

**MINUTES OF THE 16TH MEETING OF THE
CENTRAL ADVISORY COMMITTEE (CAC) OF CERC
HELD ON 14TH MARCH, 2012 AT NEW DELHI**

**VENUE : “AMALTAS” HALL, INDIA HABITAT CENTRE,
LODHI ROAD, NEW DELHI – 110 003.**

The meeting was chaired by Dr. Pramod Deo, Chairperson, Central Electricity Regulatory Commission (CERC). A list of participants is **enclosed** at *Annexure-I*.

2.0 Shri Rajiv Bansal, Secretary, CERC welcomed the members of the Central Advisory Committee of CERC. He recalled that the Committee advised in the last meeting, on the need for tightening the frequency band for ensuring grid discipline and informed that the Commission has already acted on the advice and issued orders in the context.

3.0 In his opening remarks, Chairperson, CERC expressed his appreciation for the advice and valuable suggestions given by the Central Advisory Committee. The Central Commission has immensely benefitted from the advice of the Committee in the past.

4.0 Dr. Deo underlined the need for introduction of ancillary services in India. He pointed out that we have shortages (both peaking and energy shortage) prevailing in the country but at the same time, there are generation capacities which do not get dispatch. This underscores the need for harnessing every possible generation capacity to reduce load shedding in the country. This in turn will also bring in the desired reliability and security of operation of the grid. It is in this context that the ancillary services assume importance. He underscored that through this mechanism

another opportunity would be provided for dispatch of unharnessed generation capacity in the event of corresponding demand and appetite for power consumption. This mechanism will also go a long way integrating the renewable energy generation by addressing the variation especially, for wind generation. He requested the members of the Committee to give their considered views on the proposal of introduction of ancillary services in India and help the Central Commission take a view in this regard.

5.0 The address of Dr. Deo was followed by a presentation made by Shri Sushanta K. Chatterjee, Deputy Chief (Regulatory Affairs), CERC. A copy of the presentation is **enclosed** at *Annexure-II*. The presentation highlighted the driving force behind the introduction of ancillary services in India. The objectives that ancillary services seek to achieve in the Indian context were outlined. While the underlying theme remains reliability and security of grid, the ancillary service will help harness the untapped generation capacity, mitigate load shedding, and address transmission congestion in a limited way. It will also supplement the need arising out of variability of renewable energy sources like wind and solar. He specifically drew attention to the legal provision and clarified that the requirement of the Electricity Act, 2003 of distancing the Load Despatch Centre from engaging in commercial activities of trading in electricity has been borne in mind while designing the concept of ancillary services in India. The bidding under the mechanism will take place in the Power Exchanges and the information about generation capacity discovered and stacked in merit order will be communicated to the National Load Despatch Centre for scheduling and dispatch. There will be a trigger point, say at 49.65 Hz at which the ancillary services will be kicked in. The generation capacities dispatched by the National Load Despatch Centre will be paid for by those who are responsible for overdrawal and

consequent lowering of frequency level. Introduction of ancillary services will reduce dependence of UI mechanism for meeting demand.

6.0 Shri S.K. Soonee, CEO, POSOCO thereafter made a presentation which is at **Annexure-III**. Shri Soonee highlighted that ancillary services are one of the four pillars of the market. In India, three other pillars viz., congestion management, imbalance settlement mechanism and scheduling and dispatch have already been introduced and it is high time that we introduced ancillary services. This will supplement the imbalance settlement mechanism in ensuring greater stability and security of grid operation. He informed about the two year-long study and consultation process engaged in by NLDC before evolving the framework of ancillary service. He cited certain examples of generating stations (e.g. Kayakulam of NTPC) which did not get dispatch despite shortage and demand for electricity at a cost higher than the variable cost of such generation. He underscored the need for providing a mandatory requirement for participation of all such generations in ancillary market for optimum utilization of the capacity. He also explained in detail how the proposed framework of ancillary services would work and how in future it would address the emerging concept of capacity market, spinning reserve, grid integration of renewable, black start service etc.

Discussion

7.0 The proposed mechanism of ancillary services was discussed in detail. The two Power Exchanges, namely, Indian Energy Exchange (IEX) and Power Exchange India Limited (PXIL) while appreciating the need for introduction of such market suggested certain operational requirements to be factored in before rolling out the plan. Shri R.V. Shahi and

organizations like NTPC, PGCIL, NHPC, JSW Power Trading Company Limited appreciated the efforts made by CERC and NLDC in evolving such an important framework which is the need of the hour and also which promises to address the future requirements of the power system. They, however, suggested that the framework need to be explained to the stakeholders in greater detail. GRIDCO expressed concern that this mechanism might lead to imposition of high cost of power on the consumers. It was also suggested that trigger point for the ancillary services should be clearly spelt out and it should not be left to the National Load Despatch Centre to start the process based on anticipation of grid frequency going down. Open ended provision might lead to speculation which is not desirable in the Indian context. Shri T.L. Sankar argued that it is not enough to talk about reliability of grid operation at the inter-State level. It is equally important to ensure reliability of supply at the end consumer level especially, for rural/agriculture consumers. The tariffs for supply to rural/agriculture consumers should reflect the actual hours of supply as also the quality of supply of electricity. He also stressed on the need for promotion of Off Grid generation to address these and related problems of electricity supply for rural areas. There were suggestions on addressing equally important and perhaps more pressing issues like congestion management etc. Such issues should also be brought before the Advisory Committee for discussion. Tata Power highlighted that there is a big disconnect between what is happening in the Centre and that at the State level. The Forum of Regulators (FOR) should be used as the platform for resolving some of the critical intra-State issues which have the potential of stalling the efforts being taken by the Central Commission at inter-State level. It was opined that CERC should work towards bringing down the higher range of permissible frequency from the existing 50.2 Hz

to 50.1 Hz. The Central Commission should also consider introducing separate generation tariffs for peak and non-peak hours.

8.0 **Consensus** :

- ❖ There was a general consensus on the need for introduction of ancillary services in India for greater security and reliability of grid operation.
- ❖ Introduction of ancillary service is expected to reduce dependence on UI which should be resorted to only as a last mile imbalance settlement mechanism.
- ❖ The framework should be explained in greater detail to the stakeholders before launching it.
- ❖ Care should be taken to ensure that there is no imposition of high cost power on the consumers as a result of introduction of ancillary services. Only those who are responsible for overdrawal should be made to pay for cost of ancillary services.
- ❖ Other important issues like congestion in transmission, impact of fuel crisis on power sector, factors responsible for and way forward for utilization of stranded capacity should be brought before the Advisory Committee for discussion.

9.0 Dr. Deo summed up the discussion by reiterating that the ancillary services should be seen as a complementing measure to improve operation of the power system. He appreciated the sentiment that reliability of supply at the level of rural/agriculture consumers is still an issue, and

informed that CERC Chair as Chair of Forum of Regulators has been helping evolve consensus on the need for addressing these core issues facing the country. He expressed gratitude for the suggestions given by the stakeholders representing various walks of life and requested them to give their written comments to the Central Commission. He also requested that they should suggest important topics of national importance which the Central Commission can take up for discussion in future meetings of the Advisory Committee.

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

LIST OF PARTICIPANTS ATTENDED THE SIXTEENTH
MEETING OF
CENTRAL ADVISORY COMMITTEE (CAC)
HELD AT INDIA HABITAT CENTRE, NEW DELHI
ON 14TH MARCH, 2012

S. No.	NAME	
01.	Dr. Pramod Deo Ex-Officio, Chairperson, CAC	Chairperson, CERC
02.	Shri S. Jayaraman Ex-Officio Member, CAC	Member, CERC
03.	Shri V.S. Verma Ex-Officio Member, CAC	Member, CERC
04.	Shri M. Deena Dalayan Ex-Officio Member, CAC	Member, CERC
05.	Shri T.L. Sankar Advisor	Administrative Staff College of India (ASCI)
06.	Shri R.V. Shahi	Former Secretary, MOP
07.	Shri Hemant Sharma Chairman & Managing Director	GRIDCO
08.	Shri R.N. Nayak Chairman & Managing Director	Power Grid Corporation of India Limited
09.	Shri Anil Sardana Managing Director	Tata Power Company Limited
10.	Shri T.N. Thakur Chairman & Managing Director	PTC India Limited
11.	Shri R.K. Madan CEO (Power)	Adani Enterprises Limited
12.	Shri Satish Jindal Chief Operating Officer	JSW Power Trading Company Limited
13.	Shri Bhasker U. Mete President, GEA	Maharashtra State Electricity Power Gen. Corpn. Limited
14.	Shri Kirti J. Amin President	Kisan Vikas Sangh
15.	Shri Raj Kumar Additional Member (Electrical)	Representative of Railway Board

16.	Shri Brij Mohan Director	Representative of Dept. of Consumer Affairs
17.	Shri M.S. Babu Executive Director (Comml.)	Representative of NHPC Limited
18.	Shri M.K.V. Rama Rao Executive Director (Comml.)	Representative of NTPC Limited
19.	Shri K. Ramanathan Distinguish Fellow	Representative of The Energy & Resources Institute (TERI)
20.	Ms. Rasika Chandihok Director (Energy)	Representative of Confederation of Indian Industry (CII)
21.	Ms. Tavleen Kaur Joint Director (Energy)	Representative of FICCI
22.	Shri R.K. Sharma Chief Engr. (SLDC)	Representative of PSTCL
23.	Shri Sambit Basu	Representative of IDFC
24.	Shri Rajiv Bansal Secretary	CERC
	SPECIAL INVITEES	
25.	Shri S.K. Soonee CEO	POSOCO
26.	Shri Jayant Deo CEO	Indian Energy Exchange Limited (IEX)
27.	Ms. Rupa Devi Singh MD & CEO	Power Exchange India Limited (PXIL)

Meeting of the Central Advisory Committee



PRESENTATION BY CERC
14TH MARCH 2012

In this presentation....



- Drivers for Ancillary Services in India
- What Ancillary Services seek to achieve
- Ancillary Services - proposed framework
- Roll out plan
- Issues for discussion

Drivers for Ancillary Services in India



- Utilised resources despite shortage!
- Reliability and security of grid
- Variability of renewable generation
- Restructured power industry

Driver....(1)



- Shortage of supply and unutilised generation sources
 - a paradox

Power Supply Position (January'12)



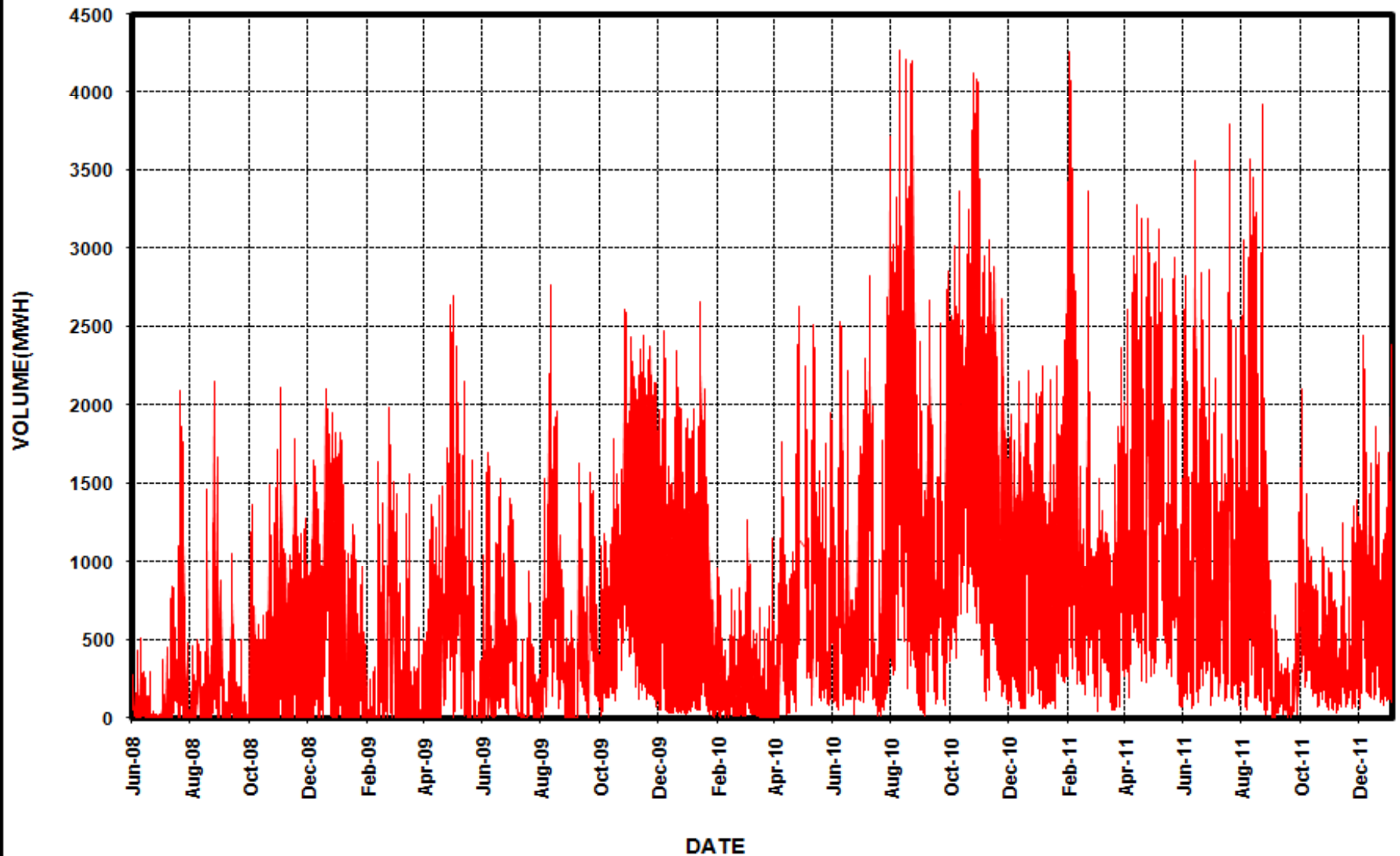
Region	Energy(MU)	Deficit%	Peak	Deficit%
	Requirement		Demand(MW)	
Northern	22,800	-7.2	38,596	-14.3
Western	27,406	-11.9	40,233	-15.4
Southern	21,904	-9.3	34,022	-13.7
Eastern	8,046	-6.8	13,716	-8.0
North Eastern	905	-9.2	1,699	-4.6
All India	81,061	-9.3	128,266	-13.7

* PROVISIONAL

Source: CEA Monthly Report

Unharnessed generation capacity – PX (specific period)

Lost Sell Volume (Sell Bid-Unconstrained MCV) (June'08-Jan'12)



Why could be the reason....



- Congestion.....high cost.....!
 - Could be absence of flexibility and customisation of products
 - Available Avenues for procurement of Power
 - ✦ Long Term Contracts
 - ✦ Short Term Open Access (STOA)/Bilateral (OTC)
 - ✦ Collective Transactions through Power Exchange(s)
 - ✦ Unscheduled Interchange (UI)
 - Standardized Products available in STOA
 - ✦ Bilateral: Advance, FCFS, Day-Ahead, Contingency
 - ✦ Collective Transactions: Day-Ahead
- There is a need for**
- Flexibility and customization
 - Harnessing all available generation resources before load shedding

Driver....(2)



- Grid Security and Reliability

Grid Security and Reliability

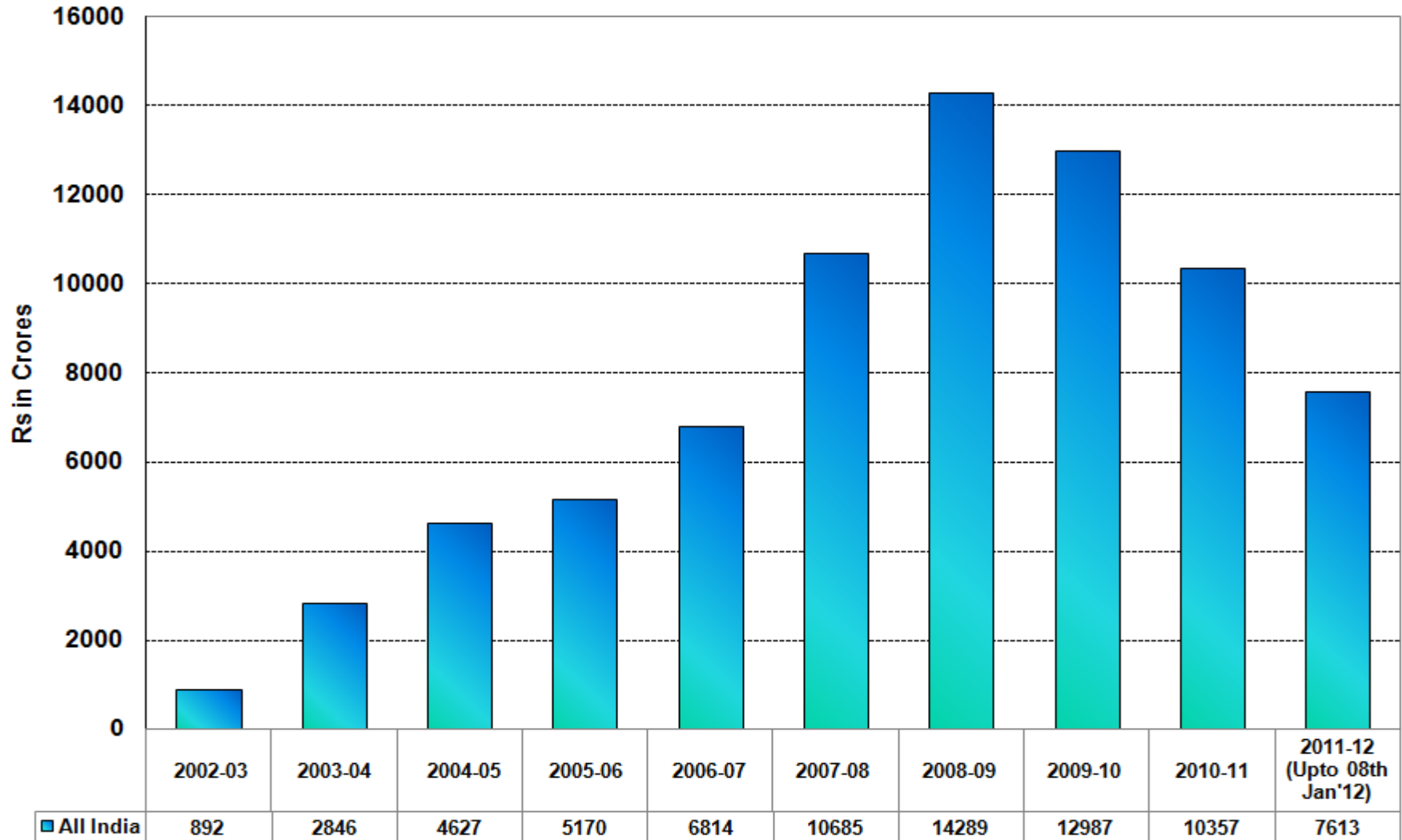


- Framework in IEGC
- Tightening of frequency band – permissible range for deviation
- Deterrent in the form high UI charges

Declining UI Volumes



UI Volume over the Years



Grid Security and Reliability



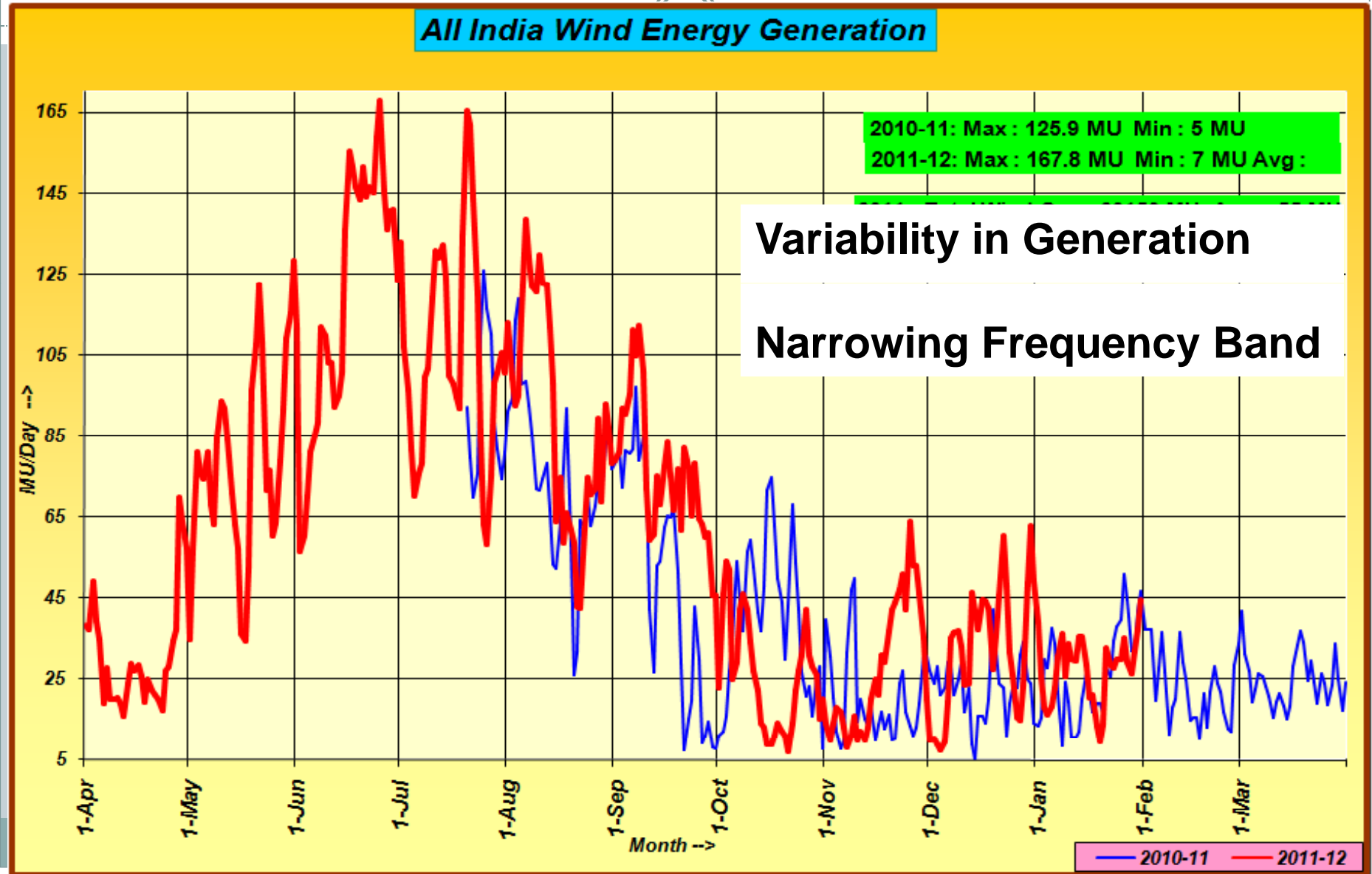
- But all this is not enough.....
- Need for exploring all kinds of market products before kicking in imbalance settlement

Driver....(3)



- Variability of renewable generation

Variation in Wind generation



Wide variation in renewable generation



- Need for a mechanism to handle variation

What would Ancillary Services achieve??



- **Harness leftover Generation at Optimum Cost**
 - Help the grid – Improved frequency profile
 - Opportunity for the Generators
- **Reduce load shedding**
- **Alleviate congestion in transmission to some extent**
- **Opportunity for peakers and pumped storage plants**
- **Renewable Generation**
 - Handling Variation thereby facilitating integration

How would Ancillary Services operate??

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- **Competitive Bidding Process**
 - Through Power Exchanges
- **Compilation and stacking of bids**
 - Despatch of bids in real time based on frequency profile
 - Merit Order to be followed
- **Settlement System**
 - Through UI pool
 - Payment to sellers through respective Power Exchange(s)

Legal Perspective

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- EA 2003, Section 27 (2):
 - “Provided further that no Regional Load Despatch Centre shall engage in the business of generation of electricity or trading in electricity.”
- Similar to Day Ahead Market
 - Facilitation through power exchanges
- System Operator’s Role
 - Despatch Decision
 - Involvement in trading in electricity is avoided

Coexistence of Ancillary Services and UI



- **Imbalance and Ancillary**
 - Two of the four pillars of market
 - Should co-exist
 - **Unscheduled Interchange.....Balancing mechanism and should follow Ancillary Services**

Future Scope.....(1)

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- ▶ **Negawatts**
 - ▶ Voluntary disconnection of loads
 - ▶ Requirement of adequate telemetry, metering and controls

- ▶ **Capacity Market**
 - ▶ Advance Contracts

- ▶ **Spinning Reserves**

- ▶ **Black Start Ancillary Service**

Future Scope.....(2)

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- **Power Flow Control Ancillary Services (PFCAS)**
 - Control power-flow on interconnectors
 - Utilizing un-harnessed surplus
 - ✦ Based on both location and merit order

- **Voltage Control Ancillary Services (VCAS)**
 - Provision in IEGC for VAr drawl
 - Synchronous condenser operation
 - ✦ Hydro Stations
 - ✦ Old gas and Thermal Units
 - Friction and windage losses
 - Auxiliary consumption

Issues for Discussion



- Frequency Support Ancillary Service (FSAS)....a necessity
- Operationalization a challenge
 - Scheduling and Dispatch principles
 - ✦ Trigger point (low frequency conditions and high frequency conditions)
 - Options for settlement
 - ✦ Pay as bid pricing
 - ✦ Uniform Pricing
 - Compensation/ Incentive

Thank You



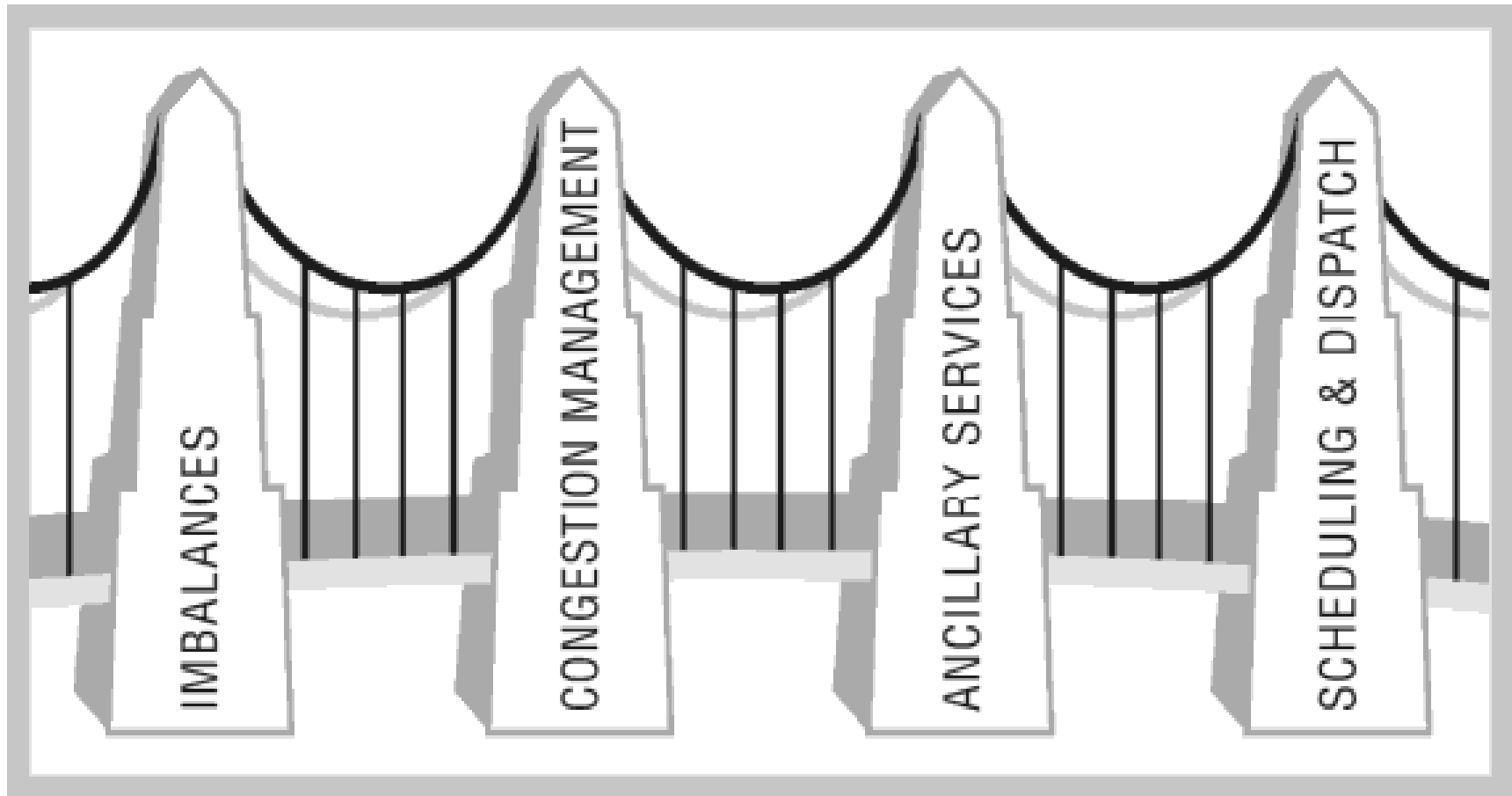
Ancillary Services in Indian Context

**Central Advisory Committee Meeting
14th March 2012**

Outline

- **Power Market Evolution in India**
- **Ancillary Services in India**
- **Frequency Support Ancillary Services (FSAS)**
 - Mechanism
 - Implementation Aspects
 - Salient Features
- **Objectives met through FSAS**

Pillars of Market Design

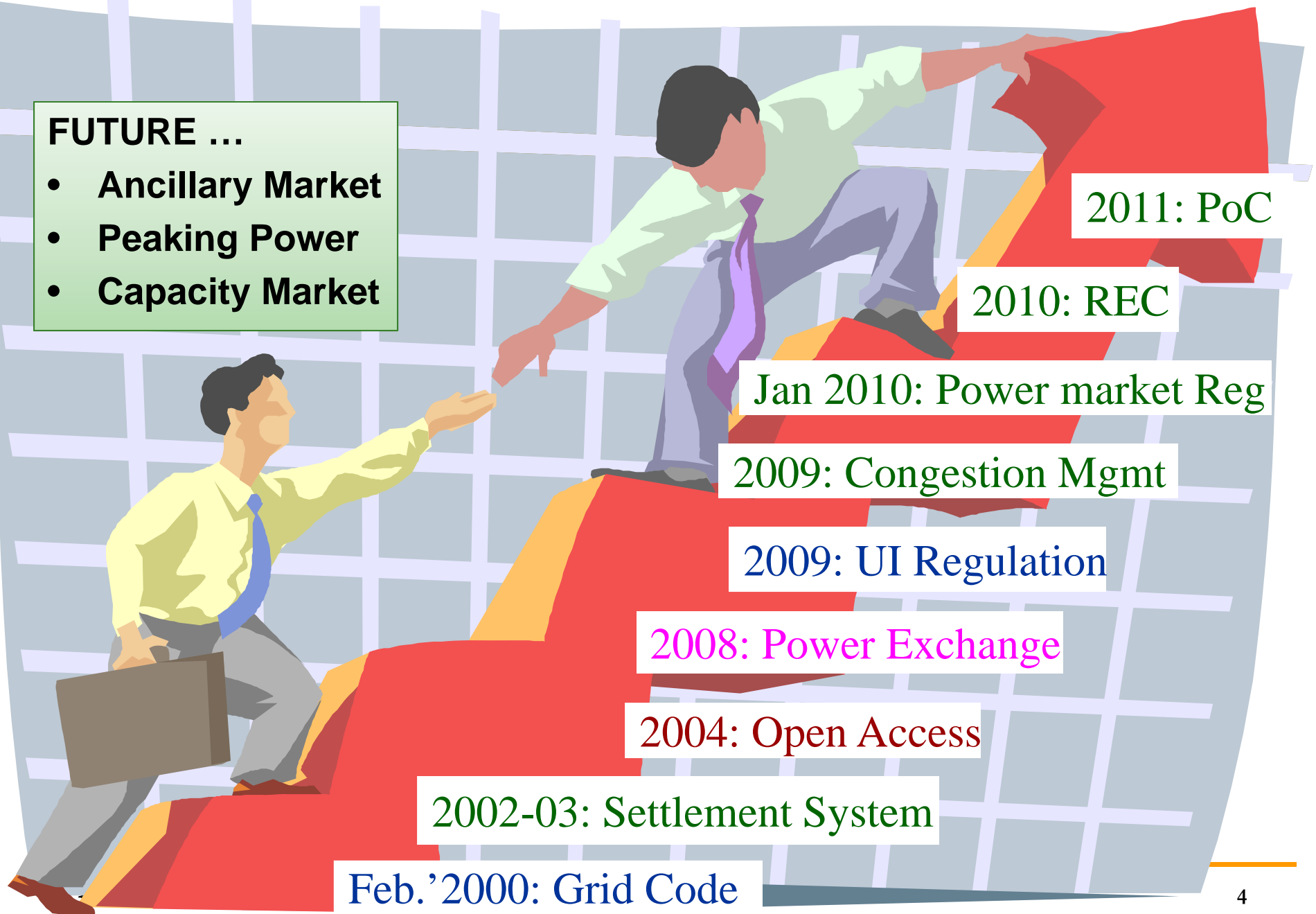


Sally Hunt – ‘ Making Competition Work in Electricity’

Evolution of Power Market in India

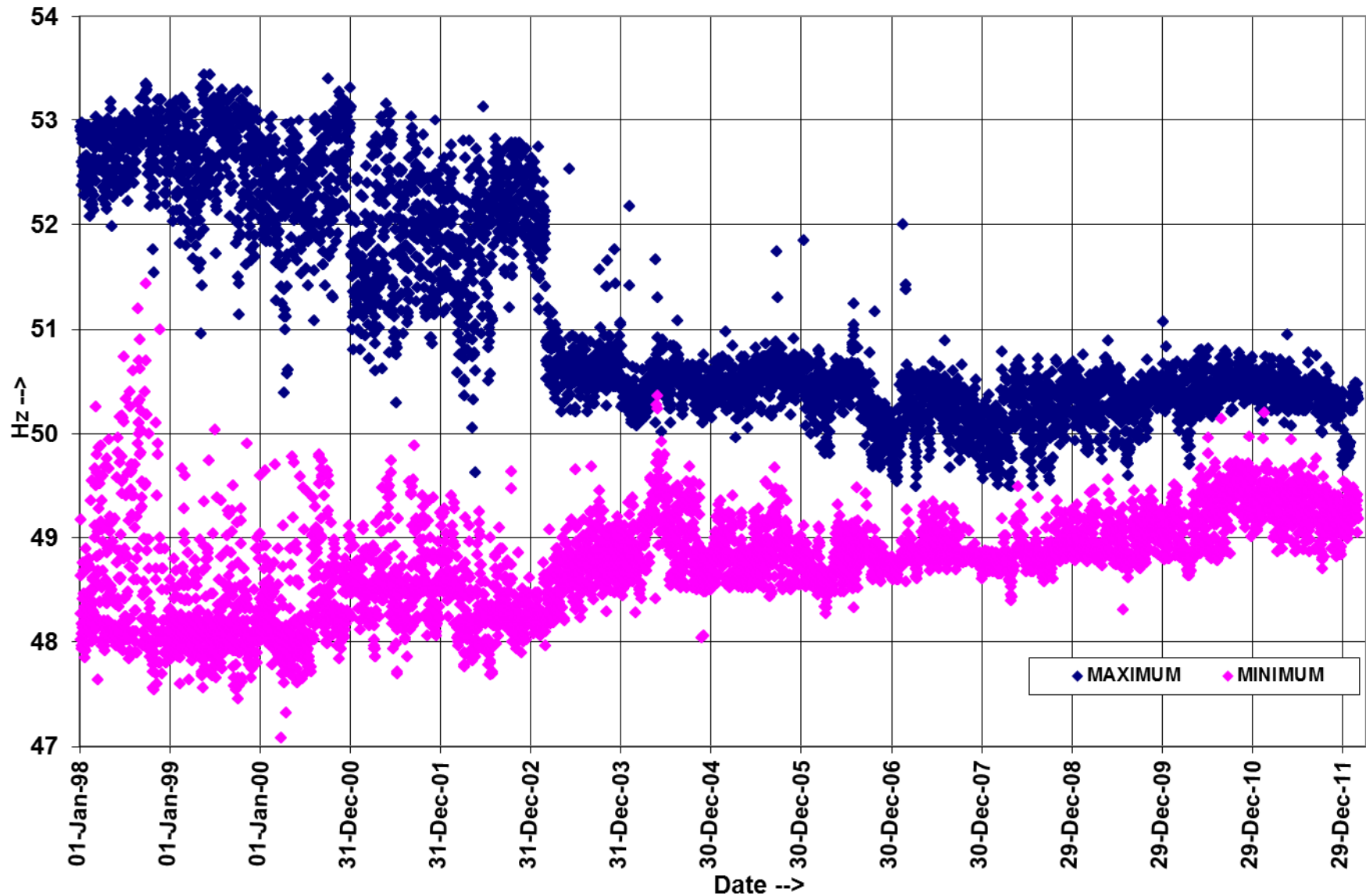
FUTURE ...

- Ancillary Market
- Peaking Power
- Capacity Market



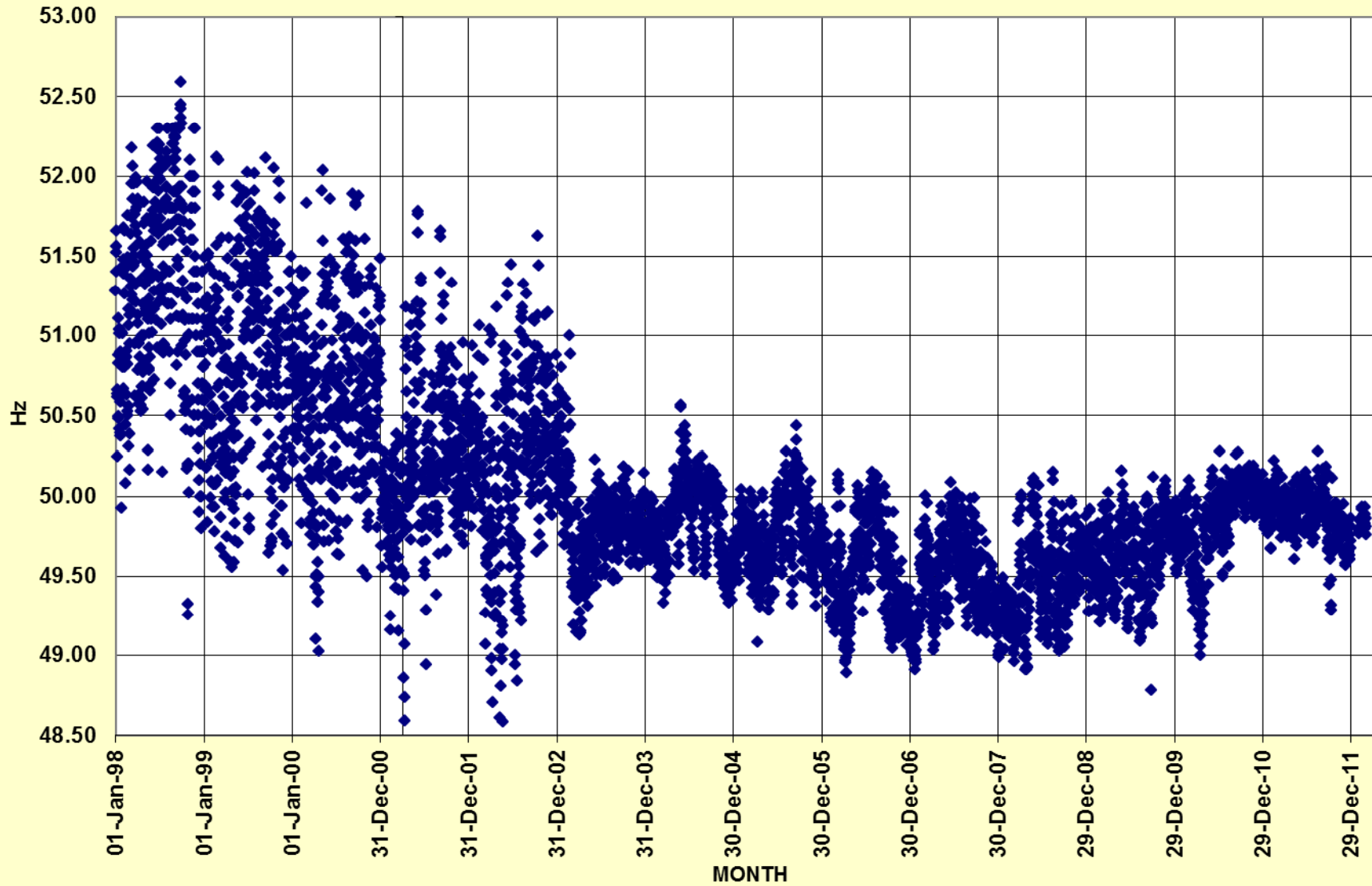
Maximum and Minimum Frequency in NEW Grid (Jan'98 onwards)

ER / NEW GRID MAXIMUM AND MINIMUM FREQUENCY JANUARY'98 ONWARDS



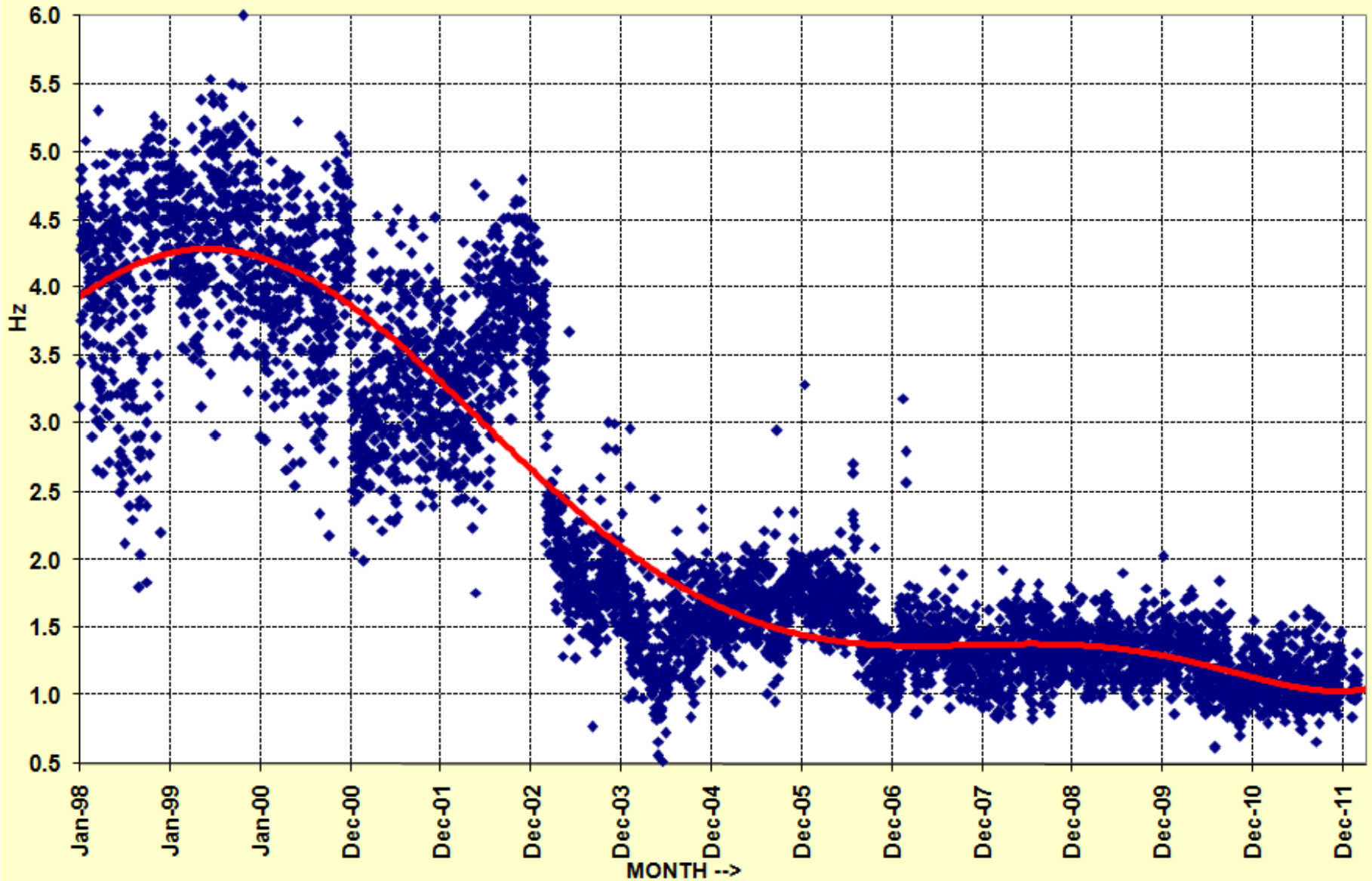
Average Frequency Recorded in NEW Grid

EASTERN REGION / NEW GRID AVERAGE FREQUENCY SCATTER PLOT
JANUARY'98 ONWARDS



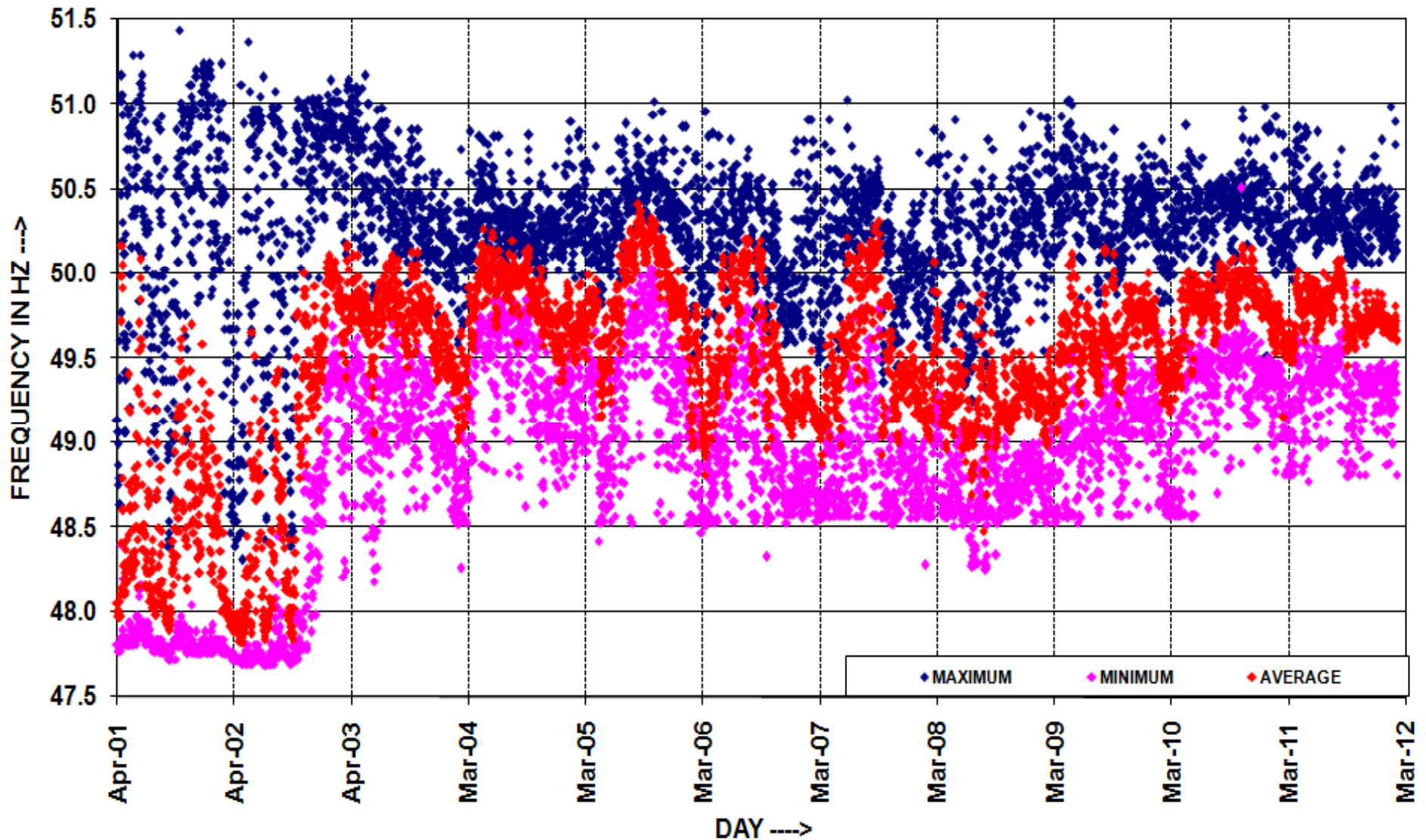
Frequency Fluctuations in NEW Grid

ER/NEW GRID FREQUENCY FLUCTUATIONS (MAXIMUM-MINIMUM)
JANUARY'98 ONWARDS

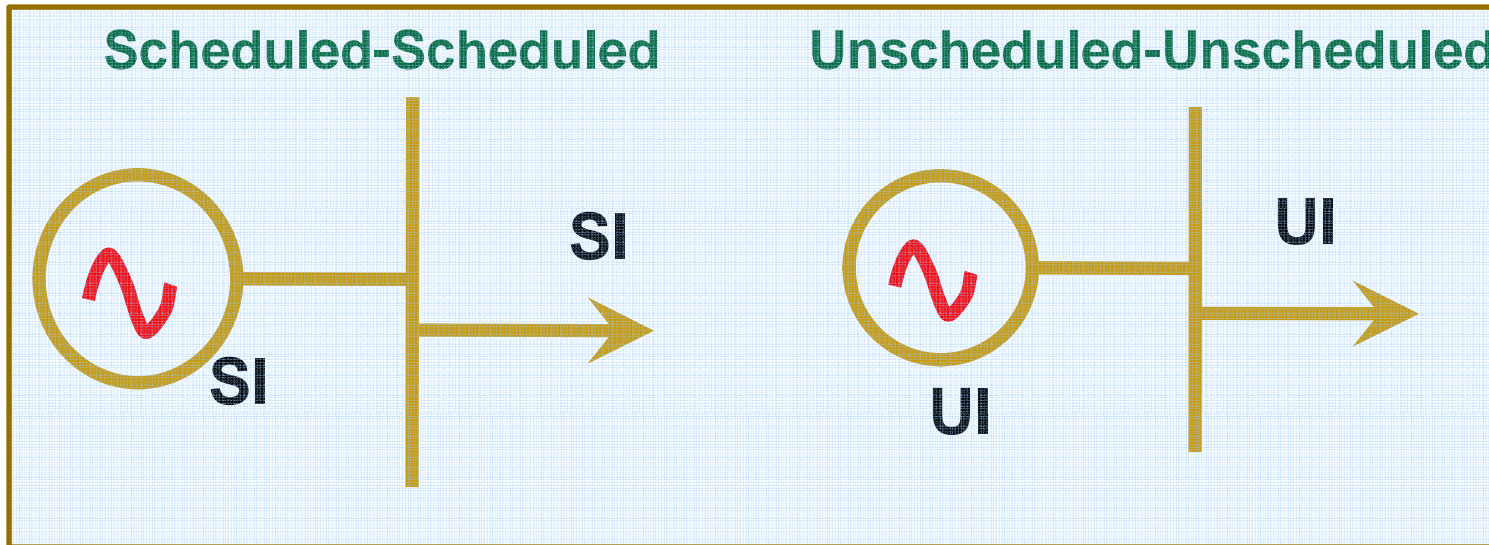


Maximum, Minimum and Average Frequency in SR Grid

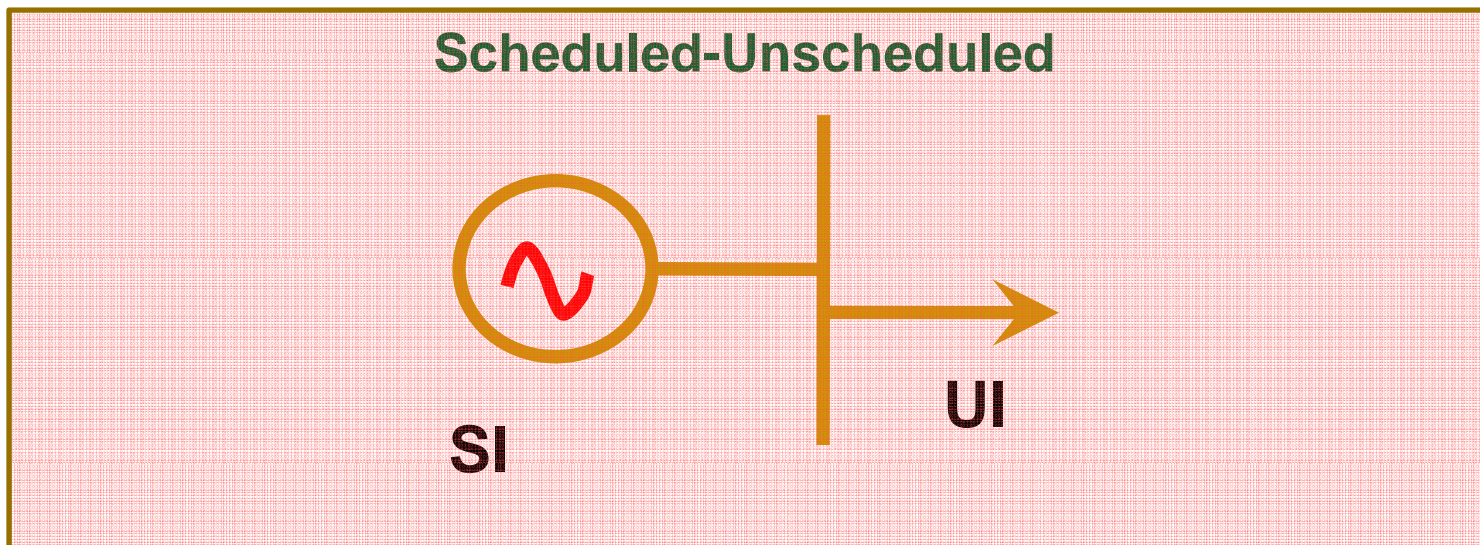
MAXIMUM, MINIMUM & AVERAGE FREQUENCY PLOT FROM APRIL-01 ONWARDS
(Southern Region)



Interchange: Possible Combinations



**Existing
Possible
Combinations**

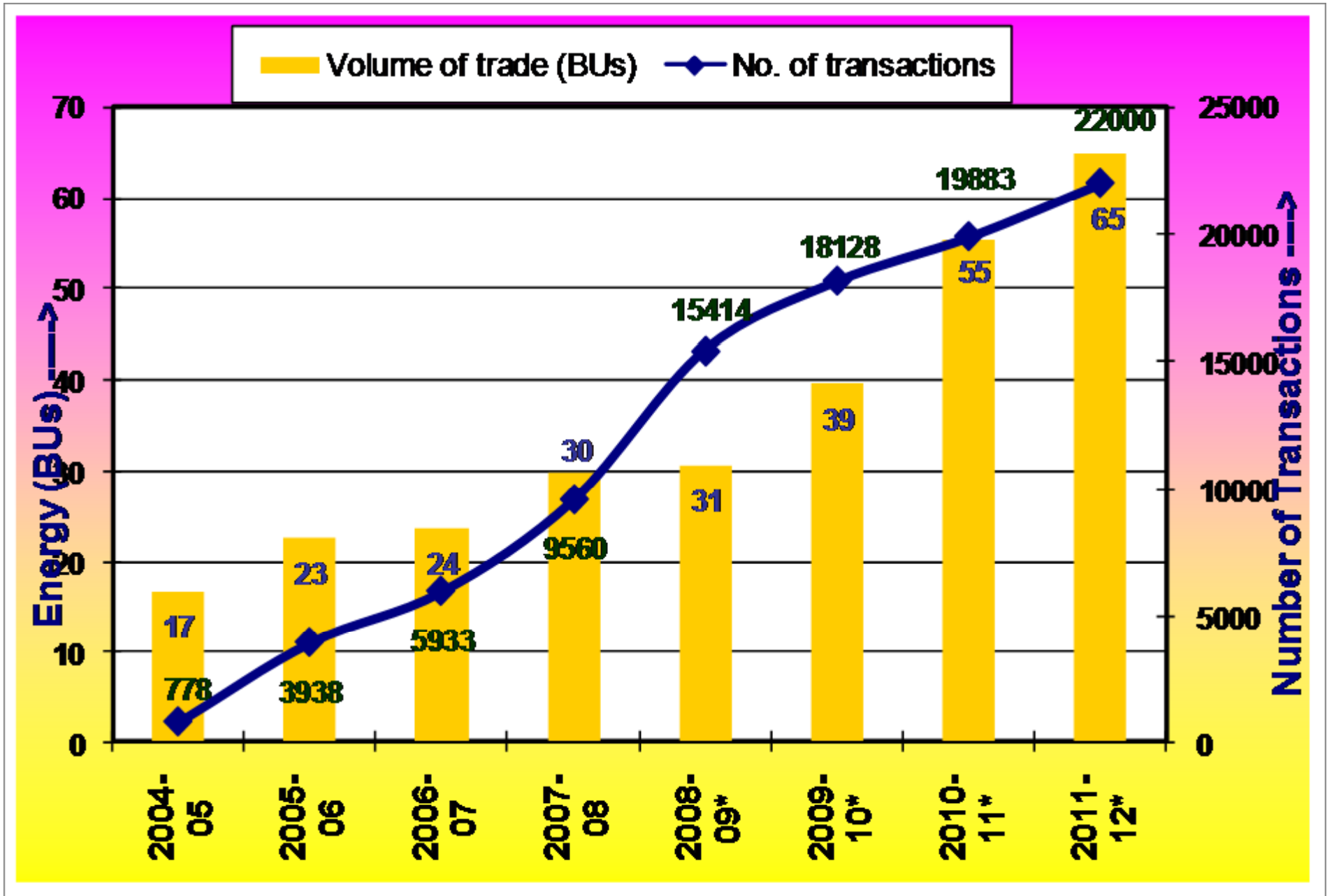


**Interchange
under FSAS**

Participant Profile in Power Exchange

Category	Number
Captive Power Plants	123
Independent Power Producers	20
Merchant Power Plants	8
Co-Gen Plants	20
DISCOMs	64
Renewable	15
OA Customer	1178
Central Generation Stations	13
Total	1441

Trade under Short-Term Open Access



Ancillary Services in India

- **Activities done for a common good**

- **Distinguishing features**
 - ❑ Electricity Market: Maturity Level
 - ❑ Lack of Adequate Reserves
 - ❑ Loose Power Pools
 - ❑ Absence of Tight Frequency Control
 - ❑ Lack of Primary, Secondary and Tertiary Response

- **Services Embedded through regulatory provisions**
 - ❑ Availability Based Tariff
 - ❑ Charges for Reactive Power

Work Done on Ancillary Services

- **Literature Survey**

- **Conference of European Electricity Ancillary Services and Grid Integration Forum at Berlin**
 - September 2010 and 2011
 - Attended by 3 executives from NLDC

- **Discussion at Forum of Load Despatchers (FOLD)**
 - 3rd Meeting, 9th November 2010 at SRLDC, Bangalore

- **Workshop on Ancillary Services**
 - Organized by NLDC
 - 21-22 September 2011
 - Attended by representatives from CERC, RPC, RLDCs, NTPC, NHPC, Power Exchange, IITK

POSOCO's Approach Paper

- **NLDC/RLDCs to identify ancillary services**

- Clause 11.1 of the amended CERC UI Regulations, 2009

“Providing ancillary services including but not limited to ‘load generation balancing’ during low grid frequency as identified by the Regional Load Despatch Centre, in accordance with the procedure prepared by it, to ensure grid security and safety”

- **Approach paper on ‘Ancillary Services in Indian Context’ published by POSOCO in June’10**

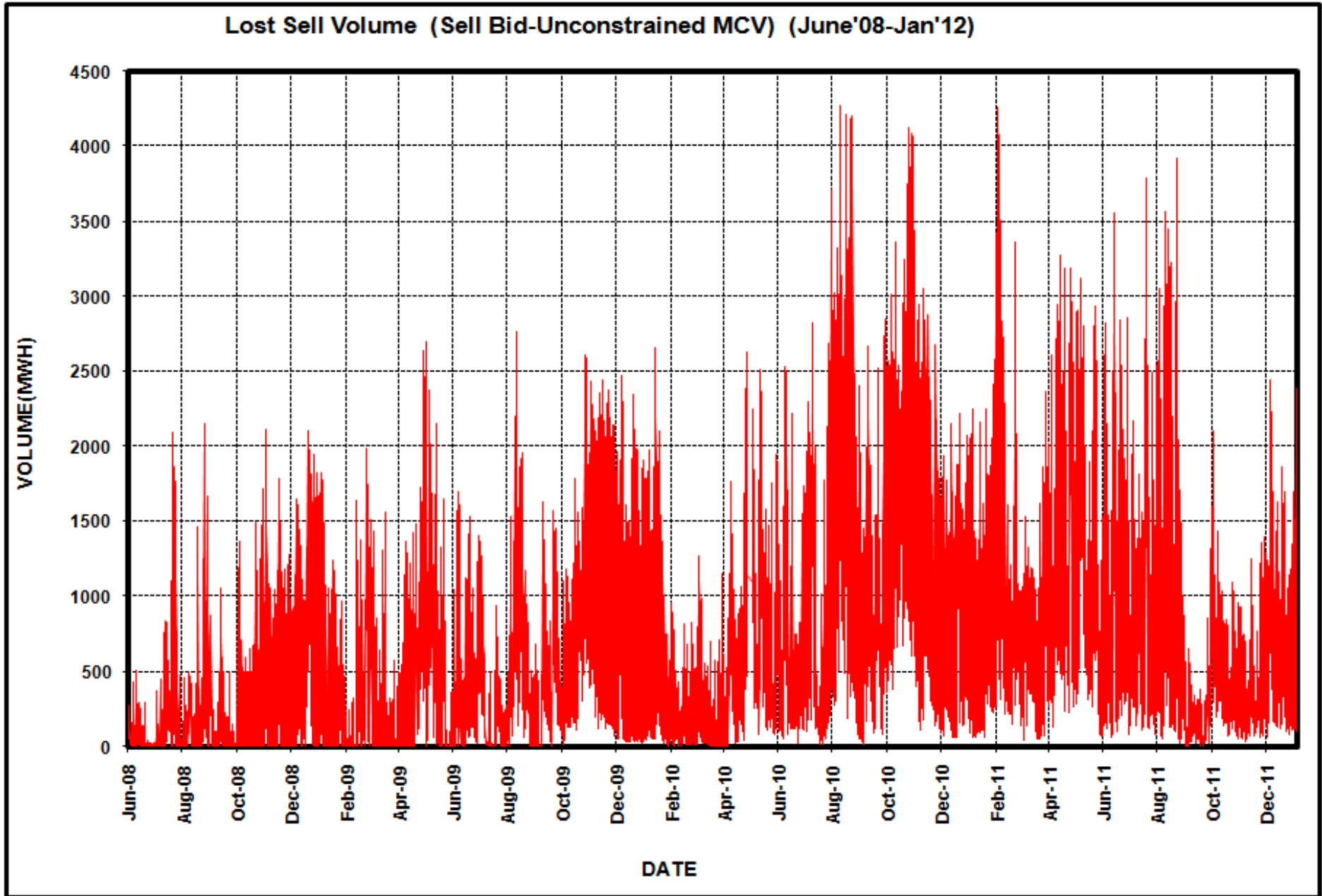
- Submitted to the Commission
- Comments sought from stakeholders

- **Limited to operational expenditure only**

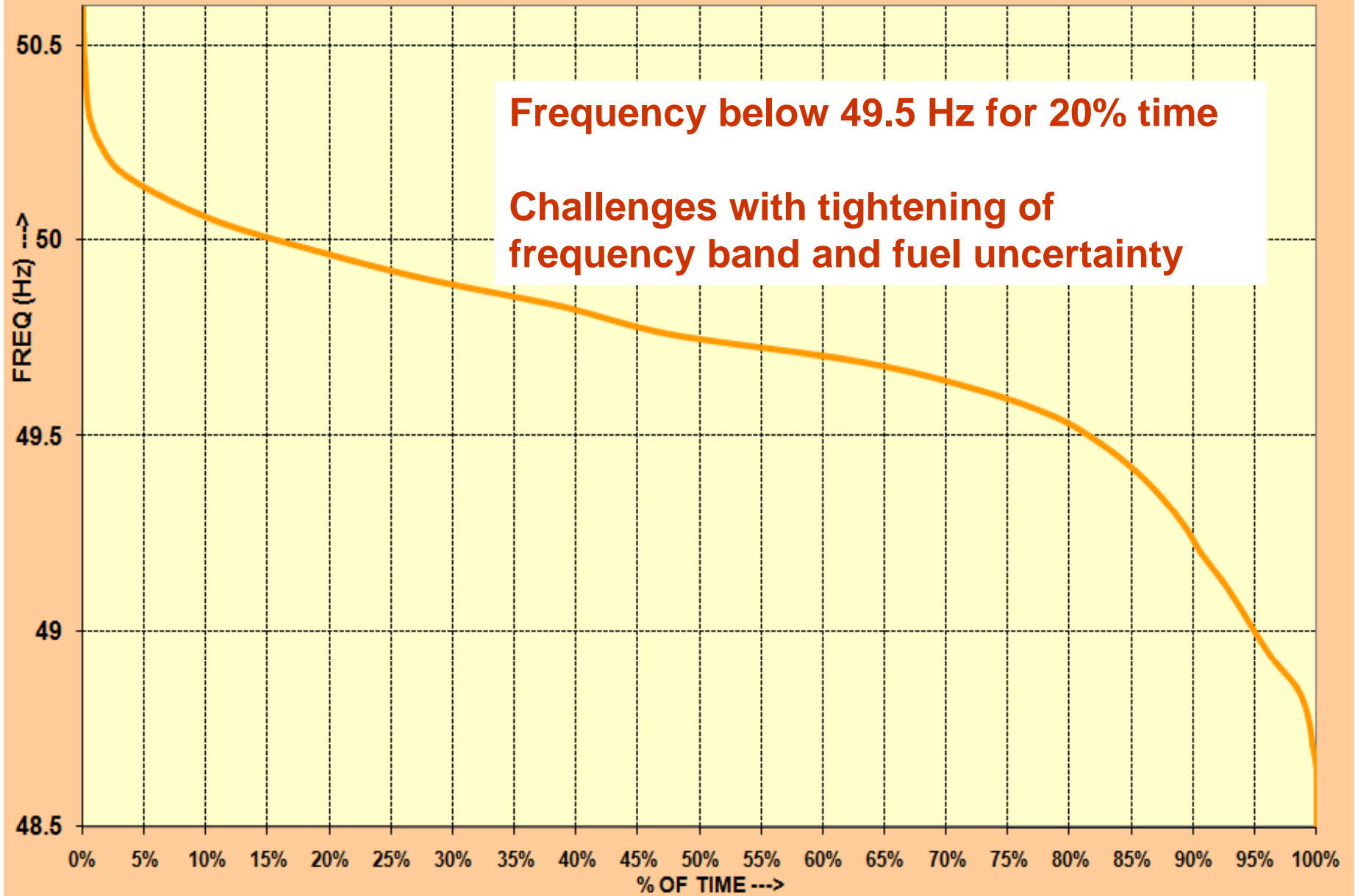
Ancillary Services for Immediate Implementation: Proposal by NLDC

- **Service identified for immediate implementation**
 - Frequency Support Ancillary Service (FSAS)
- **Harness un-despatched generation**
 - Liquid fuel based
 - Diesel based
 - Merchant/ IPPs/ CPPs
- **Limitation of Existing Mechanisms**
 - STOA
 - Fragmented capacity
 - Match Making
 - UI
 - Price Uncertainty
 - Frequent Start-stop operation

Possible Opportunity for Ancillary



NEW GRID FREQUENCY DURATION CURVE FOR OCTOBER' 2011



Implementing FSAS through Power Exchanges

- **Facilitation of FSAS through Power Exchanges**
- **New product for introducing FSAS**
- **Separate category of user group**
 - Seller registration for FSAS
 - Part of the existing settlement mechanism including deviations
 - Proper visibility with data, communication, telemetry
- **Standing clearance from concerned SLDC/RLDC**

Procurement of FSAS

- **Competitive Bidding Process**
- **After closure of Day Ahead Market**
 - Sellers to bid in either of the exchange
 - Declaration of supplier, bid area, quantum, duration, price
 - Anonymity to be maintained
- **Compilation and Stacking of bids**
 - For every time block of the next day
 - Stacking based on bid price
- **PoC Transmission Charges and Losses applicable**

Despatch of FSAS

■ Despatch in real time

- System Conditions
- Anticipated Frequency profile
 - Lower limit of IEGC band as threshold frequency
- Merit Order of bids

■ Certainty of despatch for 12 time blocks

■ Despatch in case of Congestion

- Merit order may be discounted
- Transfer Capability across seams to be honored

■ Consent from seller

- Participants free to schedule in STOA
-

Scheduling of Bids

- **Despatched bids directly incorporated in schedule of sellers**
- **Unmatched one to one schedule**
- **Creation of a notional entity 'POOL'**
 - For scheduling bids under FSAS
 - Despatched bids attributed towards drawal of the 'POOL'
- **Drawees of despatched power to pay UI charges**
- **Scheduling as per present practice on regional basis**

Settlement of Bids

■ Options for settlement

- Uniform pricing
- Pay as Bid Pricing

□ Commission to decide

■ Upper limit of CERC UI vector : ceiling price

■ No commitment or penalty charge

■ Payment to sellers through power exchanges

□ UI pool of respective regions

□ Transfer of Funds from regional UI pool to exchanges

Salient Features

- **Discovery of Information**
 - Undespached generation: Quantum & price
 - Spinning Reserves: quantum & price
- **Home Grown Solution**
- **Competitive Bidding**
- **Price Discovery**
- **Merit Order Despatch**
 - Overall Countrywide Optimization
- **Anonymity of Bidders**

Objectives Met

■ Opportunity for Generators before load shedding

- Help the grid
- Monetary Incentive
- Value of Lost Load

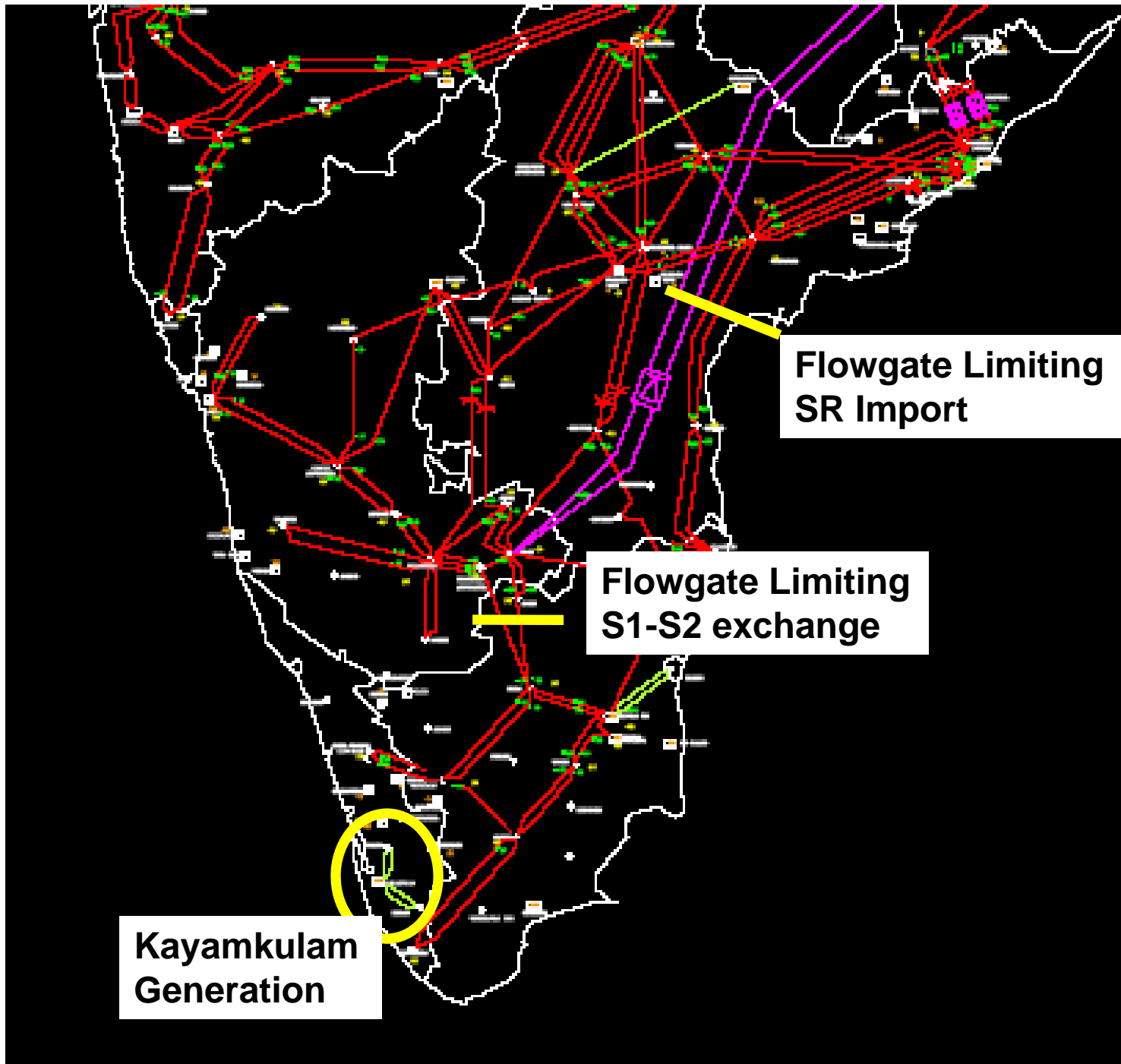
Clause 5.2(i) of IEGC

“...if frequency falls below 49.8 Hz, all partly loaded generating units shall pick up additional load at a faster rate, according to their capability.”

■ Utilization of Fragmented Capacity

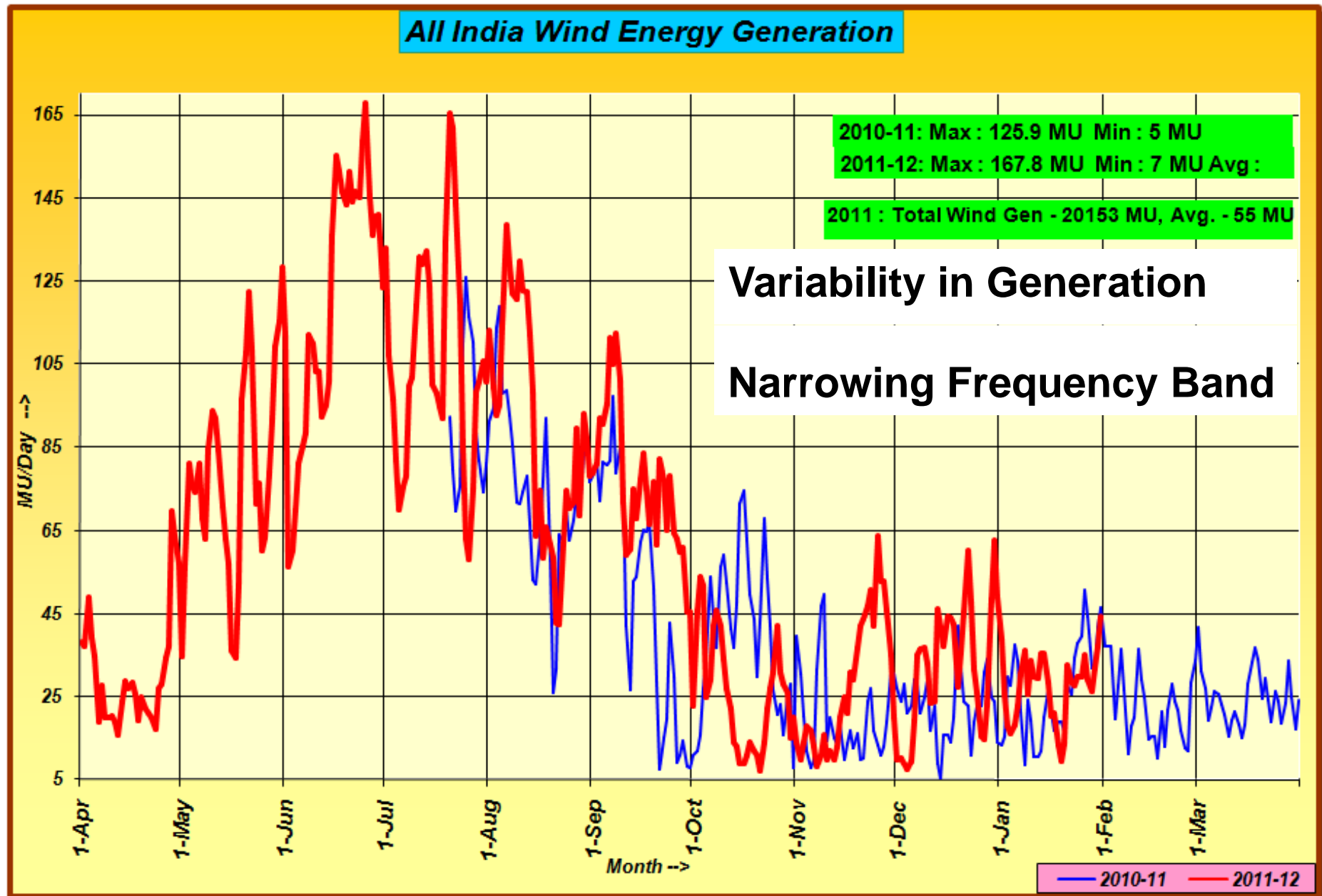
- Harness undespached generation
- Optimization

■ Confidence to the peakers



Kayamkulam injection would relieve congestion towards SR import

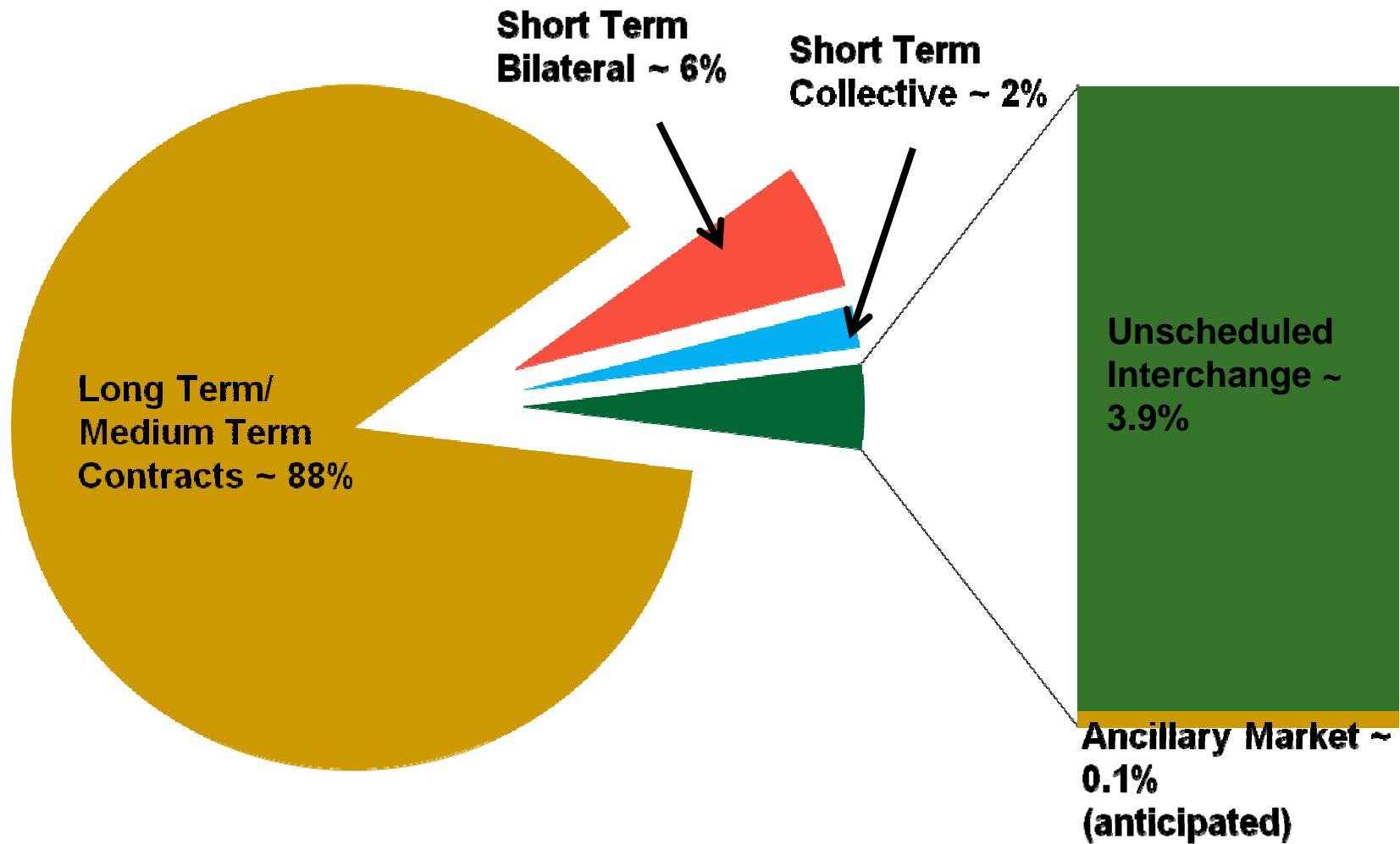
Renewable Integration.....absorbing variability



Pumped Storage Plants.....facilitation through FSAS

- **Nearly Rs. 2/kWh differential in peak and off peak prices of power**
 - **Increased standard of living.....load curve with pronounced humps.**
 - **Higher level of pithead based coal generation.....lower off peak prices**
 - **Narrowing of frequency band would further increase the differential between peak and off peak prices in the market.**
 - **Absorbing large quantities of intermittent generation.....a major challenge.....pumped storage a beautiful complement**
-

Frequency Support: Niche Market.....(1)



Frequency Support: Niche Market.....(2)

- **All India Energy Consumption ~ 2400 MU/ day**

- **Anticipated FSAS Despatch ~ 600 MW for 4 hours in peak**
 - = 2.4 MU/ day**
 - = 0.1 % of total energy**

- **Monetary Value @ Rs 7 pu = Rs 7 X 2.4 X 10⁶**
(assuming despatch of high cost generation) **= Rs 1.7 cr /day**

- **Congestion Management in Real Time**
 - Decision by NLDC
 - Maintaining Grid Security

Thank You

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