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

Venue : CERC, New Delhi

Date : 8-1-2016

List of Participants : At Annexure I Enclosed

1. The second meeting of Technical Committee on implementation of framework for renewable at State level was held under chairmanship of Shri A. S Bakshi, Member, CERC on 8 January 2015. Shri Bakshi welcomed all the Members and recalled the decisions taken in First meeting held on 16 December 2016.

2. Ms. Shruti Deorah, Advisor (RE), CERC, presented a summary of conclusions of the last meeting along with a two pronged approach towards the implementation of Availability Based Tariff (ABT)/Deviation Settlement Framework (DSM) at the state level. The first step would be for FOR to facilitate creation of Model Regulations, for which a consultant might be hired by FOR Secretariat. The second step would be to undertake an exhaustive exercise at the state level, which will include gathering requisite data about state infrastructure and preparedness, modifying Model Regulations and adopting it with suitable adjustments, implementation of regulations, installation of required hardware, rolling out of software, etc. A copy of the presentation is attached as **Annexure-I**.

3. Shri. S. K. SOONEE (CEO POSOCO) stated that nuances of every state have to be understood while implementation of DSM. This requires manpower with required skill sets at each SLDC. He expressed that strengthening the manpower is need of the hour. It was also suggested that this matter be taken up for discussion at Forum of Regulators (FOR) meeting.

4. Shri Soonee also dwelled upon the challenges encountered in implementing DSM framework at the regional level, and suggested that those complexities be proactively tackled when implementation is undertaken at the state level.

Discussion

5. The Chairman requested the SLDC representatives to briefly summarize the status of implementation of ABT and DSM along with challenges and learnings in their respective states.

6. Shri. R.A.Sharma (MPLDC) informed that ABT started in MP in 2009. The fluctuations caused by wind are managed by bringing Hydro power as a balancing measure. MPLDC is responsible for open access, scheduling, metering and DSM accounting. The financial transactions are being done by MPPPMCL. A copy of the presentation is attached as **Annexure-II**. Shri A B Bajpai (MPERC) informed that Draft Forecasting regulations have been issued and hearing is due on 19 January 2016.

7. Shri Arvind Agrawal (SLDC, Rajasthan) brought up the challenges being faced in Rajasthan related to meter vendors. It was discussed that upcoming Renewable Energy Management Centres (REMC) shall have a major role to play. A copy of the presentation is attached as **Annexure-III**.

8. Shri Venkatesan (SLDC, Tamil Nadu) presented the current status of ABT implementation in Tamil Nadu. A copy of the presentation is attached as **Annexure-IV**.

9. Shri M. Satyamurti (SLDC, AP) presented the status of ABT in Andhra Pradesh. He elaborated that DSM is directly or indirectly already implemented for solar and wind generators in the state. A copy of the presentation is attached as **Annexure-V**.

10. Shri Jayant Kulkarni (SLDC, Maharashtra) presented the settlement mechanism adopted in Maharashtra illustrating the complexities involved. Maharashtra follows a DSM framework that is not linked to frequency, instead, is based on the concept of marginal pricing. It was underscored that the mechanism is not completely effective as PPA generators are not covered under the framework. A copy of the presentation is attached as **Annexure-VI**.

11. SLDC Gujarat sent their presentation via email, though no representative was able to attend (attached as **Annexure-VII**).

12. It was discussed that credibility of Qualified Coordinating Agency (QCA) shall be an important factor in the successful implementation of Forecasting regulations for renewable generators. States such as Maharashtra emphasized that more clarity is needed on screening QCAs and ensuring financial integrity of the process.

Decisions

13. There was a unanimous consensus on the need for putting in place ABT and Deviation Settlement Mechanism (DSM) at the earliest, along with the regulation on forecasting and scheduling of variable RE, at the State level.

14. Critical to all this is the need for strengthening SLDCs. The recommendations of Gireesh Pradhan Committeee Report on strengthening Load Despatch Centres should be implemented by all States to make RE integration a success. It was agreed that the Report shall be circulated to all SERCs by POSOCO. This report presents a comprehensive plan for staff and skill-building required at SLDCs.

15. It was agreed that Chairperson, FOR, shall be requested to hire a consultant to enable the Committee to draft model regulations for ABT/DSM for states.

16. For taking up planning and implementation of ABT/DSM at the state level, a small group headed by Mr. Soonee, CEO, POSOCO and comprising one representative each from SLDC, SERC and respective RLDC was formed. It was pointed out that Tamil Nadu is ready with draft regulation, and as such the group headed by Mr Soonee should forthwith take up the issues for Tamil Nadu. During the next one month, the group should take up at least two States and present its findings before the Committee.

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

LIST OF PARTICIPANTS: SECOND MEETING OF TECHNICAL COMMITTEE ON FRAMEWORK FOR IMPLEMENTAION OF RENEWABLES IN GRID held on 8.1.2016

1	Mr. A. S Bakshi, Member	CERC
2	Mr. S. K Sooney, CEO	POSOCO
3	Mr. S Akshay Kumar, Chairman	TNERC
4	Mr. A. B Bajpai, Member	MPERC
5	Mr Deepak Laad, Member	MERC
6	Mr. P J Thakkar, Member	GERC
7	Mr. P Rama Mohan, Member	APERC
8	Dr. Sushanta K. Chatterjee, JC(RA)	CERC
9	Ms. Shruti Deorah, Advisor (RE)	CERC
10	Mr G Venkatesan, SE	TNTRANSCO
11	Mr. S.C. Shrivastav, JC(Engg)	CERC
12	Mr. R A Sharma, SE	MPPTCL
13	Mr. Arvind Agrawal	SLDC, Rajasthan
14	Mr. A K Arya	SLDC, Rajasthan
15	Mr. S K Gupta	SLDC, Rajasthan
16	Mr. S C Saxena	POSOCO
17	Mr. B Bhanu Prasad	APTRANSCO
18	Mr. AKV Bhaskar, SE	SLDC,AP
19	Mr. M. Satyamurthy, Consultant	APERC
20	Ms. T Nirmala Mary, EE	TNTRANSCO
21	Mr. Jayant Kulkarni	SLDC, Maharashtra,
22	Mr. Tanay Tarany, RA	FOR

ANNEXURE - I

LIST OF PARTICIPANTS ATTENDED THE SECOND MEETING OF THE TECHNICAL COMMITTEE FOR "IMPLEMENTATION OF FRAMEWORK ON RENEWABLES AT THE STATE LEVEL" HELD ON 08.01.2016 AT THE CERC OFFICE, NEW DELHI

1	Mr. A. S Bakshi, Member	CERC
2	Mr. S. K Soone, CEO	POSOCO
3	Mr. S Akshay Kumar, Chairman	TNERC
4	Mr. A. B Bajpai, Member	MPERC
5	Mr. Deepak Lad, Member	MERC
6	Mr. P. J. Thakkar, Member	GERC
7	Mr. P. Rama Mohan, Member	APERC
8	Dr. Sushanta K. Chatterjee, JC(RA)	CERC
9	Ms. Shruti Deorah, Advisor (RE)	CERC
10	Mr. G. Venkatesan, SE	TNTRANSCO
11	Mr. S.C. Shrivastav, Joint Chief (Engg)	CERC
12	Mr. R A Sharma, SE	MPPTCL
13	Mr. Arvind Agrawal, Executive Engineer (SCADA-I)	SLDC, Rajasthan
14	Mr. A. K. Arya, EE (Power Control)	SLDC, Rajasthan
15	Mr. S K Gupta, SE	SLDC, Rajasthan
16	Mr. S. C Saxena, DGM	POSOCO
17	Mr. B. Bhanu Prasad	APTRANSCO
18	Mr. A.K.V Bhaskar, SE	SLDC,AP
19	Mr. M. Satyamurthy, Consultant	APERC
20	Ms. T Nirmala Mary, EE	TNTRANSCO
21	Mr. Jayant Kulkarni	SLDC, Maharashtra,
22	Mr. Tanay Tarany, RA	FOR

Regulatory Roadmap for States to achieve reliable grid management and large-scale integration of Variable Renewable Energy sources

TECHNICAL COMMITTEE OF STATES

8TH JANUARY 2016

केन्द्रीय विद्युत विनियामक आयोग

CENTRAL ELECTRICITY REGULATORY COMMISSION

Summary from the first meeting

At the first meeting, unanimous consensus was reached on the need for:

- implementation of Availability-Based Tariff (ABT) & Deviation Settlement Mechanism (DSM) in States;
- specifying Regulations on Forecasting, Scheduling and Deviation Settlement of Wind & Solar generating stations at the State level
- creation of reserves at the State level; and
- introduction of Ancillary Services at the State level

The Short-term Roadmap

The path to achieving reliable grid management has the following first three steps:

- Implementation of Deviation Settlement Mechanism (DSM) for all grid connected entities in the state
  - Preparation of schedule & determine deviation for every time-block
  - Payment on the basis of schedule, settlement of deviation with the DSM pool
- Other elements of Availability Based Tariff (ABT)
  - Two part tariff: fixed charges recoverable based on availability, & variable energy charges
  - Merit order stacking based on variable charges
- Framework on scheduling & commercial settlement of Renewable energy sources

Implementation of DSM & ABT: two-pronged approach

- DSM & ABT – Model Framework can be created by seeking technical support from FOR, by engaging a consultant
- State level implementation- seek POSOCO's support, either in-house or by engaging a consultant

Commitment from State Regulatory Commissions to achieve implementation over the next 3-6 months

THANK YOU

DR. SUSHANTA CHATTERJEE (JOINT CHIEF-REGULATORY AFFAIRS)
JCRA@CERCIND.GOV.IN

SHRUTI DEORAH (ADVISOR- RE)
SMDEORAH@CERCIND.GOV.IN

SHORT TERM OPEN ACCESS
RE FORECASTING AND SCHEDULING
ISSUES IN MP

State Load Despatch Centre
MP Power Transmission Co. Ltd

- CERC notified the Short Term Open Access Regulation in 2004 effective from 6th May 2004

* MPERC notified the Short Term OA Regulation on 16.6.2005.

* STU is the nodal agency for Long Term Open Access and SLDC is the nodal agency for Short Term Open Access.

* SLDC has to issue NOC/Standing Clearance/Consent to the STOA customer within 7 working days in first occasion and 3 working days on subsequent occasions.

* **Interstate STOA :** SLDC shall check only two parameters i.e Availability of transmission Capacity & availability of metering infrastructure.

* No other ground can be basis for refusal of the STOA.

* In MP first Short Term Open Access application was received and STOA was granted on 01.08.2007.

* **Some initial problems were experienced by SLDC for granting the STOA permission .**

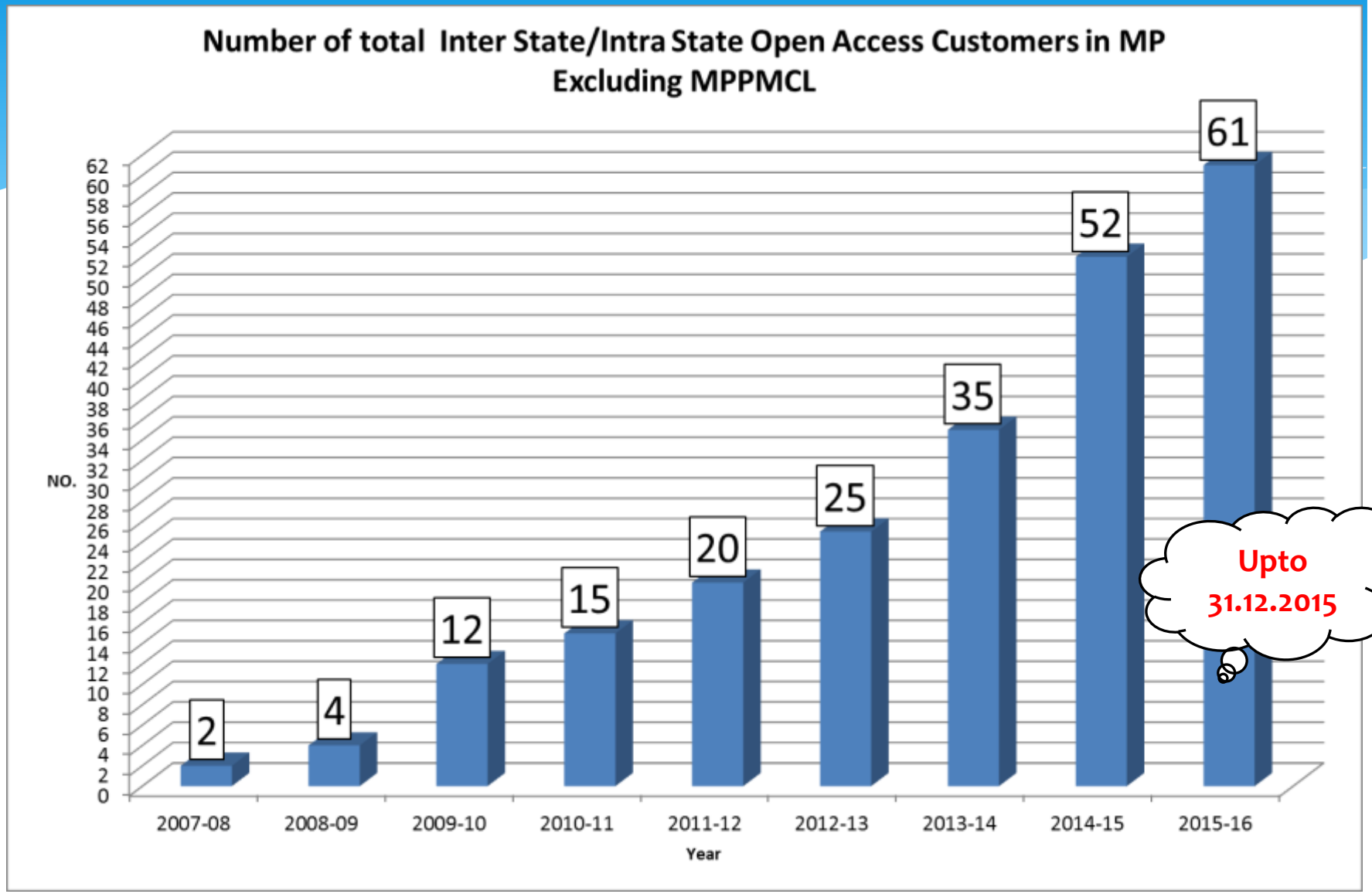
* **Application for consent of SLDC for transaction of power under STOA from their CPP in MP to their plant in UP was received from Open Access Customer on dtd 10.07.2007.**

* **Consent could not be accorded due to non compliance of regulatory requirements by the STOA.**

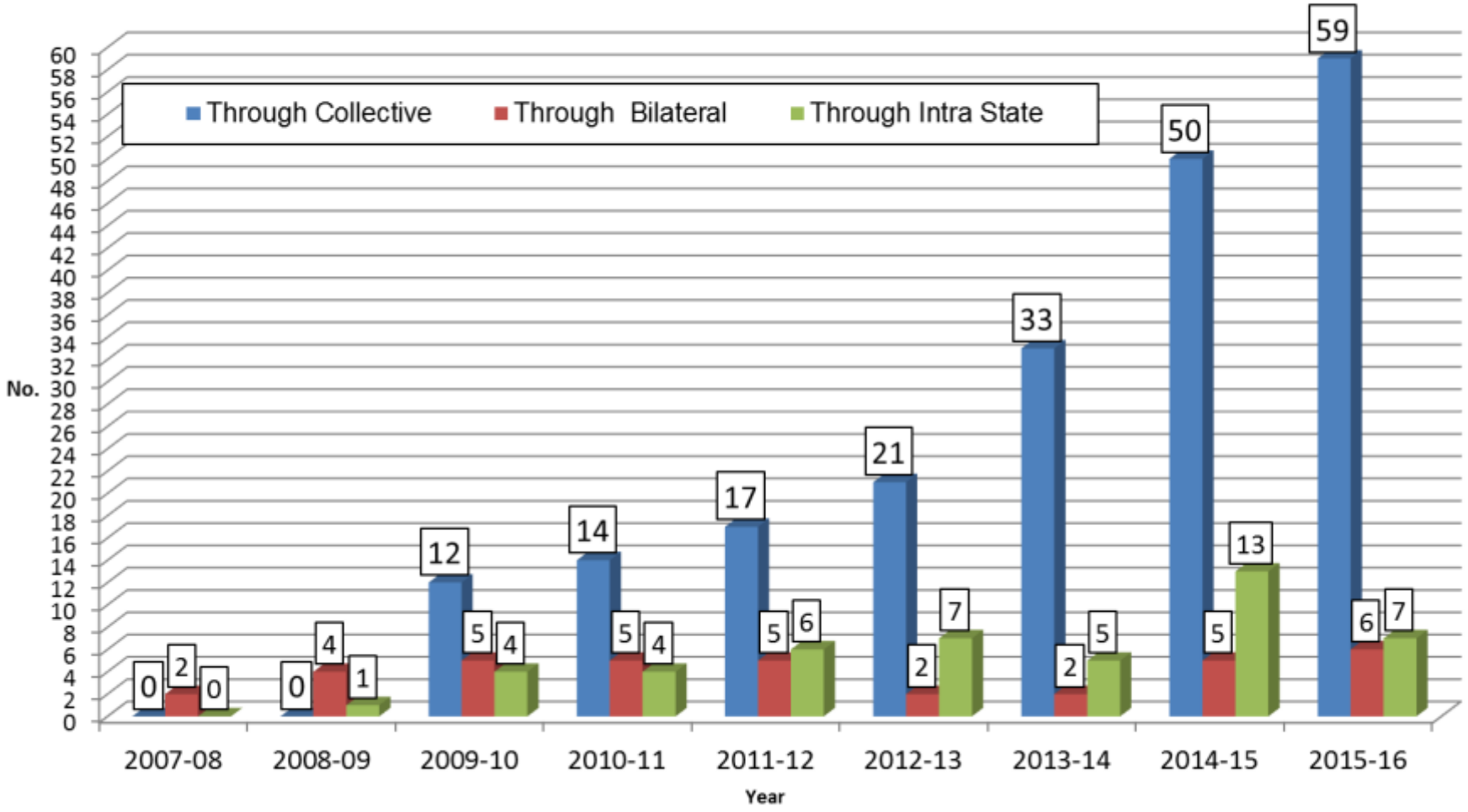
* **The OA Customer was advised to complete and confirm the same.**

* **The revised application was submitted by OA Customer after fulfilment of necessary regulatory requirement which was received in SLDC on 23.07.2007.**
* **After verification, SLDC issued the first consent on 24.07.2007 for short term open access wef from 01.08.2007.**
* **Now on receipt of request for STOA, SLDC issues the guidelines for compliance of regulatory requirement and after confirmation the same, SLDC issues the consent / no objection certificates/approval.**
* **The procedure has become smooth and no major problems are being experienced for granting STOA.**

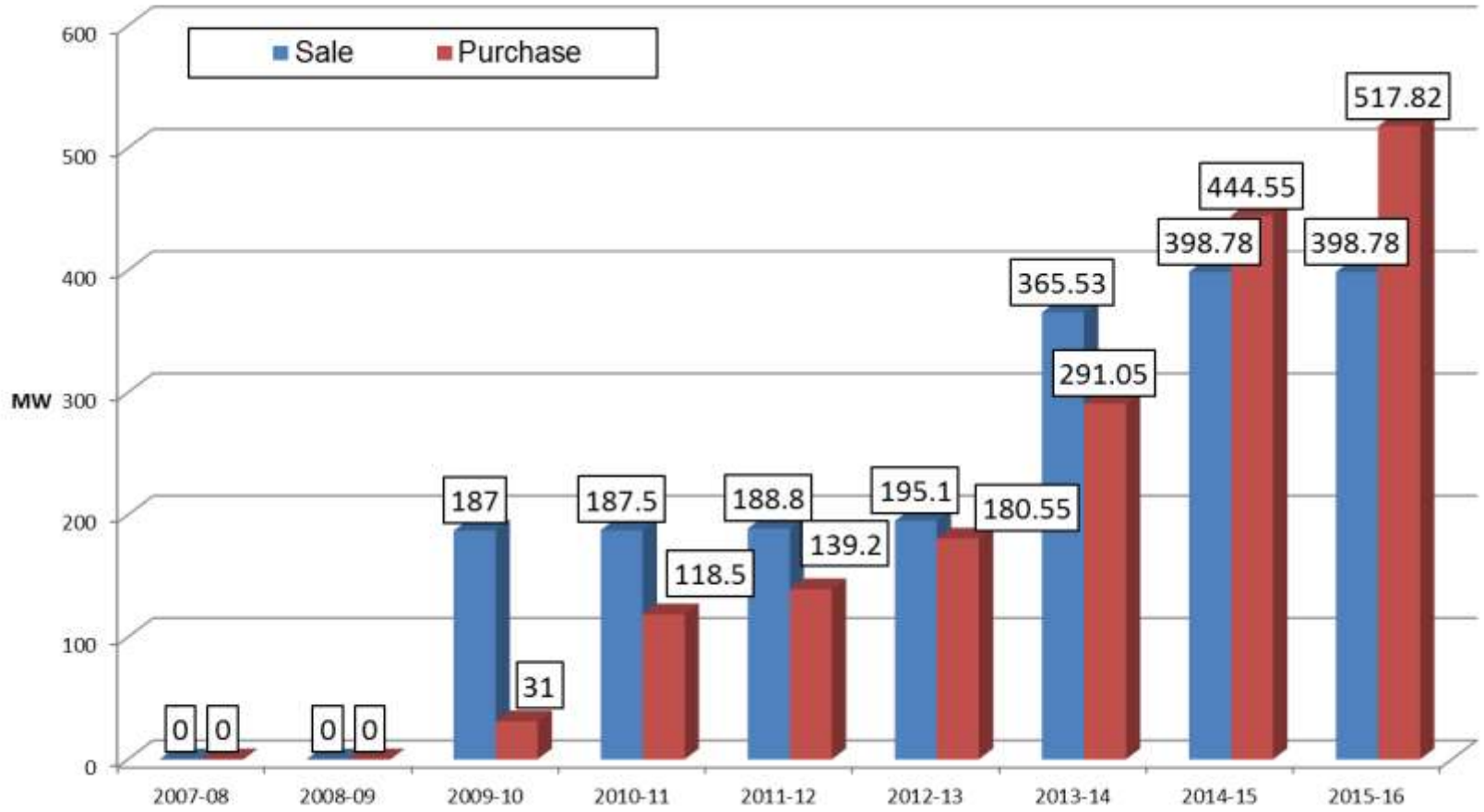
The progress of STOA in MP is shown in following slides.


Number of total Inter State/Intra State Open Access Customers in MP
Excluding MPPMCL
NO.
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
2
4
12
15
20
25
35
52
61
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
Year
Upto
31.12.2015

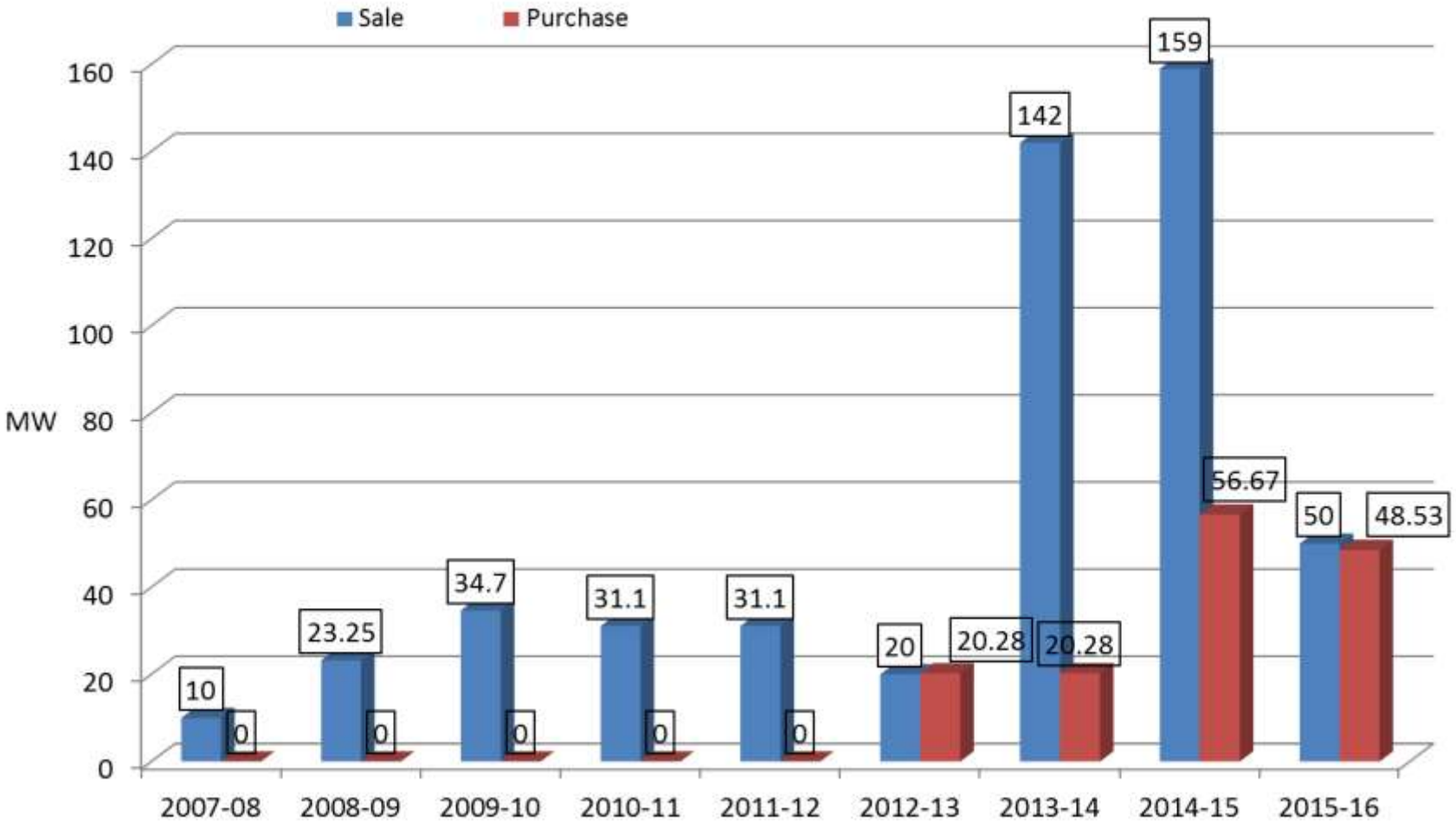
Category wise No. Of Short Open Access Customers in MP Excl MPPMCL



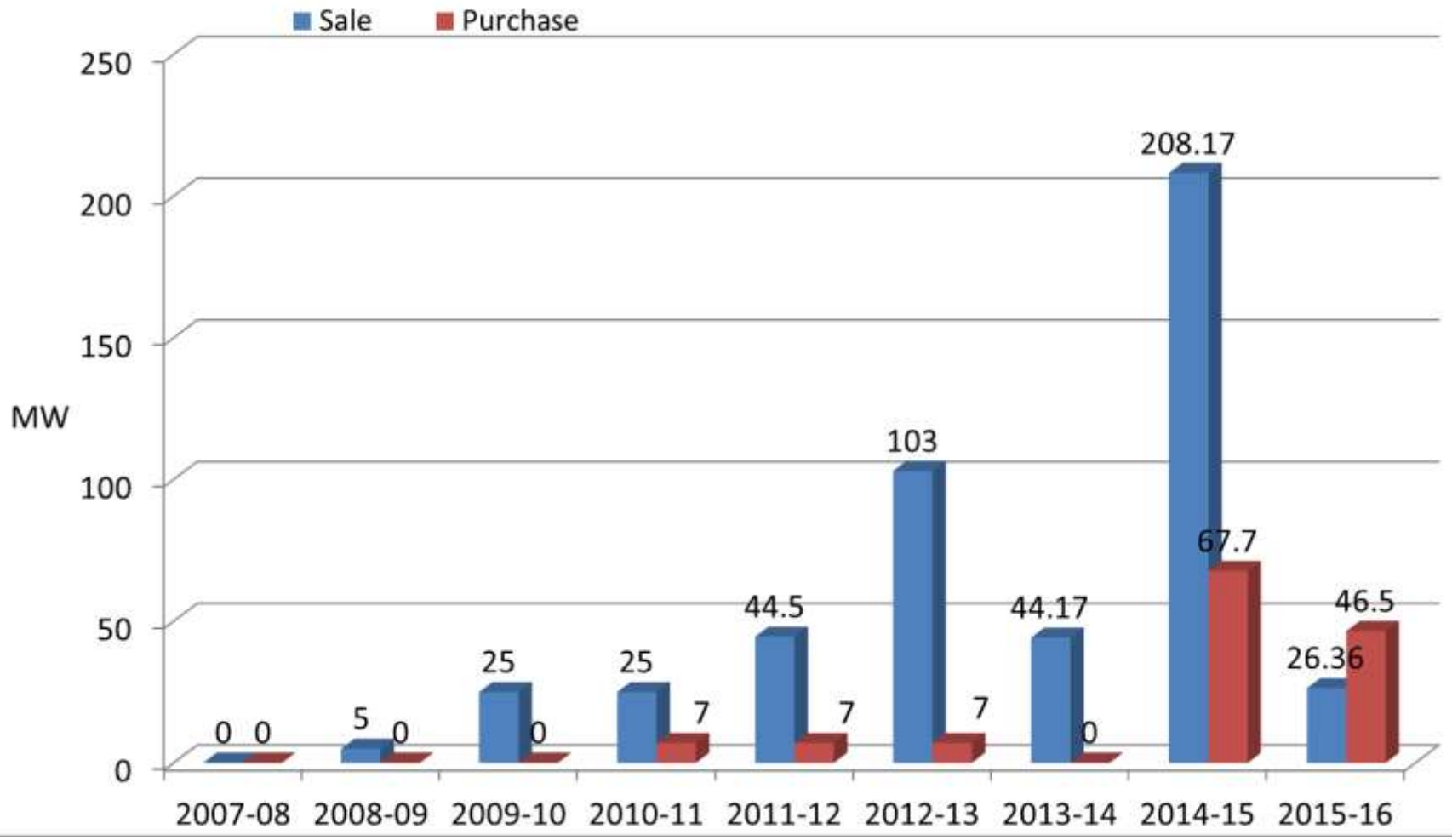
Consent / NOC for Max MW given by SLDC for Inter-state Short Term Open Access Customers Through Power Exchanges excl. MPPMCL



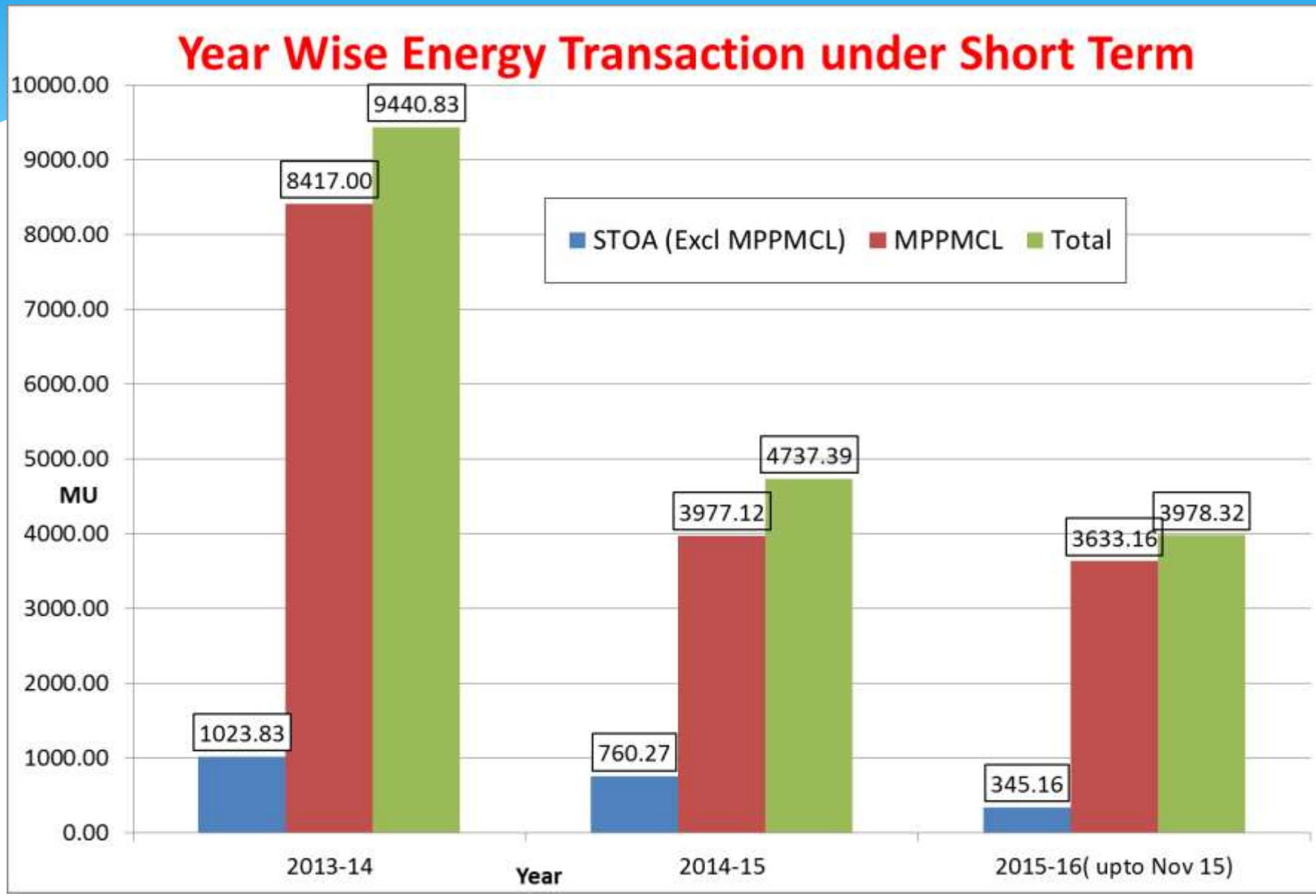
Consent / NOC for Max MW given by SLDC for Inter-state Short Term Open Access Customers through Bilateral excl. MPPMCL



Approval for Max MW given by SLDC for Intra-State Short Term Open Access customers excl. MPPMCL



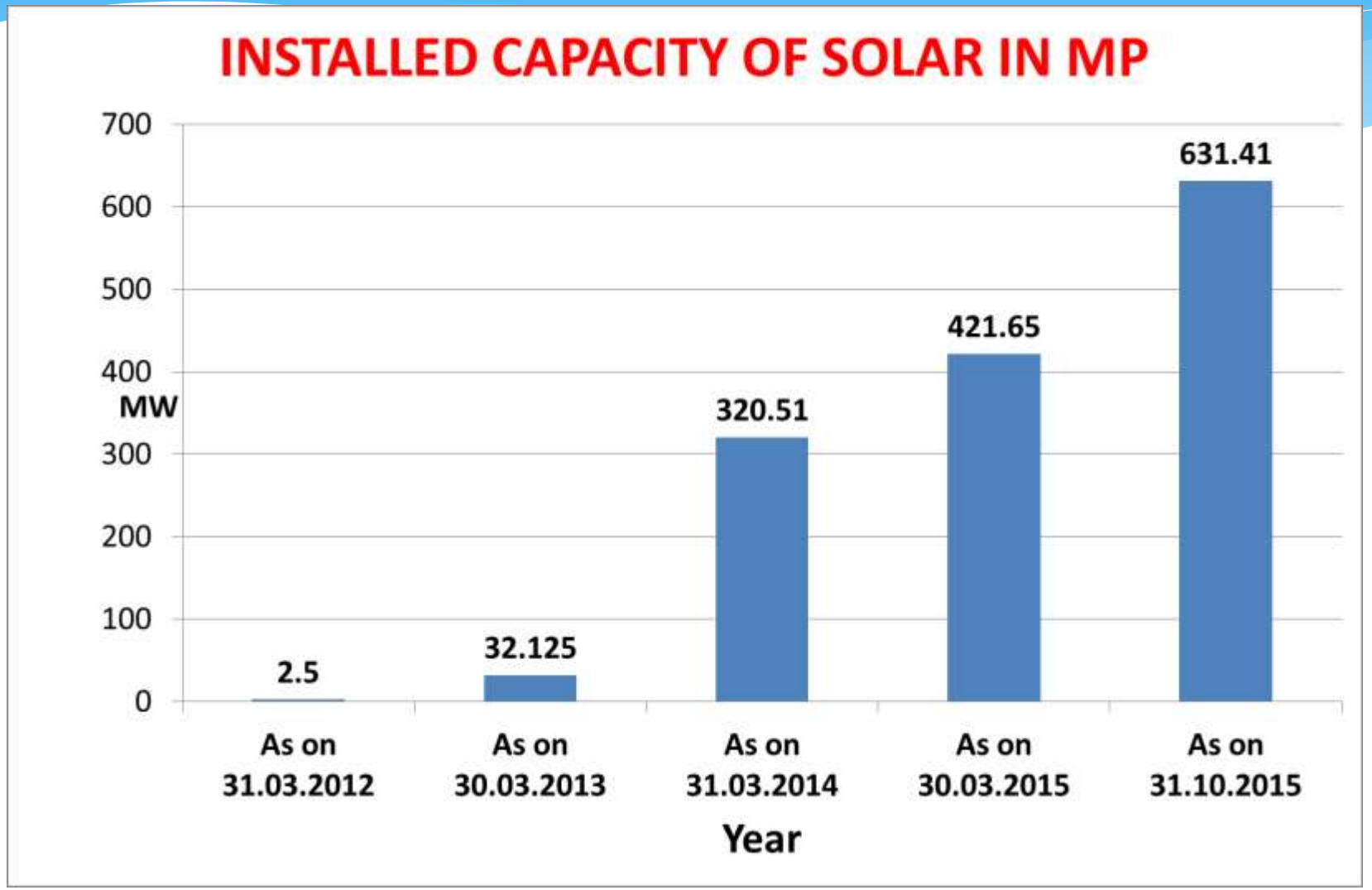
Year Wise Energy Transaction under Short Term



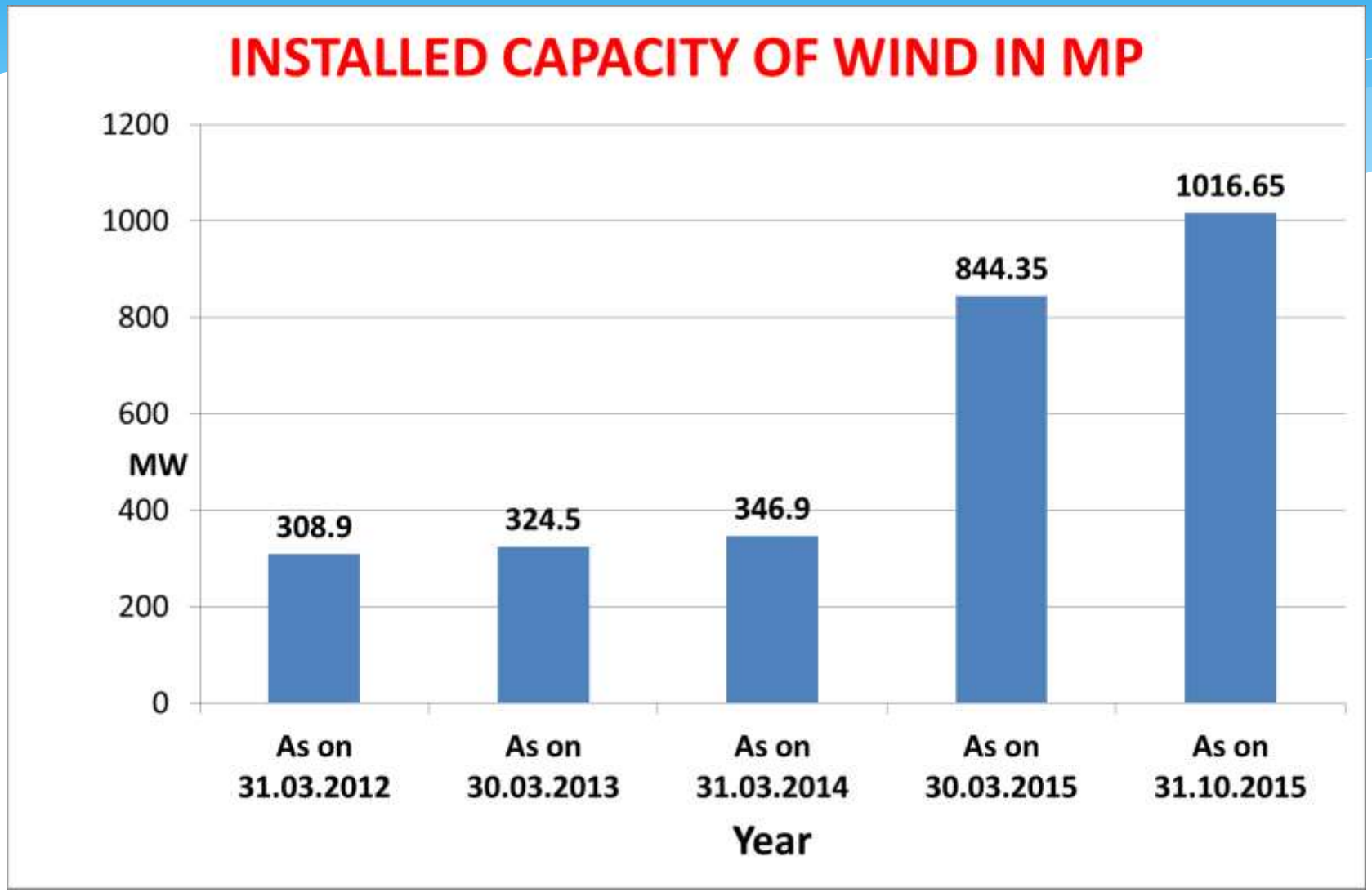
Challenges in integration of RE Generation including its transactions under Open Access.

Renewable Energy (WIND & SOLAR) integration with MP grid

- The installed capacity of Solar and Wind which was 2.5 and 308.9 MW by the end of 2011-12 has gradually increased to 631.41 MW and 1016.65 MW respectively on 31st October 2015



Renewable Energy (WIND & SOLAR) integration with MP grid



Renewable Energy (WIND & SOLAR) integration with MP grid

Cumulative Capacity Addition Plan till 2020 in MW					
RE Type	**2016**	**2017**	**2018**	**2019**	**2020**
WIND	1800	2800	3800	4800	5800
SOLAR	750	1800	2500	3000	3500
BIOMASS	97	117	167	217	250
SMALL HYDRO	100	150	200	250	300
Total	2747	4867	6667	8267	9850

Source : MNRED, Bhopal

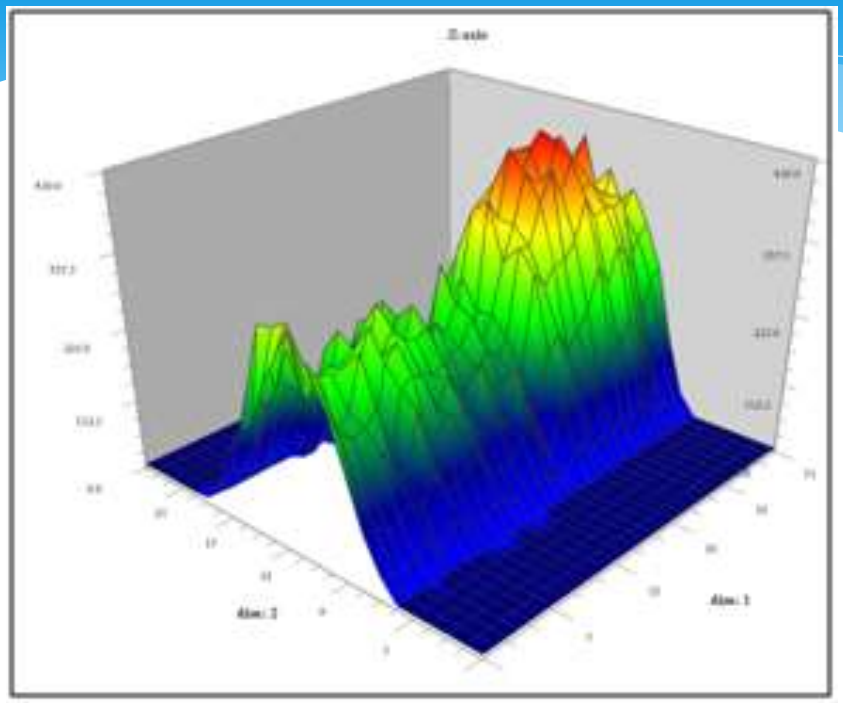
challenges in integration of renewable power with grid

* **The forecasting in real time with accuracy better than 15% is must for existing RE Generators and 10% for new RE Generators.**

* **The RE generation needs to be brought under the regulatory framework to safeguard not only the grid related technical issues but also the distribution companies need to be insulated from the financial impact of intermittency and variability nature of wind and solar generation.**

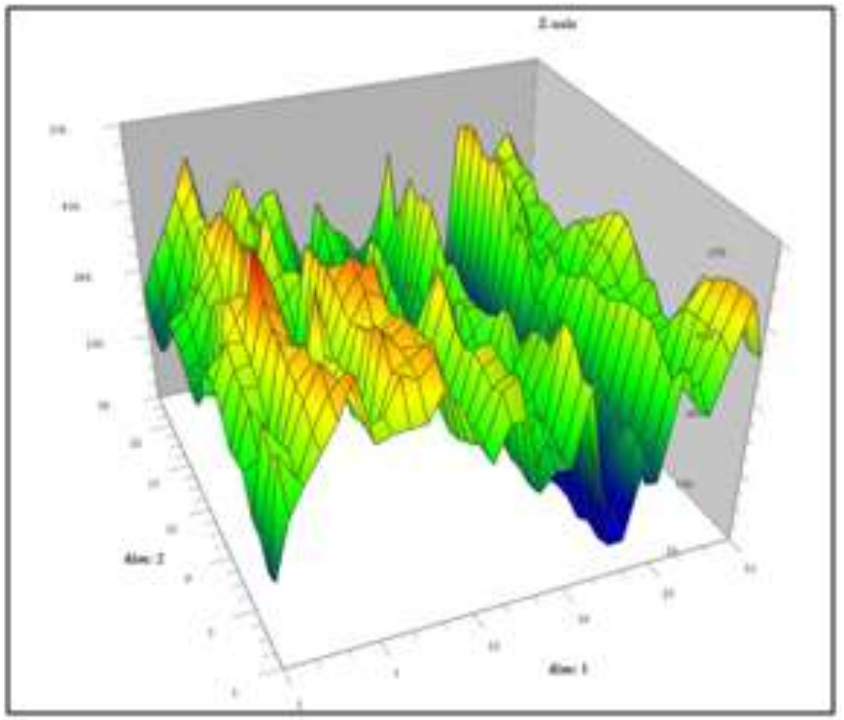
* **In MP except SECI selling power to other states, no other RE Generators are doing real time forecasting in absence of regulatory framework for imbalance settlement.**

The RE generators still enjoy the must run status without any penalty for no forecast or forecast without consideration for real time variations.

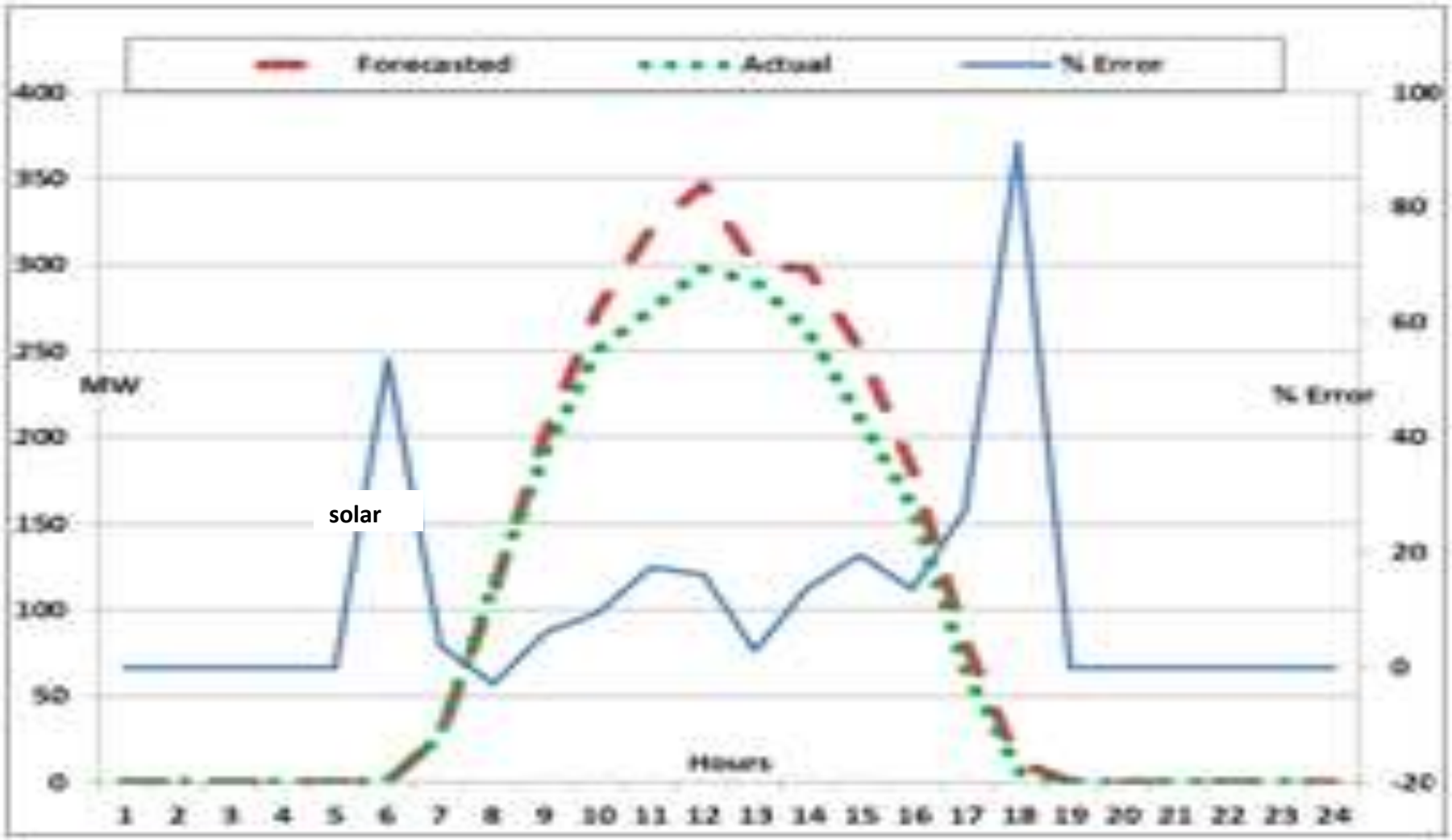


Solar Generation pattern during July 2015

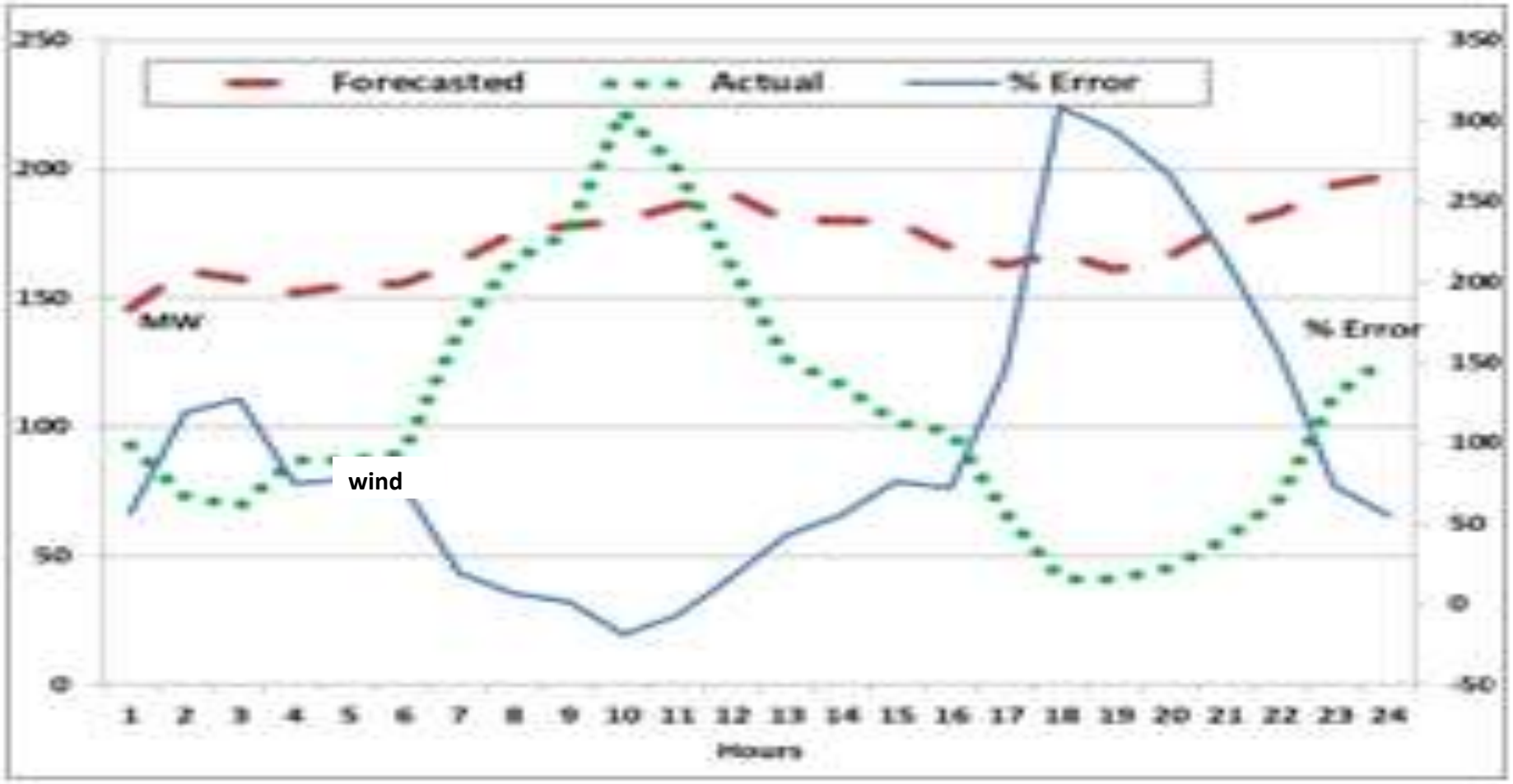
Wind Generation pattern during July 2015



Solar


Forecasted
Actual
% Error
MW
% Error
Hours
solar
400
350
300
250
200
150
100
50
0
100
80
60
40
20
0
-20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Wind


Forecasted
Actual
% Error
MW
% Error
wind
Hours
250
200
150
100
50
0
350
300
250
200
150
100
50
0
-50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Forecasting and scheduling of Wind and Solar power

- The wind and Solar forecasting by developers is not to the expectations throughout the country.

- The states like Gujarat which have implemented pilot project for Wind power forecasting in January 2015, are also achieving accuracy in the range of ±30% for 60-65% of the time per 15 minutes time blocks during high wind scenarios.

- In MP the situation is not very encouraging as RE generators have only recently started forecasting only on day ahead basis and real time revisions may start only when DSM for RE is in place.

- The generation trend for July 2015 shows that the Solar forecast for the peak time periods is within 5 to 20% but during ramp up and ramp down periods the percentage forecast error is as high as 50+ percent. The Wind forecasting has error as high as 300% as the real time generation forecasting is absent.

- The Govt. of India is establishing "Renewable Energy Management Centres" (REMC) in National and Regional Load despatch centres as well as State Load Despatch Centres of RE rich states including MP. The REMC shall comprise of SCADA, Forecasting tool, RE Scheduling tool, Control reserve monitoring tool and WAMS for RE substations and is expected to be operational by first quarter of 2017-18.

Real Time Monitoring

- The RE Generators are required to provide Data Acquisition facility for real time monitoring by SLDC.
- Most of existing RE Generators have not provided telemetry to SLDC. Notices were served to them in 2015-16 twice giving three month's time on both occasions. So far only 13 Nos developers have provided Telemetry to SLDC.
- As response was not encouraging, 42 Nos developers have been given notice for suspension of Energy accounting if they fail to provide telemetry.
- New Generators are giving commissioning permission only after providing telemetry.
- The guidelines to be followed by the RE generators for Metering, AMR, Telemetry etc. have been made available on MP SLDC website.
- RE Generators are required to bring under penalty clause to disconnect them from grid in case not compliance of regulatory requirements.

Regulatory framework for forecasting, scheduling & Imbalance handling

- RRF mechanism for RE Generators implemented wef 15.07.2013 was got suspended on 7.01.2014.
- CERC on 7th August 2015 amended DSM and IEGC Regulation bringing the Inter-State Solar and Wind Generators of 50 MW and above capacity within the ambit of DSM with effect from 1st November 2015.
- These Regulations do not address the issue of Intrastate RE Generators selling power to other states.
- In MP RE generators having PPAs with other states have agreed to adopt existing DSM till MPERC comes up with regulation for RE DSM.
- FOR has prepared a Model Regulation on "Forecasting, Scheduling and Deviation Settlement of Wind and Solar Generators in the State level".
- MPERC has notified draft Regulation on "Forecasting, Scheduling and Deviation Settlement of Wind and Solar Generators in the State level" which also addresses the issue of RE Generators selling power to other states through Open Access.

- MPERC on 08.12.2015 notified draft regulation based Model regulation.
- There is no limit on the applicability of generators under proposed DSM.
- Issue of Generators selling power outside states is addressed
- It mandates the SLDC to compute actual commercial impact on state
- proposed that differential be made good from the PSDF/NCEF.

SN	Absolute Error		Deviation Charges for Over/Under- Injection for sale of power	
	New Generators	Existing Generators	Generators commissioned after Regulation date	Generators commissioned before Regulation date
01	<= 10%	<= 15%	None	None
02	>1 0% but <= 20%	>15% but <= 25%	At Rs. 0.50 per unit for the shortfall or excess energy for absolute error beyond 10% and upto 20%	At Rs. 0.50 per unit for the shortfall or excess energy for absolute error beyond 15% and upto 25%
03	>20% but <=30 %	>25% but <=35 %	At Rs. 0.50 per unit for the shortfall or excess energy beyond 10% and upto 20% + Rs. 1.0 per unit for balance energy beyond 20% and upto 30%	At Rs. 0.50 per unit for the shortfall or excess energy beyond 15% and upto 25% + Rs. 1.0 per unit for balance energy beyond 25% and upto 35%
04	> 30%	> 35%	At Rs. 0.50 per unit for the shortfall or excess energy beyond 10% and upto 20% + Rs. 1.0 per unit for shortfall or excess energy beyond 20% and upto 30% + Rs. 1.50 per unit for balance energy beyond 30%	At Rs. 0.50 per unit for the shortfall or excess energy beyond 50% and upto 25% + Rs. 1.0 per unit for shortfall or excess energy beyond 25% and upto 35% + Rs. 1.50 per unit for balance energy beyond 35%

Imbalance settlement for RE Generators selling power to other states

For Intrastate Generators selling outside state

SN	Absolute Error in 15 Minute time block	Under-Injection : Deviation Charges payable by the seller to DSM pool account	Over-injection : Deviation Charges receivable by the seller from DSM account
01	<= 15%	At the Fixed Rate for the shortfall energy for absolute error upto 15%.	At the Fixed Rate for excess energy upto 15%.
02	>1 5% <= 25%	At the Fixed Rate for the shortfall energy for absolute error upto 15% + 110% of the Fixed Rate for balance energy beyond 15% and upto 25%	At the Fixed Rate for excess energy upto 15% + 90% of the Fixed Rate for excess energy beyond 15% and upto 25%.
03	>2 5% <=35 %	At the Fixed Rate for the shortfall energy for absolute error upto 15% + 110% of the Fixed Rate for balance energy beyond 15% and upto 25% + 120% of the Fixed Rate for balance energy beyond 25% and upto 35%.	At the Fixed Rate for excess energy upto 15% + 90% of the Fixed Rate for excess energy beyond 15% and upto 25% + 80% of the Fixed Rate for excess energy beyond 25% and upto 35%.
04	> 35%	At the Fixed Rate for the shortfall energy for absolute error upto 15% + 110% of the Fixed Rate for balance energy beyond 15% and upto 25% + 120% of the Fixed Rate for balance energy beyond 25% and upto 35% + 130% of the Fixed Rate for balance energy beyond 35%.	At the Fixed Rate for excess energy upto 15% + 90% of the Fixed Rate for excess energy beyond 15% and upto 25% + 80% of the Fixed Rate for excess energy beyond 25% and upto 35% + 70% of the Fixed Rate for excess energy beyond 35%.

Thank You

REQUIREMENT FOR IMPLEMENTATION OF FRAMEWORK ON RENEWABLES IN THE STATE

(SLDC RAJASTHAN)

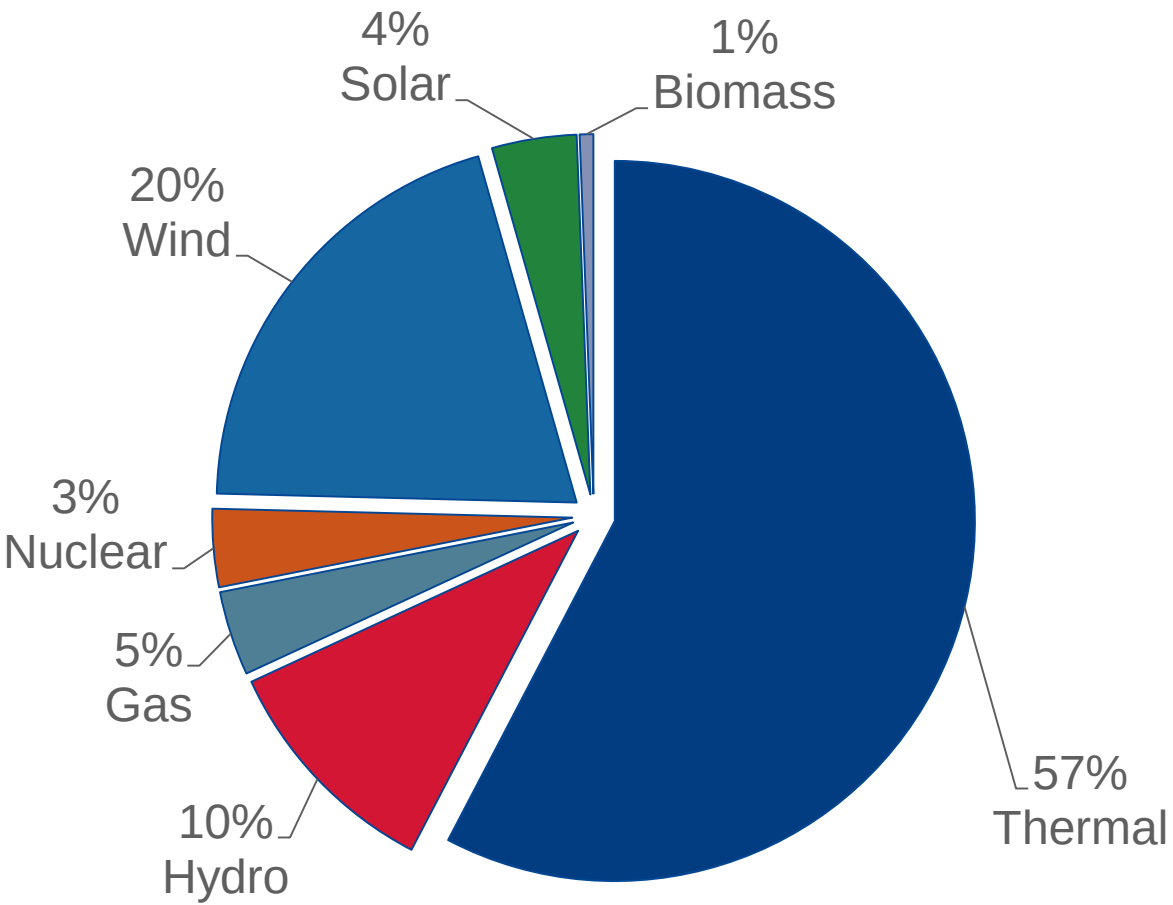
Power position of Rajasthan

(Installed capacity as on November-15)

Total Installed capacity : 17181MW

- **Thermal (own 5190+ cen.1384+Pvt. 3160) : 9734 MW**
- **Hydel (own 356 + cen. 1393) : 1749 MW**
- **Gas (own 603 + cen. 221) : 825 MW**
- **Nuclear (own 300+ cen. 257) : 557 MW**
- **Wind : 3464 MW**
- **Solar : 755 MW**
- **Biomass : 97 MW**

Graphical Display



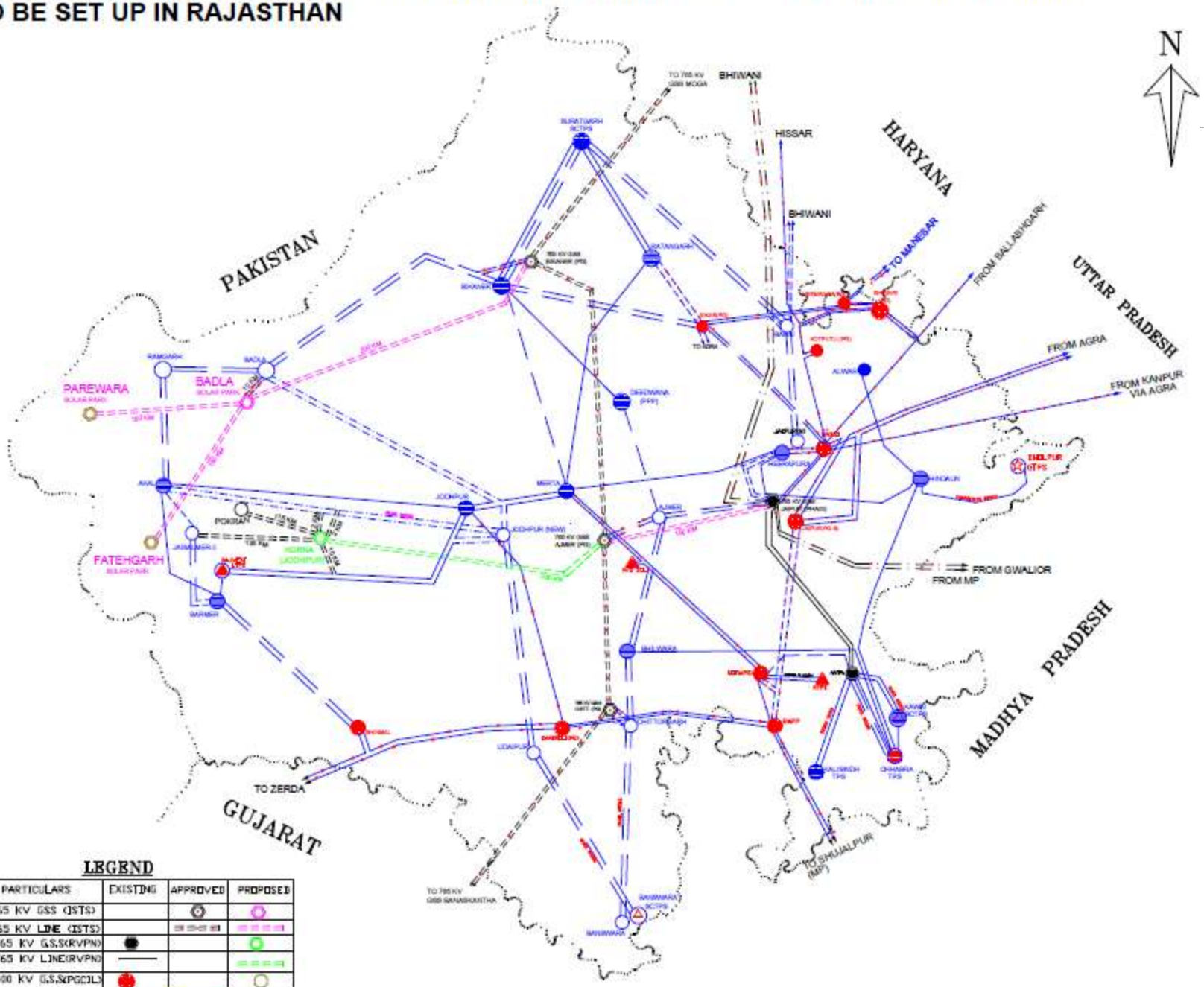
Existing Transmission System for Evacuation of RE Power in Rajasthan

Voltage Level	GSS No./MVA	Associated Tr. Lines Ckt kms
400/220 kV GSS	2/2075	374
220/132 kV GSS	10/2280	1268
132/33 kV GSS	23/1833	726

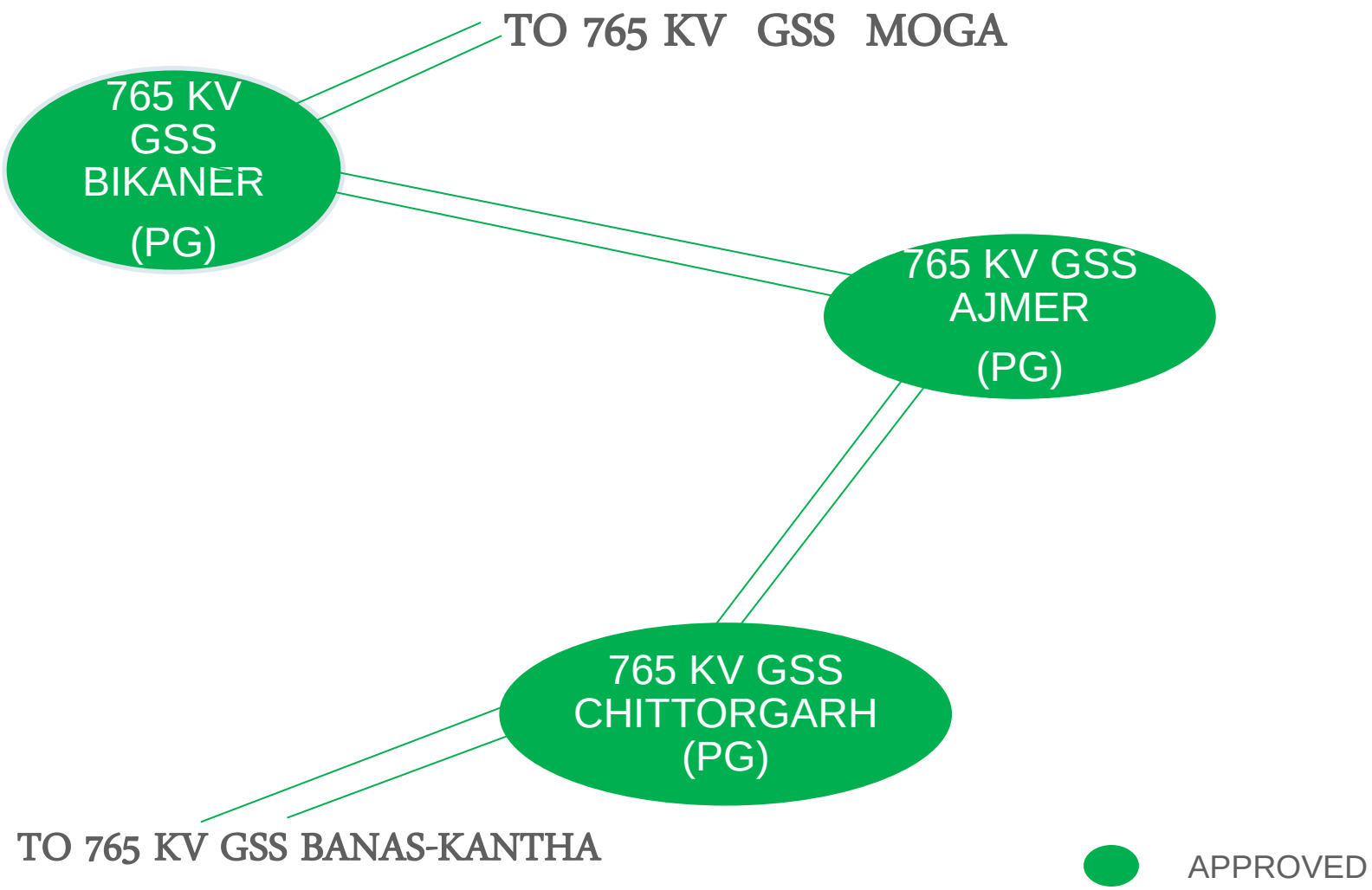
Under Construction Transmission System for Evacuation of RE Power in Rajasthan

Voltage Level	GSS No./MVA	Associated Tr. Lines Ckt kms
400/220 kV GSS	3/4000	2882
220/132 kV GSS	7/1860	944
132/33 kV GSS	0/350	92

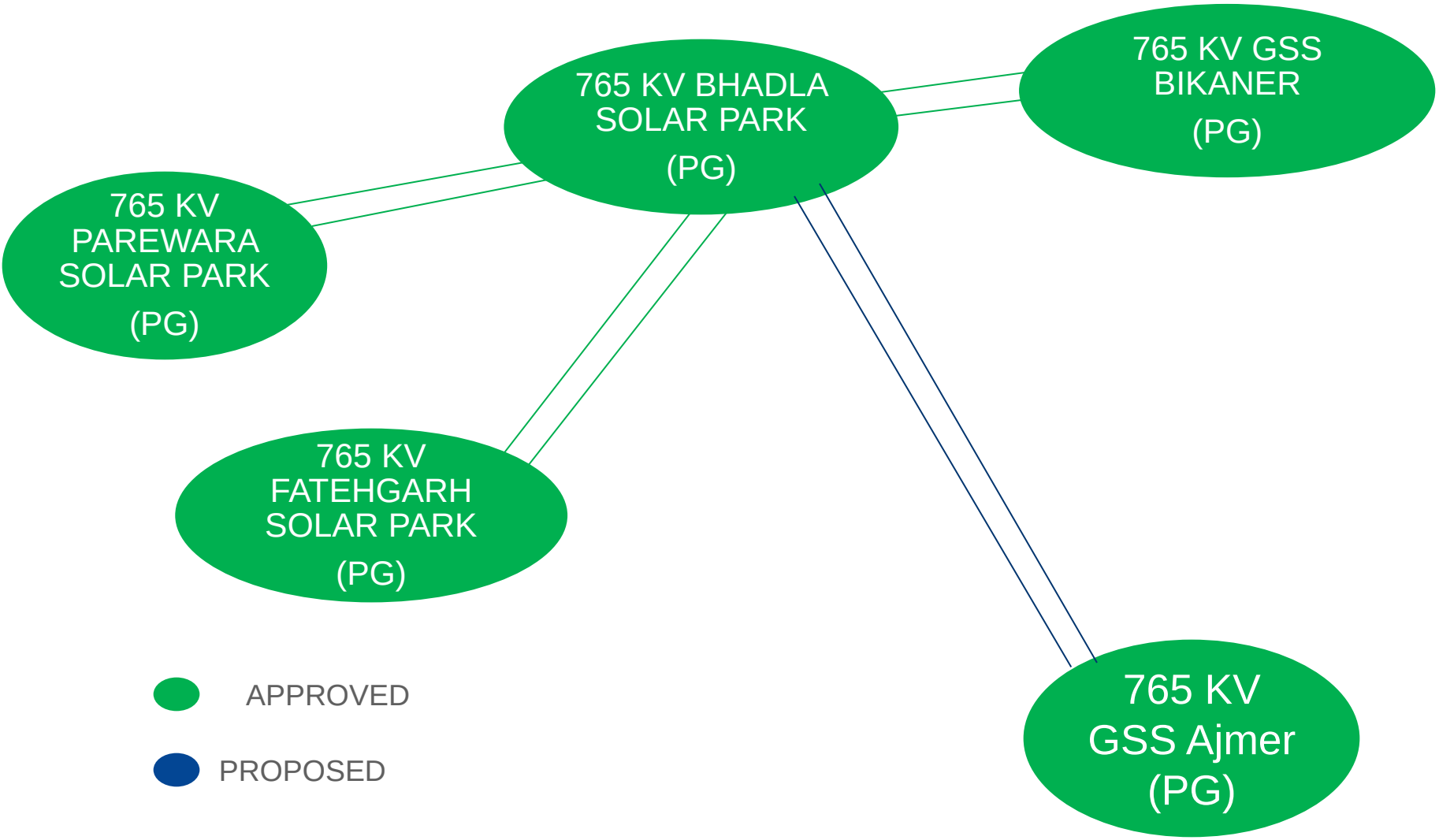
PROPOSED TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM SOLAR PARKS TO BE SET UP IN RAJASTHAN



GREEN ENERGY CORRIDOR (PHASE–I)



GREEN ENERGY CORRIDOR (PHASE-II)



RE GENERATION SCHEDULE

RE GEN.	SANCTIONED (MW)	COMMISSIONED upto 30-11-2015 (MW)	Additional to be commissioned upto 2021-22 (MW)
WIND	9360	3779 (PPA with state 3464)	5581
SOLAR (To be connected to intra state Trans. System)	3620	1264 (PPA with state 755)	2356
SOLAR (To be connected to inter state Trans. System)	13000	0	13000
TOTAL SOLAR	16620	1264	15356

IMPLEMENTATION OF ABT REGULATIONS IN RAJASTHAN contd...

- State Regulatory Commission (RERC) had issued RERC intra-state ABT Regulation-2006 for implementation of ABT in the state effective from 1.10.2006.
- For implementation of the intrastate ABT mechanism various equipments i.e. ABT meters and CBS (Central Billing Station) required to be installed.
- An Order was issued to M/s. L& T on 7.8.2004. Quantity were increased by subsequent orders dated 26.4.2005, 14.11.2005 and 20.10.2006. The L&T failed to execute the order due to communication problem.
- New NIT was issued in 26th Sep.2013 but in response to the said NIT only one firm participated and the tender could not executed.
- After modification in QR (qualifying requirements), fresh NIT was issued on 30.6.2014. Only one qualified bidder was available in this NIT. Price bid was opened. The case was submitted to the BOD (Board Of Directors) for approval, but BOD had cancelled the Bid on dated 28.9.15.

IMPLEMENTATION OF ABT REGULATIONS IN RAJASTHAN

- PRESENT STATUS

A timeline has been framed by RVPN for implementation of intra-state ABT regulation.

a) ABT Meter procurement
   i) Tendering and finalization : Feb-16
   ii) Delivery and implementation : May-16

b) Implementation of ABT regulations
   Deviation settlement and
   Energy Accounting etc.
   i) Tendering and finalization : March-16
   ii) Complete ABT implementation : March-17

The above time line has also been submitted to RERC.

Challenges for implementation of (State) Electricity Regulatory Commission Regulations

1. **QCA shall be treated as a State Entity :-**

   It is a good concept, will facilitate to SLDC But it is a big challenge to nominate QCA at pooling station level. In case of Rajasthan we are facing difficulty with NVVN.

‘

2. **Forecasting and Scheduling Code:-**

   i)In clause no. 2.1, it has been mentioned that appropriate meters alongwith telemetery/ communication system and data acquisition system shall be provided to SLDC by RE generators**:-**

   State is facing problem. REMC should be established at the earliest possible.

Challenges for implementation of (State) Electricity Regulatory Commission Regulations

ii) In clause no.2.3 forecasting shall be done by wind and solar generators connected to the state grid, or by QCAs on their behalf:-

State is facing difficulty in spite for regular persuance with RE generators

iii) In clause no. 2.5 the schedule of wind and solar generators connected to the State grid (excluding collective transactions) may be revised by giving advance notice to the SLDC. Such revisions shall be effective from 4th time block, the first being the time-block in which notice was given:-

The medium of conveying notice to SLDC should be specified.

Challenges for implementation of (State) Electricity Regulatory Commission Regulations

3. Metering, Energy and Deviation Accounting

Interface Metering for intra-state entities shall be undertaken on an urgent basis. Every entity must be metered with a Special Energy Meter (SEM):-

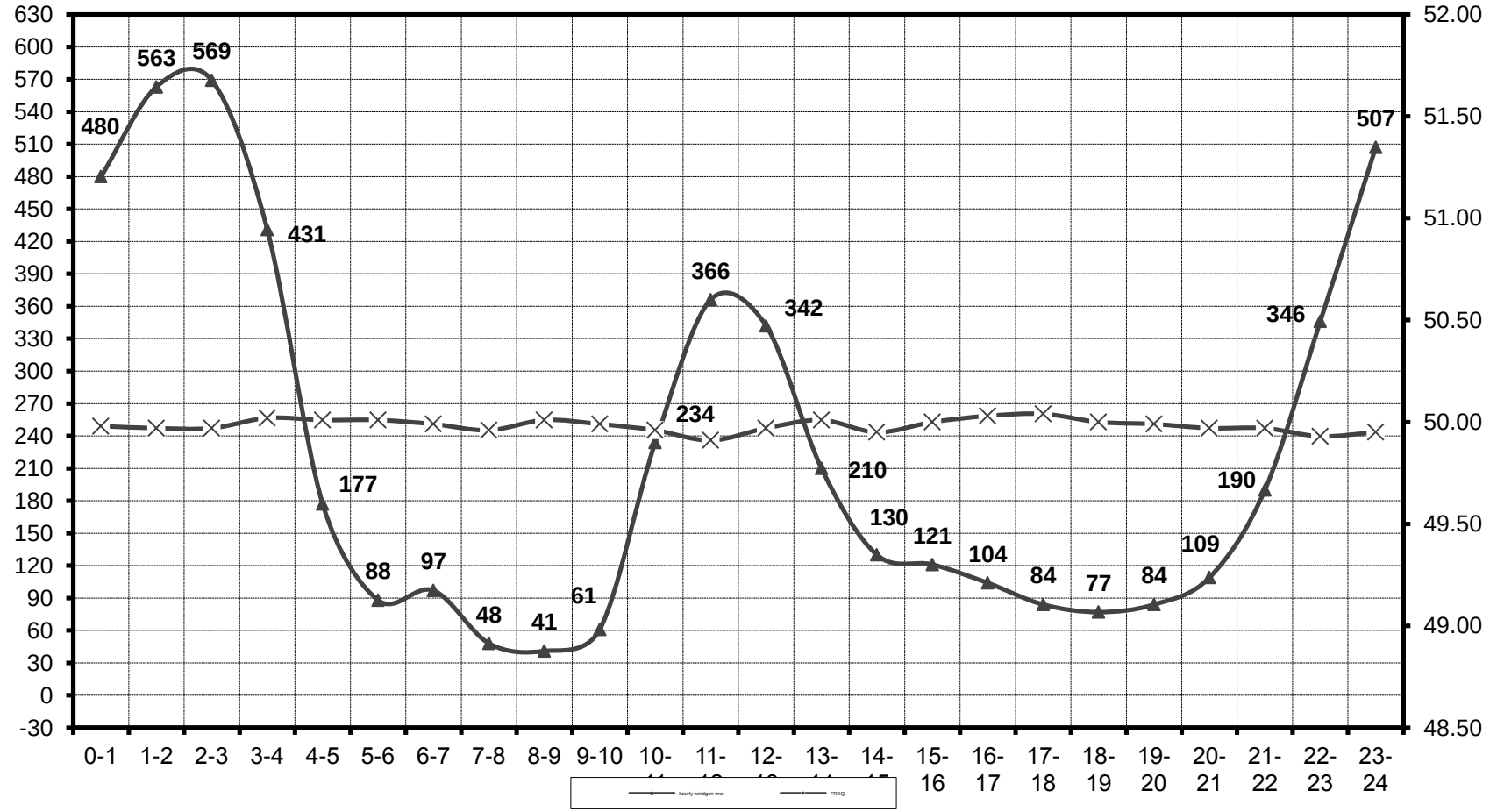
Whether all ABT meters installed at interface points are to be replaced ? Which will be a big challenge.

4. Commercial and Deviation Settlement

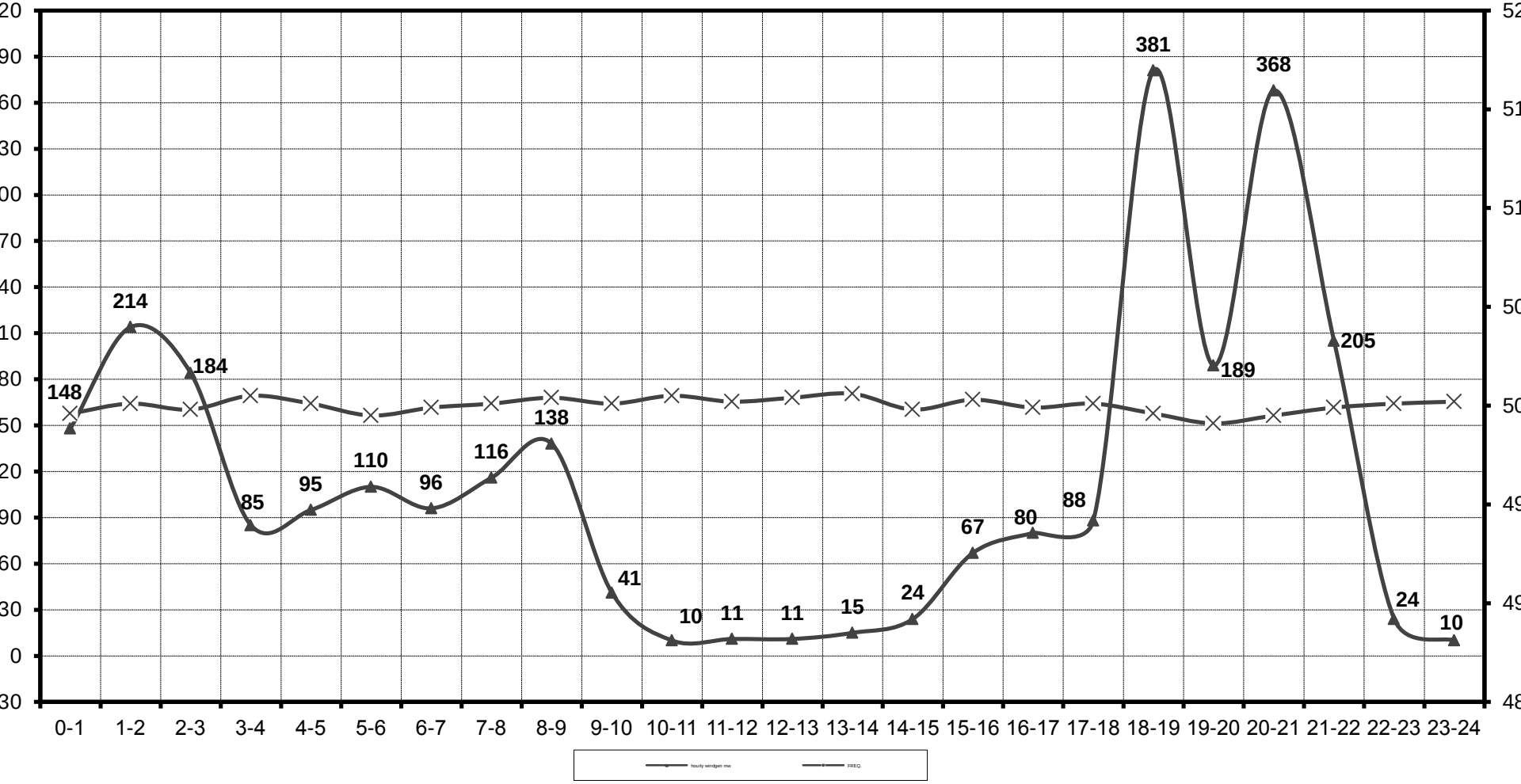
In clause no. 3.4 of part III, Commercial and Deviation Settlement mechanism,

it is very difficult to comply these because presently there is no infrastructure is available to handle the deviation charges payable/receivable for under or over injection by the wind or solar generator or the QCA, which has been commissioned prior to the date of effect of these regulations.

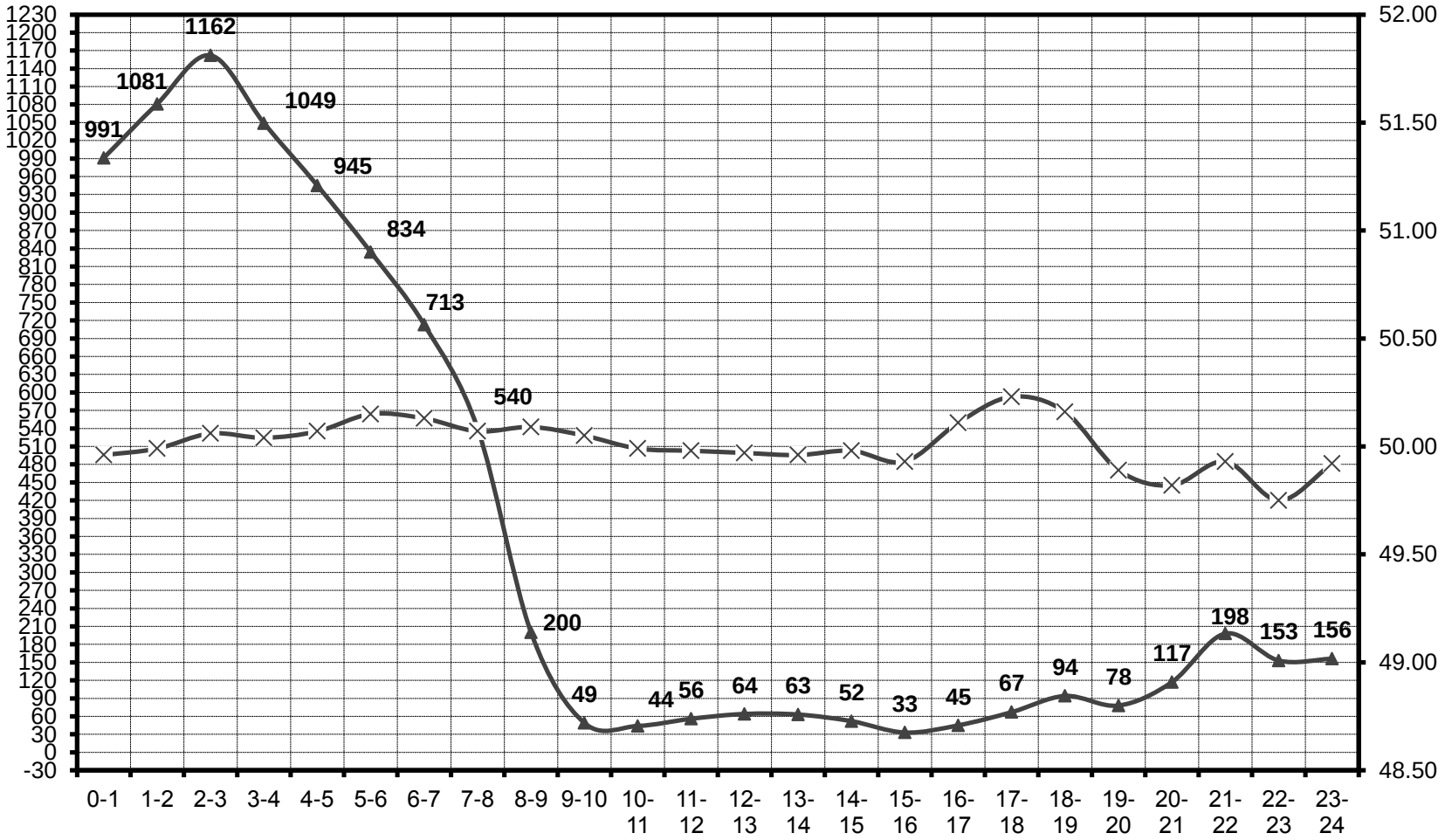
Wind Curve of 28th August 2015



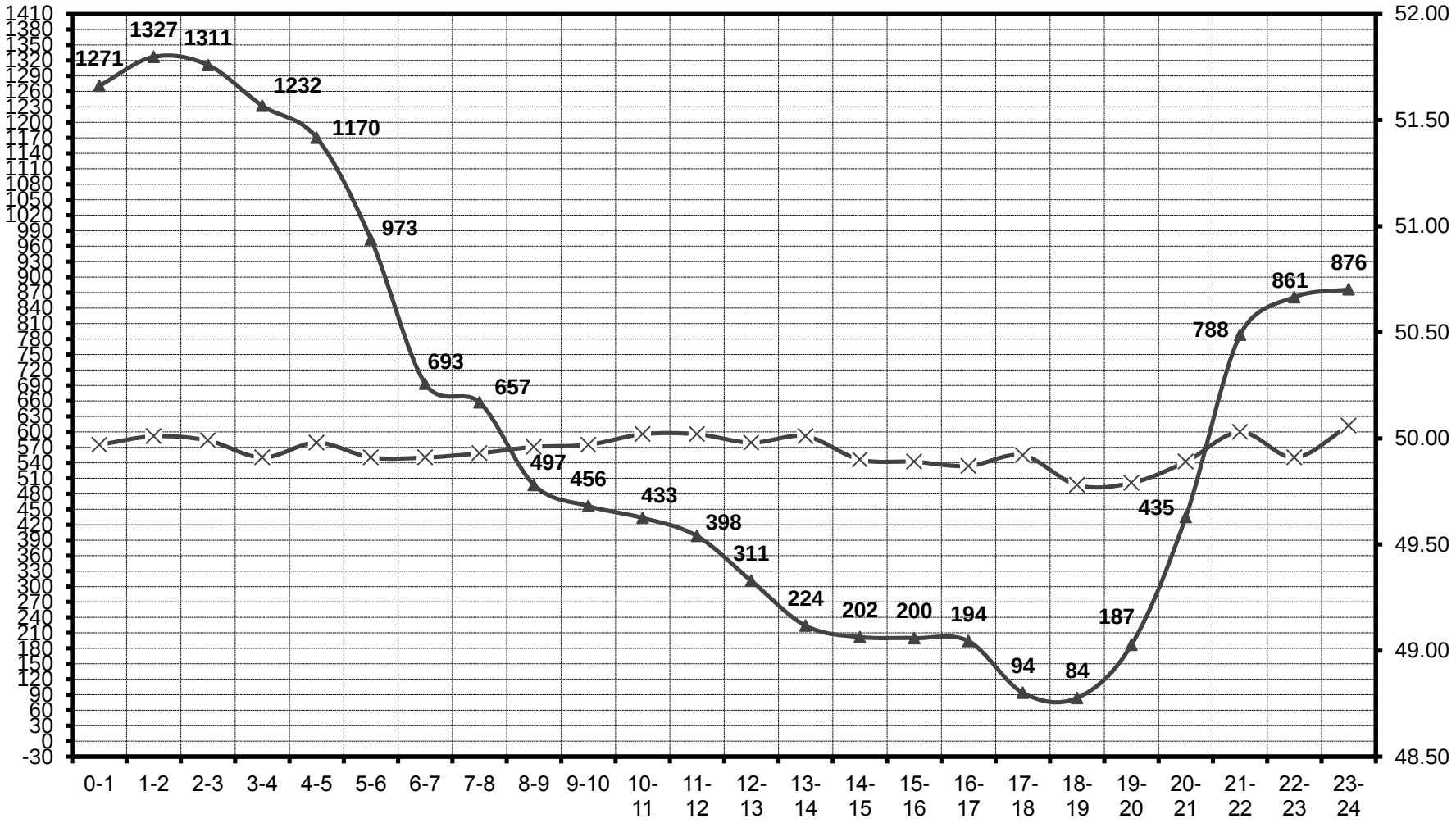
Wind Curve of 22nd July 2015



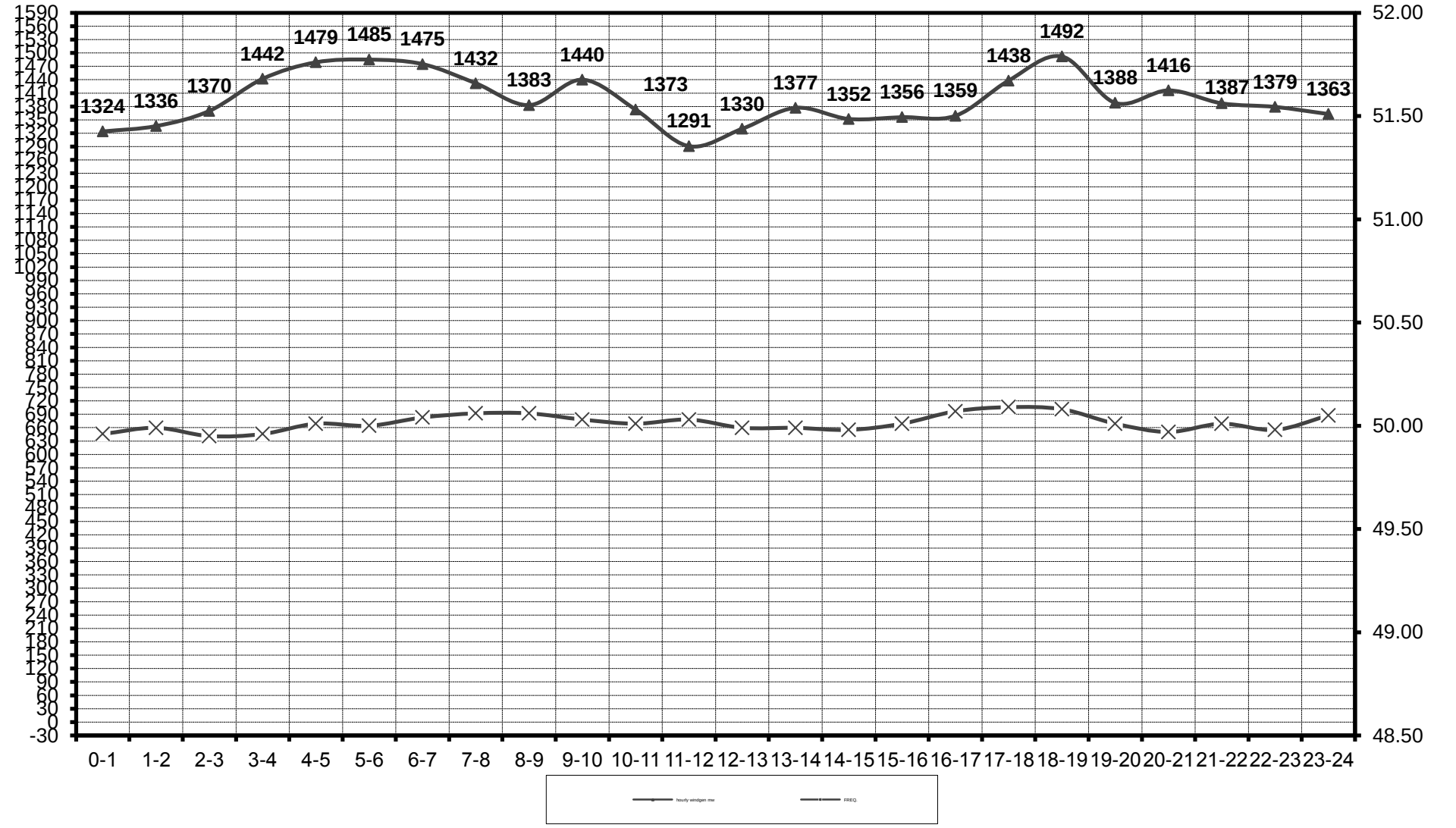
Wind Curve of 1st June 2014



Wind Curve of 23rd July 2014



Wind Curve of 5th July 2015



THANK YOU

INTRA STATE ABT IMPLEMENTATION PLAN

Physical identification of Intra State Entities

Applicability of Intra State ABT

- State Generating Stations
- Fossil Fuel based Private Generators
- NCES based Co-Generation plants & Biomass
- RE Generators (Wind & Solar) – Separate Regulation
- IPPs
- TANGEDCO as a DISCOM
- Open access HT consumers
- ALDC Boundaries to be identified

Identification & Provision of ABT meters -I

Sl. No.	Category	Number of Generators/Consumers		
		Total	ABT meters provided	Balance to be provided
1	Fossil fuel based private generators	50	50	--
2	NCES based Co-generation generators	29	14	15
3	NCES based Biomass generators	31	27	4
4	IPPs	7	1	6
5	HT/EHT OA consumers	2300	2300	--

Identification & Provision of ABT meters –II Separate Regulation for RE Generators

Sl. No.	Category	Number of Generators/Stations/Developers		
		Total	ABT meters provided	Balance to be provided
6	Wind Energy generators	11393	2793	8600
	WEG Pooling Stations	106	74	32
7	Solar generators	95	95	--

The procurement and fixing of ABT meters at WEG's end and pooling station are under process. The meters are expected to be delivered within 2-3 months and shall be fixed in the respective WEG within 2 months after.

Scheduling Activities

- The procurement of comprehensive software for automation of scheduling process for all the generators is under process.
- The scheduling activities will be carried out in full fledged manner on installation of comprehensive software for automation of scheduling process.

On line data transfer from Generating Stations to SLDC/ALDC- I

- The on line data of the state owned generating stations and most of the private generators are being received at SLDC/ALDC.
- Action is being taken to bring the on line data transfer for the remaining generators and will be completed soon.

On line data transfer from Generating Stations to SLDC/ALDC- II

- Regarding RE generators the procurement of modem and DCUs for on line data transfer is under process.
- The tender has been initiated for procurement of around 9250 MODEMs and 136 Data Concentrator units(DCUs).
- The necessary hardware procurement for on line data transfer is also under process.

DEMAND FORECASTING

- Demand forecasting is being carried out with conventional method of taking peak and non peak load pattern for the previous five years and apply 3% to 5% weightage on the mean value of the above data.
- The ABT meters have to be provided on all load feeders of all the substations and real time data of the above ABT meters have to be brought to LD centre for better demand forecasting.
- The demand forecasting software procurement is also under process.

Deviation Charges

Deviation charges may be at CERC deviation rate based on the frequency or any specific rate fixed by the state commission.

Mock implementation of intra State ABT

After getting Regulations from the commission, Mock implementation of intrastate ABT has to be carried out in the phased manner for the period of one year.

Thank you !!

A.P.E.R.C.

STATUS
OF

Intra-State ABT
And
Forecasting, Scheduling & Deviation
Settlement of variable RE
Creation of Reserves
Ancillary Services

Applicability of Intra-state ABT

Intra-state ABT shall be applicable to the following:

a. All state owned generating stations;
b. All generating stations owned or otherwise within the general ambit of the State Government by virtue of their being public sector entities or joint sector entities;
c. All other Generators (i.e.,IPPs, CPPs etc.) in the Private Sector who have contracted to supply power to Distribution Licensees;
d. All Distribution Licensees
e. Captive Wheeling consumers
f. Intra State Open Access users

IMPLEMENTATION OF INTRA STATE ABT IN AP.

- Presently AP is handling around 6400MW load.
- Generation covered under ABT are as given below.
- In this 1700MW load met through CGS stations which are operating in DSM mechanism.
- AP State owned thermal generation of 2810MW capacity is shared between Telangana and AP. This generation is also indirectly in DSM mechanism as power from these stations supplied to Telangana through CTU. @1300 MW of load met with these generation.

IMPLEMENTATION OF INTRA STATE ABT IN AP.

- Telangana State owned thermal generation 1800MW is shared between Telangana and AP. This generation is also indirectly in DSM mechanism to get power to AP through CTU. @ 850 MW load met with these generation.
- Around 700MW load is met through Interstate purchase (Open Access) which is also covered under DSM mechanism.

IMPLEMENTATION OF INTRA STATE ABT IN AP.

- IPPs installed capacity is around 2500 MW. Due to non availability of gas only about 400MW load is met through these gas stations after Telangana share. These generators are also shared projects between AP and Telangana. These generators are having long term PPAs with united AP.
- For implementation of intra state ABT to these generators, PPAs need to be amended. A.P. , Telangana and IPPs concurrence is mandatory for amendments.
- Around 5000 MW generation is indirectly under ABT (out of 6400 MW total load).

Generators presently not covered under ABT

- Remaining load is met through Hydel, Intra-state purchases, wind and solar.
- Above 1400 MW generation is presently not covered under ABT .

Issue related to Bifurcation of state.

- Settlement for the shared projects among AP and Telangana state owned generation is carried out on the basis of net scheduling mechanism. It is required to amend the PPAs for shared projects before implementing ABT.

Implementation of ABT in DISCOMs

- Interim Balancing and settlement Mechanism (IBSS) has been implemented between DISCOMs.
- IBSS is also a similar mechanism like ABT or DSM for levying suitable penalties for any deviation.
- In IBSS, presently 30 minutes time block is considered.

INTRA STATE ABT WHERE AP STAND

REQUIREMENTS IN
GENERATION
TRANSMISSION
DISTRIBUTION

GENERATORS

- NTPC SIMHADRI IS ALREADY IN CENTRAL ABT POOL.
- OPEN ACCESS GENERATORS EMBEDDED IN AP AND SUPPLYING POWER TO OTHER STATES ARE ALSO IN CENTRAL POOL.
- APGENCO, KRISNAPATNAM, IPPs AND **RE** GENERATORS ARE TO BE COVERED IN INTRA STATE ABT. ALL PPAs ARE TO BE AMENDED ACCORDINGLY BEFORE THE ABT IMPLEMENTATION. AT PRESENT THEY ARE HAVING TWO-PART TARIFF (FIXED CHARGES AND VARIABLE CHARGES). NOW **UI** OR DEVIATION CHARGES TO BE INCLUDED APPROPRIATELY WITH MUTUALLY AGREED AMENDMENTS TO PPAs.

GENERATORS

- DISCOMs ARE IMPACTED BY CENTRAL **UI** DUE TO TELANGANA SHARE IN NTTPS AND RTPP GENERATORS .
- **RE** GENERATORS ARE HAVING PPAs WITH PREFERENTIAL TARIFF AND NEW DEVIATION MECHANISM MAY BE IMPLEMENTED EXCLUSIVELY FOR WIND & SOLAR GENERATORS. 10 TO 15% DEVIATIONS CHARGES SHALL BE BORNE BY DISCOMs. STATE OF THE ART FORECASTING MECHANISM IS REQUIRED.
- AMENDING PPAs OR APPLYING THREE-PART TARIFF TO IPPs IS MAIN ISSUE TO BE TAKEN UP FOR IMPLENTING INTRA-STATE ABT IN GENERATION AREA.

TRANSMISSION

- ABT COMPATIBLE METERING IS TO BE KEPT IN PLACE.
- SLDC SHALL HAVE SCHEDULING SOFTWARE PROTOCOL FOR COLLECTING DATA AND PREPARATION OF DEVIATION ACCOUNTS IS TO BE EVOLVED.
- BOUNDARIES ARE TO BE SPECIFIED.
- WEEKLY LOSSES SCHEME OR MONTHLY SCHEME IS TO BE DECIDED.
- ISSUE OF SOME 33 KV AND 11 KV INTER-STATE FEEDERS BETWEEN AP & TELANGANA IS TO BE RESOLVED BEFORE IMPLEMENTION OF INTRA STATE ABT.

DISCOMs

- ALREADY IBSS (30 MINUTE TIME BLOCK) SCHEME IS INPLACE AMONG DISCOMS WHICH IS WORKING.
- STATE OF THE ART LOAD FORECASTING IS REQUIRED.
- LOAD GENERATION BALANCE SHALL BE DONE BY RESPECTIVE DISCOM. SUITABLE INFRASTRUCTURE AT DISCOMS LEVEL IS REQUIRED

Ancillaries

- Under utilized surplus capacity will be available in A.P during 2016-17.
- IPPs – GVK (Ph 1&2), Spectrum, Lanco, Reliance, Konaseema, Gauthami and GMR – with a total capacity of 1150MW.
- MPPs - LVS(17MW), SRIVATSA(37 MW).
- Under utilization of above capacity is due to non availability of gas and Naphtha cost.
- All the above plants have PPAs with DISCOMs.(except GVK-1 in buyout stage, Lanco-I PPA due for renewal).
- The above projects can be utilized as Ancillaries with suitable modifications to PPAs and Tariff clauses.

HOT RESERVE

- Operating couple of units in partial load, some other units shall be kept as hot reserve duly amending PPAs.

Requirements for intra state ABT

a) Metering
b) Communication facility
c) Tariff
d) Up-gradation of SLDC
e) Training and Familiarization
f) Conducting Mock Exercises before implementation.

PREPAREDNESS FOR INTRASTATE ABT BY AP (**SLDC-Communication facility)**

- SCADA data from 111 RTUS are being reported to SLDC inclusive of all state owned generating stations, IPPS and all 400 kV 220 /132 kV substations .
- Additionally 135 RTUS are required to get data from 132/33 kV sub-stations. Procurement of 20 RTUs is under progress for 2016-17.
- AP Transco has envisaged to add RTUs in a phased manner.

.

PREPAREDNESS FOR INTRASTATE ABT BY AP(**EBC-Metering)**

- Meter Installation to interface points of 787 completed
- Round the clock scheduling activities need to be organized
- Guidelines for Scheduling to be evolved.
- Data polling to SLDC on weekly basis
- Energy Accounting on weekly basis need to be organized
- Weekly UI & REC mock bill to be organized
- Energy Accounting Committee need to be formulated

Metering Arrangements

The available data at EBC as per the information provided by Field Engineer

G_T	Tranfer points	0.2	0.2S	0.5
AP GENCO	58	16	42	0
APGPCL	6	0	6	0
EHT PD	20	0	20	0
IPP	23	0	23	0
CPP	26	0	26	0
NTPC	6	0	6	0
TOTAL	139	16	123	0

T_D	Tranfer points	PTR/LVS		EHT consumers		
		0.2	0.2S	0.2	0.2S	0.5
SPDCL	434	10	311	11	102	0
EPDCL	214	1	138	8	66	1
TOTAL	**648**	11	449	19	168	1
Grand Total=	**787**					

Installed Capacity of Wind Power Generators in the State of AP as on 30.12.2015 & Status of Scheduling

- WIND

Installed capacity	Sch being received	Sch Not receiving
1111.89	354.9	756.99

- Note: an additional capacity by end of June 2016.
- Wind 800 MW;

Installed Capacity of Solar Power Generators in the State of AP as on 30.12.2015 & Status of Scheduling

- Solar

Installed capacity	Sch Receiving	Sch Not receiving
160.65	80	50.4

- **note : Individual Capacity less than 5MW total to 30.25 MW , for them Schedules are not required.**
- Note: an additional capacity by end of June 2016.
  Solar 500 MW;

Implementation of ABT / RRF to Solar wind Generators.

- So far 1100 MW wind generation and 160 MW solar generation capacity is installed AP control area.
- Further 800MW wind and 500 MW is anticipated for the year 2016.
- By end of 2016, 2500 MW solar ,wind will contribute generation to AP system.
- Hence a suitable deviation mechanism shall be evolved for these generators.
- **Implementation of Model regulation of FOR is under active consideration of APERC**.

Thank you

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Status of Implementation of ABT in Maharashtra vis-à-vis FOR Model regulation on RE Forecasting & Scheduling

8th January 2016

Maharashtra State Load Despatch Centre

Intra-State ABT in Maharashtra

- Maharashtra has implemented Intra-State ABT from August 2011.

- The mechanism is different from that at Central level, and is System Marginal Price (SMP) based mechanism and is known as Final Balancing and Settlement Mechanism (FBSM).

- This is in line with MERC Order in Case 42 of 2006 dated 17 May 2007 for Implementation of Intra-State ABT in Maharashtra.

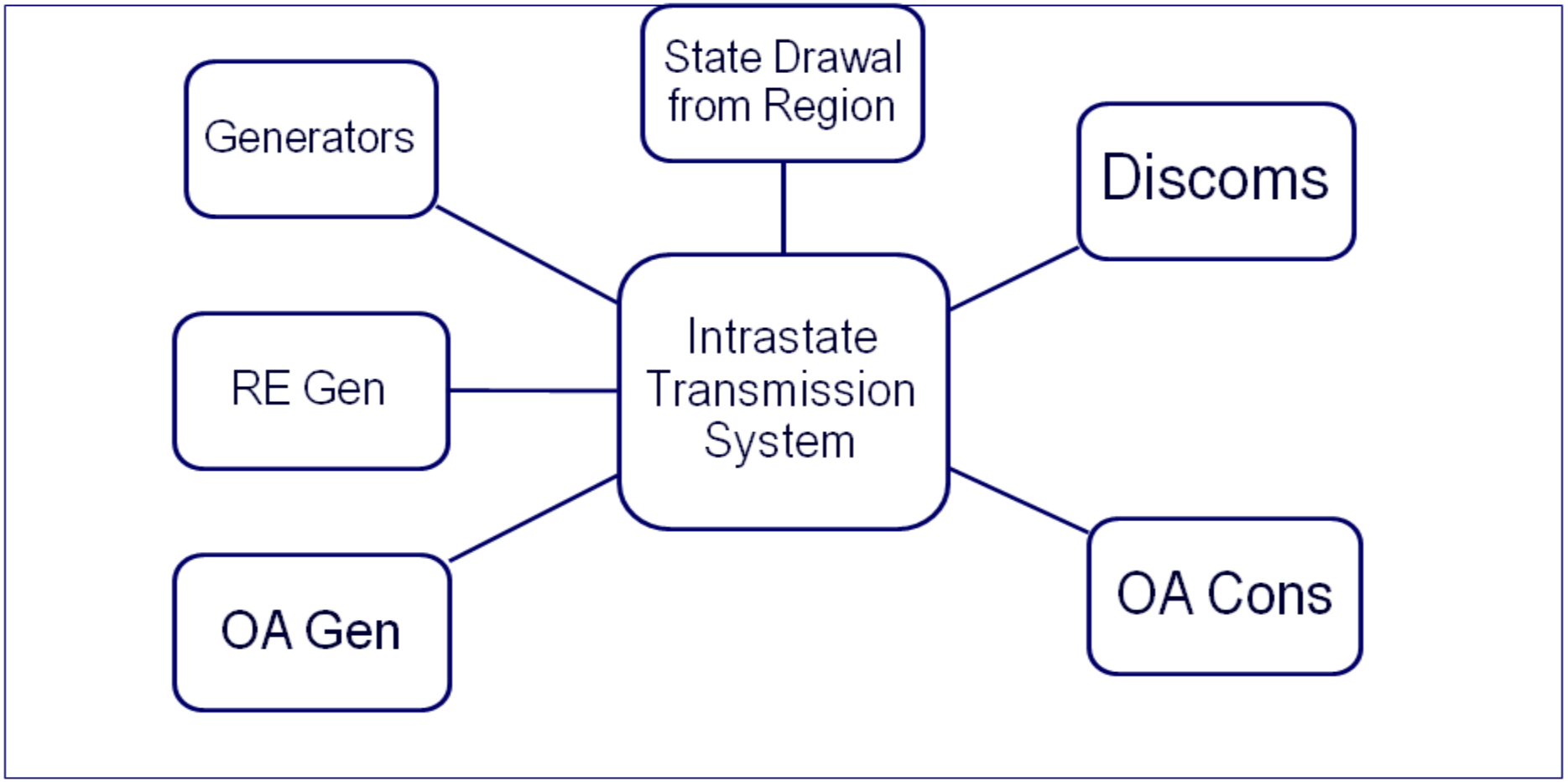
MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Cont'd…

- Rates of settlement are not linked to frequency, but are computed on marginal costs of utilities incrementing (having positive imbalance) to the pool.
- All calculations are 15 min time block based.
- The pool is balanced in terms of both energy as well as charges

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

State Energy Pool



G-T Interface

T-D Interface

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Structure of FBSM

- In FBSM, all generators in long term contract with discoms are not subjected to imbalance charges.
- Their Actual generation is allocated to beneficiaries.

- FBSM settlement takes place in 3 parts-
  - Pool UI – Difference between actual energy drawal and available energy- (at SMP)
  - Net UI-1- Deviation from Scheduled drawal -(Pro rata)
  - Net UI-2- Deviation from Scheduled generation (to be borne by Discoms only) -(Pro rata)

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Features of FBSM

- Centralized (State wide) Merit Order Dispatch (MOD) is followed by declaring 'ex-ante' prices of the pool.
- Pro rata allocation of 'actual' transmission loss
- Pool is inherently balanced in term of both energy and charges
- State UI with region integrated in both energy balancing and imbalance settlement
- All RE power categorized as in-firm, has been exempted from imbalance charges (actual energy allocation)
- Settlement based on Marginal Price
- 15 min based weekly settlement

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Typical Pre-MOD Schedules

BLOCK NO	MSPGCL	IPP	TPC	REL	CPP	WIND	TOTAL INSTS GEN	TOTAL CS	TOTAL INTER STATE BILATERAL	TOTAL INTER STATE OA SALE	TOTAL INTRA STATE BILATERAL	TOTAL DC	TOTAL DRAWL	SURPLUS(+) /SHORTFALL(-)
1	3411	275	1366	240	80	733	6105	4198	767	134	1082	12287	11912	375
2	3411	275	1366	240	80	712	6084	4218	748	134	1087	12271	11871	399
3	3411	275	1366	240	80	699	6071	4237	723	134	1092	12258	11832	426
4	3411	275	1366	240	80	693	6065	4259	704	134	1103	12265	11820	445
5	3411	275	1366	240	80	691	6063	4261	654	129	1103	12211	11630	582
6	3411	275	1366	240	80	691	6063	4261	635	129	1103	12192	11539	653
7	3411	275	1366	240	80	693	6065	4261	620	129	1103	12179	11512	667
8	3411	275	1366	240	80	695	6067	4261	605	129	1103	12166	11493	673
9	3411	275	1366	240	80	695	6067	4267	600	129	1103	12167	11468	698
10	3411	275	1366	240	80	682	6054	4267	595	129	1103	12149	11436	713

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Post MOD Schedules

BLOCK NO	MSPGCL	IPP	TPC	REL	CPP	WIND	TOTAL INSTS GEN	TOTAL CS	TOTAL INTER STATE BILAT ERAL	TOTAL INTER STATE OA SALE	TOTAL INTRA STATE BILAT ERAL	TOTAL DC	TOTAL DRAW L	SURPL US(+)/ SHORT FALL(-)
1	3411	275	991	240	80	733	5730	4198	767	134	1082	11912	11912	0
2	3411	275	967	240	80	712	5685	4218	748	134	1087	11871	11871	0
3	3411	275	940	240	80	699	5645	4237	723	134	1092	11832	11832	0
4	3411	275	921	240	80	693	5621	4259	704	134	1103	11820	11820	0
5	3411	275	784	240	80	691	5481	4261	654	129	1103	11630	11630	0
6	3384	275	740	240	80	691	5410	4261	635	129	1103	11539	11539	0
7	3377	275	740	233	80	693	5398	4261	620	129	1103	11512	11512	0
8	3377	275	740	227	80	695	5394	4261	605	129	1103	11493	11493	0
9	3377	275	740	202	80	695	5369	4267	600	129	1103	11468	11468	0
10	3377	275	740	187	80	682	5342	4267	595	129	1103	11436	11436	0

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Intra-State ABT Illustration Simplified

Marginal Price of B

Marginal Price of C

Figs are in MWh and are for illustrative purpose only

	A	B	C	D	Pool Volume
Drawn	200	700	500	2,500	3,900
Loss adjusted	211	737	526	2,632	4,105
Contracted	205	740	550	2,610	4,105
Imbalance	-6	3	24	-21	0
Rate	6.94	6.50	7.00	6.94	-
Payment	-38,359	20,526	165,789	-147,957	0

Source	Qty	Rate
1	4	10.0
2	5	8.0
3	15	5.87
	24	
	SMP	7.00

System Marginal Price

In actual ABT bill, the state UI is also taken as a Pool Participant and its rate also affects the SMP. Further, state UI charges are settled in three parts, Pool UI, Net UI 1&2.

A typical time block calculations

Date: 30.09.2011 Block No: 88

All figures in kWh and charges in Rs.

Sr. No.	Particulars	TPC-D	BEST	MSEDCL	REL-D	IIPL	IRSL	TPCU8	JSW	AMNEPL	WPCL	LMEL	LODHIVALI	State	Pool Volume
1	Drawl at T_D	174,670	141,177	2,690,166	242,728	0	0	5,502	131,560	13,156	83,713	5,732	5,262	-	3,493,665
2	Loss Adjusted Drawal	182,556	147,551	2,811,628	253,687	0	0	5,750	137,500	13,750	87,492	5,991	5,500	1,049,306	3,651,406
3	Metered Injection	135,494	147,726	1,644,550	119,220										
4	Central Sector	-	-	567,772	-										
5	Inter OA Purchase	0	2,421	401,916	76,190										
6	Inter OA Sale	0	0	0	0										
7	Intra OA Purchase	19,809	30,389	137,500	76,250										
8	Intra OA Sale	0	0	0	0										
9	NCER Purchase	7,500	235	-8,985	1,250										
10	Total Availabilty	162,803	180,770	2,742,752	272,910	0	0	7,030	136,236	13,670	87,710	6,130	5,480	35,915	3,651,405
11	Pool Imbalance	-19,753	33,219	-68,876	19,223	0	0	1,280	-1,264	-80	218	139	-20	35,915	0
12	Imbalance Rate Rs/kWh	3.41	5.78	3.41	2.59	3.41	3.41	1.62	3.41	3.41	1.62	1.62	3.41	1.72	-
13	Pool Charges	67,275	-192,141	234,576	-49,787	0	0	-2,073	4,305	272	-353	-225	68	-61,916	2
	Discom Deviations	Net UI- I													
15	Scheduled Drawl	188,471	137,861	2,726,462	275,557	-	-	-	-	-	-	-	-	1,013,391	3,328,351
16	Act. drawal	182,556	147,551	2,811,628	253,687	0	0	5,750	137,500	13,750	87,492	5,991	5,500	1,049,306	3,651,406
17	Net UI - I	5,915	-9,690	-85,166	21,869	0	0	1,280	-1,264	-80	218	139	-20	-	-
18	Allocation	0	5,084	44,680	0	0	0	0	663	42	0	0	10	-	50,479
	State Generator Deviations														
	Net		Net UI - II												
	Instate Scheduled														
19	Gen	121,612	138,388	1,398,250	119,500	0	0	5,750	137,500	13,750	87,492	5,991	5,500		2,033,733
20	IActual Injection	126,797	146,259	1,408,036	119,220	0	0	7,030	136,236	13,670	87,710	6,130	5,480		2,056,567
21	Net UI - II	5,185	7,870	9,786	-280	-	-	-	-	-	-	-	-		-
22	Allocation	0	0	0	0	-	-	-	-	-	-	-	-		0
23	Net UI Charges	0	5,084	44,680	0	0	0	0	663	42	0	0	10		-
	Additional UI														
24	charges	0	0	0	0	0	0	0	0	0	0	0	0		-
25	**Net Pool Charges**	**67,275**	**-187,058**	**279,256**	**-49,787**	**0**	**0**	**-2,073**	**4,968**	**314**	**-353**	**-225**	**79**	**-112,396**	**2**
														State Loss	4.32
	Regional Payments	Gross UI	Pool UI	Net UI	Cap UI	Add UI								Freq Rate	3.1295
		112,396	-61,916	-50,479	0	0									

Settlement in FBSM

- Basic principle of FBSM is zero balance of energy and charges pool.
- In case of inter-state transactions of RE energy, such entity shall be SPP in FBSM.
- In case of part inter-state sale out of a pooling station, how to make it an SPP?
- Also all calculations shall be as per FBSM i.e. pool UI (SMP), Net UI-1 and 2. Other wise the bill will not balance.
- These charges shall be different than the charges computed as per this regulation.
- This necessarily means that there has to be uniform settlement mechanism through out the country.

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Wind/Solar in Maharashtra

- Maharashtra has around 4500 MW Wind and 300 MW Solar generation at present. (March 2015)
- Additional 5000 MW solar and 7500 MW solar is to come up as per new GoM Policy.

Renewable Energy Source	Cumulative capacity as on 31.03.2015 in MW	Proposed Expansion as per State RE policy 2015
Wind	4442	5000
Small-Hydro	284	400
Bagasse based co-gen	1414	1000
Biomass power project	200	300
Industrial Waste	32	200
Solar	329	7500
Total	6669	14400

- Actual Wind witnessed 2350 MW peak.
- Annual contribution of wind energy in state's demand 9 to 10 %.

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Managing wind energy

- Barring one incident, Maharashtra has never curtailed wind energy. All energy is absorbed.
- In case of high under-drawal owing to wind energy, the following sequence of operations is undertaken-

1. Hydro generation is kept minimum.
2. Thermal generation is backed down to tech. min.
3. Ghatghar generation is taken to pumping mode.
4. If required, CS generation is re-scheduled.

Requirements for future

- Real time visibility of wind generation is mandatory.
- Establishment of REMC
- Better management of reactive power
- Accuracy of forecasting of wind energy
- Regulatory provision for the above.

Mix of connectivity and PPAs

- In Maharashtra there are around 43 wind energy and 10 solar energy pooling stations.
- There are around 8-12 numbers of 33 kV feeders at each station.
- However, several turbines of different owners/ developers/ make are connected on each feeder (typically 33 kV).
- At some old stations, feeders have wind generation and discom load also.
- There can be different PPAs of generators connected on a single feeder-
  - CPP
  - OA (third party)
  - Preferential tariff with discom
  - APPC with discom
  - Inter-state (CPP/Third party/discom)

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Inter-state transactions

- *Where the Fixed Rate is the PPA rate as determined by the Appropriate Commission under section 62 of the Act or adopted by the Appropriate Commission under section 63 of the Act. In case of multiple PPAs, the weighted average of the PPA rates shall be taken as the Fixed Rate. The wind and solar generators shall furnish the PPA rates on affidavit for the purpose of Deviation charge account preparation to respective SLDC supported by copy of the PPA.*
- *Fixed Rate for Open Access participants selling power which is not accounted for RPO compliance of the buyer, and the captive wind or solar plants shall be the Average Power Purchase Cost (APPC) rate at the National level, as determined by CERC from time to time*

- How to know whether the sale is under RPO or under captive?
- In case of part Intra-state and part inter-state out of a pooling stations, how to handle this and how to segregate deviations?
- Weighted average rate (of Preferential/APPC) will have to be worked at this interface.
  - This shall be different for each 15 min time block.
  - Shall be done by QCA
  - How to vet this?

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Present Measurement System(STU metering)

- Where different developers are connected at a station-

  Measurement is done at the meter located at the pooling station at the emanating side of each feeder ★

- Where single developer is connected at a station-

  Measurement is done at the meter located at the pooling station at the LV side of the transformer. ★

Typical EHV pool Station- 132/33 kV

Wind Turbines (Having Different Contracts)

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Error formula

- Error (%) = 100 X [Actual Generation– Scheduled Generation] / (AvC) …..*(As given in FOR Model Regulation)*

- For each outage of a turbine(s) on a feeder/station, the available capacity would change.
- Accordingly schedules would have to change in real time.
- This means, scheduling needs to be up to machine level.
- As the AvC (denominator) is under control of Forecaster, they can play with available capacity.
- It is not possible for SLDC to go up to machine level.

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Forecasting, scheduling and Accounting

- SLDC can measure energy at the interface meter and compare the same against net schedule provided.
- Responsibility of forecasting (both at pooling station and machine level) to be clearly defined.
- Machine level scheduling and apportioning deviation charges (de-pooling) should be entrusted on a separate entity. (QCA)
- Role of REMC would be important.

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Provisions in draft Regulation

- 2.3.

  Forecasting shall be done by wind and solar generators connected to the State grid, or by QCAs on their behalf.

  The concerned SLDC is also mandated to undertake forecasting of wind and solar power that is expected to be injected into the State grid, by engaging forecasting agency(ies) if required.

  The forecast by the concerned SLDC shall be with the objective of ensuring secure grid operation by planning for the requisite balancing resources.

  The forecast by the QCA or wind and solar generator, as the case may be, shall be generator centric.

  The QCA or wind and solar generators will have the option of accepting the SLDC's forecast for preparing its schedule or provide the SLDC with a schedule based on their own forecast.

- For operational planning purpose (to plan dispatch of conventional generation), only collective impact of RE at state level is required.
- Pooling station wise forecasting by SLDC is not desirable.
- QCA should do pooling station wise forecasting

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Provisions in draft Regulation

- *The schedule of wind and solar generators connected to the State grid (excluding collective transactions) may be revised by giving advance notice to the SLDC.*

  Collective transaction may not be allowed (as schedules are not subjected to revision)

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Deviation charges

Deviation Charges in case of under or over-injection, for sale of power within the State

Instead of bringing absolute error into calculations for deviation charges,

a) Actual deviation from schedules shall be considered in place of absolute error.

b)A uniform slab rate for deviation charge may be introduced.

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Issues to be addressed

- Telemetry and Real time Visibility
- Separate software for Forecasting/scheduling, reporting, energy accounting and deviation settlement.
- Uniform ABT mechanism
- Sufficient balancing Capacity to counter balance RE variations
- Lack of Primary Response (FGMO)
- Introducing Secondary Control (AGC)
- Enhancement of flexibility in thermal units (lower down tech min)
- Regulatory support
- QR of QCA
- REMC establishment and operation
- Who will work average PPA rate for inter-state ? Mechanism Needs to be simplified.
- How to distinguish part inter and part intra-state sale at a pooling station?

Thank you !

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

Experience of implementation of Intra-State ABT in the State of Gujarat

Second meeting of technical committee on implementation of framework for renewables at State level

State Load Despatch Centre

Gujarat Energy Transmission Corporation Limited

[An ISO 9001 : 2008 Company]

Introduction of Intra-State ABT in the State.

- **Hon'ble GERC vide order dated 11.08.2006 introduced Intra-State Availability Based Tariff (ABT) in the State and decided to operate it as a mock trial.**
- **Mock trial continued for about more than 3.5 years.**
- **Hon'ble GERC directed (notification No.3 of 2010) to implement Intra-State ABT fully in the State with all its commercial aspects w.e.f 05.04.2010.**

Comparison : At the time of Introduction of ABT V/s As on date:

Sr. No.	Descrepation	on 05.04.2010	As on today
1	Nos of UI pool Members	53	72
2	No of ISGS	13	20
3	Nos of RE generating stations	No scheduling	91
4	Nos of OA Users	8	504

Introduction of major new regulations

- **Intra-State Open Access regulation : Notification No. 3 of 2011.**

Large number of consumers opted for open access and covered under scheduling and energy accounting ambit.

- **Renewable Regulatory Fund mechanism**

RE (wind and solar) generators covered under scheduling and energy accounting ambit.

- **Deviation settlement mechanism.**

Stringent provisions to limit unscheduled interchange.

RE treatment:

- **At the time of inception of Intra-State ABT, RE generators were not covered under scheduling/ UI ambit.**
- **Subsequently, after introduction of RRF mechanism, RE generators (as per specified criteria) are being covered under scheduling ambit with special provisions to handle its deviation from schedule.**
- **However, commercial mechanism outlined in the RRF mechanism is suspended and only scheduling part is under force.**

Open Access:

- **Subsequent to introduction of Intra-State Open access regulation, large number of consumers/entities opted for open access and covered under scheduling and accounting ambit.**
- **At time of introduction of Intra-State ABT it was merely about 8-10 entities. And as of now registered OA users are more than 500.**
- **Energy purchased by OA consumers are added in to the drawl account of respective DISCOMs.**

Open Access: Continue

- **OA consumers are given set-off as per scheduled energy (purchased through collective/bilateral transactions). However, such scheduled energy (purchased by OA consumer) is not being settled back to back. i.e balancing is not done by SLDC.**
- **DISCOM will settle such scheduled energy at the time of billing w.r.t actual drawl of OA consumer.**

Open Access: Continue

- **Bank guarantee (amount equivalent to max UI for the week) is taken from Intra-State generator selling power under STOA as a payment security mechanism.**

- **Suggestion: SLDC may insist similar kind of BG from LTOA and MTOA users.**

State UI/DSM settlement at regional pool.

- **Gujarat State is a UI/DSM pool member WR region.**
- **At present, GUVNL on behalf of the State as a whole settles the amount (payable/receivable) with WR pool.**
- **At Intra-State level, UI/DSM pool is balanced. i.e. payable=receivable.**

UI/DSM settlement so far.

Year	Rs. In Crores
2010-11	1114.27
2011-12	1328.02
2012-13	875.24
2013-14	398.47
2014-15	412.58

Challenges.

- **Outstanding bill recovery**
- **Communication issues**
  - SCADA
  - Website

Suggestion.

- **For proper and timely settlement, BG from LTA and MTOA users (except DISCOMs) are required.**
- **So that in case of any grievance/ litigation/outstanding bill, payment among the State pool members can be ensured.**
- **SLDC development fund to be introduced.**


SUN
WIND
Thank you !!!
EARTH
WATER