource
- Capacity Building & Empowerment for swift decision-making for Security and Economy
- Seam Management
- Ancillary and Reserves for balancing and contingency
- Congestion management
- Stakeholder confidence
- Regulators' support

## Interstate Energy Accounting & Settlement System- *Lessons learnt*

- ***Multi-part tariff*** vs Single part tariff
- ***Net settlement*** vs Gross Settlement
- ***Multi layer settlement*** vs Single layer settlement
- ***Non-Zero sum pool*** vs Zero-sum pool
- Despatch- ***Decentralized*** vs Centralized
- Deviation Settlement Rate , Transmission Charges- ***Ex-Ante*** vs Post facto
- ***Double Entry*** vs Single Entry for Energy as well as Financial Accounts
- Settlement Period / Cycle- ***Short*** vs Long
- Market Design – ***Simple*** but ***Scalable*** vs Complex
- Compliance through ***Incentives and Disincentives*** vs Diktat
- Truing up - ***Larger period*** vs Shorter period
- Periodic Process Audit and Reconciliation- ***Mandatory*** vs Voluntary
- ***Taxation and Interest treatment – to be part of Regulation***

# Generic Coordinated Multilateral model

- Decision mechanism regarding economics and reliability are separated
- Economic decisions
  - By private multilateral trades among generators and consumers
  - Broker arranges trades
  - Losses paid in kind
- Reliability decisions
  - By power system operator
  - Evaluation of feasible trades. Unfeasible trades are curtailed.
- The power system operator has no information about the economic aspects of the trades. It calculates and distributes the load and loss vectors
- Efficiency is attained through the invisible hand of the market

# Intra State E-MASS

## Suggestions and Challenges

# Functions of State Load Despatch Centres

- Sec 32 (2) The State Load Despatch Centre shall -
  - (a) be responsible for optimum scheduling and despatch of electricity within a State, in accordance with the contracts entered into with the licensees or the generating companies operating in that State;
  - (b) be responsible for the operation and maintenance of the State grid;
  - (c) keep accounts of the quantity of electricity transmitted through the State grid;

# Accounting of Energy in the Intra State System

## **Compliance to Sec 32 (2) (c): Energy Accounting**

- All intra State Entities to be bounded by Interface Meters
- Actual Interchange with intra State Grid to be measured
- Logistics for Meter data collection, processing, validation to be in place
  
- Losses in intra State Transmission to be computed
- Publication of last 52 weeks Intra State Transmission Losses on website



# Criteria for Intra State Pool Membership

- All Intra State Generating Stations
  - Thermal, Hydro, Gas
  - RES at pooling point level
  - CPPs connected at Transmission level
- All Licensed Discoms embedded within the State
- All HT consumers connected at Transmission level
- All Embedded STOA customers connected to intrastate transmission
- Virtual Entity for Ancillary scheduling and settlement

# Proposed Roadmap: Step-1

- Notification of Meter Specifications (as per CEA standards) by SERC
- Identification of Transmission - Distribution Interface by SLDC
- Assessment of Meter Requirement-present and future by SLDC
- Procurement of Meters including spare quantities by STU
- Placement of Meters as per CEA Standards by STU
- Establish Logistics for
  - Data Collection, Processing and Validation at SLDC
  - Meter Calibration, Time Synchronization, Maintenance at STU locations
  - Trouble shooting
- Preparation of trial weekly Intra State Energy Account by SLDC
- Reconciliation of Energy Account at respective boundary with every Intra State Entity by respective Entities

# Every intra State Entity to be made Accountable

## **Compliance to Sec 32 (2) (a): Scheduling**

- Compilation of all contracts by intra State Entities
- Banking transactions to be converted into two separate transactions
- Freedom and choice for portfolio management with accountability
- Scheduled Interchange for each intra State Entity to be prepared
  - Total Injection Schedule = Total (Long-term + Medium-term + Short-term) Scheduled Sale
  - Total Drawal Schedule = Total (Long-term + Medium-term + Short-term) Scheduled Purchase
  - Ex-ante Scheduled losses to be appropriately applied

# Proposed Roadmap: Step-2

- Conversion of Single part-contracts to multi-part
- De-pooling of existing contracts
  - Transfer to embedded entities/Discoms
  - Apportionment of ISGS allocations to Discoms
- Notification of Adequacy Norms for Intra State Entities by SERCs
  - Demand forecasting by intra-State Entities
  - Portfolio management by Intra State Entities
  - Submission of compliance report by Entities
  - Compliance monitoring by SLDCs
- Assessment of Intra State Transfer Capability by SLDCs for scheduling
- Non-discriminatory Open Access
- Monitoring and Control of ACE at the interstate boundary by SLDC

## Simple, Non-discriminatory, Transparent, Dispute-free quick commercial settlement to be the objective

- Settlement rate for Deviations declared ex-ante, no post facto adjustments
- Self computation of deviations by every entity and reconciliation
- Before-the-fact Interchange Schedules, Actual Interchange, Deviations to be available transparently to the respective Entities
- Apriori declaration of applicable Transmission Losses and charges on intra State and interstate transactions

# Proposed Roadmap: Step-3

## Fundamental Requirements

Simple  
Transparent  
Real-time signals  
Quick & Dispute-free

- **Design of Intra State Deviation Mechanism**

- Replica of Inter State DSM
- System Marginal Price based with some modifications (Maharashtra, Andhra Pradesh)
- Inter State DSM with some hysteresis to have a Surplus Pool
- New mechanism ?

- **Non-Zero Intra State Deviation Pool**

- Recovery of ISTS Deviation Charges
  - Payments to Pool : 103% of DSM Rate
  - Payments from Pool : 97% of DSM Rate

Mock Trial  
Removal of Difficulties

- **Relaxations in Deviation if any to be explicitly accounted and settled**

- **Notification of settlement methodology for relaxations in deviation granted**

- **Recovery of charges payable to super pool and recovery from sub-pool**

- Recovery of ISTS Transmission Charges + Deviation
- Recovery of ISTS Congestion Charges

# Proposed Roadmap: Step-4

- Loss Recovery in kind
- Monitoring of Scheduled vs Actual Losses- Notification of targets
- Recovery of intra-State Transmission Charges
  - Keep it Simple
- Intra State wheeling Charges for Discoms
  - Keep it Simple

# Proposed Roadmap: Step-5

- Transmission Loss- in energy terms only- truing up at large interval
- Creation and Operation of Intra State Pool Accounts
  - Deviation Pool Account- Energy and Financial
  - Reactive Energy Pool – Energy and Financial
  - Congestion Charge Pool – Financial
- Formation of multi-Stakeholder State Power
  - Maker-Checker !
  - Reconciliation
- Transmission Account Deviation ?



# Other Challenges-1

- Reactive Energy Settlement
  - Recording – Every 15 min or Weekly Cumulative Register as in ISTS
  - Pricing – As in ISTS ?
  - Intra State Generators - Payment / Receivable ?
- Intra State Congestion Management
- Intra State Ancillary Services
  - Provider of Last Resort
  - Handling Emergencies

# Other Challenges-2

- Independent Revenue Stream for SLDC through SLDC fee and Charges
- Human Resource Adequacy
- HR Capacity building through exposure/engagement – Expert Groups
- IT Infrastructure Adequacy - Technology partner
- Establishing robust SLDC – SERC interface / Interaction
  - Teething trouble, Removal of difficulties
  - Harmonization with CERC regulations
- Stakeholder involvement
- Intra State Market Monitoring

# Other Challenges-3:

- Telemetry of RES
- Compliance of Grid Standards by RES- LVRT
- QCA as per RE model framework- Regulated / Eligibility
  
- Must run RES through tariff - recovery through two part ?
- Valuation of Flexibility
  - Ramping, Two cycle operation, Load following, Peaking, Backing down
- Granularity of Despatch : 5-min vs 15-min

Thank you !