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

Venue	:	CERC, New Delhi
Date	:	16-12-2015
List of Participants	:	At Annexure - I **(Enclosed)**

1. The first meeting of Technical Committee on implementation of framework for renewables at State level was held under chairmanship of Shri A. S Bakshi, Member, CERC on 16 December 2015. Shri Bakshi welcomed all the Members and highlighted the terms of reference of the Committee.

2. Ms. Shruti Deorah, Advisor (RE), CERC, presented Regulatory Roadmap for States to achieve reliable grid management and large-scale integration of Variable Renewable Energy sources. The presentation discussed agenda for the Committee, recent steps taken by CERC and the need to emulate complementary regulatory framework at the state level. She also informed that 6 states have already implemented Deviation Settlement Mechanism (DSM) in some form. A copy of the presentation is attached as **Annexure-II**.

3. Shri. S. K. SOONEE (CEO POSOCO) discussed the current frequency scenario, requirements and next steps for improved grid management, and elaborated on the complexities involved in Grid Management for the large interconnected Indian grid. He also expressed that challenges in India are different from the developed nations as they had a mature grid when renewable power emerged. A copy of the presentation is attached as **Annexure-III**.

Discussion

4. The Chairman requested the state representatives to briefly summarize the status of implementation of ABT and DSM in their respective states.

5. Shri. R.S. Rathore (RERC) informed that ABT regulations are already in place in Rajasthan. However, work to deploy ABT meters is still in progress and is expected to complete by 31st March 2016.

6. Shri S.A. Kumar (TERC) brought up the challenges being faced in Tamil Nadu to meter thousands of turbines. Tamil Nadu is currently pursuing metering at the pooling station level. CERC staff emphasized that once metering of all conventional generators and all pooling stations with RE generators is complete, implementation of DSM is feasible. Shri S.K.Chatterjee (JCRA, CERC) also underscored that it is best to initiate the process of drafting the regulations now so that they are ready in a few months by the time metering is complete.

7. The Members agreed that there is a need for a robust institution as a system operator, which should be neutral, independent, transparent, non-discriminatory and equipped with skilled manpower. Concept of Distribution System Operator (DSO) on bylines of SLDC was also elaborated.

8. Requirement of Technical Consultant or Partner to iteratively modify the software keeping pace with evolving regulations was discussed. The job of TC would be to provide necessary assistance in load forecasting and strategizing grid management.

9. It was suggested by members that for proper ring fencing of SLDC, it must be isolated from state control. Shri Lad (MERC) emphasized that this needs amendment to the Electricity Act.

10. It was concluded that ABT and DSM implementation in all states is the need of the hour. Proper Forecasting and Scheduling have to be focused upon.

Decision

11. After detailed discussion, there was a unanimous consensus on the need for :-

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

12. It was also agreed that in the next meeting, SLDC Heads of 4 states viz Maharashtra, Gujarat, Rajasthan and Tamil Nadu, along with the representatives of respective State Commissions, shall present the status of implementation of ABT/DSM in the respective states.

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

Annexure I

LIST OF PARTICIPANTS

FIRST MEETING OF TECHNICAL COMMITTEE ON FRAMEWORK FOR IMPLEMENTAION OF RENEWABLES IN GRID

HELD ON 16.12.2015

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. Anand Kumar, Chairman	Meghalaya ERC
8	Mr. P Rama Mohan, Member	APERC
9	Mr. Raghuvendra Singh Rathore, Member	RERC
10	Dr. Sushanta K. Chatterjee, JC(RA)	CERC
11	Mr. S.C. Shrivastav, JC(Engg)	CERC
12	Ms. Shruti Deorah, Advisor (RE)	CERC
13	Tanay Tarany, Research Associate	FOR

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

TECHNICAL COMMITTEE OF STATES

16TH DECEMBER 2015

केन्द्रीय विद्युत विनियामक आयोग

CENTRAL ELECTRICITY REGULATORY COMMISSION

Technical Committee of States

Committee of States, under chairmanship of Shri A.S.Bakshi:

Technical Members of State Commissions of renewable rich States, viz. Tamil Nadu, Gujarat, Rajasthan, Maharashtra, Andhra Pradesh, Karnataka and Madhya Pradesh

Terms of Reference of the Committee:

- Deployment and implementation of Framework on Forecasting, Scheduling and Deviation Settlement of Wind & Solar generating stations at the state level;
- Put in place the Availability Based Tariff (ABT) framework at the State level as mandated in the National Electricity Policy and Tariff Policy;
- Evolve a framework for Ancillary Services and Reserves at the State level;
- Implementation of AGC and primary control within the States.

Building blocks for reliable grid management

- Robust grid code
- Availability-Based Tariff/Deviation Settlement Mechanism
- Forecasting & scheduling of variable RE
- Reserves
- Complementary market mechanism (ancillary services, 24x7 market, shorter gate closure)

Recent measures taken by CERC

- Operational and Commercial Framework for Renewable Sources
  - Framework on Forecasting, Scheduling and Imbalance Handling for Variable Renewable Energy Sources (Wind and Solar)- for Regional Entities- published on 7.8.2015
  - Model Regulations for Wind and Solar Generating Stations at the State level, presented to FOR on 29.9.2015
- Ancillary Services Operations Regulations, notified on 19.08.2015
- Suo motu order "Roadmap to operationalise Reserves in the country", notified on 13.10.2015
- Draft Deviation Settlement Mechanism Third Amendment, posted for stakeholder comments on 23.10.2015

Measures by the FOR & States

- Chhattisgarh, Delhi, Gujarat, Maharashtra, MP, West Bengal have implemented Deviation Settlement Mechanism
- FOR adopted Model Regulations for Wind and Solar Generating Stations at the State level, at 50th FOR meeting in Pune
- Karnataka notified draft regulation for renewables on 16th November, 2015
- Madhya Pradesh notified draft regulation for renewables on 8th December, 2015

Alignment of State Regulatory Framework…

There is a need to replicate complementary regulatory framework at the State level:

- Detailed energy accounting of all generators and load entities connected to the State grid;
- Deviation Settlement Mechanism pool in the State;
- Implementation of Availability Based Tariff as urged in National Tariff Policy, by April 1st, 2016;
- Ring fencing the State Load Dispatch Centres (SLDCs) and evolve a special scheme for their capacity building;

…Statutory Advice to MoP

- Adoption of FOR evolved Model Regulations on Forecasting, Scheduling and Deviation Settlement for solar & wind generators, latest by April 1st, 2016;
- Deployment of requisite funds from a central fund such as PSDF or NCEF;
- States level regulation on Ancillary Services & Reserves aligned with timelines of implementation delineated in CERC's order on Reserves, latest by April 1st, 2016;
- Approval of one-time reimbursement of expenses incurred by generators and load dispatch centers for implementation of AGC.

Agenda for the Meeting

- Review status of implementation of ABT & Deviation Settlement Mechanism (DSM) in States
  - 6 States have implemented DSM- is there a need for their alignment with national level framework?
  - Introduction of ABT & DSM in other states
- Review status of Regulations on Forecasting, Scheduling and Deviation Settlement of Wind & Solar generating stations at the State level
- Way forward on creation of Reserves at the State level
- Way forward on introduction of Ancillary Services at the State level

THANK YOU

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

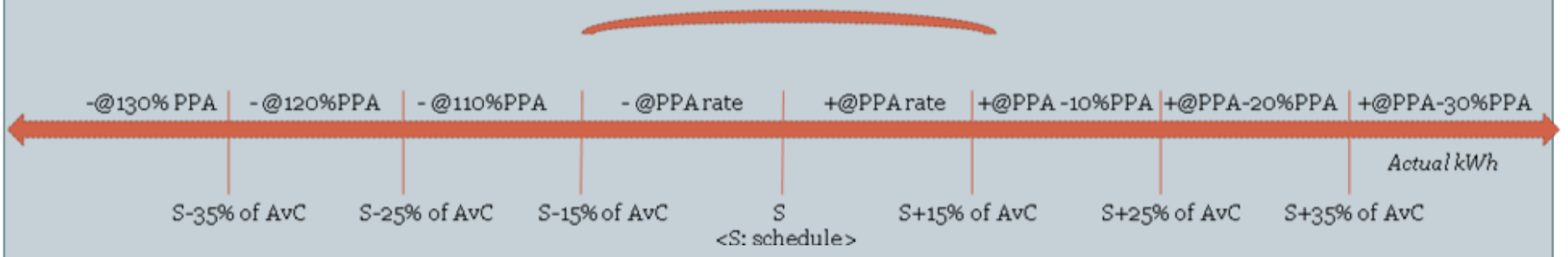
SHRUTI DEORAH (ADVISOR- RE)
SMDEORAH@CERCIND.GOV.IN

APPENDIX

CERC's Framework for Scheduling, Forecasting & Deviation Settlement for Regional RE Generators (solar & wind)

- Forecasting and scheduling must be done for both solar and wind regional entities
  - Can be done by generator and/or RLDC
  - Larger geographical area results in better forecasting accuracy
- Due to the infirm nature of these sources, more flexibility provided w.r.t schedule
- Incentive to improve forecasting- deviation charges outside a tolerance band, which could be tightened over time.
- Integration with existing grid-framework for long term sustainability of RE sources on the grid

Deviation Settlement Framework for Regional Entities



- Error definition: [(Actual generation – Scheduled generation)/Available Capacity] x 100
- Payment as per schedule @PPA Rate
- Deviation Settlement within tolerance band (+/- 15%):
  - Receipt from/payment to pool @PPA rate (i.e. in effect, payment as per actuals)
- Beyond 15%, a gradient band for deviation charges is proposed as follows:

Abs Error (% of AvC)	*Deviation Charge*
15%-25%	10% of PPA rate
25%-35%	20% of PPA rate
>35%	30% of PPA rate

- 16 revisions allowed, one for every one-and-half-hour block, effective from 4th time-block.

Settlement of RPO under the framework

- RPO deemed complied at scheduled generation
- In case of under-injection or over-injection by RE generator, actual units to be balanced with RPO
- Instead of procuring or crediting REC for each case, all RE under/over-injections can be netted off (on monthly basis) for the entire pool first
  - RE shortfall: RECs will be purchased from exchange and extinguished
  - RE surplus: notional RECs will be credited to DSM Pool as carry forward for next cycle

- Settlement of OA and CPP poses challenge, particularly for CPP where there is no PPA rate
- Therefore a reference rate equal to APPC at National level shall be determined by CERC through order
- All deviations from schedule by these entities must be settled at APPC rates.

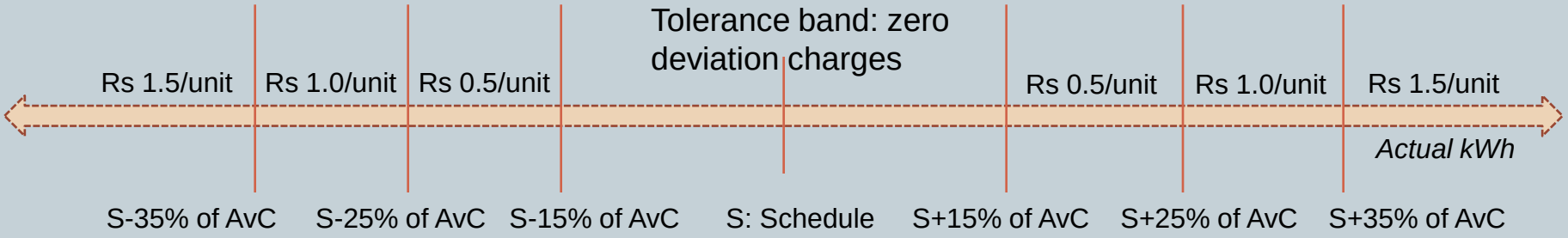
State Model Regulation for Renewables

- Presented and approved in-principle at 50th FOR meeting on 29th September, 2015 in Pune
- Salient Features
  - Introduction of Qualified Coordinating Agency (QCA)
  - Payment to generator as per actuals
  - Graded deviation settlement band, settlement by SLDC
  - For generators selling power outside state, settlement as per framework similar to CERC framework on regional entities
  - All RE generators to be treated together as a virtual pool within the State Pool
  - Any deficit in State pool due to RE generators to be covered by a national fund (such as PSDF or NCEF)

Proposed Deviation Settlement for RE generators at the State level

'Absolute Error' : absolute value of the error in actual generation w.r.t. scheduled generation and the 'Available Capacity' (AvC), for each time block: Error (%) = 100 X [Actual Generation– Scheduled Generation] / (AvC) ;

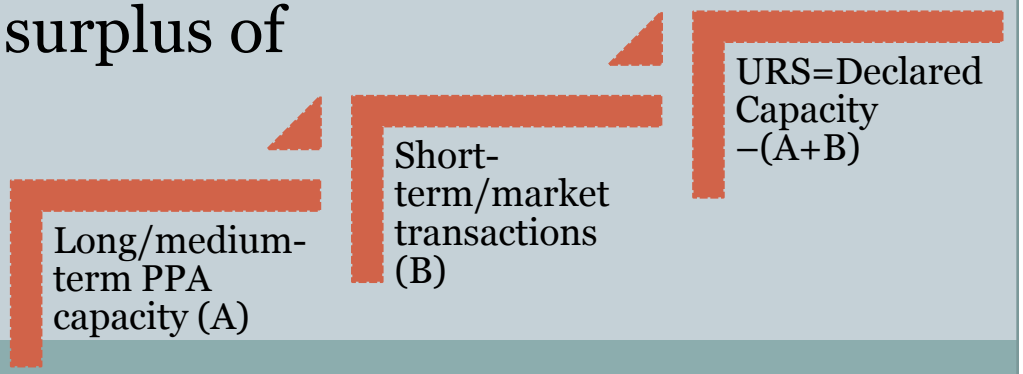
Deviation Charges:



- **15% tolerance band for existing wind / solar generators**
- **10% tolerance band for new wind / solar generators**

Ancillary Services Regulations

- Objective: to restore the grid frequency to desired level and to relieve congestion in the transmission network
- Scope: all generating stations that are regional entities and whose tariff is determined or adopted by the Commission for their full capacity
- Reserves Regulation Ancillary Services (RRAS): utilize URS i.e. un-requisitioned surplus of generating stations



Proposed RRAS Framework- Operations

- Nodal Agency- NLDC (through RLDCs)- shall prepare merit order stack of surplus capacities available based on variable cost of generation and factors such as ramp up/down rate, response time, transmission constraints, etc.

- Nodal agency shall direct selected RRAS providers for Regulation Up or Regulation Down based on the trigger events.

- Generation under the RRAS shall be scheduled to the *Virtual Ancillary Entity* in any one or more Regional Grids as decided by the Nodal Agency.

- The schedules of the RRAS Provider(s) shall be considered as revised by the quantum scheduled by the Nodal Agency under RRAS.

Proposed RRAS Framework- Commercials

- Weekly energy accounting by the respective Regional Power Committee (RPC) along with Deviation Settlement Account
- Payment to RRAS provider would be from the Regional DSM Pool

- For Regulation Up Service, the RRAS Provider shall be paid fixed and variable charges, with a mark-up decided by the Commission
  - Fixed charges to be refunded to beneficiary to the extent of quantum surrendered
  - Mark-up on fixed cost based on factors viz. age, ramp rate, additional wear & tear etc.
  - Fixed & variable charges at the time of delivery to calculate payment

- For Regulation Down service, the RRAS Provider shall pay back 75% of the variable charges corresponding to the quantum of Regulation Down services scheduled, to the Regional Deviation Pool Account

Roadmap to Operationalise Spinning Reserves

Suo moto order "Roadmap to operationalise Reserves in the country", notified on 13.10.2015

Reserves of ISGS to be utilized w.e.f. 1st April, 2016, along the lines of Ancillary Services Regulations 2015

Automatic Generator Control (AGC) to be operationalised in regional generating stations by 1st April 2017

Market based framework for Ancillary Services to be in place by April 1st, 2017

States must evolve a similar framework on AGC & market for ancillary services, aligned with these timelines

DSM 3rd Amendment

- Salient Features
  - Deviation limit for States based on their peak demand met in the year 2014-15
  - Proposed DSM limit varies from 50 MW to 250 MW
  - Comments from stakeholders received, and regulatory process underway
- Not a long-term solution; in the long term:
  - Control areas shall undertake cutting edge forecasting and scheduling processes, and
  - Shall minimize deviations by executing fast intra-day market transactions, and by deploying spinning reserves to maintain load-generation balance

FOR Technical Committee for Implementation of Framework on Renewables at the State Level

Meeting at CERC

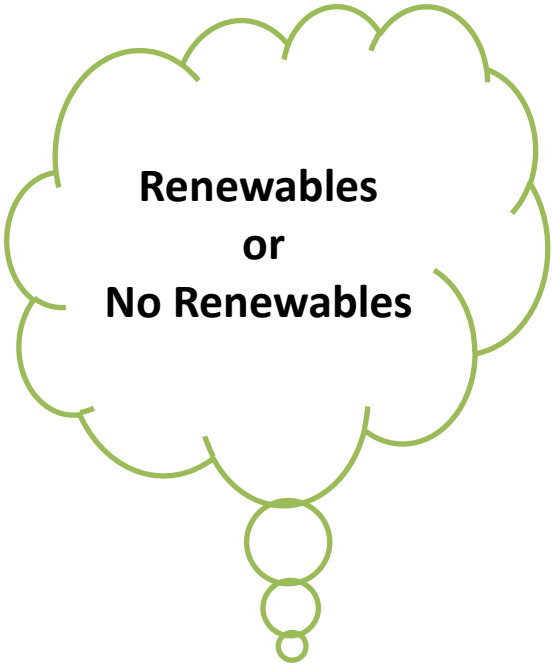
16th Dec 2015

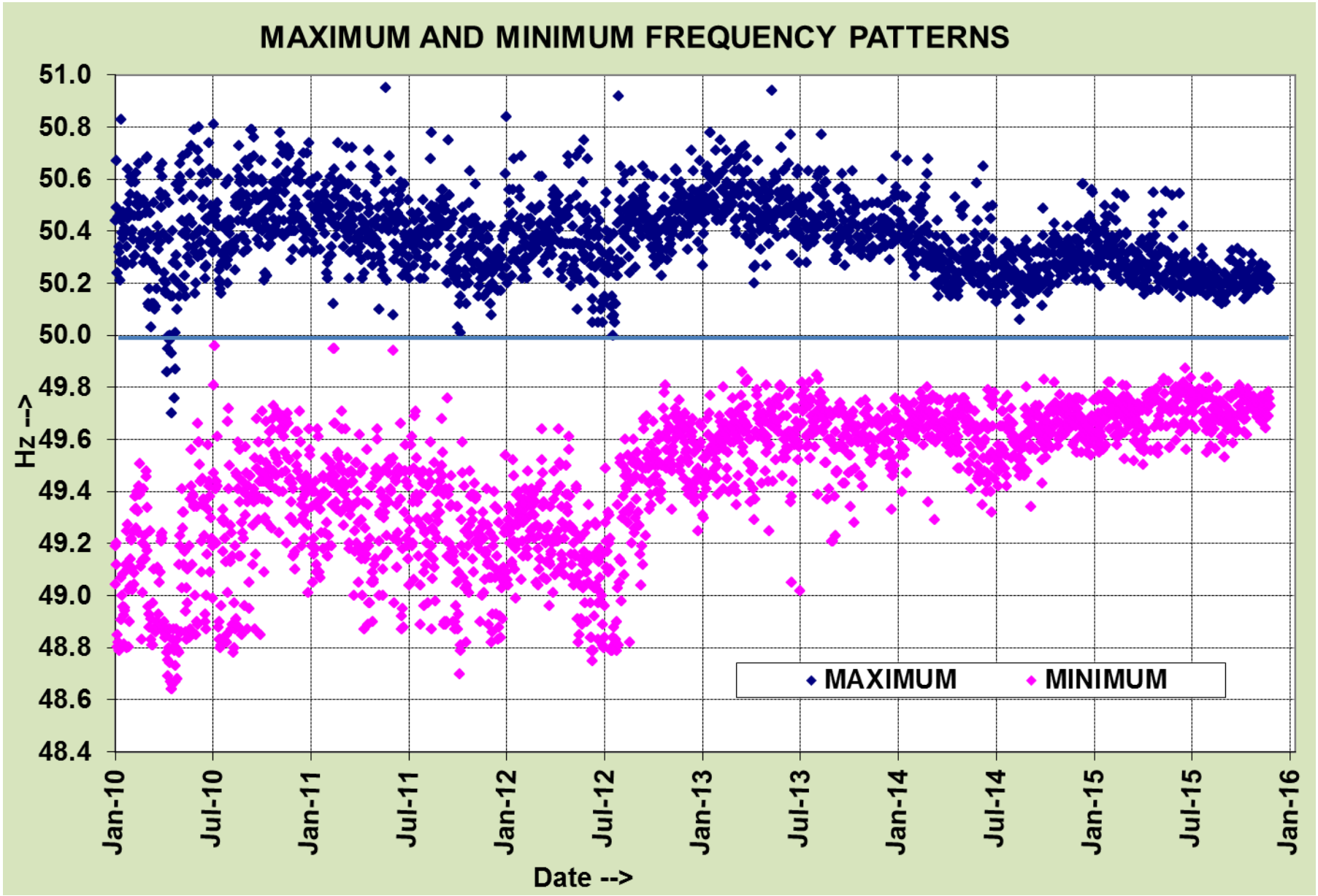
Terms of Reference

- Deployment and implementation of Framework on Forecasting, Scheduling and Deviation Settlement of Wind & Solar generating stations at the State level.
- Introduction / implementation of the Availability Based Tariff (ABT) framework at the State level as mandated in the National Electricity Policy and Tariff Policy
- Introduction of Ancillary Services and Reserves at the State level.
- Implementation of Automatic Generator (AGC) and primary control within the States.
- Provide periodic reports to the FOR.

Prerequisites for Large Grids

- **Demand Forecasting**
  - IEGC, 2010 - 5.3(e): Demand Estimation
- **Resource Adequacy including Reserves**
  - IEGC, 2010 – 6.4 – Demarcation of Responsibilities
- **Frequency Control**
  - Primary Control – IEGC, 2010 – 5.2 (i)
  - Secondary Control – Yet to be defined
  - Tertiary Control - Re-scheduling, Load Management
- **Performance Metrics for Control Area**
- **Intra – Control Area Deviation Settlement Mechanism**
- **Visualization and Situational Awareness**
  - Real Time Data Telemetry, Hardware and Software Tools, Big
- **Defence Mechanisms**
  - Incredible Contingencies




MAXIMUM AND MINIMUM FREQUENCY PATTERNS
51.0
50.8
50.6
50.4
50.2
50.0
49.8
49.6
49.4
49.2
49.0
48.8
48.6
48.4
Hz -->
MAXIMUM
MINIMUM
Jan-10
Jul-10
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Jan-12
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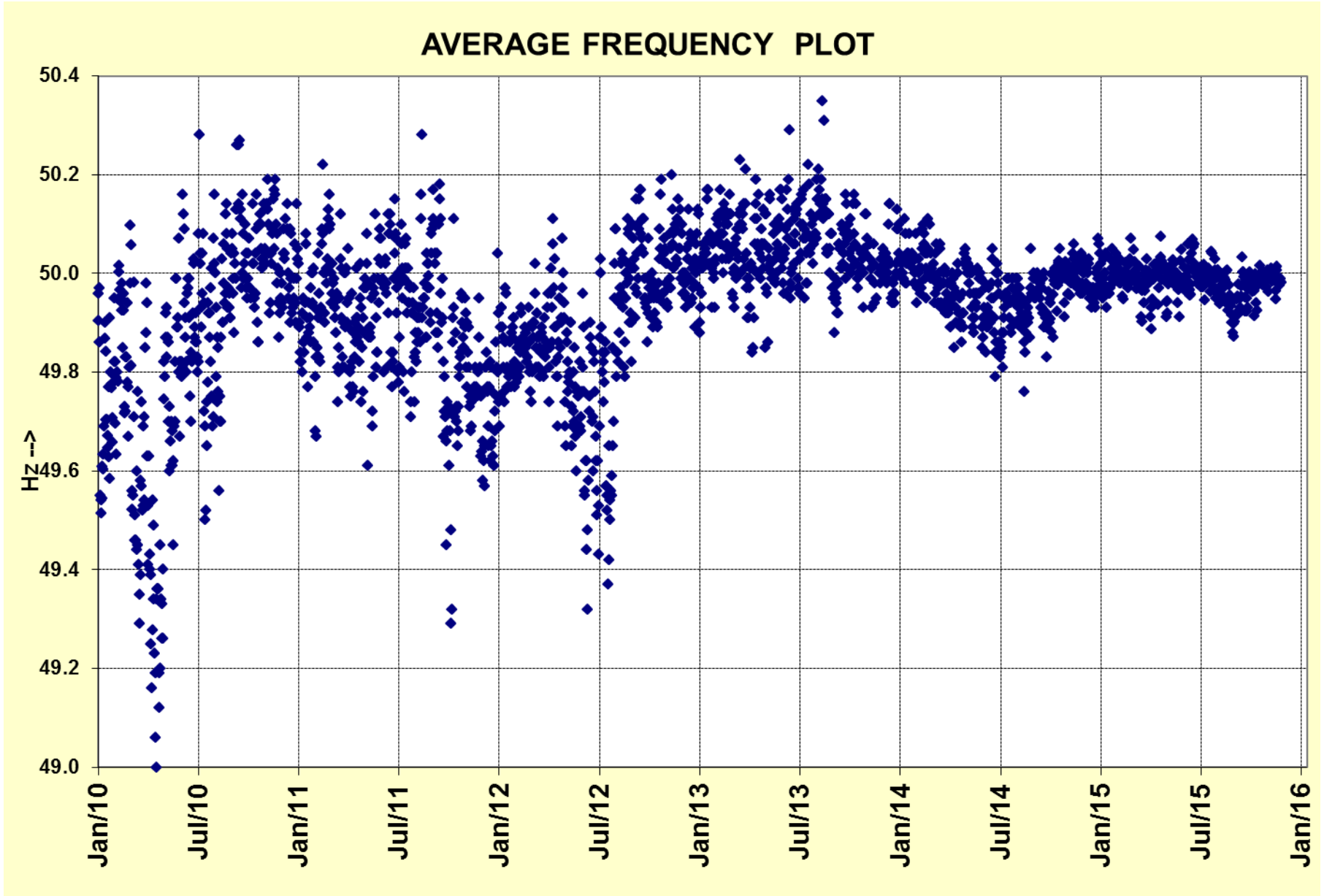
Jan-15
Jul-15
Jan-16
Date -->


AVERAGE FREQUENCY PLOT
50.4
50.2
50.0
49.8
49.6
49.4
49.2
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Hz -->
Jan/10
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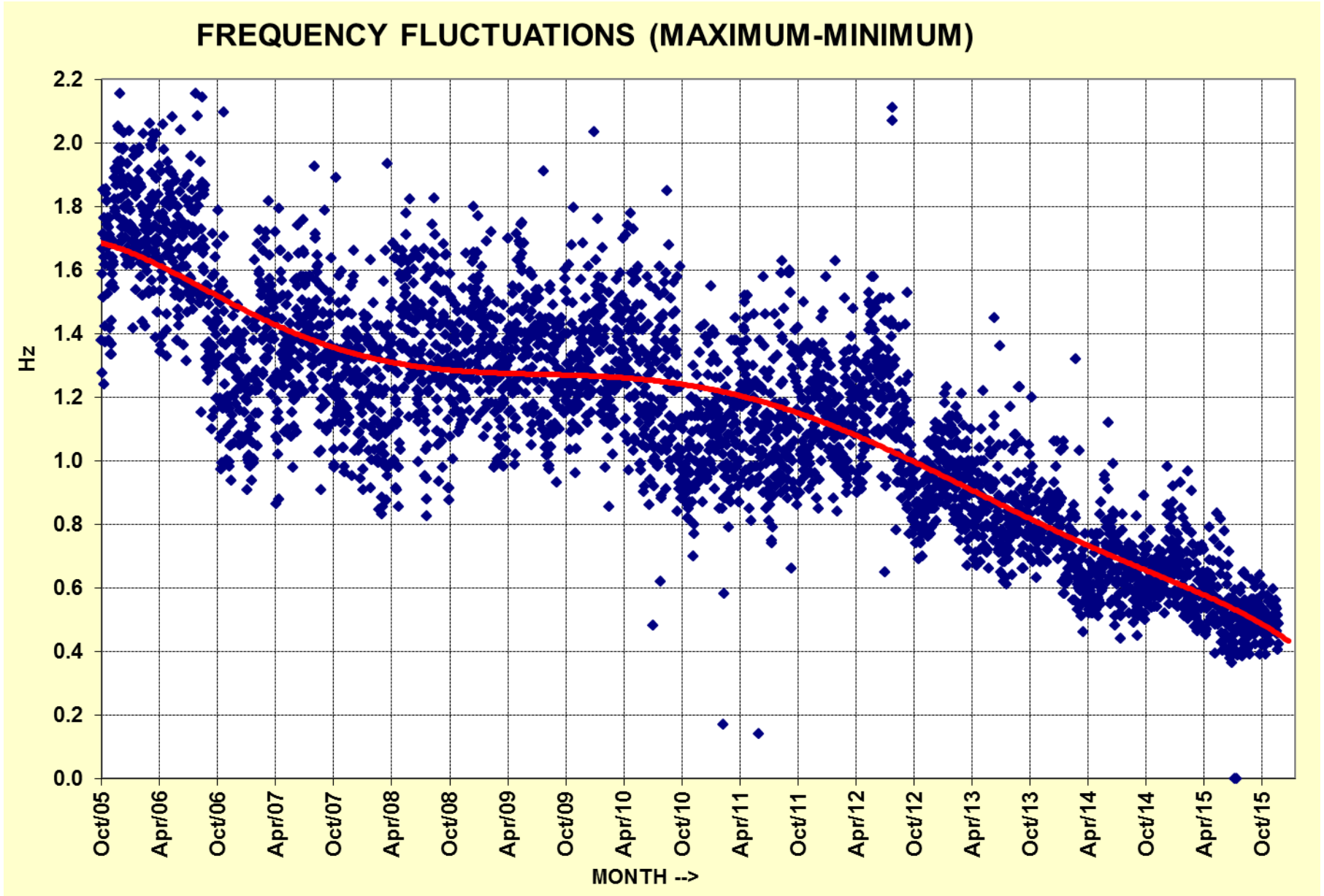
Jul/15
Jan/16


FREQUENCY FLUCTUATIONS (MAXIMUM-MINIMUM)
Hz
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
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Oct/05
Apr/06
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Apr/08
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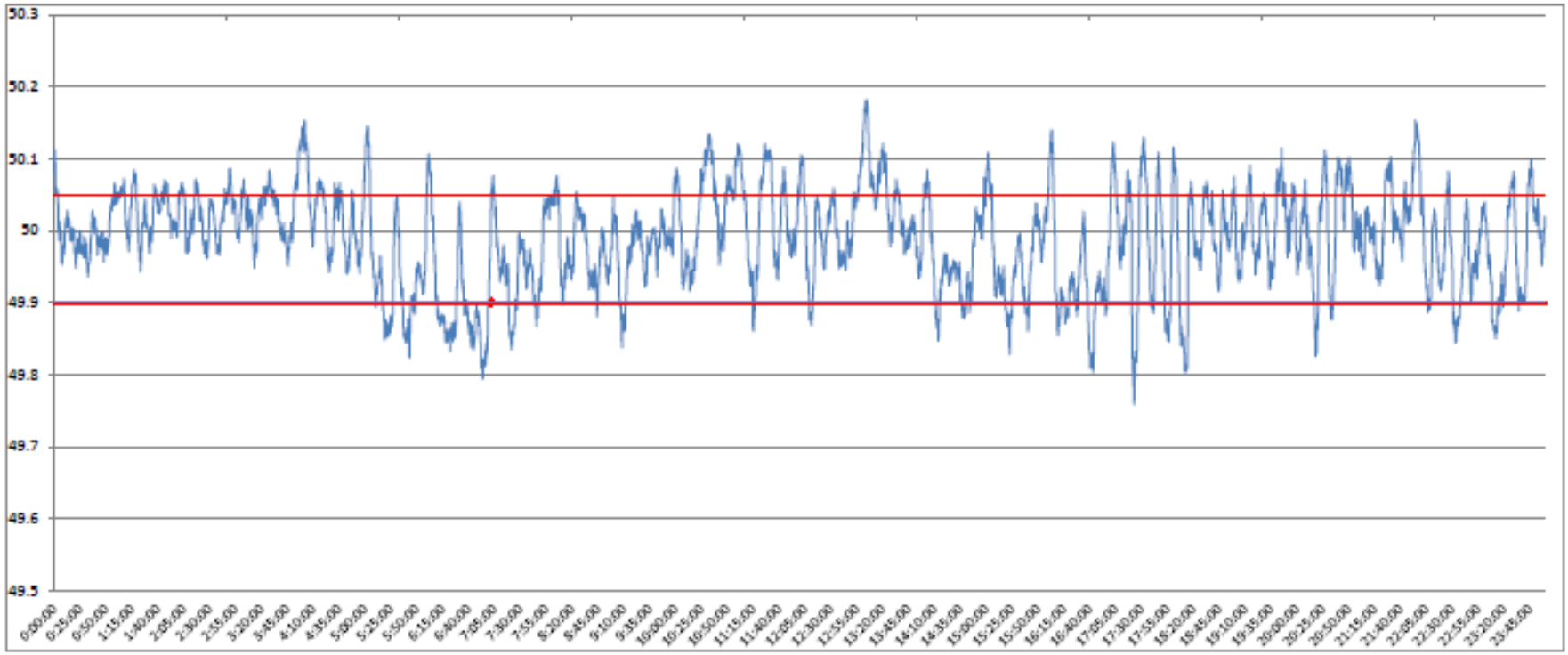
Apr/09
Oct/09
Apr/10
Oct/10
Apr/11
Oct/11
Apr/12
Oct/12
Apr/13
Oct/13
Apr/14
Oct/14
Apr/15
Oct/15
MONTH -->

Frequency Profile for a Sample Day

POWER SYSTEM OPERATION CORPORATION LIMITED

NATIONAL LOAD DESPATCH CENTRE NEW DELHI

HISSAR:Frequency — National Grid Frequency Profile for 30-Nov-15



<49.2	<49.7	<49.90	<49.97	49.7-49.8	49.8-49.9	49.9-50.0	50.0-50.1	50.1-50.2	49.90-50.05	49.7-50.2	49.97-50.03	50.05-50.1	>50	>50.03	>50.05	>50.2
0	0.00	11.89	37.16	0.15	11.74	42.42	41.45	4.25	68.63	100.00	32.88	15.30	45.61	29.95	19.48	0.00

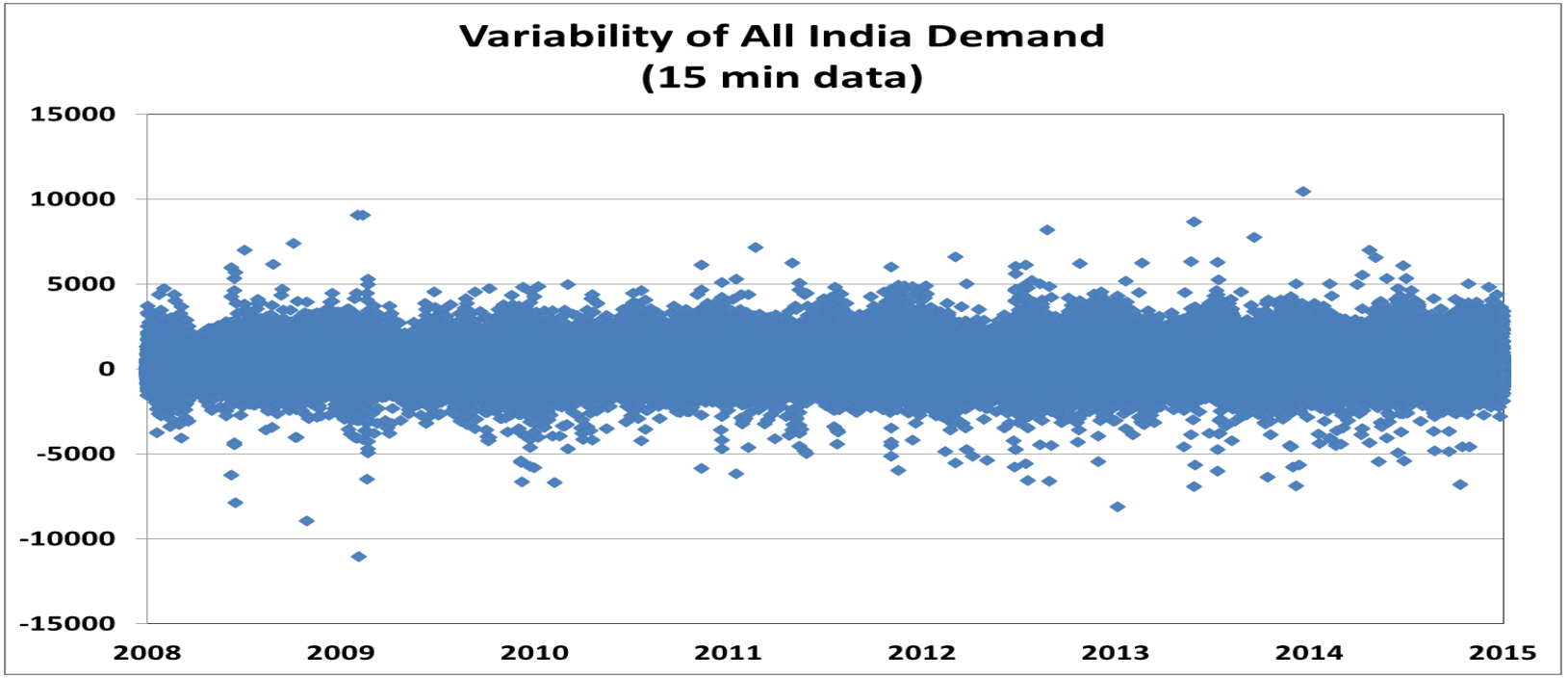
Average Frequency	49.99	Frequency Variation Index :	0.048	Standard Deviation :	0.068

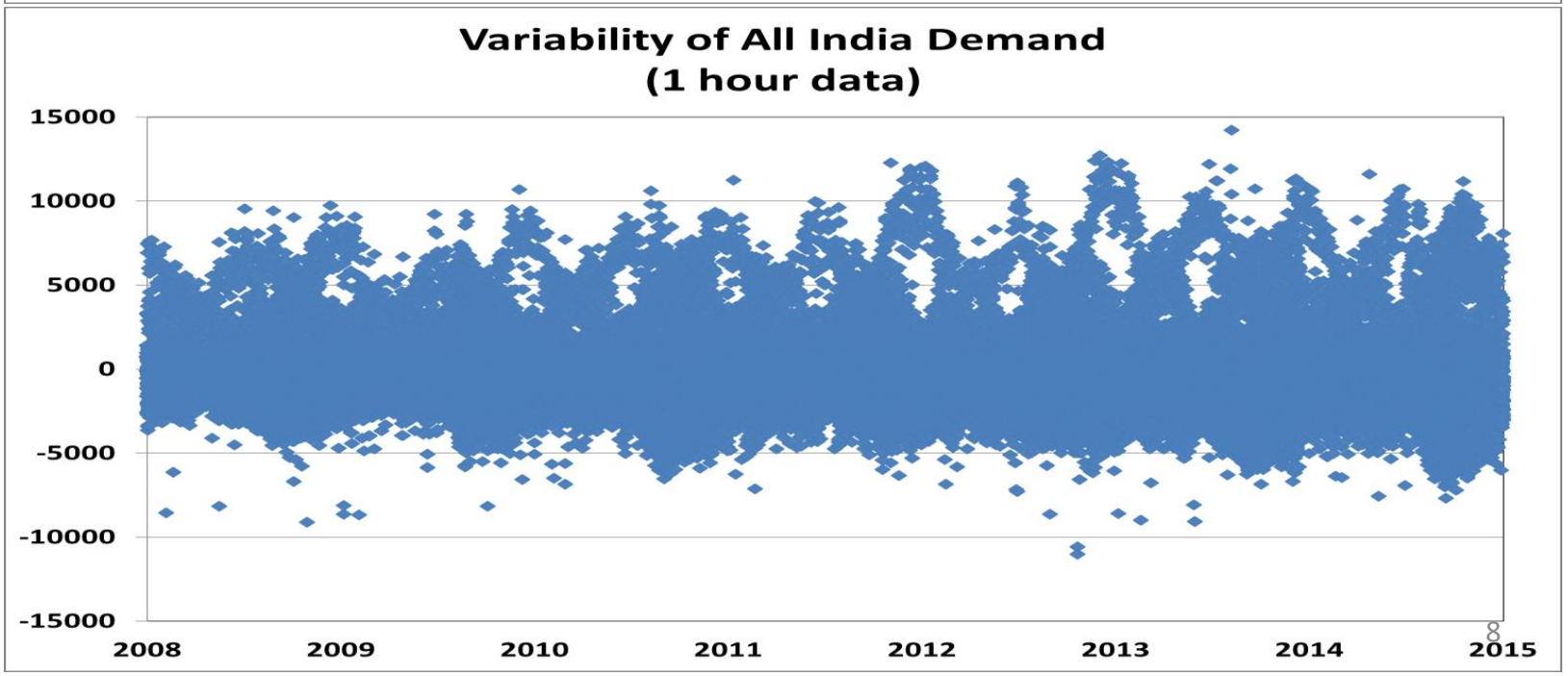
Instantaneous Frequency		
Max	50.18	13:04:10
Min	49.76	17:23:00

15 minute average Frequency		
Max	50.103	13:15:00
Min	49.849	7:00:00

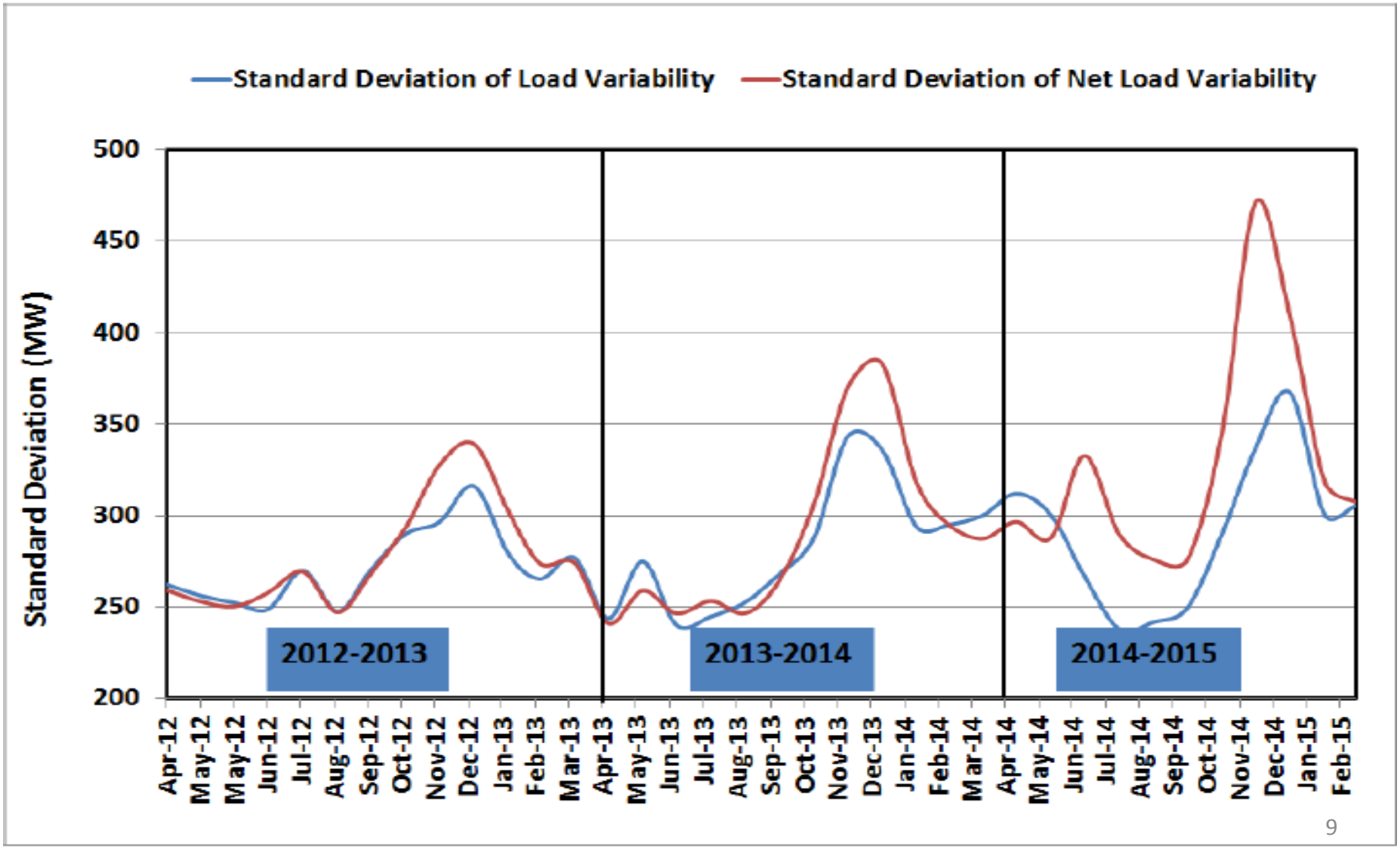
No. of excursion above 50.03 Hz	113
No. of excursion below 49.97 Hz	129
No. of excursion above 50.00 Hz	141
No. of excursion below 50.00 Hz	141

Average time freq remains below 49.97 per excursion	0:04:09	Average time frequency remains above 50.03 per excursion	0:03:49

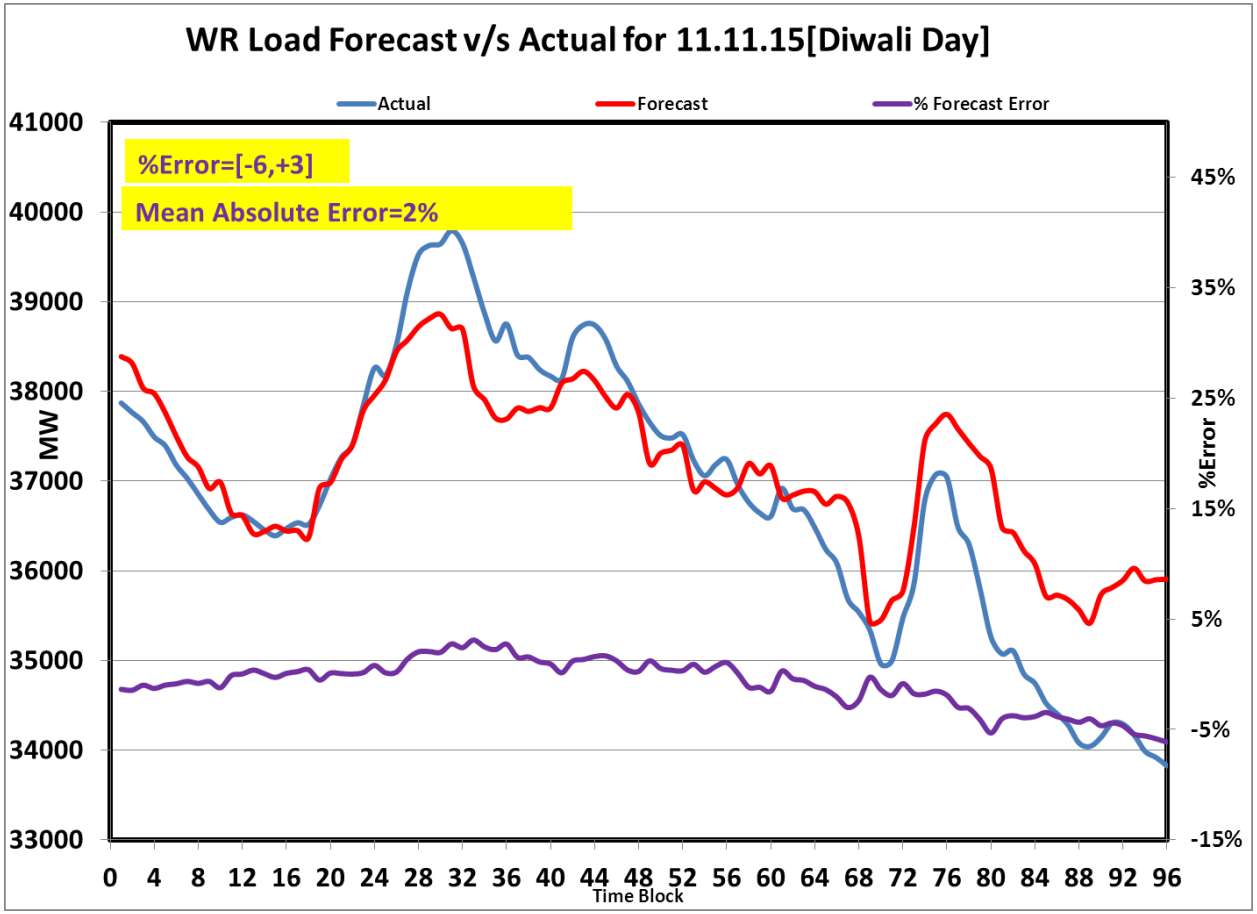

Variability of All India Demand
(15 min data)
15000
10000
5000
0
-5000
-10000
-15000
2008
2009
2010
2011
2012
2013
2014
2015

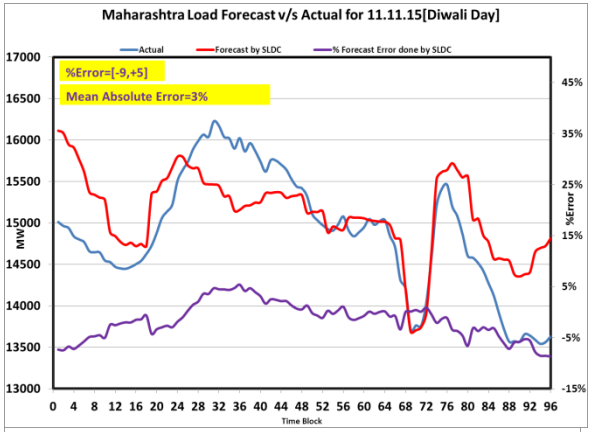

Variability of All India Demand
(1 hour data)
15000
10000
5000
0
-5000
-10000
-15000
2008
2009
2010
2011
2012
2013
2014
2015

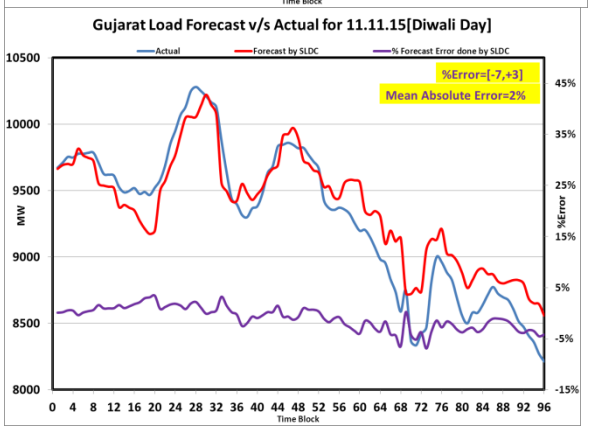
Standard deviation (σ) of the hourly load variability and net load variability of Gujarat

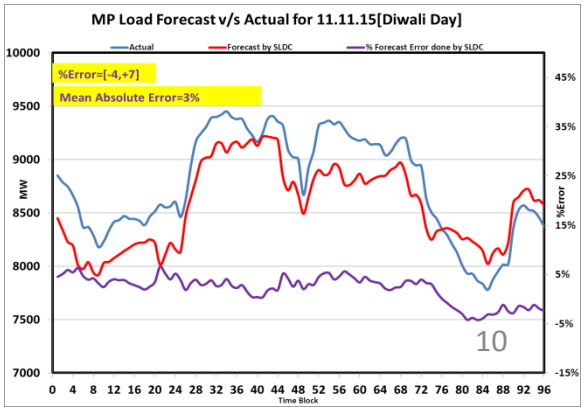


Sample Load Forecast (11.11.2015)



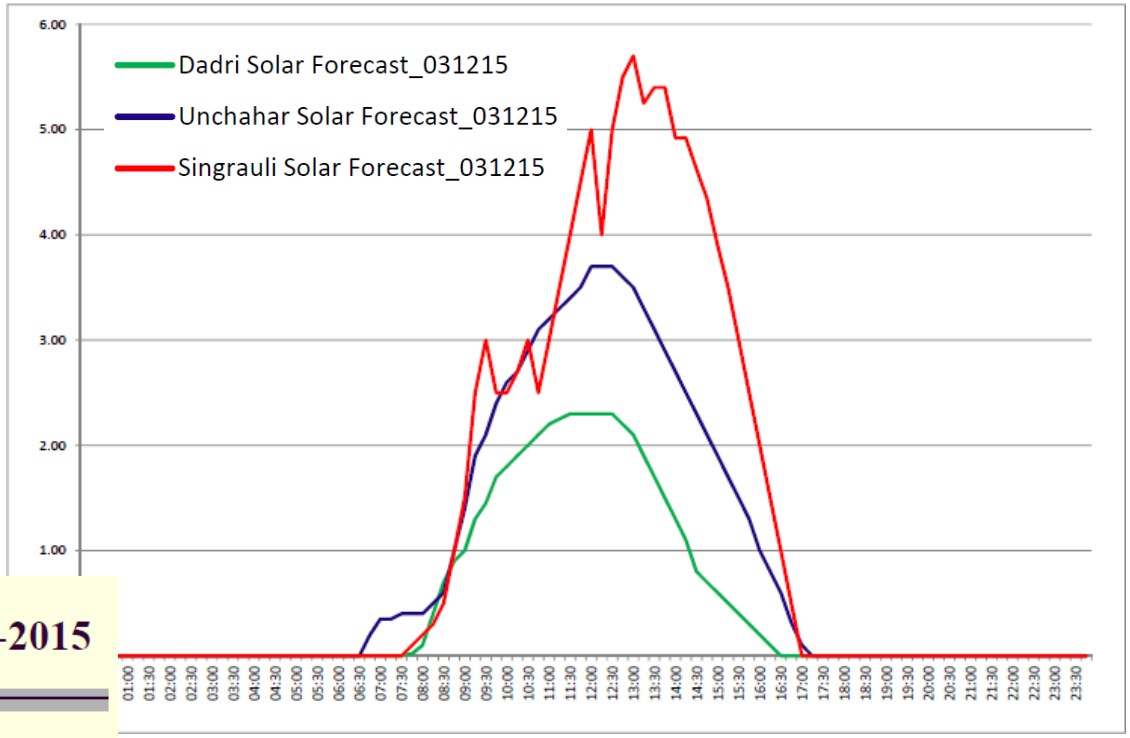


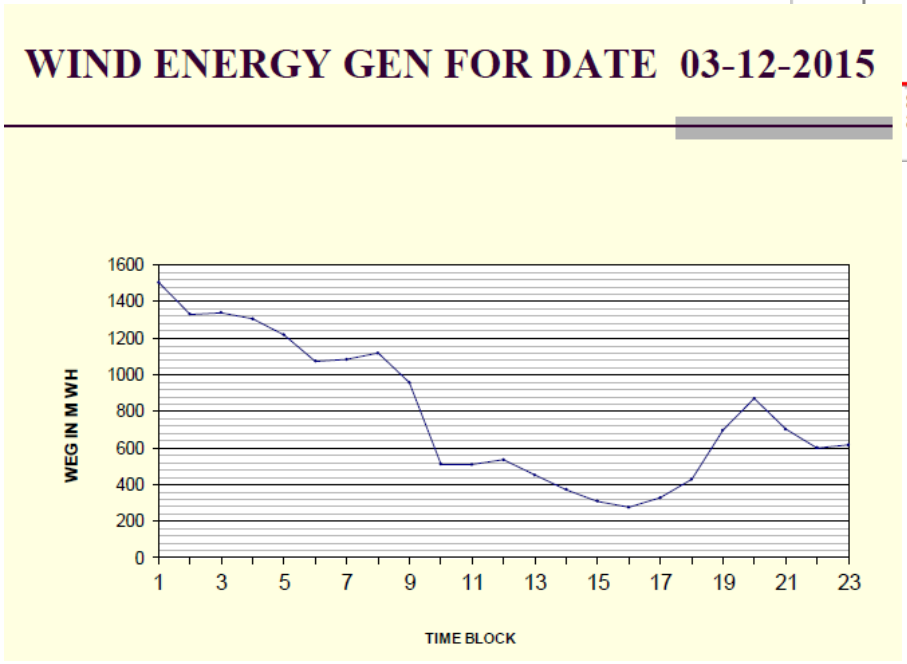




Sample Forecasts

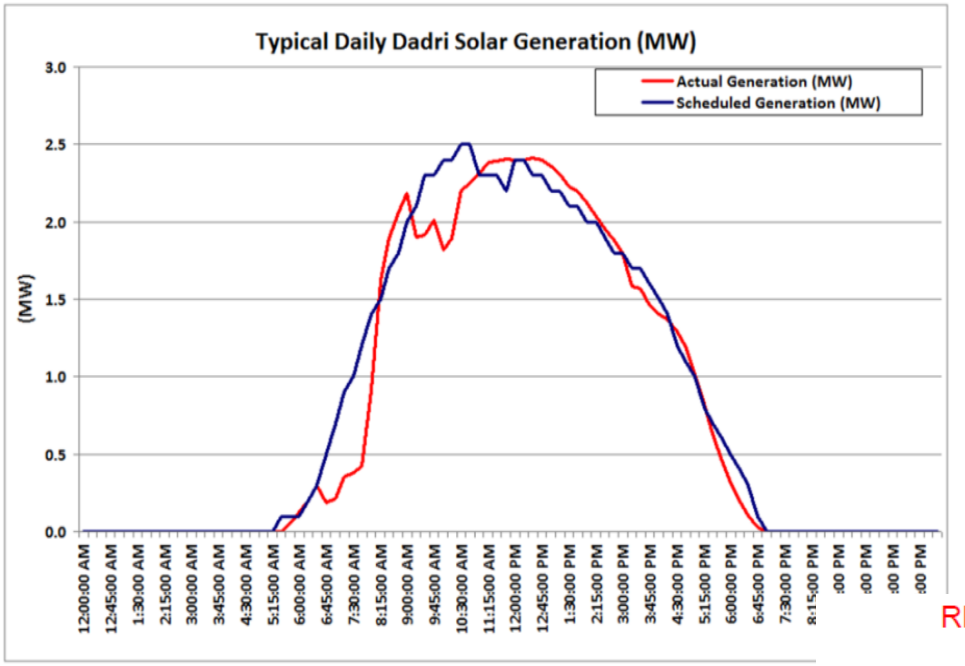
NRLDC Solar Forecast
(for 03 Dec'15)





Gujarat Wind Forecast
(for 03 Dec'15)

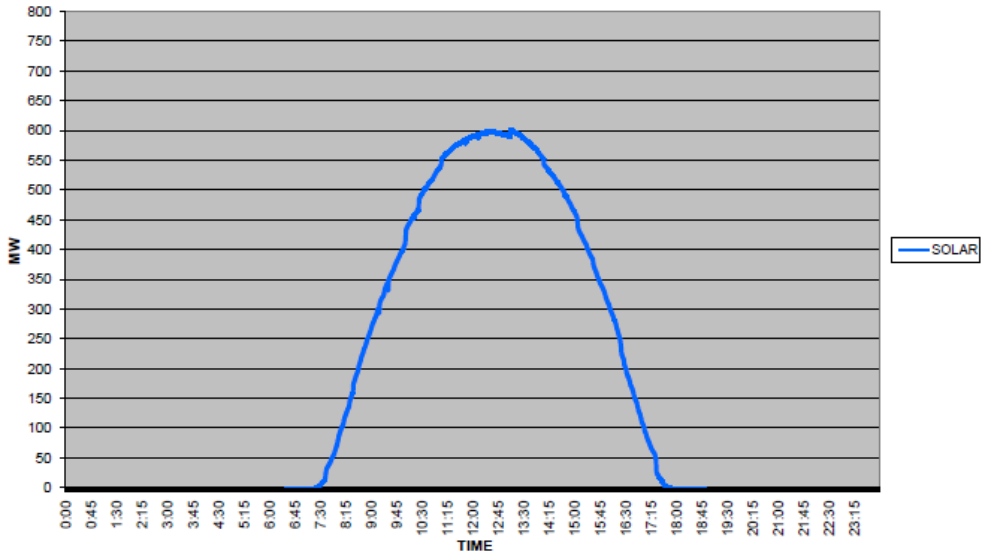
Scheduling (Sample Day)



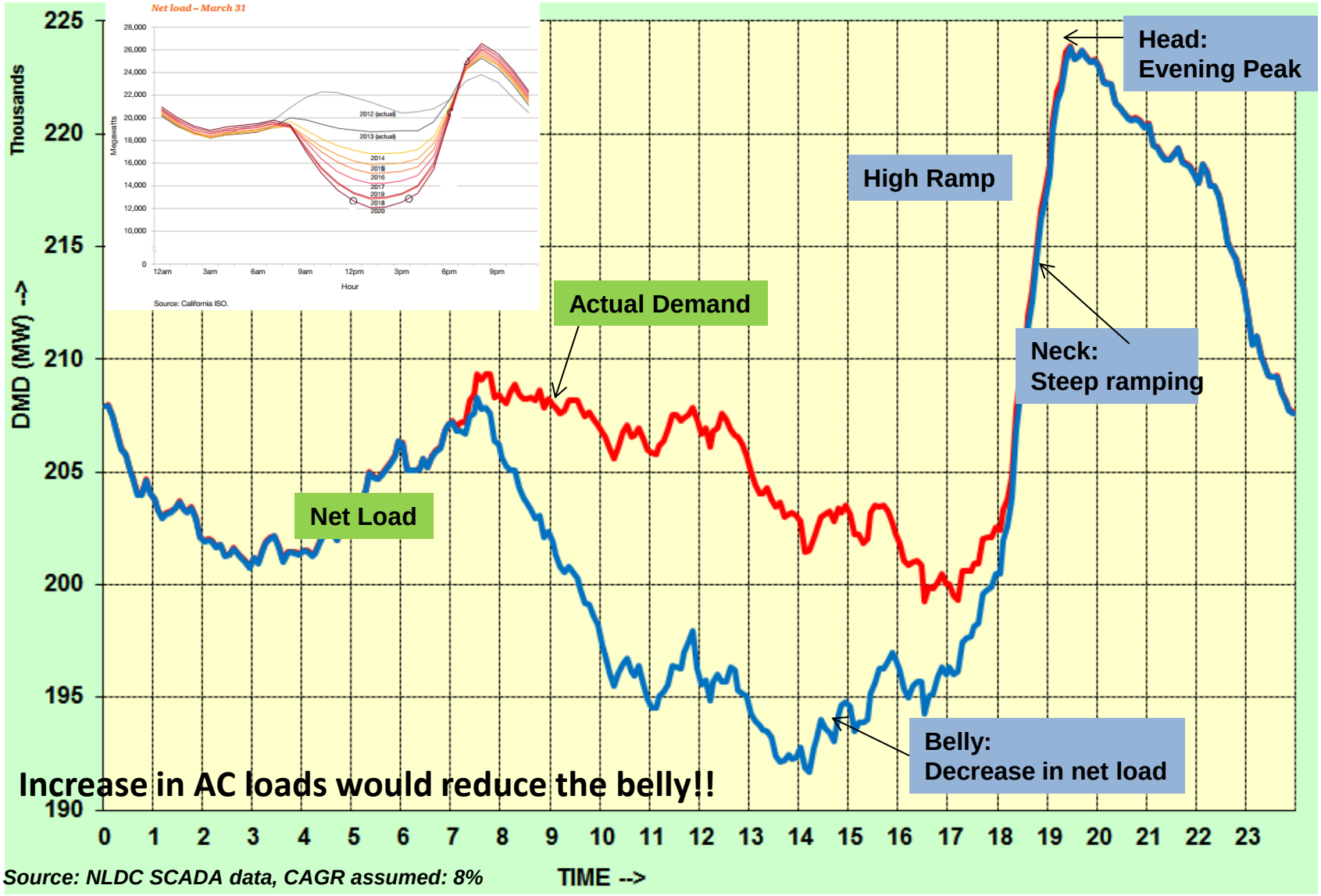
NTPC Dadri Solar Schedule and Actual Generation (Sample Day)

REALTIME GUJARAT SOLAR TREND :- 29/11/2015

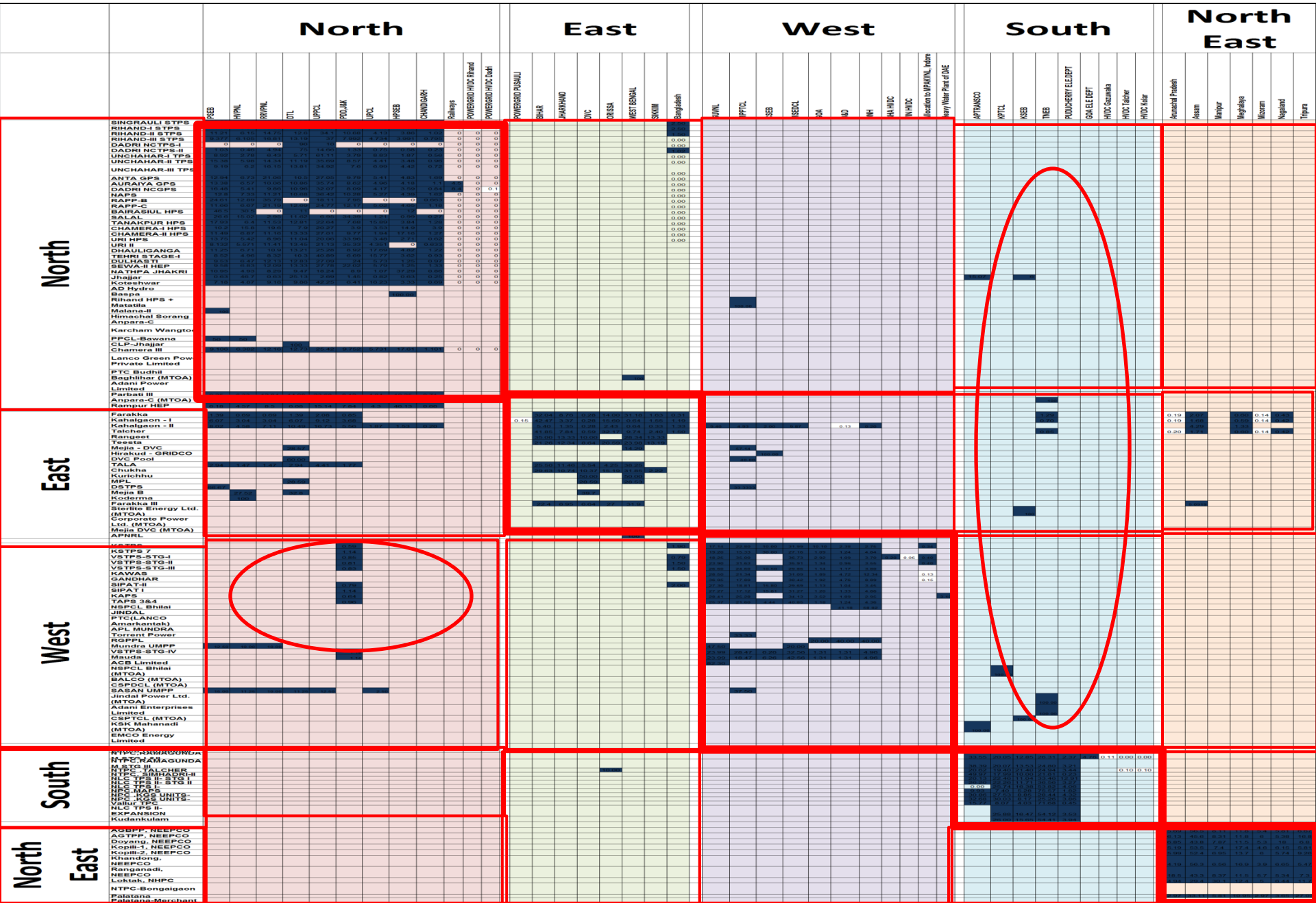
Gujarat Solar Generation (Sample Day)



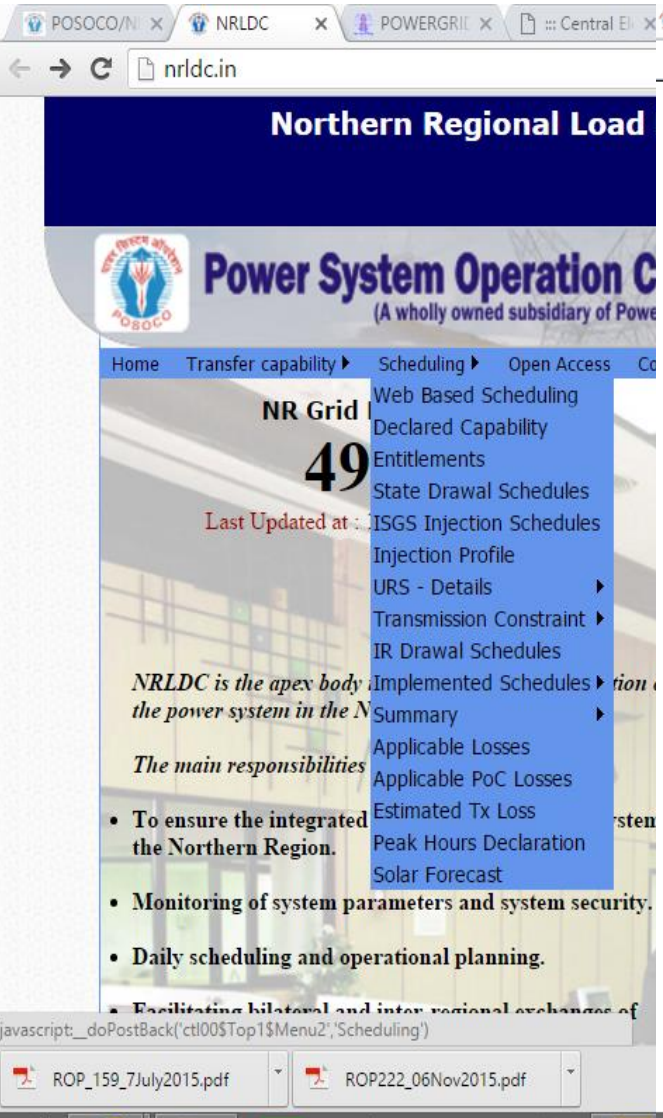
Expected All India Duck Curve by 2020 (Sample: 20000 MW of Solar Generation)

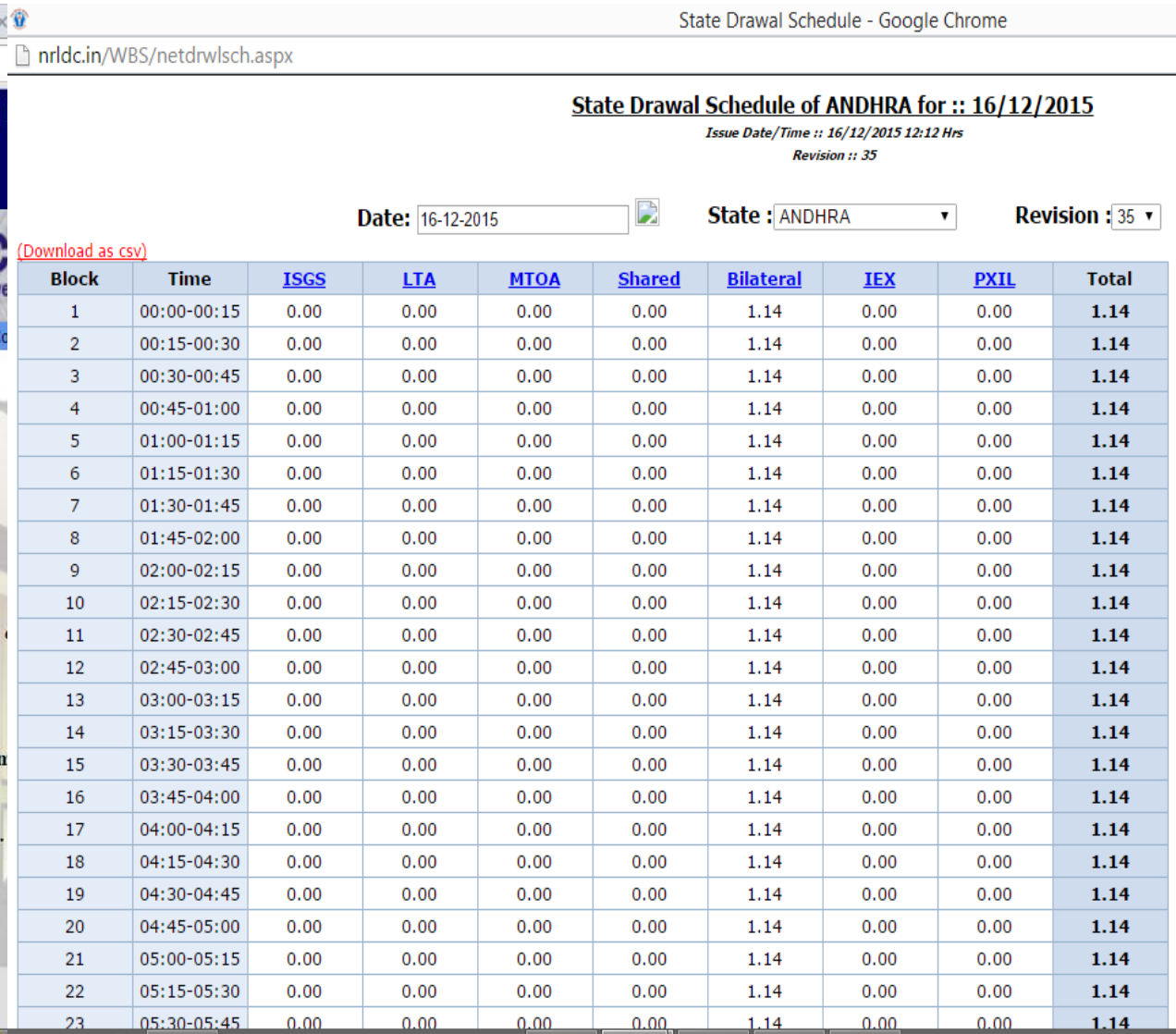


Allocation Matrix



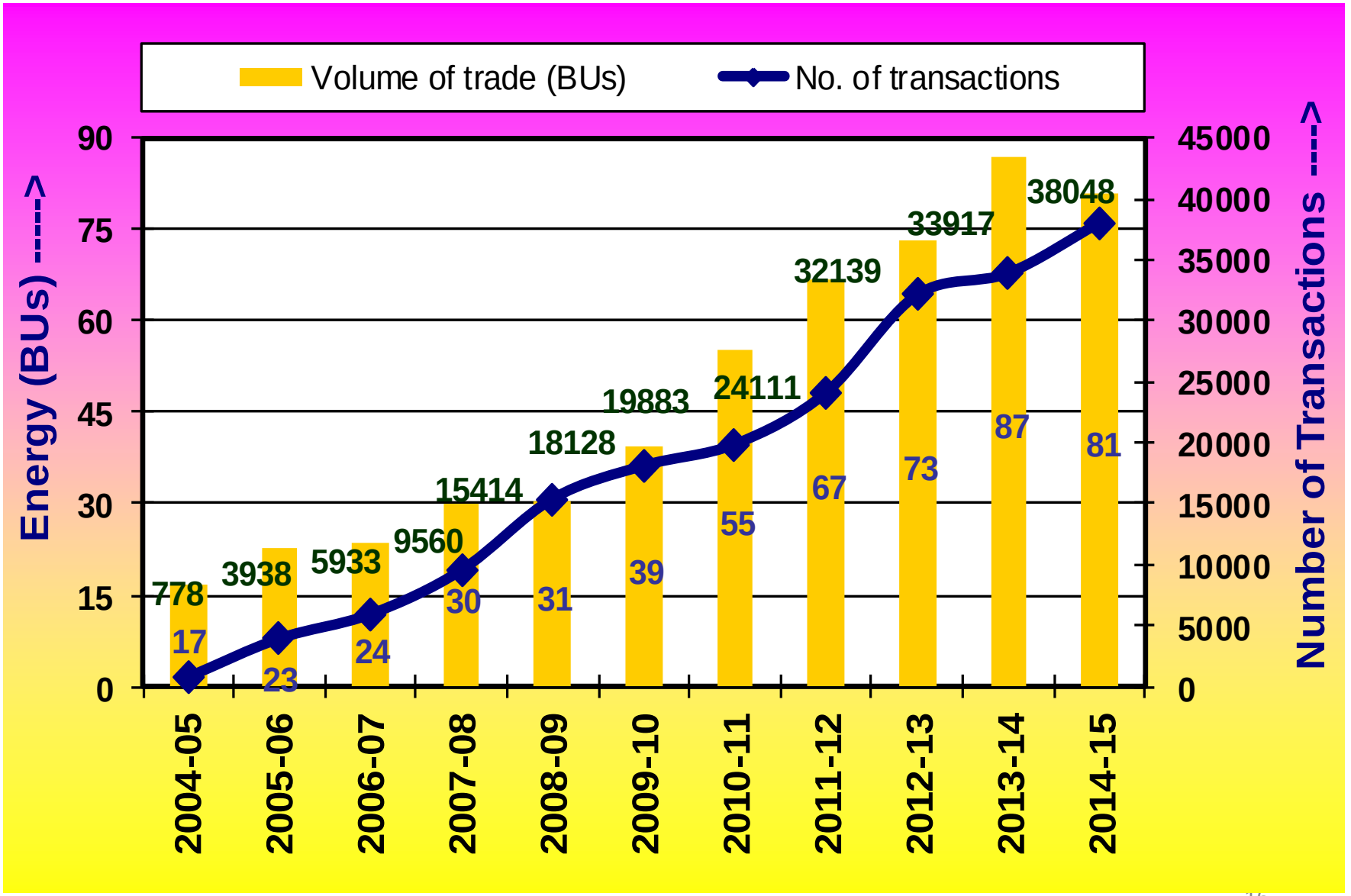
Web Based Scheduling





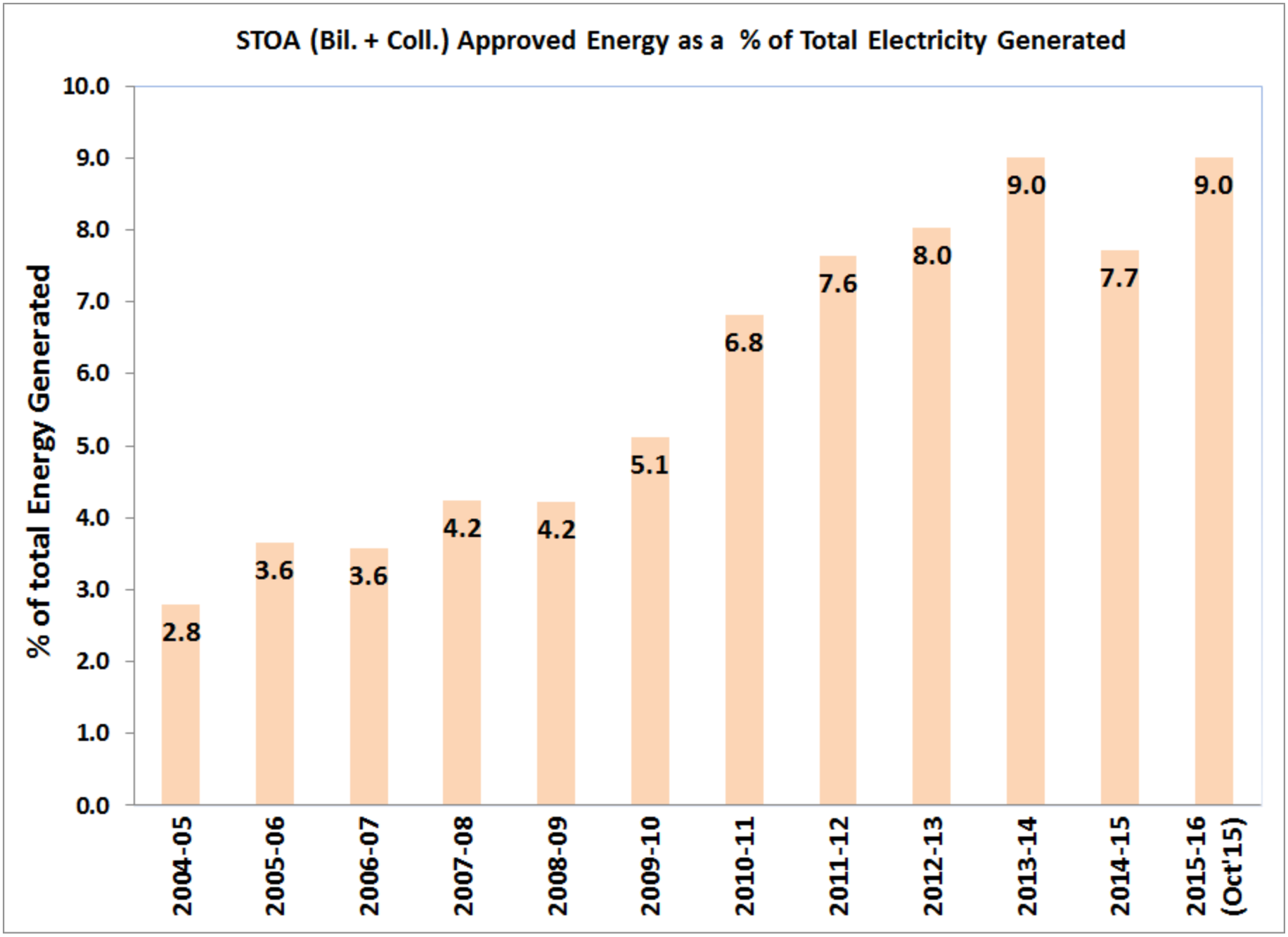
Block	Time	ISGS	LTA	MTOA	Shared	Bilateral	IEX	PXIL	Total
1	00:00-00:15	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
2	00:15-00:30	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
3	00:30-00:45	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
4	00:45-01:00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
5	01:00-01:15	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
6	01:15-01:30	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
7	01:30-01:45	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
8	01:45-02:00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
9	02:00-02:15	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
10	02:15-02:30	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
11	02:30-02:45	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
12	02:45-03:00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
13	03:00-03:15	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
14	03:15-03:30	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
15	03:30-03:45	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
16	03:45-04:00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
17	04:00-04:15	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
18	04:15-04:30	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
19	04:30-04:45	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
20	04:45-05:00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
21	05:00-05:15	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
22	05:15-05:30	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14
23	05:30-05:45	0.00	0.00	0.00	0.00	1.14	0.00	0.00	1.14

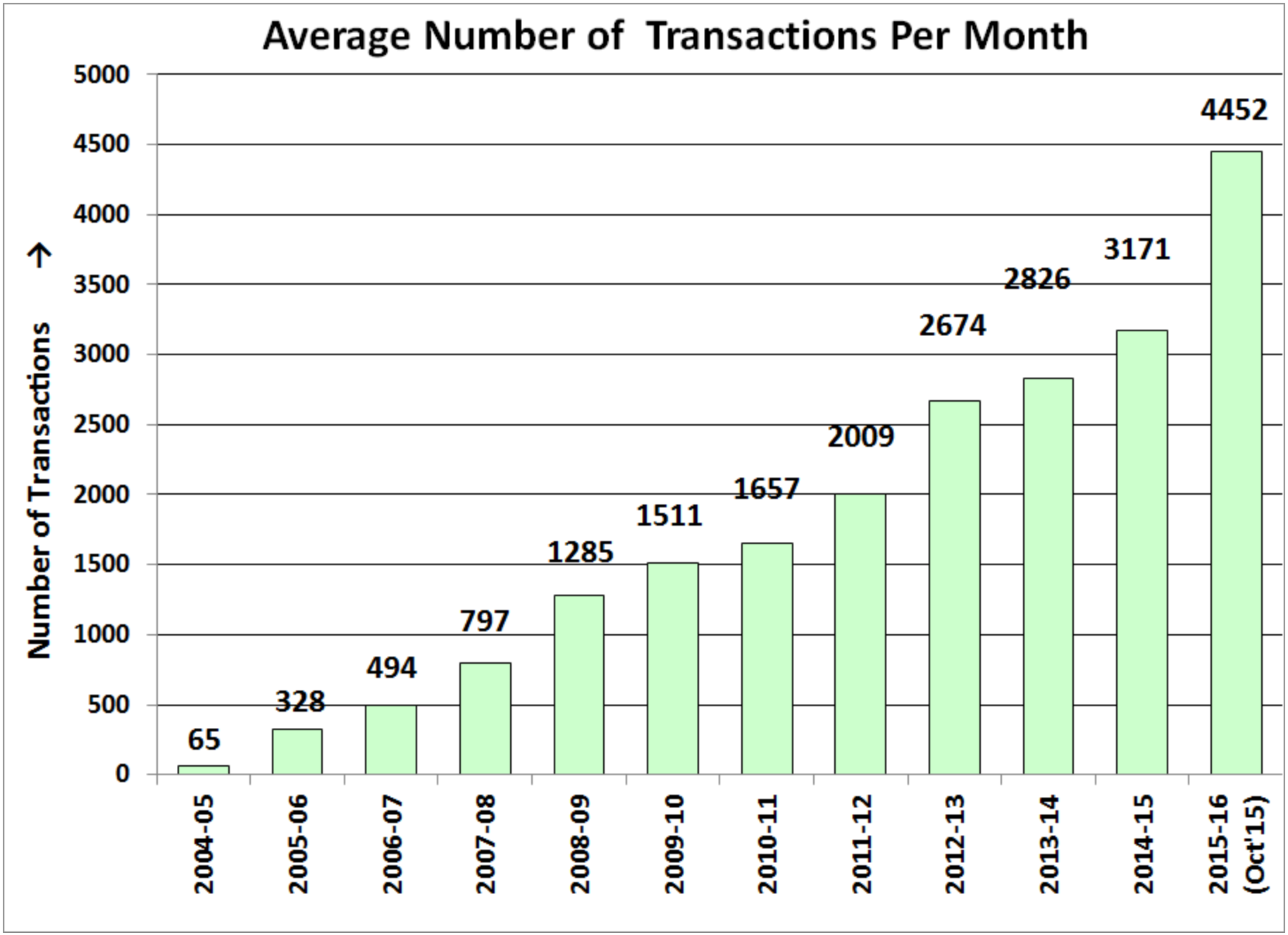
Volume of Short Term Transactions

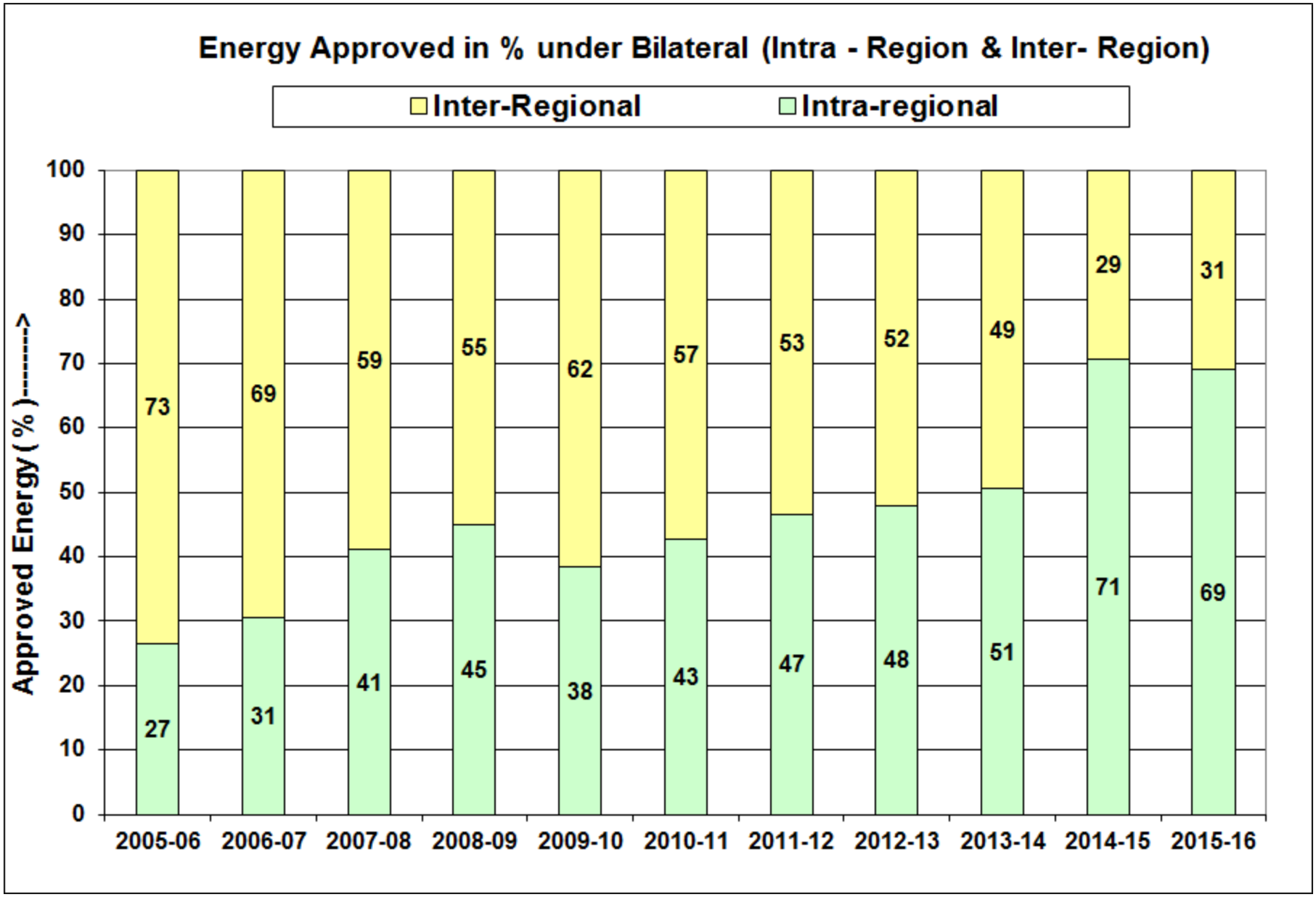


*Includes Bilateral + Collective

16


STOA (Bil. + Coll.) Approved Energy as a % of Total Electricity Generated
% of total Energy Generated
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2.8
3.6
3.6
4.2
4.2
5.1
6.8
7.6
8.0
9.0
7.7
9.0
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16 (Oct'15)


Average Number of Transactions Per Month
Number of Transactions →
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
65
328
494
797
1285
1511
1657
2009
2674
2826
3171
4452
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16 (Oct'15)


Energy Approved in % under Bilateral (Intra - Region & Inter- Region)
Inter-Regional
Intra-regional
Approved Energy (%)-------->
100
90
80
70
60
50
40
30
20
10
0
73
69
59
55
62
57
53
52
49
29
31
27
31
41
45
38
43
47
48
51
71
69
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16

Short Term Open Access Web Based Online Application

Power System Operation Corporation Ltd.
(A wholly owned subsidiary of Power Grid Corporation of India Ltd.)

Home | Transfer capability | Scheduling | Open Access | Commercial | Availability Verificati

Open Access...

Open Access Online Application
(Alternate Link)

Status Reports
View STOA (Bilateral)Transactions
View Refused Applications

Northern Regional Load Despatch Centre

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nrldc.in/OpenAccess/oat.asp

Current ST Open Access Accepted Transactions

Select Month December Year 2015 Go For 16-Dec-2015 For 17-Dec-2015

STOA Scheduling Acceptance for December 2015

Colored transactions are Revised/Surrendered

S.No	Acceptance No	Application no	Utilities	FromDate	ToDate	Schedule	Route
1	Dec-15/AP-31713-SD 15-Dec-15	PTC/OA/23842 dt15-Dec-15	PTC SPDC-JK -HPPC	16-Dec-15	16-Dec-15	0000-2400: 26.29 MW	----
2	Dec-15/AP-31712-SD 15-Dec-15	OA/JPL-NPCL/1591 dt15-Dec-15	KISPL JPL -NPCL(UP)	16-Dec-15	16-Dec-15	0600-0700: 20 MW 1000-1300: 10 MW 1400-1500: 10 MW 1500-1700: 5 MW 1700-1800: 10 MW 1800-2000: 47 MW 2000-2100: 37 MW 2100-2200: 26 MW 2200-2300: 10 MW	WR-NR
3	Dec-15/AP-31711-SD 15-Dec-15	SPT/OA/3309-DA dt15-Dec-15	SCL SCLTPS -NPCL(UP)	16-Dec-15	16-Dec-15	0000-0200: 25 MW 0200-0400: 18 MW 0400-0600: 12 MW 0600-2400: 25 MW	----
						0000-0100: 19 MW	

Select Language | Search...

पावर सिस्टम ऑपरेशन कॉरपोरेशन लिमिटेड

(पावरग्रिड की पूर्ण स्वामित्व प्राप्त सहायक कंपनी)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A wholly Owned Subsidiary of Powergrid Corporation of India Ltd)

National Load Despatch Center

राष्ट्रीय भार प्रेषण केंद्र

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MAIN MENU

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- Scheduling-Open-Access
- Rajbhasha
- Disaster Mgmt
- Communication to CERC
- Transmission Losses
- Internship Guidelines
- PSDF
- PPSA
- Tenders
- CSR
- RTI
- Feedback
- Disclaimer
- Contact Us

Transfer Capability for September 2015

Attachments:

File	File size
ATC_NLDC_Sep'15_Rev17.pdf	133 kB
ATC_NLDC_Sep'15_Rev16.pdf	404 kB
ATC_NLDC_Sep'15_Rev15.pdf	398 kB
ATC_NLDC_Sep'15_Rev14.pdf	390 kB
ATC_NLDC_Sep'15_Rev13.pdf	320 kB
ATC_NLDC_Sep'15_Rev12.pdf	310 kB
ATC_NLDC_Sep'15_Rev11.pdf	296 kB
ATC_NLDC_Sep'15_Rev10.pdf	284 kB
ATC_NLDC_Sep'15_Rev9.pdf	271 kB
ATC_NLDC_Sep'15_Rev8.pdf	327 kB
ATC_NLDC_Sep'15_Rev7.pdf	250 kB
ATC_NLDC_Sep'15_Rev6.pdf	308 kB
ATC_NLDC_Sep'15_Rev5.pdf	392 kB
ATC_NLDC_Sep'15_Rev4.pdf	389 kB
ATC_NLDC_Sep'15_Rev3.pdf	319 kB
ATC_NLDC_Sep'15_Rev2.pdf	319 kB
ATC_NLDC_Sep'15_Rev1.pdf	317 kB
ATC_NLDC_Sep'15_Rev0.pdf	321 kB

- TTC assessment
- To Facilitate Short Term Open Access (STOA)
- Declared 3 months in advance
- Revisions till the time of operation

S No	Year	No of TTC postings on NLDC website
1	2012-13	162
2	2013-14	222
3	2014-15	292
4	2015-16 (Till Sep 15)	122

Transfer Capability Assessment

http://posoco.in/attachments/article/282/ATC_NLDC_Dec'15_Rev12.pdf

National Load Despatch Centre
Total Transfer Capability for December 2015

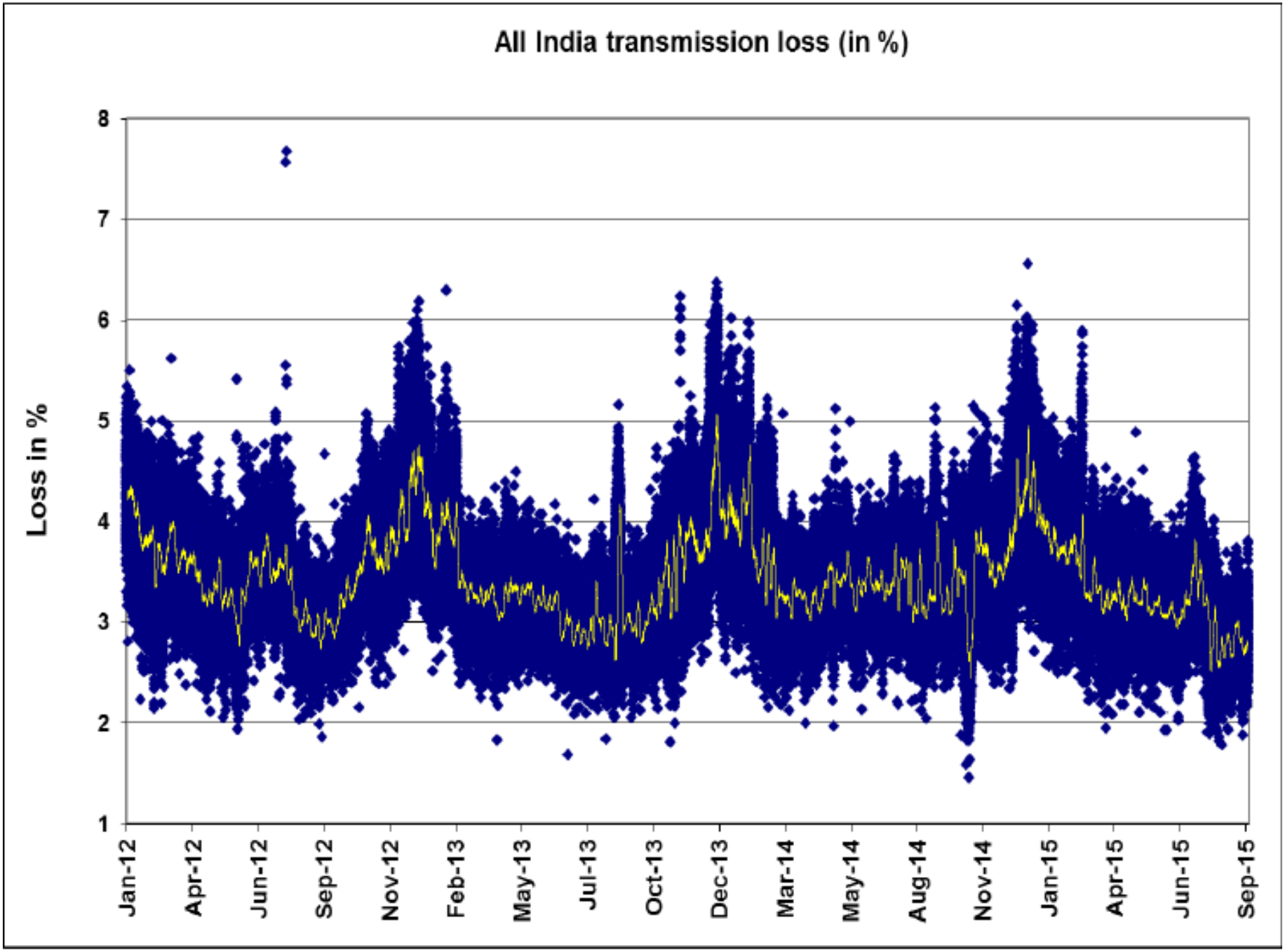
Issue Date: 15/12/2015 Issue Time: 1400 hrs Revision No. 12

Corridor	Date	Time Period (hrs)	Total Transfer Capability (TTC)	Reliability Margin	Available Transfer Capability (ATC)	Long Term Access (LTA)/ Medium Term Open Access (MTOA) #	Margin Available for Short Term Open Access (STOA)	Changes in TTC w.r.t. Last Revision	Comments
NR-WR *	1st Dec 2015 to 31st Dec 2015	00-24	2500	500	2000	706	1294		
WR-NR*	1st Dec 2015	00-06	7700	500	7200	5818	1382		
		06-24'	6700	500	6200	5818	382		
	2nd Dec 2015 to 5th Dec 2015	00-06	7700	500	7200	5818	1382		
		06-24'	6700	500	6200	5818	382		
	6th Dec 2015 to 8th Dec 2015	00-24	7700	500	7200	5818	1382		
	9th Dec 2015 to 31st Dec 2015	00-24	7700	500	7200	6103	1097		
NR-ER*	1st Dec 2015 to 31st Dec 2015	00-06	2000	200	1800	293	1507		
		06-18'	2000		1800	358	1442		
		18-24	2000		1800	293	1507		
ER-NR*	1st Dec 2015 to 31st Dec 2015	00-24	3800	300	3500	2431	1069		
W3-ER$	1st Dec 2015 to	00-24	No limit is being specified.						

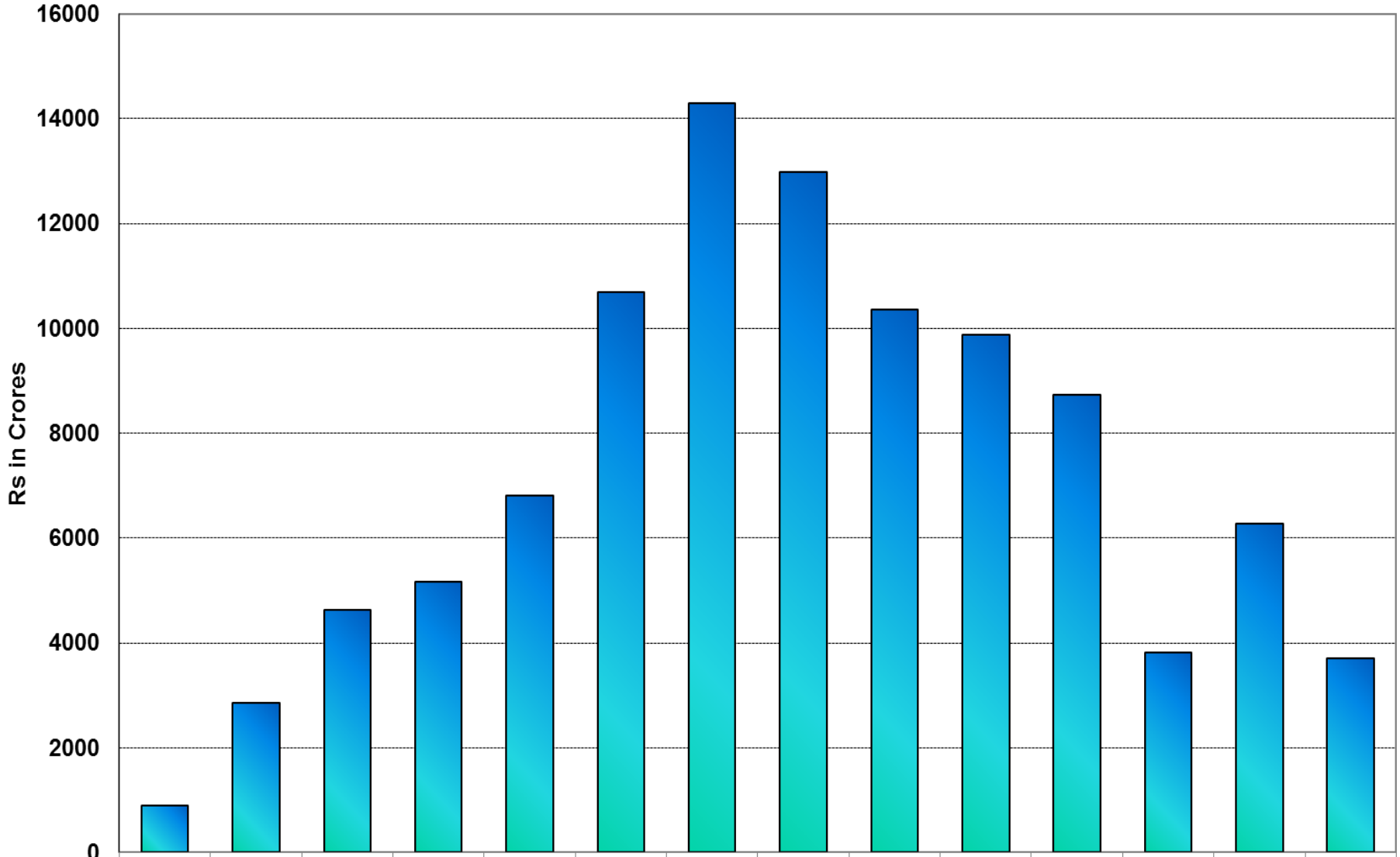
Inter-face Meters for Inter-state System

	Meter Locations	No. of Meters
North	274	1666
East	146	828
West	142	1255
Southern	157	887
North East	72	279
All India	789	4914

Data available on RLDC website

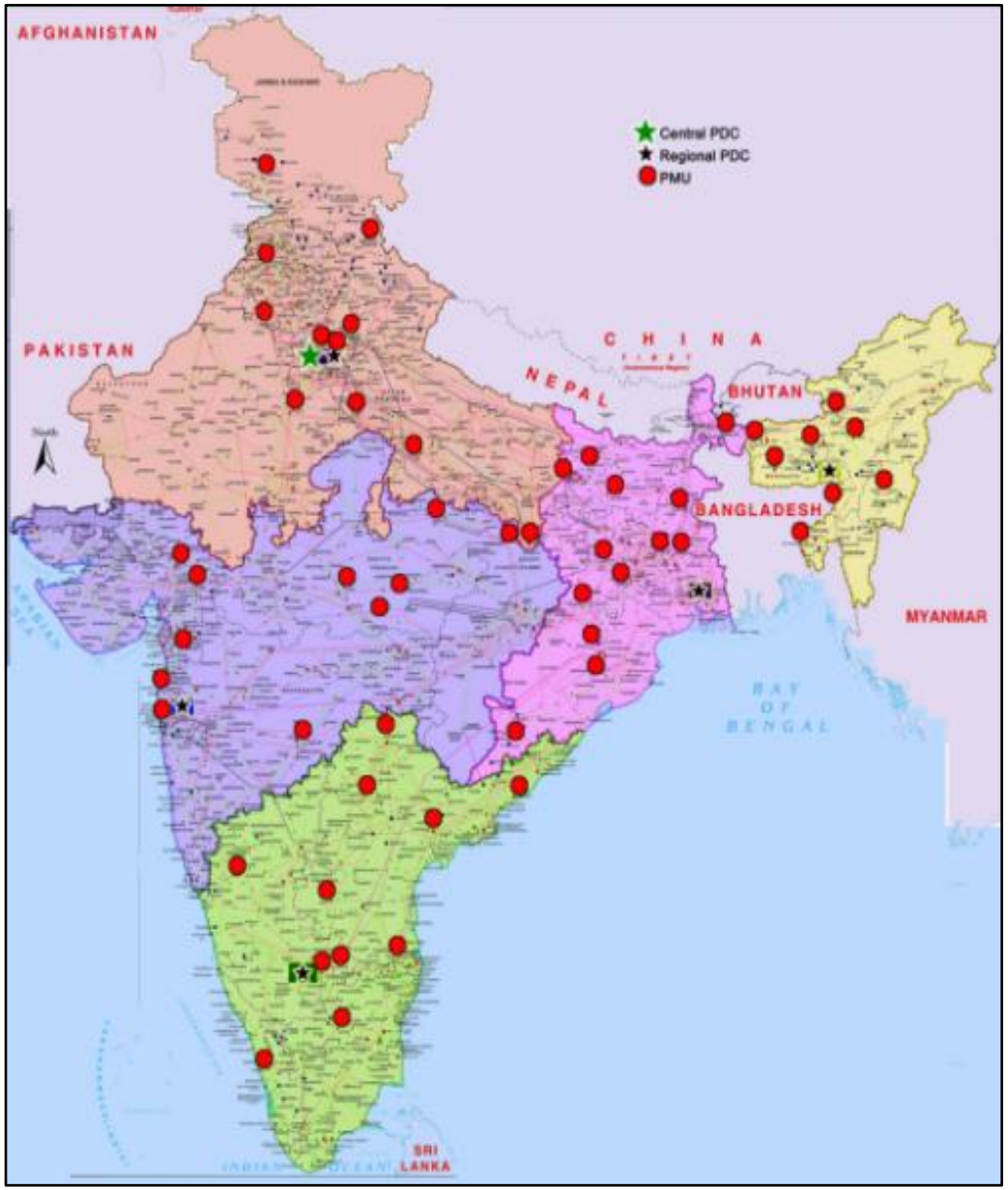

All India transmission loss (in %)
Loss in %
8
7
6
5
4
3
2
1
Jan-12
Apr-12
Jun-12
Sep-12
Nov-12
Feb-13
May-13
Jul-13
Oct-13
Dec-13
Mar-14
May-14
Aug-14
Nov-14
Jan-15
Apr-15
Jun-15
Sep-15

Deviation Charges over the Years



	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (Sep'15)
All India	892	2846	4627	5170	6814	10685	14289	12987	10357	9883	8732	3817	6276	3714

Synchrophasor Initiative – Phasor Measurement Units



Total no of PMUs - 63 Nos. (including 3 nos. PMU installed by IPPs)

Region wise PMUs:

NR - 14 Nos
WR - 17 Nos
ER - 12 Nos
SR - 12 Nos
NER - 08 Nos

Two reports have been published on "Synchrophasor Initiative in India" and are available at:

http://www.posoco.in/2013-03-12-10-34-42/synchrophasors

Major Actions Taken

Date	Action Taken
18 Nov'15	FOR - Technical Committee for State Level RE Implementation
02 Nov'15	FOR - Model Regulations (Karnataka ERC draft on 16 Nov'15)
23 Oct'15	CERC - Draft (DSM) (Third Amendment) Regulations, 2015
13 Oct'15	CERC - Roadmap to Operationalize Reserves
13 Aug'15	CERC - Ancillary Services Operations Regulations, 2015
07 Aug'15	CERC - Regulatory Framework for Inter-state RE generation
20 Jul'15	Power Exchanges - 24x7 Round-the-clock extended market session
02 Jul'15	CERC - Draft IEGC (Fourth Amendment) Regulations, 2015

CERC Statutory Advice (Dtd. 02 Nov'15)

Detailed energy accounting of all generators & load entities at intra-state level

Intra-state Deviation Settlement Mechanism pool in the States

Availability Based Tariff at Intra-state level as per Tariff Policy by 01 Apr'16

Ring fencing the SLDCs and Special scheme for capacity building

Adoption of FOR evolved Model Regulations by April 1st, 2016;

Support from PSDF/NCEF till Mar'19 to cover yearly deficit on account of RE

State level Regulation on Ancillary Services & Reserves as per timelines of implementation in CERC's order on Reserves, latest by April 1st, 2016;

Approval of one-time reimbursement of expenses incurred by generators and load despatch centers for implementation of Automatic Generation Control (AGC).

Renewable Integration

- Forecasting and Scheduling of Renewable Generation
- CERC Amendment Regulations
  - 07th August, 2015.
- Implemented w.e.f 01st November, 2015
- FOR State Model Regulations floated
  - November, 2015
- SERCs
  - Need for similar framework at the Intra-State level

Spinning Reserves

- Suo-motu CERC Roadmap for Reserves
  - 13th October, 2015
- Spinning Reserves to be Operationalized
  - 01st April, 2016
- All India Primary Reserve - **Total approx. 4000 MW**
- Region-wise Distribution of Secondary Reserves
  - Corresponding to the largest unit size in the region
  - NR – 800 MW, ER – 660 MW, WR – 800 MW, SR – 1000 MW, NER – 363 MW, **Total approx. 3600 MW**
- Region-wise Distribution of Tertiary Reserves
  - At least 50 % of the largest generating unit available in state control area
  - NR – 1658 MW, ER – 856 MW, WR – 1352 MW, SR – 1512 MW, NER – 65 MW, **Total approx. 5450 MW**
- Automatic Generation Control
  - 01st April, 2017
- SERCs – Need for similar framework at the State level

Ancillary Services Operation

- CERC Regulations on Ancillary Services Operations
  - 19th August, 2015
- Detailed Procedures for Approval by CERC
  - 02nd November, 2015
- To be operationalized
  - By end of December 2015
- Spinning Reserves also to be operationalized in line with Ancillary Services Operations
- SERCs – Need for similar framework at the State level

Flexibility in the Grid

- Incentivizing "Flexibility" in Conventional Generation
  - CERC Draft Amendment Regulations
    - 02nd July, 2015
    - Proposed Technical Minimum - 55%
    - Proposed station heat rate degradation to be considered for the purpose of compensation
    - Public Hearing - 19th August, 2015
  - SERCs – Need for similar framework at the State level
  - In the future, two shifting of generators also envisaged

S.No.	Unit loading as a % of Installed Capacity of the Unit	Increase in SHR (for supercritical units) (%)	Increase in SHR (for sub-critical units) (%)
1	85-100	Nil	Nil
2	75-84.99	1.25	2.25
3	65-74.99	2	4
4	55-64.99	3	6

Handling Deviations especially for Large and High RE Penetration States

- CERC Draft Amendment Regulations
  - 23rd October, 2015
- Stakeholder comments invited
  - 16th November, 2015
- Deviation Limits increased – Based on Peak Demand
- Five buckets: 250/200/150/100/50 MW
- Imbalance Handling & Settlement System for RE
  - CERC Framework for Renewables – 07th August, 2015
  - SERCs – Need for similar ABT / DSM framework at the State level
    - For all intra-state grid connected entities

Other Measures… (1 of 2)

- Communication in Power Sector
  - CERC constituted Task Force - 22nd April 2015
  - Inputs to frame the draft Regulations for communication systems in power sector
  - **SERCs – Need for similar framework at the State level**
- Market Design Enhancements
  - CERC order - 8th April, 2015
    - Power Exchanges - 24 x 7 extended market session
    - Implemented w.e.f 20th July, 2015.
  - Need for more opportunities to buy/sell power
  - **Concept of Aggregators introduced in FOR State Model Regulations**
  - **Intra – State open access**
- Institution Building
  - Ring Fencing of Load Despatch Centres
  - Independent Revenue Stream through Fees and Charges
  - Need for Distribution System Operator (DSO)

Other Measures… (2 of 2)

- Manpower & Capacity Building
  - Training & Certification
- Technology
  - Control Center upgradation
  - New technologies such as PMU/WAMS
  - Technology Partners
- REMCs
  - Manning/staffing
  - Software Tools
  - Soft skills & knowledgebase
- Metering, Accounting and Settlement
- Finance/Commercial Issues
  - Pool account settlement
  - Taxation issues / other related
  - Statutory compliances

Thank You !!