MINUTES OF FOURTEENTH MEETING OF "TECHNICAL COMMITTEE FOR IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL"

Venue	:	Upper Ground Floor, Conference Hall CERC
Date	:	13-09-2016
List of Participants	:	At **Annexure – I (Enclosed)**

1. The Fourteenth meeting of Technical Committee on Implementation of Framework for Renewables at the State level was held under the Chairmanship of Shri A. S Bakshi, Member, CERC on 13th September 2017. Shri Bakshi welcomed all the participants and the special invitees. He further informed the Committee that in the 13th Technical Committee meeting it was decided that at every meeting, all States in the particular region shall be invited so that implementation of SAMAST and other critical elements can be ensured in all States. He emphasized that the objectives of the Committee need to be undertaken in mission mode.

2. Dr. S.K. Chatterjee, Jt Chief (RA), CERC, welcomed all participants on behalf of the FOR Secretariat and welcomed Members of State Commissions of Haryana and Punjab, who'd been invited as special invitees for the meeting. He highlighted that the intent of this Committee is to implement the SAMAST Framework and Forecasting, Scheduling and Deviation Settlement Mechanism across all the States. Further, he informed that Idam Infra Ltd shall continue to support the Technical Committee, for which it is being funded by USAID.

Discussions on the Agenda

I. Update on SAMAST implementation and DSM – West Bengal Haryana and Punjab

Discussion

1) The Consultant (Idam Infra) made a presentation (attached as Annexure-II) on the status of implementation of SAMAST in West Bengal, Haryana and Punjab.

2) **West Bengal:** Idam stated that West Bengal is a Category A State as identified in the SAMAST Report, for which they took stock of current status, gap analysis as well as challenges. Idam has prepared a Draft DPR for West Bengal. The presentation included the Status of ABT meters installed by the State/Central run generating stations and by the Distribution Licensees.

3) The existing ABT system where the entire process of Meter data acquisition, Meter data processing, Scheduling, Regional Energy Accounting and Deviation Bill for state entities was explained.

4) Various challenges like lack of IT resources were highlighted as the energy accounting by SLDC is done on an excel based software, Completion of boundary metering and AMR system, software protocol and compatibility issue of existing meters with open source software were highlighted. It was also highlighted that once the DPR is prepared and funding is arranged, it will be the responsibility of STU to go for the tendering process for procurement, installation etc., and given their limited bandwidth, it might be a challenging task for them.

5) Shri Soonee, Advisor – POSOCO, informed the Committee that they are procuring meters which are only compatible with AMR and have feature of 5 minutes metering.

6) Both options of complete replacement as well reconfiguring existing meters were discussed. Chairman, WBERC highlighted that it can be decided to opt for which option once the DPR is finalized. Also, he asked the consultants to prepare a table listing out the information required from the STU.

Haryana:

7) Idam stated that both Haryana and Punjab are Category B States, wherein partial implementation of SAMAST has happened. Idam team held a meeting with HERC along with key stakeholders from SLDC/STU on 7 Sept 2017.

8) Intra-state load and generation entities prepare schedules. Intra-state settlement is done on actual basis. Therefore, currently no commercial implication of scheduling is there.

9) Idam also mentioned that accounting of Open Access transactions needs to be streamlined with an Open Access Registry.

10) It was discussed that PPA allocation to DISCOMs was mandated in Electricity Act 2003, but is currently pending in the State. The Committee emphasized the need to prioritize the same.

11) Shri Soonee underscored the importance of integrity of accounts. He said that the acid test of the settlement mechanism is that the State should be able to figure out losses for every 15-min time-block.

Punjab:

12) It was acknowledged that deviation accounting is a challenge as PSPL is a consolidated generation and transmission company. Functional segregation is a pre-condition to establish proper accounting.

13) Punjab currently does not have any intra-State deviation settlement. Punjab Member expressed that the State is keen to implement SAMAST.

14) Ownership of DSM Pool account was also discussed by the stakeholders. It was clarified by POSOCO that while the DSM account is owned by the SLDC, it needs regulatory sanction so it can be operated independently.

Consensus

The Members of West Bengal, Haryana and Punjab agreed that they will take necessary actions in a time bound manner to implement SAMAST in their respective states and will keep the Committee posted about the progress.

II. Status of implementation of Regulations on Forecasting, Scheduling and Deviation Settlement

Discussion

1) The Members from States updated on the status of Forecasting & Scheduling and DSM Regulations in their respective States.

Andhra Pradesh: Forecasting & Scheduling Regulations for Solar & Wind plants have been recently notified by APERC, as shared with the Committee and DSM Regulations are under preparation.

Gujarat: Forecasting & Scheduling Regulations to be finalized soon. Dr. Chatterjee requested Member Gujarat to check their regulations vis-à-vis the FOR Model Regulations, and examine any major points of difference.

Maharashtra: Forecasting & Scheduling Regulations under preparation (at final stage) and a revised DSM Framework has been prepared and is under review.

Telangana: DPR for SAMAST has been submitted to PSDF and is currently under process.

Tamil Nadu: Forecasting & Scheduling Regulations are under Draft stage, and shall be finalized soon with the assistance of consultant Idam Infra.

It was agreed unanimously that MOP, POSOCO and CEA would be requested to allow the cost of interface meters also under PSDF funding and matter would be taken up in the upcoming meeting of FOR for its approval. If approved by FOR, Chairman, FOR would be requested to write to the concerned in this regard.

III. Issues pertaining to Grid Integration of Renewables and RPO- presentation by special invitee

Discussion

1) Renew Power, made presentation (attached as Annexure-III) on Issues pertaining to Grid Integration of Renewables and RPO. He highlighted that RE is emerging as cost effective option and getting competitive day by day, solar and wind have witnessed drop in cost by 44% and 29% during last one year. Further, he mentioned that few states are meeting their RPO possibly due to lenient implementation- rollover/ exemption from meeting current RPO targets.

2) Chairman, TNERC said that cost of RE technologies is decreasing significantly and now it's almost same as conventional power.

   Renew Power stated on grid integration of Renewables that states cannot absorb the targeted capacity and will have to export power outside the states. Further, he said that forecasting & scheduling mechanism is not effective in most of the states as on date. He also recommended an intra-day market to handle imbalances. He requested that State regulators be proactive in forcing the effectiveness of these regulations at the earliest.

IV. Status update on Sub-group for Regional co-operation for Optimum Utilization of Generation Resources

Discussion

1) Dr. Chatterjee presented on Load/Generation Management- Intra Day (Options for handling Variation including in RE) (attached as Annexure-IV). He proposed 7 options (as listed below) for Intra Day/Hour Ahead transactions. The pros and cons of all these options were discussed

   - Option 1: Banking – Already taking place between states. When there is higher generation in one State, it banks its power with the other and gets the same quantum of energy when it has high demand.
   - Option 2: Power Exchange (DAM price as reference) - The reference price in this case is taken as the Day Ahead price on the power exchange.
   - Option 3: Pool based on Variable Cost (VC) as approved by the Regulator and on payment of variable cost
   - Option 4: Pool based on VC as approved by the Regulator and on payment of Marginal Cost

   Options 5, 6 and 7 are based on the auction

   - Option 5: Pool based on auction for intra-day for the rest of the day

- Option 6: Pool based on auction for intra-day on hourly basis
- Option 7: Pool based on auction for intra-day on intra-hour basis i.e for 15 min. block-wise

2) To prevent any gaming, the schedule of DAM is not to be altered and only generators with surplus power beyond their Day-ahead schedule will be allowed to participate in this market. For the purpose of DSM, net schedule will be prepared and the settlement will be done accordingly.

Consensus

The Members of the Committee appreciated the presentation and consensus was arrived in taking this discussion forward. Dr. Chatterjee highlighted that above presentation has been shared with the RPCs for their feedback. Further deliberations and final recommendation shall be undertaken in the subsequent meetings of the technical Committee. Any required changes in the Power Market Regulations will be done through recommendation from the Technical Committee to CERC to operationalize this market.

V. Model Regulations for tariff Determination & other related matters for intra-State hydro Generating Stations

Discussion

1) Shri S.k Soonee, Advisor – POSOCO, presented on this subject (attached as Annexure – V). He highlighted that the Installed capacity of hydro is around 44GW but the utilization is not more than 31- 32GW only. Wherever there is two-part tariff, those plants are delivering better than other

2) He underscored that it is required to incentivize the plant for showing peaking and also to incentivize the pumped storage. Member - Telangana highlighted that the water of hydro plants is in the hand of plant operator but he has to honor other departments like irrigation etc. Sh. Soonee clarified that all the quantities of all constraints like hydrology, flood control, irrigation, drinking water etc will be honored first and after that if any margin is available that will be utilized in a better way.

3) Dr. Chatterjee also emphasized that the optimal utilization of hydro should be made through a tariff signal and States should adopt it.

4) Shri Soonee further highlighted that the ramping of thermal plants for ancillary services takes up lot of time and hydro can be used for this purpose. Scheduling process for this purpose also needs to be developed.

5) Incentivizing of Synchronous condenser operation and Blackstart was also discussed

Consensus

The Technical Committee endorsed the Model Regulations and recommended for consideration by FOR.

VI. Status update on RPO web-tool

Discussion

1) Idam Infra made a presentation (attached as Annexure-VI) on Status of Generic Renewable Purchase Obligation (RPO) Compliance Web-tool, wherein following points were covered in detail:

   - Background
   - Developments with Gujarat on RPO deployment
   - Discussions with TERI-MNRE regarding coordination for National Level Portal
   - Rolling out web tool in other states
   - Status on mandatory use of RPO - amendments in RPO regulations

2) Idam Infra also circulated dossier for RPO compliance monitoring framework and web tool describing key features, need, process flow, software requirement and approach of submission information of RPO tool.

3) Member, PSERC asked whether rooftop is covered under the current framework of RPO tool or not, on which the consultant explained about the entities covered in the current framework.

4) It was discussed that FOR will write to all SERCs regarding mandatory implementation of RPO tool in respective States and amend the necessary regulations accordingly.

Annexure-I

LIST OF PARTICIPANTS ATTENDED THE FOURTEENTH MEETING OF THE TECHNICAL COMMITTEE FOR "IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL"HELD ON 13.09.2017 AT CERC, NEW DELHI

1	Shri. A. S. Bakshi, Member	CERC
2	Shri S. Akshaya kumar, Chairperson	TNERC
3	Shri Ismail Ali Khan, Chairperson	TSERC
4	Shri Rabindra Nath Sen, Chairperson	WBERC
5	Shri A. B Bajpai, Member	MPERC
6	Shri M. S Puri, Member	HERC
7	Shri D.B. Manival Raju, Member	KERC
8	Shri P. Rama Mohan, Member	APSERC
9	Shri P.J. Thakkar, Member	GERC
10	Shri R.P Barwar, Member	RERC
11	Shri Deepak Lad, Member	MERC
12	Shri Debashish Majumdar, Member	HERC
13	Smt. Anjuli Chandra, Member	PSERC
14	Shri S.C. Shrivastava, Chief (Engg.)	CERC
15	Dr Sushanta K. Chatterjee, JC(RA)	CERC
16	Smt Shruti Deorah, Advisor – RE	CERC

17	Shri S. K.Soonee, Advisor	POSOCO
18	Shri K.V.S Baba, CEO	POSOCO
19	Shri K.V.N Pawan Kumar, Dy. Manager	POSOCO
20	Shri Siddharth Arora, Research Officer	CERC
21	Shri Ajit Pandit, Director	Consultant
22	Shri Anant Sant	Consultant
23	Shri Abhishek Dixit	Consultant
24	Shri Parag Sharma (Special Invitee)	Renew Power
25	Shri Ishan Nagpal (Special Invitee)	Renew Power
26	Shri Neeraj Gupta (Special Invitee)	Renew Power

Idam Infrastructure Advisory Pvt. Ltd.

Status update for implementation of SAMAST

For Discussions during 14th Meeting of FOR Technical Committee

September 13, 2017

Agenda Item No. 1

Status of implementation of SAMAST Report and DSM

- Status update for West Bengal
- Status update for Haryana
- Status update for Punjab

The engagement of Consultant for support to FOR and its Technical Committee is supported under USAID/GTG-RISE initiative through Deloitte and operational with effect from 1st Sep, 2017.

Status of implementation of SAMAST in West Bengal:

Scheduling, **A**ccounting, **M**etering **a**nd **S**ettlement of **T**ransactions in Electricity

Profile and ABT Status of West Bengal

Boundary meters considered for preparation of Deviation Bill

Entities	Constituent	No. of feeders	Installed Main meters
WBPDCL Generating Stations (G<>T)	BTPS	16	16
	STPS	9	9
	KTPS	14	14
	BkTPP	11	11
	SGTPP	8	8
NHPC Generating Stations (G<>T)	TLDP-III	1	1
	TLDP-IV	2	2
IPP/CPP (G<>T/C)	HEL	2	2
	TATA POWER, HALDIA	4	4
	PCBL	1	1
	CPL	2	2
	IPC(H)L	2	2
SOLAR (G<>T)	SIIPL	1	1
Distribution Licensees other than WBSEDCL (T<>D)	CESC	18	18
	DPL	4	4
	IPCL	2	2
	Total	**97**	**97**
WBSEDCL	126 S/S	T<>D	360* (TBD)

- **Additionally 44 nos . of Region-STU boundary meter data is also considered**

- Intra-state ABT, Energy accounting and Deviation settlement for all intra-state entities since 1.4. 2008 through **WBERC BSC Code Regulations, 2008**.
- Frequency linked DSM similar to CERC
- DSM liability is transferred to DISCOMs.
- 100% boundary metering is yet to be achieved.
- Data conversion through manufacturer's software & meter data processing by in-house software.
- SLDC issues following accounts/statements on its Website
  - weekly- deviation and reactive account,
  - Monthly- Declared capacity, Scheduled Energy, infirm energy generation statement, Energy Drawal Statement
  - OA charges- Intra-State STOA charges and SLDC Charges

Interface Metering at Intra-State level			
Main meters	Check meters	Standby meters	Total
97	97	79	273

Exiting ABT system under operation at state level

Meter data acquisition

- **Main meter data (97)** feeders and boundary meter (44) with STU-regional periphery
- **Raw meter data** are being received at WBSLDC **through e-mail**.
- Converting raw meter data into **.npc format** through the **software** provided by **meter manufacturers**.
- **Uploading** converted meter **data into the Server.**

Meter data processing

- **Data validation** through different error checking process and subsequent correction if required.
- **Finalization of** feeder-wise, block-wise meter data for **preparation of deviation bill** and other energy accounting reports and certificates.

Scheduling

- Real time block wise, **constituent wise Scheduling** is being done in **Microsoft Excel**.
- Preparation of **Final Schedule**.
- **Uploading Final** schedule into the server is being used for **preparation of deviation bill.**

Regional UI Energy Accounting

- **Uploading master frequency** information into server
- **Verification of regional UI bill** w.r.t. West Bengal
- **Uploading the verified block-wise** Regional UI for West Bengal into Server.

Deviation Bill for state entities

- Ascertain Block-wise **WBSEDCL schedule** (derived)
- **Ascertain Block-wise WBSEDCL actual drawal** (derived)
- **Apply notified Rules** and regulation and **calculate deviation charge**.
- Spool deviation bill related data from server and prepare Deviation bill in Microsoft Excel & publish the bill.

Gap Analysis and issues Identified in existing Energy Accounting Process

- **WBSEDCL boundary meters** are not considered for Energy accounting due to inadequate infrastructure
- During Deviation Bill processing, summation of all constituents schedule and region-state boundary schedule is considered as WBSEDCL drawal schedule.
- Similar principle is followed for meter data also for WBSEDCL
- **Raw meter data** is received at WBSLDC from all constitutes **through E-mail**.
- **Completion of boundary metering and AMR system**, however necessary communication systems and recommended Hardware and Software is not in place, hence existing AMR system can not be used.
- **Most of the existing Meters (85%) are Secure make and its software protocol is not open Source protocol**. Facing difficulties in development of AMR software compatible with meter data. Needs to address this issue urgently.
- **In-house software** used for scheduling, meter data processing and short term Open Access applications processing have **limitations of compatibility and scalability**

Preparedness for SAMAST implementation: Check List

Sr. No.	Activity	Present Status
1	Identification of Intra State Entities	completed
2	Demarcation of Interface boundary for each Intra State Entity	completed
3	Assessment of Meters - Main, Check and Standby	completed
4	Assessment of AMR logistics requirement, IT infrastructure	Yet to be started
5	Approval of the State-specific SAMAST scheme by SERC	DPR yet to be prepared
6	Commencement of load forecasting by SLDC	Since inception of SLDC
7	Commencement of Interchange Scheduling by SLDC for all the Intra State Entities	Done
8	Establishment of State Regulatory Pool Account	Done
9	Formation of State Power Committee for Energy Account preparation	Not Done
10	Completion of Boundary Metering and AMR System (as per DPR)	To be done (STU involvement necessary)
11	Implementation of Recommended IT Infrastructure (Hardware and Software)	Presently Using In-house infrastructure
12	Deviation rates as notified of WBSERC	As per CERC
13	Preparation of Energy Account by SPC/SLDC and publication of Website	Yes . By SLDC

Status Update on DPR preparation for SAMAST Implementation in West Bengal:

- **Meeting was held on 4 Sept., 2017** at WBSLDC, Howrah with WBSLDC and ERLDC team.
- Consultant elaborated on the **steps for DPR preparation**, shared the **various forms and formats** for development of DPR, **implementation roadmap** and **standard packages** to be considered for inclusion in the DPR for submission to Evaluation Committee to avail funding support from PSDF.
- Consultant has also prepared **Draft DPR** in line with DPR of MP and AP and circulated for review of WBSLDC and ERLDC. The draft DPR covers:
  - As-Is study for prevalent ABT system in West Bengal,
  - identification gaps in the existing system,
  - Technical specifications of Hardware and Software required for IT infrastructure
  - Excel formats for Cost estimate preparation.
- As WBSLDC do not have any bench mark cost reference for estimation purpose, ERLDC has shared the results of similar bids of AMR data processing for estimation purpose.
- The Consultant has also highlighted the **need for STU involvement and necessary approvals from authorities** before submission of DPR.

Status of implementation of SAMAST in Haryana:

Scheduling, **A**ccounting, **M**etering **a**nd **S**ettlement of **T**ransactions in Electricity

Profile and ABT Status of Haryana

Number of Intra State Entities whose scheduling is coordinated by SLDC					
Thermal /Hydro Stations	RES	Distribution Licensees	HT Consumers/ CPPs directly connected to STU	interstate STOA customers	Total Intra State Entities
2	-	2	31	349	384

Interface points of Intra-State Entities with Intra-State Grid of Haryana						
G-T	RES-T	ISTS - InSTS	D-T	HT-T	OA-T	Total
32	6	69	920	34	17	1078

Interface Metering at Intra-State level for Haryana				
Main meters	Check meters	Standby meters	Total interface energy meters	AMR
835	680	0	1515	No

- Haryana is particularly a State where loads are catered by small transmission lines but large no. of interface points and sub-stations to cater the load and maintain voltage profile as per Norms.
- Haryana state has implemented deviation settlement system for IPPs selling power to the Discoms under open access in the State.
- **Deviation Settlement system Status**: Partial - Applicable for Open Access transactions
- Haryana Vidyut Prasaran Nigam Limited (HVPNL)/SLDC is the Pool account administrator

SAMAST Implementation progress for Haryana:

- Meeting on 31.08.2017 in CERC with Members of HERC, to discuss the SAMAST report.
- Presentation to the Members on the rationale behind SAMAST and the steps required to be taken by various agencies in the States to roll out SAMAST.
- After discussion it was agreed that the consultant (viz., M/s. Idam Infrastructure) engaged for Technical Committee may visit HERC office.
- **Meeting was held on 7th Sept., 2017** at HERC, Chandigarh with HERC, HVPNL (STU), SLDC team.
- Presentation made by consultant on key features of SAMAST and implementation roadmap.
- Elaborated on the **steps for DPR preparation**, shared the **various forms and formats** for development of DPR and **standard packages** to be considered for inclusion in the DPR for submission to Evaluation Committee to avail funding support from PSDF.
- Consultant emphasized the need for **framing of Regulations for Deviation Settlement Mechanism** at state level and highlighted the Model DSM Regulations at state level as prepared by FOR.
- HERC requested for support in framing of DSM Regulations at state level taking into account prevalent electricity market structure in Haryana and other state specific considerations.

Key Issues for consideration

- **Existing practice of scheduling, power procurement and load generation balancing at state level**
  - Settlement of energy transactions of Intra-state Generating Stations on 'actual' energy basis
  - Haryana Power Procurement Centre acting on behalf of both Distribution Licensees; collectively.
  - Need for separate deviation accounting for DISCOMs
  - Need for Inter-se balancing of input costs of DISCOMs to maintain uniform retail tariff and parity in agriculture subsidy,
- Treatment for **Deviation Settlement mechanism of Open Access transactions** as per prevalent Open Access Regulations, 2013
  - Full OA transactions
  - Partial/Embedded OA transactions
- The regulatory guidance on these matters is necessary for design of framework, energy accounting and settlement system. This would influence the complexities of energy accounting, scheduling and deviation settlement software systems and timeline for implementation.
- State level DSM Regulations will have to guide the process and constitution of SPC could facilitate/guide the process.

Status of implementation of SAMAST in Punjab:

Scheduling, **A**ccounting, **M**etering **a**nd **S**ettlement of **T**ransactions in Electricity

Profile and ABT Status of Punjab

Interface points of Intra-State Entities with Intra-State Grid						
G-T	RES-T	ISTS - InSTS	D-T	HT-T	OA-T	Total
121	0	62	398	20	0	601

Interface Metering at Intra-State level for Punjab				
Main meters	Check meters	Standby meters	Total interface energy meters	AMR
593	89	48	730	Yes

Number of Intra State Entities whose scheduling is coordinated by SLDC					
Thermal /Hydro Stations	RES	Distribution Licensees	HT Consumers/ CPPs directly connected to STU	interstate STOA customers	Total Intra State Entities
2		1	0	248	251

- Punjab state has implemented deviation settlement system only for IPPs selling power to the Discoms under open access in the respective State
- **Deviation Settlement system Status**: Partial - Applicable for Open Access transactions
- Open Access transactions have reduced significantly in the recent past.
- PSPCL operates combined business of Generation and Distribution

SAMAST Implementation progress for Punjab:

- Consultant had a meeting with Member, PSERC on 7th September, 2017.
- The consultant highlighted key features of SAMAST, implementation roadmap and elaborated on the steps for DPR preparation.
- Member, PSERC raised the **issue of functional segregation between generation and distribution function** of PSPCL, which would require further deliberations.
- The Consultant highlighted the **need for putting in place energy accounting framework and corresponding metering/communication infrastructure** in place and how SAMAST implementation would facilitate the same.
- Member, PSERC agreed to **convene a meeting with STU/SLDC to seek inputs as per SAMAST Check List** and convene further meetings with STU/SLDC to take forward this initiative.

Idam Infrastructure Advisory Pvt. Ltd.

Thank You

Contact:

Balawant Joshi +(91) 98214 21630
Ajit Pandit +(91) 98211 08222

Email:
contact@idaminfra.com

Mumbai

801, Crystal Plaza,
158, CST Road,
Kalina, Santacruz (E),
Mumbai – 400 098
Tel: +(91) 22 4057 0200

Delhi

513-516, Narain Manzil
23, Barakhamba Road
New Delhi - 110 001
Phone: + (91) 11 4943 4000

Kolkata

T2, 8C, Millennium City IT Park,
DN 62, Sector V, Salt Lake, Kolkata
700091
Phone: +91 33 3012 8485

Hyderabad

House No. 3-51, Flat No. 201
Abhishek Towers, (Opp. HAL
Gate), Balanagar
Hyderabad – 500 042.
Phone: +91 40 6999 8062

Framework for DPR : Key Components

Hardware Components-I

- ABT Meters
- Instrument Transformers (CT/PT)
- Calibration of Meters
- Automated Meter Reading Instruments (CMRI)
- Installation & testing

Hardware Components-II

- Servers (database, application, domain, web, anti-virus)
- Storage SAN
- UPS/firewall/Rack for Server,
- Laptops/Desktops Printers, Monitoring Screens
- Installation & testing

Software Components

- Operating Systems and Software Licensing
- Scheduling s/f Module
- OA s/f Module
- Energy Accounting Module
- Billing & SLDC Report Module
- Financial Accounting and Statutory Compliance
- Testing/Trial runs

Communication Components

- Modems
- DCUs at field
- GPRS/GSM connectivity for sites
- MPLS communication lines
- Internet & telephone connectivity
- Installation & testing

Training, Cap. Building and Infra Dev. Components

- Training & Capacity Building
- AMC for Hardware & Software
- Office space within Building/ Premises
- Furniture & Fixtures
- Air-conditioning system
- Project Mgmt/IT consultant

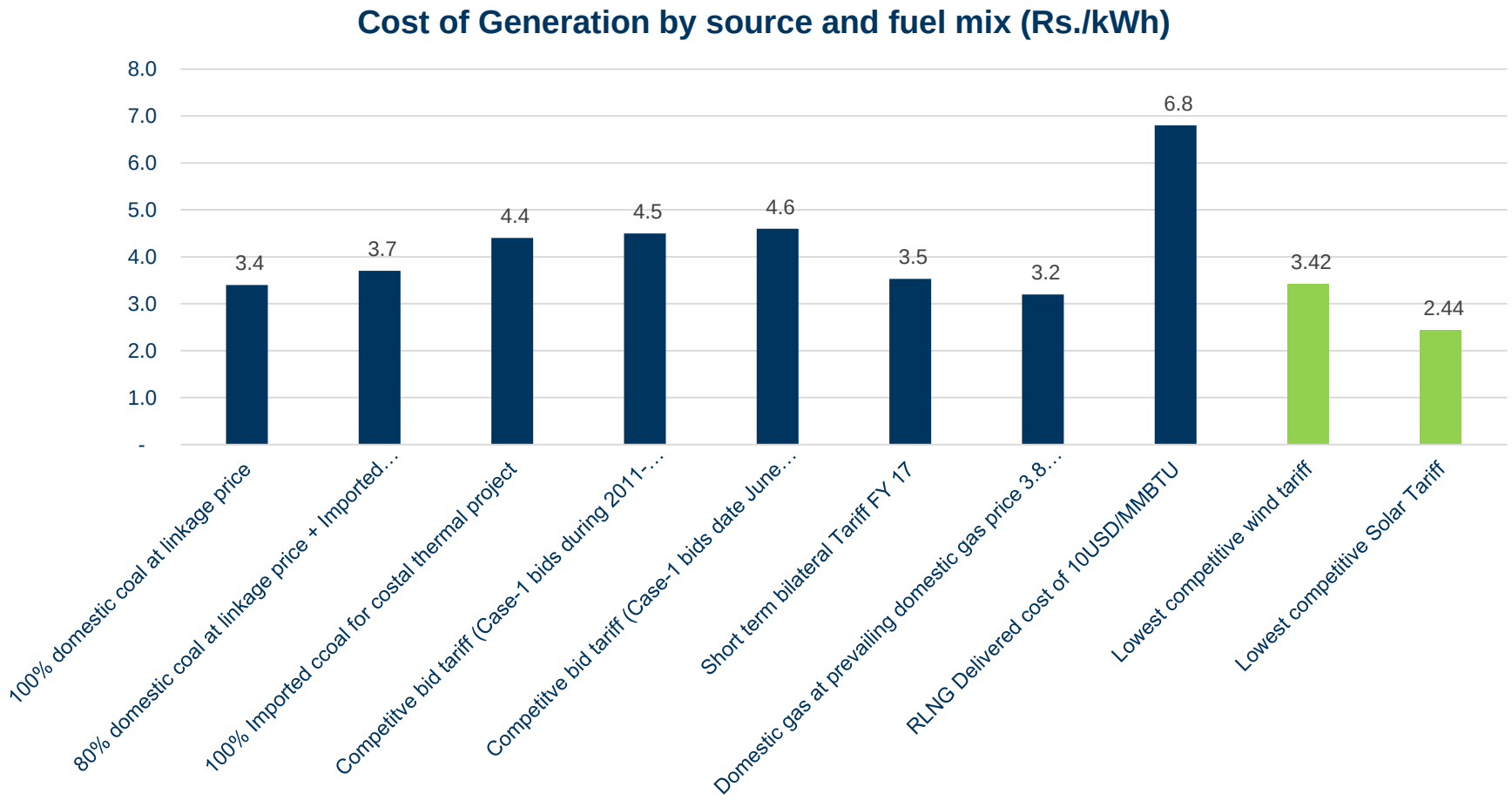
Forum Of Regulators

September 2017

ReNew POWER

Renewable Purchase Obligation Compliance

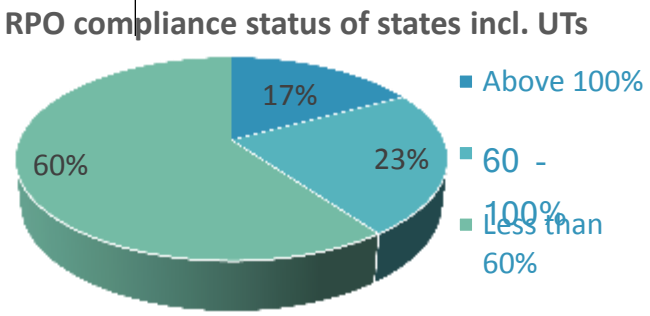
Cost of Generation Comparison

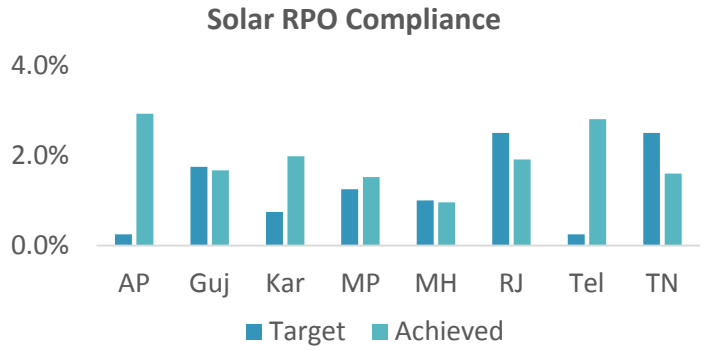


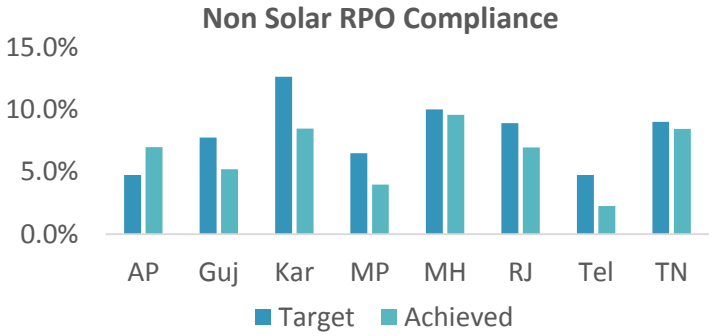
- **Renewable energy is emerging as cost effective option and getting competitive day by day**
- **Solar and Wind has witnessed drop in cost by 44% and 29% during last one year**

Source: ICRA Research

RPO Compliance status



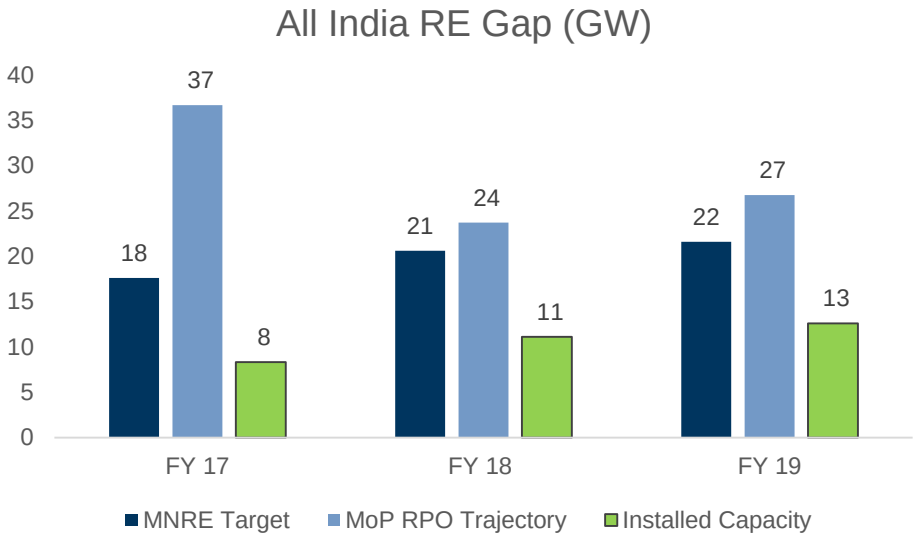




RPO compliance issues

- Only 17% states meeting mandated RPO.
- 60% of the states had RPO compliance levels less than 60% - FY-16.
- Lenient implementation – rollover/ exemption from meeting current RPO targets
- Exemption of RPO to the extent of waste heat generation despite clarification under NTP.
- Subdued REC market - Demand was 3-5% of the supply.
- **State Commissions not adopting the RPO trajectory specified by MoP.**
- Only Chhattisgarh has adopted RPO trajectory as per MoP guidelines
- MoP allowed a roll forward of RPO for UP by 7 years; Orissa discoms have got a stay enforcement of RPO from the state HC
- GERC allowed compensation of Non-Solar RPO via Solar RPO and reduction of target to the extent of shortfall
- Several SERCs have not enforced RPO on customers under the Open Access regime

All India RE capacity GAP



Tamil Nadu	FY 17	FY 18	FY 19
State RPO Trajectory	726	1885	2116
MoP RPO trajectory	737	1989	2277
Installed Capacity	9205	-	-

Maharashtra	FY 17	FY 18	FY 19
State RPO Trajectory	**265**	**1,317**	**1,293**
MoP RPO trajectory	**1,093**	**1,658**	**2,379**
Installed Capacity	**5,084**	-	-

- As per targets 48 GW of solar & 43 GW of wind to be installed by FY 19
- Additional 38 GW of solar and 13 GW of wind is required by FY 19.
- The RE rich states can accommodate 18 GW of Solar and 13 GW of Wind.

Proactive and RE resource rich states have exceeded or are close to their RPO targets; second phase will have to be driven by other states

Way forward

- Robust Regulatory Frame work for RPO compliance with provision of penalty and incentives.**(Mandatory Compliance reporting to SNAs)**
- Creation of RPO Regulatory fund for meet the shortfall **(MERC has already taken initiatives)**
- Refraining Rollover of RPO targets to next year. **(SERC's to ensure compliance)**
- Encouraging procurement through long term contracts **(Less dependency on short term procurement).**
- Cogeneration from sources other than RE should be under the purview of RE applicability. **(NTP 2016)**
- Facilitating inter-state exchange of RE power: **(competitive biddings at central level)**
- Mandatory compliance to MoP RPO Trajectory.

Grid Integration of Renewables

Background

- Electricity demand and supply need to matched at all times.
- Increasing variable energy increases the threat of blackout if not managed with systematic planning.
- Challenges exist in achieving the ambitious target of 175 GW of renewable energy by 2022
- Table Below illustrates the likely grid position in FY22 for the month of July, which is assumed to have peak renewable generation. Considerations for analysis:
  - Coal based projects have to maintain technical minimum PLF of 55%
  - Hydro and gas based plants can be fully shut down
  - Renewable generation during peak hours is estimated considering 40% CUF for solar and 70% for wind
- The analysis suggests that the states can not absorb the targeted capacity and will have to export power outside the state.

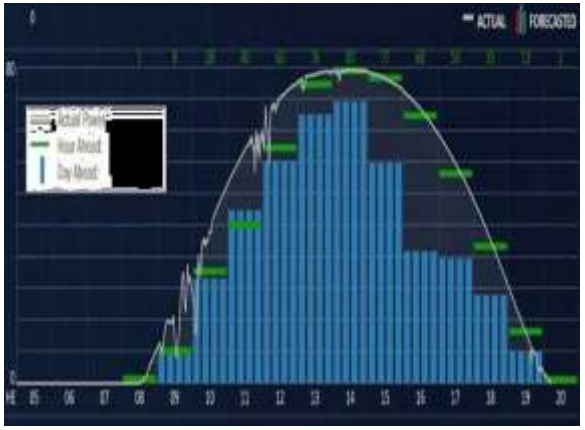
Scenario July 2022	Renewable target capacity **(GW)**	Average demand (GW)	Technical minimum conventional capacity (GW)	Balance demand **(GW)**	Average renewable generation **(GW)**	Likely back down of renewables during peak
Tamil Nadu	21.5	19	8.7	10.4	12.2	15%
Gujarat	17.1	17.7	14	3.7	9.5	61%
Rajasthan	14.4	10.1	6.1	4	8.3	52%
Maharashtra	22	22.4	13.8	8.7	11.1	22%
Karnataka	14.8	11.2	5.6	5.6	7.8	28%
M.P	12	8.5	6.5	2	6.7	70%
A.P	18.5	10.2	4.6	5.6	9.8	43%

Source: Ernst & Young Report

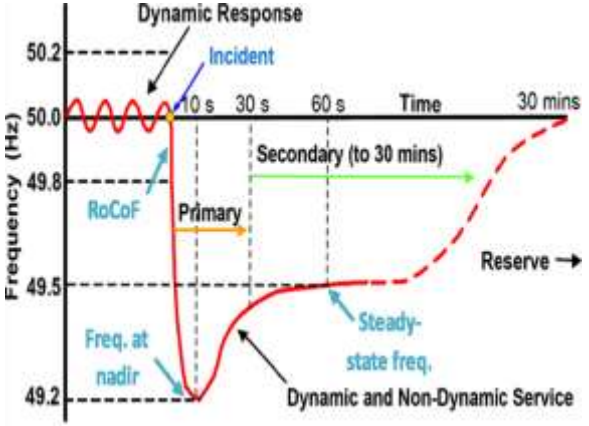
Background

- Supply-demand imbalances can be broadly be seen in three segments:
  - Planning for the seasonal variations (Timeframe: months)
  - Planning for continuous balancing (Timeframe: day to minutes)
  - Planning for instantaneous balancing (Timeframe: seconds to minutes)
- Managing timeframe 1 require investment in grid strengthening and changes in market mechanisms.
- Managing timeframe 2 require better planning in terms of forecasting and scheduling
- Managing timeframe 3 require immediate reaction by primary and secondary reserves

Timeframe 1: months to Year



Timeframe 2: day to minutes



Timeframe 3: seconds to minutes

Grid Integration - Entities that Matter

System Operator / Transmission / State Utilities	Regulator (CERC / SERCs)	Generation / Demand Side

• Implementation of Scheduling and Forecasting regulation
• Implementation of Imbalance Market (Ancillary Market)
• Implementation of Frequency Response (Primary Response).
• Implementation of Renewable Energy Management Centres
• Standards and Regulatory Framework for incentivizing "Flexibility" in Conventional Generation
• Capacity Building of SLDCs particularly in RE Rich States
  ◦ Manpower training
  ◦ Implementation of SAMAST at state level
• Strengthening of the transmission network – Green Energy Corridor
	• Scheduling and Forecasting Mechanism
	• Regulatory Framework for Reserves
	• Imbalance Market: Regulatory Framework for Ancillary Services Operation (implemented at National Level by NLDC)
	• Regulatory Framework for Secondary Response
	• Regulatory Framework for Communication in Power Sector, Availability of Real Time Data at the SLDCs/RLDCs/NLDC particularly of generators
		• Technical Standards and Protection Requirements for Renewables
		• Scheduling and Forecasting by the Generators

Summary of Scheduling & Forecasting Regulations

S.No.	State	Parameters						
		Applicability	Settlement Base	Error Base	Permissible Deviation (+/-)	Penalty on Deviation	Category	Status
1	Central	All Wind & Solar	Scheduled Generation	Available Capacity	15% for all	% of PPA	A	Finalized & Efffective
2	MP	All Wind & Solar	Actual Generation	Available Capacity	15% for all	Fixed rate	B	Final awaited
3	Karnataka	Wind > 10 MW Solar > 5 MW	Actual Generation	Available Capacity	15% for all	Fixed rate	B	Finalized , Effective from 01.06.2017
4	Rajasthan	All Wind & Solar > 5 MW	Actual Generation	Available Capacity	15% for all	Fixed rate	B	Final awaited
5	Jharkhand	All wind & Solar	Actual Generation	Available Capacity	Old: 15% New: 10%	Fixed rate	B	Final awaited
6	Andhra Pradesh	All Wind & Solar	Actual Generation	Available Capacity	Over Inj: 10% Under InJ=15%	Fixed rate	B	Final awaited
7	Tamilnadu	All Wind & Solar	Actual Generation	Available Capacity	solar: 5%, Wind: 10%	Fixed rate	B	Final awaited
8	Gujarata	All Wind & Solar	Actual Generation	Available Capacity	Solar: 7%, Wind Old: 12% Wind New: 8%	Fixed rate	C	Draft Floated
9	Odisha	All Wind & Solar	Scheduled Generation	Available Capacity	15% for all	% of PPA	A	Final awaited

S.No.	Category	No. of Bands	Bandwidth	Penalty (Rs./kWh)	
				Minimum	Maximum
1	A	3	10%	10% of PPA Rate	30% of PPA Rate
2	B	3	10%	0.50	1.50
3	C	3	8%	0.60	1.80

Forecasting & Scheduling mechanism is not effective in most of the states as of date. State regulators have to be proactive in forcing the effectiveness of these regulations at the earliest.

State Load Dispatch Center – Capacity Building Requirements

Capacity Building / Infrastructure requirements at SLDC

- Detailed survey like SAMAST to be conducted at SLDC level.
- Deployment of adequate manpower.
- Implementation of AMR to be paced up for real time data collection. (basic requirement for F&S implementation).
- System automation to reduce the response time.
- Establishment of REMC and its integration with SLDC.
- Central guidelines for procurement and implementation of technologies to ensure hassle free integration among LDCs.
- Skill development program for manpower manning LDCs and REMCs.

Way Forward

- Appropriate Regulatory Framework for handling Inter-State Deviations especially for Large and High RE Penetration States.

- Forecasting and scheduling
  - Forecasting of net load (total load – RE Generation) to be introduced – all available RE to be dispatched
  - Forecasting and scheduling of renewable generation

- Deployment of reserves
  - Identification of reserves and their segregation into primary, secondary and tertiary
  - 5% spinning reserve as per National Electricity Policy to be implemented in spirit

- Frequency Control
  - With increasing interchanges between areas, proper frequency regulation brings out the need for primary control supplemented by secondary control and tertiary control
  - Pilot test for testing of response of few generating stations

- Flexible Generation
  - Flexibility in existing fleet of conventional generation as well as Pumped Storage Plants, Demand Side Management may be utilized –
  - technical minimum of 55% specified by CEA for old sets and 40% for supercritical units

- Market Design Enhancements
  - More frequent clearing in markets – creation of market by CERC/ identification of balancing area
  - Introduction of new products in the market

Way Forward

- Transmission Augmentation
  - Need for system strengthening – implementation of green corridor
  - Technical Standards for RE grid integration – CEA has framed the regulations on technical requirement
  - Introduction of robust communication system between generators and LDCs

Capacity building

- Development of renewable energy management centres
- Developing skills of employees at SLDC level – identification of gaps

Action Plan

S.No.	Action Required	Action By
1	Load Forecasting as per IEGC Section 5.3	States
2	Demonstration of Adequacy of Balanced Portfolio	States / SLDCs
3	Regulatory Framework for Intra-State Settlement System and Imbalance Handling Mechanism (already implemented at inter-state level)	SERCs / SLDCs (implemented by few states)
4	Regulatory Framework for Forecasting of Renewable Generation and Scheduling and Implementation at interstate level (already implemented at inter-state level)	CERC, NLDC, RLDCs, RE Generators, REMC
5	Regulatory Framework for Forecasting of Renewable Generation and Scheduling including Aggregators (or Qualified Scheduling Entities) and Implementation at intra-state level	SERCs / FOR / MNRE, SLDCs, RE Generator REMCs
6	Regulatory Framework for Reserves	CERC, SERCs
7	Regulatory Framework for Ancillary Services Operation, Implementation of Ancillary Services	CERC, NLDC, RLDCs, RPCs
8	Implementation of Frequency Response (Primary Response)	All Generators
9	Regulatory Framework for Secondary Response (AGC)	CERC, SERCs
10	Technical Standards and Protection Requirements for Renewables such as LVRT, FRT, etc.	CEA, CTU, STUs, RE Generator
11	Market Design – Frequent clearing, more opportunities, New entities (Aggregators)	CERC
12	Regulatory Framework for Communication in Power Sector, Availability of Real Time Data at the SLDCs/RLDCs/NLDC	CERC, RE Generators, SLDCs, RLDCs, NLDC
13	Implementation of Renewable Energy Management Centers (REMCs)	CTU, STU, SLDCs, RLDCs, NLDC
14	Standards and Regulatory Framework for introducing “Flexibility” in Generation	CEA, CERC

Thank You

ReNew POWER

Load/Generation Management – Intra Day

(Options for Handling Variation including in RE)

Presentation

before

FOR Technical Committee

13.9.2017

Dr. Sushanta K. Chatterjee*
Joint Chief (Regulatory Affairs)
Central Electricity Regulatory Commission

*Views expressed are personal

Options for "Intra Day / Hour Ahead" Transactions

PX – Power Exchange
DAM – Day Ahead Market
VC – Variable Cost
MC – Marginal Cost

Option-1 for "Intra Day / Hour Ahead" Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 1:	Banking	- Voluntary; - No price transaction; - Easy to implement	- Still bilateral; - Opaque to cheaper options; - True marginal cost of meeting demand not known; - Elements of Cost and Value missing; - No knowledge of gain or loss

Option-2 for “Intra Day / Hour Ahead” Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 2:	PX, DAM price as reference for settlement	- Well accepted reference price - Dispute free	- Very remote chance of availability of generation sources with marginal cost equal to or less than DAM price - Liquidity will always be an issue

PX – Power Exchange
DAM – Day Ahead Market

Option-3 for "Intra Day / Hour Ahead" Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 3:	Pool based on regulator approved VC / and pay as per cost.	- Visibility of all options for purchase decision - Dispute free as regulator approved VC - All resources get paid as per their cost or marginal cost - Improvement over option 2, liquidity	- still based on cost and not on value. - VC difficult to ascertain - Merchant plants cannot participate as their tariffs are not determined by regulator

VC – Variable Cost

Option-4 for "Intra Day / Hour Ahead" Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 4:	Pool based on regulator approved VC / and pay as per marginal cost.	- Same as Option 3 - Improvement over Option 3 – element of 'value' introduced because of marginal cost based payment	- VC difficult to ascertain - Merchant plants cannot participate as their tariffs are not determined by regulator - Payment based on marginal cost may lead to heart burn - still administered

VC – Variable Cost

Option-5 for "Intra Day / Hour Ahead" Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 5:	**- Pool based on auction (collective transaction)** - Auction based ✓ Double sided closed bidding ✓ Bidding platform at RPC level/PX ✓ Monitoring Committee at RPC level. **Illustration** ✓ 7.30 – 8.00 – for ---rest of the day, and so on ✓ Until 7.30 am discoms can self – schedule for rest of the day, if they so desire. ✓ 7.30 am onwards, no right for self scheduling for rest of the day (This will need change in existing re-call facility of one hour) This is not going to adversely affect discoms' right to recall as they will have several reference price points every hour to take a call on self scheduling. **Participants** - State Gencos inclining RE, on their own , or - Discoms on their behalf - Discoms as buyers and sellers - ISGS - IPPs/MPP	**- Market Discovered Price** **- Dispute free** **- Not administered** **- Akin to DAM but closer to real time**	**- Preparedness of PX** **- Discoms decision making process** **- OA registry, a pre-requisite**

PX – Power Exchange
DAM – Day Ahead Market
OA – Open Access
ISGS – Inter-State Generating Station
IPP – Independent Power Producer
MPP – Merchant Power Producer

Option-6 for "Intra Day / Hour Ahead" Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 6:	- Pool based on auction (collective transaction) - Auction based ✓ Double sided closed bidding ✓ Bidding platform at RPC level/PX ✓ Monitoring Committee at RPC level. **Illustration** ✓ 7.30 – 8.00 – for ---9.00 to 10.00 and so on ✓ Until 7.30 am discoms can self – schedule for, 9.00 to 10.00 if they so desire. ✓ 7.30 am onwards, no right for self scheduling for 9.00 to 10.00 (This will need change in existing re-call facility of one hour) This is not going to adversely affect discoms' right to recall as they will have several reference price points every hour to take a call on self scheduling, say for 9.00 to 10.00 and so on. **Participants** - State Gencos inclining RE, on their own , or - Discoms on their behalf - Discoms as buyers and sellers - ISGS - IPPs/MPP	- Market Discovered Price - Dispute free - Not administered - Akin to DAM but closer to real time	- Preparedness of PX - Discoms decision making process - OA registry, a pre-requisite

PX – Power Exchange
DAM – Day Ahead Market
OA – Open Access
ISGS – Inter-State Generating Station
IPP – Independent Power Producer
MPP – Merchant Power Producer

Option-7 for "Intra Day / Hour Ahead" Electricity Transactions

Options For Hour Ahead Transactions		Pros	Cons
Option 7:	**- Pool based on auction (collective transaction)** - Auction based ✓ Double sided closed bidding ✓ Bidding platform at RPC level/PX ✓ Monitoring Committee at RPC level. **Illustration** ✓ 7.30 – 8.00 – for ---9.00 to 9.15 and so on ✓ Until 7.30 am discoms can self – schedule for 9.00 to 9.15 time block, if they so desire. ✓ 7.30 am onwards, no light for self scheduling for 9.00 – 9.15 block (This will need change in existing re-call facility of one hour) This is not going to adversely affect discoms' right to recall as they will have several reference price points every hour to take a call on self scheduling, say for 9.00 – 9.15 and so on **Participants** - State Gencos inclining RE, on their own , or - Discoms on their behalf - Discoms as buyers and sellers - ISGS - IPPs/MPP	**- Market Discovered Price** **- Dispute free** **- Not administered** **- Akin to DAM but closer to real time**	**- Preparedness of PX** **- Discoms decision making process** **- OA registry, a pre-requisite**

PX – Power Exchange
DAM – Day Ahead Market
OA – Open Access
ISGS – Inter-State Generating Station
IPP – Independent Power Producer
MPP – Merchant Power Producer

Process Flow

Illustration

- Auction: 7.30 Hrs. – 8.00 Hrs. window, transaction for 'rest of the day' (Intra-day : Option 5) / 'for 9.00 – 10.00 Hrs.' (Hourly : Option 6) / 'for 9.00 – 9.15 Hrs.' (Intra-hour : Option 7), and so on
- Generators can participate for sale of surplus power (over and above already scheduled on day-ahead basis)
- Sellers (other than generators) and buyers can participate for surplus / deficit vis-à-vis their schedule on day-ahead basis
- After the trade materializes under Option 5, 6 or 7 as the case may be, net schedule for the buyers and sellers shall be prepared, which will serve as reference point for Deviation Settlement Mechanism (DSM) / Unscheduled Interchange (UI)
- However, payment for 'Day-ahead' transaction and 'Intra-day' (Option 5) / 'Hourly' (Option 6) / 'Intra-hour' (Option 7) transactions shall be settled separately based on the schedules for the respective segments
- Open Access Registry and delegation of decision making authority to operating level at Discom are pre-conditions to success of this framework

Thank you

Model- Intra State Hydro Tariff Regulation

Draft

Tariff Structure

- Annual Fixed Charges (AFC)
  - Return on equity; Depreciation;
  - Interest on loan capital; Interest on working capital; and
  - Operation and maintenance expense
- Base Rate for Return on Equity
  - 15.5 % for RoR Hydro;
  - 16.5 % for Storage & Pumped Storage Type Hydro Power stations
  - Additional 0.5 % for timely completion;
  - 1% deduction in case of commissioning without Peaking/FGMO/PSS/Communication/Blackstart/Synchronous Condenser facility wherever applicable
- AFC recovery through Two-part tariff
  - Capacity Charge (50% of AFC) ; PAF to be more than or equal to NAPF
  - Energy Charge (50% of AFC, Energy rate computed by using Design Energy)
- Deviation Charge to be computed as per Deviation Settlement Mechanism
  - Ex-ante schedule to be sacrosanct

Capacity Charge – Hydro Station (other than PSP)

- 100 % recovery of Capacity Charge if Plant Availability Factor (PAF) is more than equal to Normative Plant Availability Factor (NAPF)
- AFC x 0.5 x (NDM / NDY) x (PAFM / NAPAF) (in Rupees)
  - AFC = Annual fixed cost specified for the year, in Rupees
  - NAPAF = Normative plant availability factor in percentage
  - NDM = Number of days in the month
  - NDY = Number of days in the year

$$PAFM = \frac{10000 \times \sum_{i=1}^{N} DC_i}{\{N \times IC \times (100 - AUX)\}} \%$$

- AUX = Normative auxiliary energy consumption in percentage
- DCi = Declared capacity (in ex-bus MW) for the i^{th} day of the month which the station can deliver for at least three (3) hours, as certified by the SLDC after the day is over. The three (3) hour period shall be decided by the SLDC.
- Pumped Storage Station to submit DC for generation mode as well as Pumping Mode
- IC = Installed capacity (in MW) of the complete generating station
- N = Number of days in the month
- PAFM = Plant availability factor achieved during the month, in percentage

Energy Charge - Hydro Station other than PSP

- Energy charge rate = AFC x 0.5 x 10 / {DE x (100 – AUX) x (100 – FEHS)}
  - DE (MWh) = Annual design energy specified for the Hydro generating station
  - FEHS (%) = Free energy for the home State
- Energy charge rate shall be capped at Rs 0.90/Unit
- Saleable Energy in excess of the Design Energy shall be billed at Rs. 0.90/unit
  - Provided that in a year following a year in which total energy generated was less than the design energy for reasons beyond the control of the generating company, the energy charge rate shall be reduced to ninety paise per kWh after the energy charge shortfall of the previous year has been made up;
- The energy charge shall be payable by every beneficiary for the total energy scheduled to be supplied to the beneficiary, excluding free energy, if any, during the calendar month, on ex power plant basis, at the computed energy charge rate. Total Energy charge payable to the generating company for a month shall be:
- (Energy charge rate in Rs. / kWh) x {Scheduled energy (ex-bus) for the month in kWh} x (100 – FEHS) / 100

Capacity Charge-Pumped Storage Station

- **CC = (AFC x NDM / NDY) (in Rupees),**
  - *if, actual Generation during the month is >= P % of the Pumping Energy consumed by the station during the month;* OR
- **CC = {(AFC x NDM / NDY) x (actual generation during the month during peak hours/ P % of the Pumping Energy consumed by the station during the month)** (in Rupees)},
  - *if actual Generation during the month is < P % of the Pumping Energy consumed by the station during the month;*
- Where,
  - AFC = Annual fixed cost specified for the year, in Rupees
  - NDM = Number of days in the month
  - NDY = Number of days in the year
- Provided that the total capacity charges recovered during the year shall be adjusted on pro-rata basis in the following manner in the event of total machine outages in a year exceeds 15%:
- **(ACC) adj = (ACC) R x (100- ATO)/85**
- Where,
  - (ACC)adj – Adjusted Annual Capacity Charges
  - (ACC) R – Annual Capacity Charges recovered
  - ATO - Total Outages in percentage for the year including forced and planned outages

Energy Charge-PSP

- **Energy charge** payable to the generating company for a month shall be:
- = 0.20 x {Scheduled energy (ex-bus) for the month in kWh – (Design Energy for the month (DEm) + P % of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir of the month)} x (100 –FEHS) / 100.
- Where,
- P = Normative Pumping Efficiency in %
- DEm = Design energy for the month in MWh
- FEHS = Free energy for home State, in per cent, if any.
  - Provided that in case the Scheduled energy in a month is less than the Design Energy for the month plus P % of the energy utilized in pumping the water from the lower elevation reservoir to the higher elevation reservoir of the month, then the energy charges payable by the beneficiaries shall be zero

Submission of Undertaking prior to COD

- Successful trial operation for 12 hours
- Black Start Capability
- Islanded Operation / House load operation
- Dead bus charging and line charging capability
- Auto synchronization
- Peaking Capability (110 %)
- Dynamic VAR support as per the capability curve
- Frequency Response (Primary & Secondary)
- Synchronous Condenser Mode of Operation wherever applicable
- Pumped Mode of Operation wherever applicable
- Part-load operation
- Ramp-up capability
- Ramp-down capability
- AVR and Power System Stabilizer wherever applicable

Scheduling

- By 0600 hrs: Submission from Station to SLDC for next day
  - Number of units mechanically available
  - Ex power plant DC in MW, Max MW including overload
  - Total MWh based on inflows and water release protocol
  - Ramp-Up and Ramp down rates (in MW/minute)
  - Despatch Constraints (if any)
- By 0800 hrs: Entitlement of beneficiaries as per allocations
- By 1000 hrs: Requisition in the Station by beneficiaries
- By 1200 hrs: Optimized Injection Schedule for the Station and the drawal schedule of the beneficiaries from the Station
  - Anticipated Net load, Requisition of the beneficiaries, Pattern of MCP in the power exchange etc to be considered during moderation

Synchronous Condenser Operation

- Demonstration of Synchronous Condenser Mode of Operation (SCMO) at-least once in a calendar month as per SLDC instructions
  - when voltage is more than 103% or less than 97% of the nominal value at the interface point of the station with the grid.
- Active power drawn during SCMO to be socialized and included in pooled transmission loss by the SLDC during preparation of state energy accounts.
- VARh exchange payable @ 25 p/kVArh subject to periodic review by the Commission

Blackstart

- Demonstration of Blackstart at least once every year
  - Surviving separation from Grid & islanded operation
  - Auto-Start facility of Black Start Diesel Generator (BSDG) set
  - Blackstart of unit, Dead bus & line charging
  - Island build-up and operation with remote load
  - Island synchronisation with the grid
- Testing of Diesel Generator sets (BSDG) for black start on weekly basis
- Fuel stock (useable under black out conditions) to be maintained in sufficient quantity to operate at full for a minimum of 20 hours and/or at 50% of accredited capacity for 40 hours
- Reimbursement of O&M expenses incurred during Blackstart
- Lumpsum incentive of Rs. 0.5 Lakh for successful demonstration of blackstart capability by the Station subject to certification by the SLDC

PARTNERSHIP TO ADVANCE CLEAN ENERGY-DEPLOYMENT TECHNICAL ASSISTANCE PROGRAM

Agenda Item-4 : Status of Generic Renewable Purchase Obligation Compliance Web-tool

Presented to: Forum of Regulators – 14th Technical Committee Meeting
Date: September 13, 2017

Contents

- Background
- Developments with Gujarat on RPO deployment
- Discussions with TERI-MNRE regarding coordination for National level Portal
- Rolling out web tool in other states
- Status on mandatory use of RPO - amendments in RPO regulations

Background of RPO compliance monitoring Webtool and related discussions during earlier meetings of Technical Committee

1. RPO compliance monitoring Web tool has been developed for Rajasthan, as an initiative under USAID PACE-D TA programme
2. FOR referred to Technical Committee to explore the possibilities for scaling up
3. The committee deliberated on need of generic web tool for RPO monitoring by states and agreed upon for necessity of framing Regulatory support for web tool implementation
4. During 10th meeting, presented the regulatory interventions required for rolling out the web tool for SERCs for monitoring compliance of RPO
5. Decided to develop Generic RPO Webtool to be ready for two states viz. (Rajasthan and Gujarat)
6. During 11th meeting, presented the details of Beta Version of Generic RPO tools with modalities
7. During 12th meeting, presented updates on customization of tool for Gujarat and received consent from Technical Committee for rolling out RPO tool in other states

RPO Deployment in Gujarat – Status Update

- **Gujarat Electricity Regulatory Commission (GERC)** constituted Working Group for implementation of RPO Web Tool in the State of Gujarat;
- GERC organised first meeting of Working Group on July 20, 2017 to discuss and finalized the key functionalities of RPO Web Tool;
- The USAID PACE-D TA Program presented the key functionalities of Web Tool such as data updation, verification process, ownership, reporting guidelines and procedures etc.
- GERC appointed Gujarat Energy Development Agency (GEDA) as nodal agency to own and host the proposed RPO Web Tool for the state of Gujarat (Vide letter dated August 21, 2017)
- The Program shared the Web Hosting Requirement with GEDA;
- Meeting is called by GEDA on September 20, 2017 to discuss the implementation modalities such as sharing of source code, security audit, pilot testing etc.

Coordinated approach with MNRE/TERI

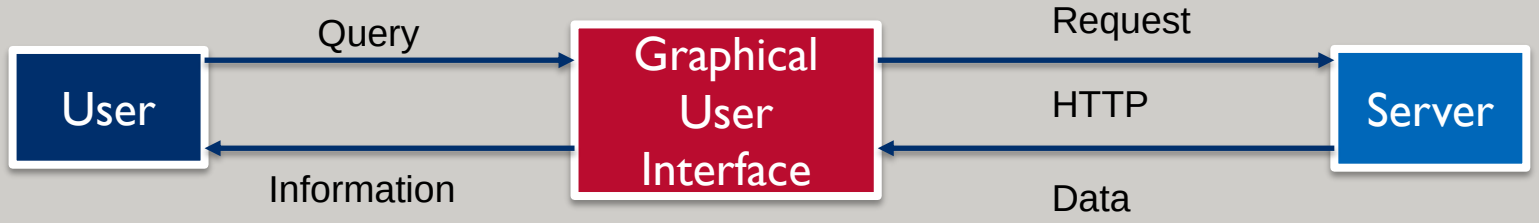
- TERI has developed a National-level RPO reporting tool in support with MNRE. A meeting was convened at CERC, New Delhi on 01.08.2017, wherein representatives from MNRE, CERC, PACE-D and TERI had a discussion on the modalities of the web-tool and its implementation in the remaining states.
  - ✓ Both tools can be configured based on specific features of RPO regulations for the State
  - ✓ The tools are flexible to be used in any state
  - ✓ Both tools complement each other and can be integrated for data sharing

- Subsequently, the PACE-D TA Program conducted meetings with TERI and presented the features of Generic RPO Webtool. The modalities of integration of data from Generic RPO webtool into National Portal under development by TERI have been finalized in consultation with their IT teams.
  - ✓ Suggested data integration via API method , TERI gave consent on data sharing method

Application Programming Interface (API)

API is a set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.

Generally, it is a query based program which fetches data from a server as requested by the Client.



Steps for integration of data via API:

- The consultants will provide an API link to TERI.
- TERI will get useful data in raw format.
- TERI will convert data into desired formats.

General API based application:

a) Shopping websites i.e. flipkart

b) Travelling websites i.e. makemytrip.com

c) Food delivery websites i.e fasoos

d) Social media i.e. facebook

Salient features of State RPO tool and MNRE RPO tool

Parameter	State RPO Webtool	MNRE RPO tool
Approach	**Bottom-up approach**	**Top-down approach**
Nodal Agency	State level	Central Level
Obligated Entity registration	By Obligated Entity	By State Nodal Agency/OE
Energy Consumption data	By Obligated Entity	By Obligated Entity/ OE
Verification by	SLDC, EI, DISCOM	State Agency
Verification method	Via documents submitted by OE	Via documents submitted SLDC, EI, DISCOM
Verification Allocation	On OE basis (i.e. DISCOM, OA, CPP)	Energy Source basis (Solar and Non-Solar)
Documents Uploading	Available	Available
General details Obligated Entity	To be updated by OE	Not requested
Energy Generator Details	To be updated by OE	Not requested
Energy Contract Details	To be updated by OE	Not requested
Reporting format	Multiple formats	Multiple formats
Data fetching methods	Manual update	Manual update, API and, excel files
Data updating Method	Monthly	Annual
Login for Other Govt. Bodies	FOR, SERC, SNA	Not Known
REC Procured details	By OE	By Power Exchange

Outreach/Rolling out Web Tool in Other States – Status Update

- **Andhra Pradesh –** Received consent letter from Department of Energy, Government of Andhra Pradesh;
- **Haryana** – Both HAREDA & HERC have shown interest, Salient features of State RPO tool shared; modalities for engagement and preparedness assessment of SNA needs to be discussed);
- **Punjab** – PEDA has shown interest, Salient features of State RPO tool shared; modalities for engagement and preparedness assessment of SNA needs to be discussed;
- **Uttar Pradesh** – UPNEDA has shown interest, modalities need to be discussed;
- **Assam** – AERC has shown interest, modalities need to be discussed with SNA;

Modification to RPO Regulations – mandatory use of RPO : Status Update

- During 10th Technical Committee meeting of FOR, the PACE-D TA Program presented the regulatory interventions required for rolling out the web tool for SERCs for monitoring compliance of RPO;
- The Technical Committee agreed that efforts should be made to incorporate various provisions in the State level RPO Regulations at the earliest;
- The Program approached Electricity Regulatory Commission of three States such as Gujarat, Rajasthan and Haryana requested them to carry out necessary amendments in existing regulations for mandatory use of RPO Web Tool;
- The Program (through USAID) sent the request letter along with model draft conditions of amendments to RPO Regulations to HERC, RERC and GERC in the month of August 2017;

Next Steps

- Sharing of source code with GEDA, Security audit and migration of Web Tool in Gujarat;
- Preparation of API format and pilot testing for data integration with MNRE/TERI Portal;
- Meeting with DoE, GoAP and Implementing Agency to discuss and finalize the implementation modalities;
- Limited time period available for support under PACE-D TA program (upto Dec-17).
- Need guidance/clarity (budgetary support) on rolling out of RPO Web Tool in other States such as (e.g. Haryana, Punjab, Uttar Pradesh),
- Support from FOR for reaching out to SERCs of various States for issuing amendments in RPO Regulations to make use of RPO Web Tool as mandatory by OEs;

Anurag Mishra
Senior Clean Energy Specialist
USAID/India
Email: amishra@usaid.gov

Ronnie Khanna
Deputy - Chief of Party
PACE-D TA Program
Email: rkhanna@nexant.com

Ajit Pandit
Lead Consultant - Policy and Regulations
PACE-D TA Program
Email: ajit.pandit@idaminfra.com

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