Electricity Market

December'16

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In this presentation

Introduction to Indian Power Market

Product Portfolio

Trading Mechanism

Market Snapshot

- Participation
- Volume
- Price

Trade @ IEX

Indian Power Market: Present Status

Long Term
Upto 25 Years

Power Purchase Agreements — 89%

Medium Term
3 months- 3years

Short-Term
Intraday - 3 months

OTC
Licensed traders *(61)*

OTC Intraday- 3 months

— 6%

Exchanges
1. Intra-day
2. DAM
3. DAC
4. Daily
5. Weekly

— 3%

Balancing Market
Real Time

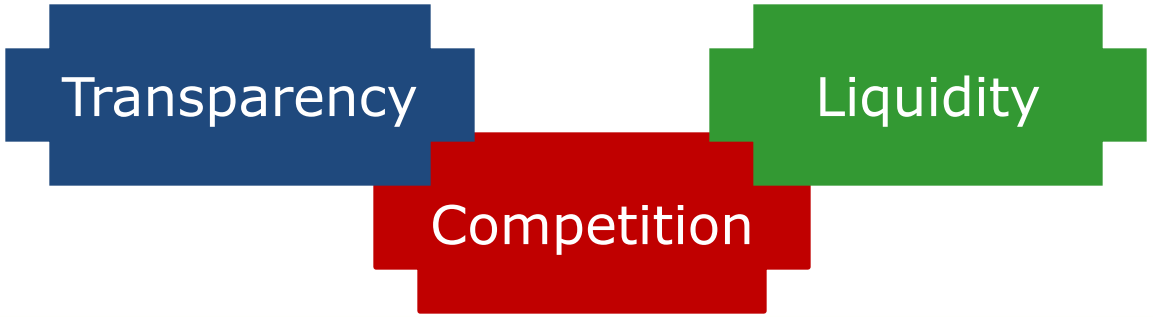
Unscheduled Interchange — 2%

Company Snapshot

IEX
INDIAN ENERGY EXCHANGE
India's No.1 Power Exchange

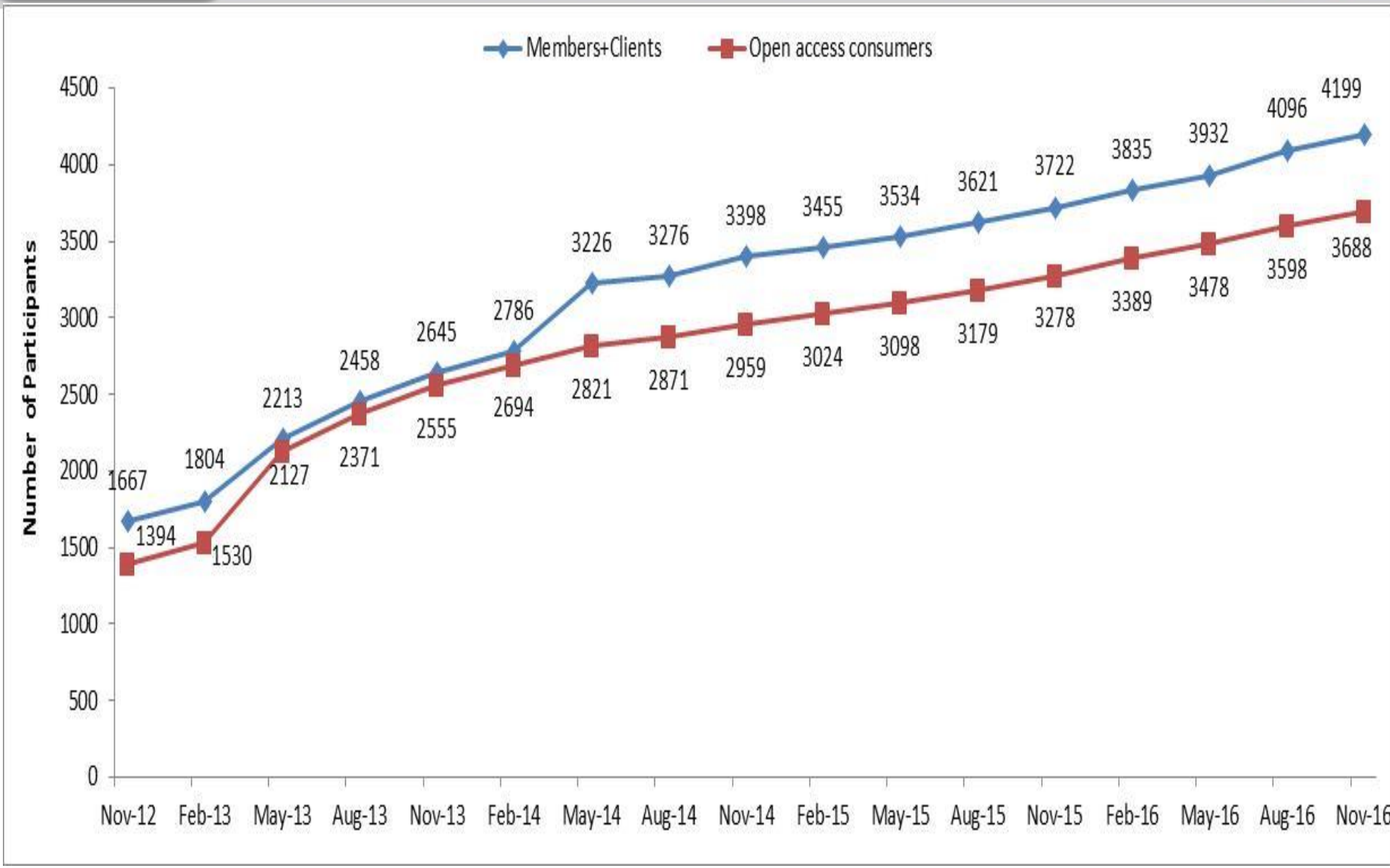
- Market Share: **96%**
- Average daily trade: **5000 MW**
- High Participation: **3700+**

3300+ Industries | **50+** Discoms (all) | **350+** Generators



Participation

Increasing Participation



IEX Market Segments

Delivery-based Contracts

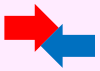
Day-Ahead Market
since June,08

Closed , Double-sided Auction
10-12 am bidding
Each 15-min block , 0.1 MW min NOC required

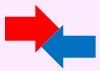
Term-Ahead Market
since Sep,09

Extended Markets introduced
20th July'15

Day-Ahead Contingency – *Another window for Day-Ahead.*
Extended Market: Trading window increased to 1500-2300 Hours

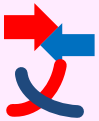


Intra-Day **-Extended Market: Trading window increased to 0030 – 2000 Hrs for same day delivery, with delivery starting at 0400 Hours**



Daily- *for rolling seven days (delivery starting after 4 days)*

Weekly- *for 1 week (Monday-Sunday)*

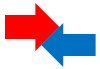


Renewable Energy Certificates
since Feb,11

Green Attributes as Certificates
Sellers : *RE generators not under feed in tariffs*
Buyers: *Obligated entities*
1MWh equivalent to 1 REC

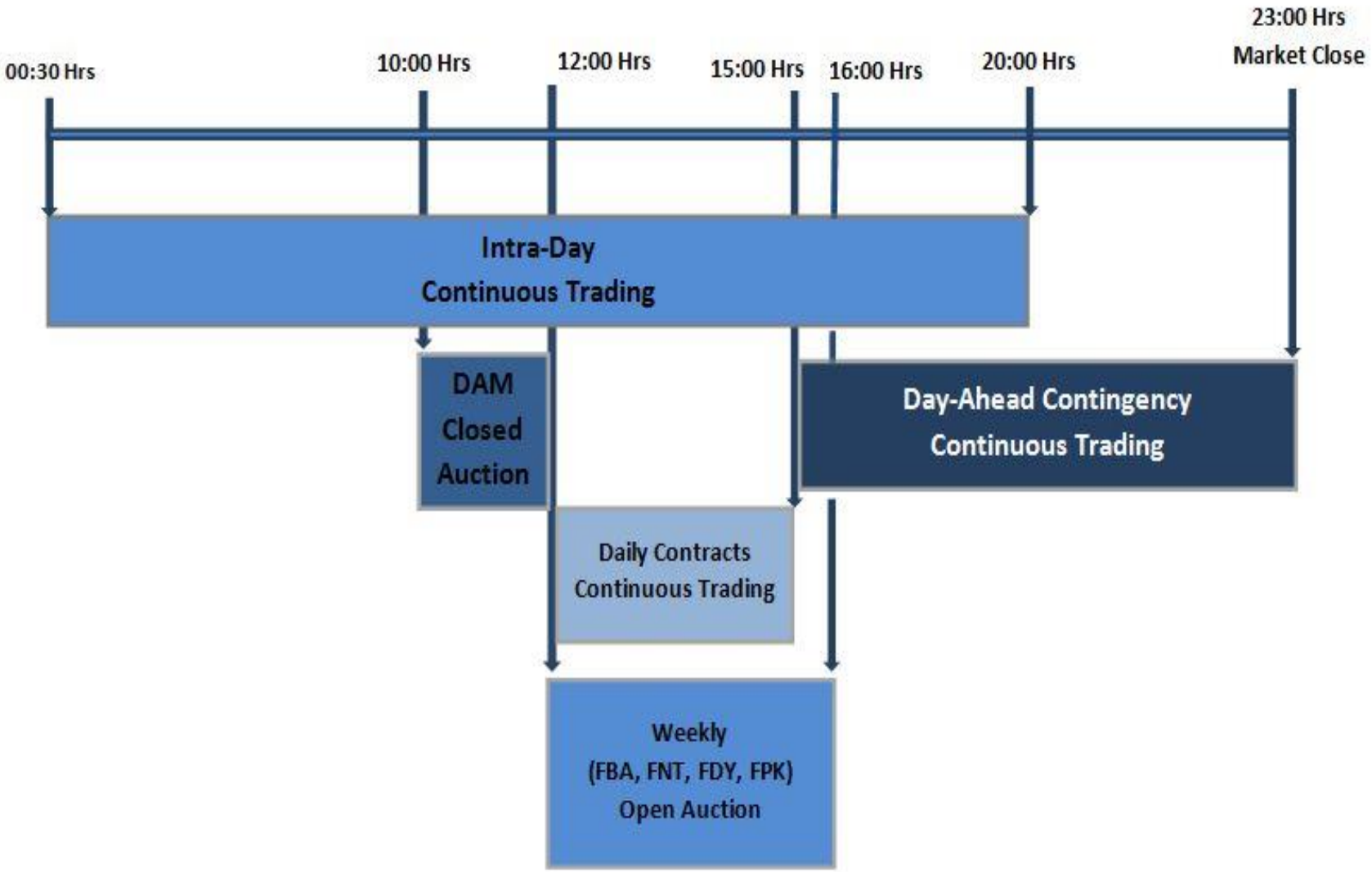
Next… Energy Saving Certificates

Auction



Continuous

DAM and TAM Trading Timeline



Features of Day Ahead Market

A closed double-sided anonymous auction for **each 15-min time block** for the following day

The intersection between the aggregated sale and purchase curves defines the market clearing price (MCP)

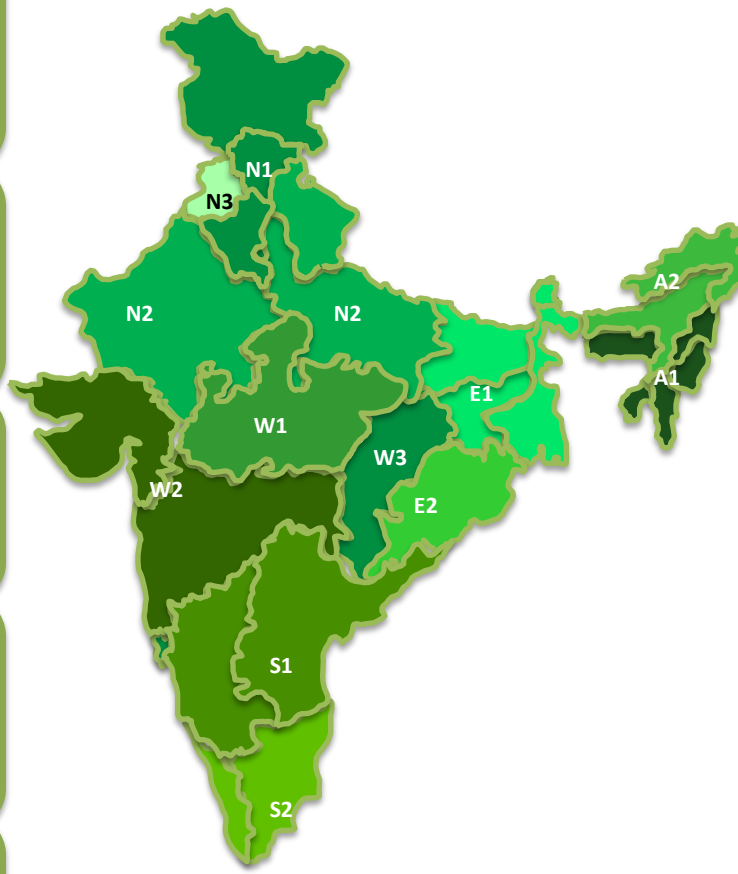
12 Bid area defined

Congestion Management through market splitting and determining Area Clearing Price (ACP) specific to an area

Bid types: Portfolio Orders or Block Orders

Minimum bid=Re.1 for 0.1MWh

Minimum Price & Volume Step = 0.1p * 0.1 MWh



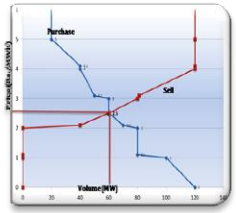
12 Bid Areas

DAM trading process

Bidding

Matching

Review corridor and funds availability



Result

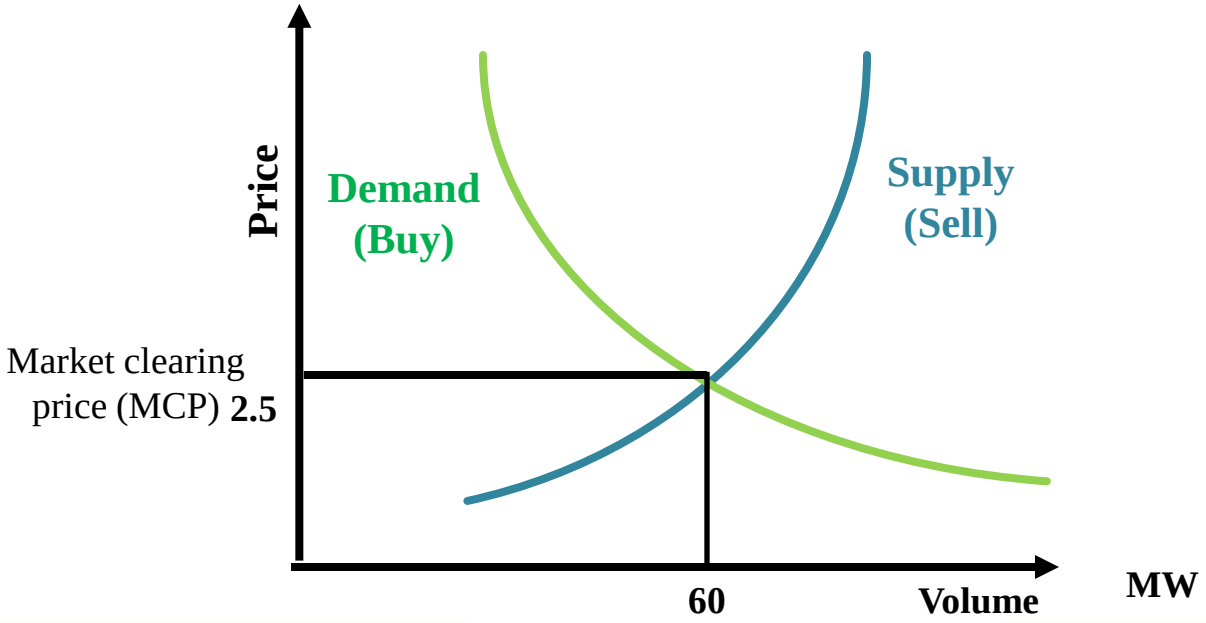
Confirmation

Scheduling

10:00 am to 12:00 pm	12:00 pm to 1:00 pm	1:00 pm to 2:00 pm	3:00 pm	5:30 pm	6:00 pm
Bids for 15- min each or block bids can be placed	MCP &MCV calculated	Corridor availability and funds verified	Final ACV and ACP calculated. Market splitting if congestion	Collective transaction confirmation by NLDC	Final Schedule sent to RLDC for incorporation

Model Price Calculation algorithm

	Price Tick (Rs.)	0	1	1.1	2	2.1	2.5	3	3.1	4	4.1	5	---	---	----	20
Bid Quantum by different portfolios	Portfolio A, MW	20	20	20	20	20	20	20	10	0	0	0	0	0	0	0
	Portfolio B, MW	60	60	60	60	50	40	40	40	40	40	20	20	20	20	20
	Portfolio C, MW	40	20	0	0	-40	-60	-80	-81	-120	-120	-120	-120	-120	-120	-120
Total Buy Quantum received, MW		120	100	80	80	70	60	60	50	40	40	20	20	20	20	20
Total Sell Quantum received, MW		0	0	0	0	-40	-60	-80	-81	-120	-120	-120	-120	-120	-120	-120
Net Transaction, MW		120	100	80	80	20	0	-20	-21	-80	-100	-100	-100	-100	-100	-100



Market Clearing Volume (MCV)

BID MATCHING

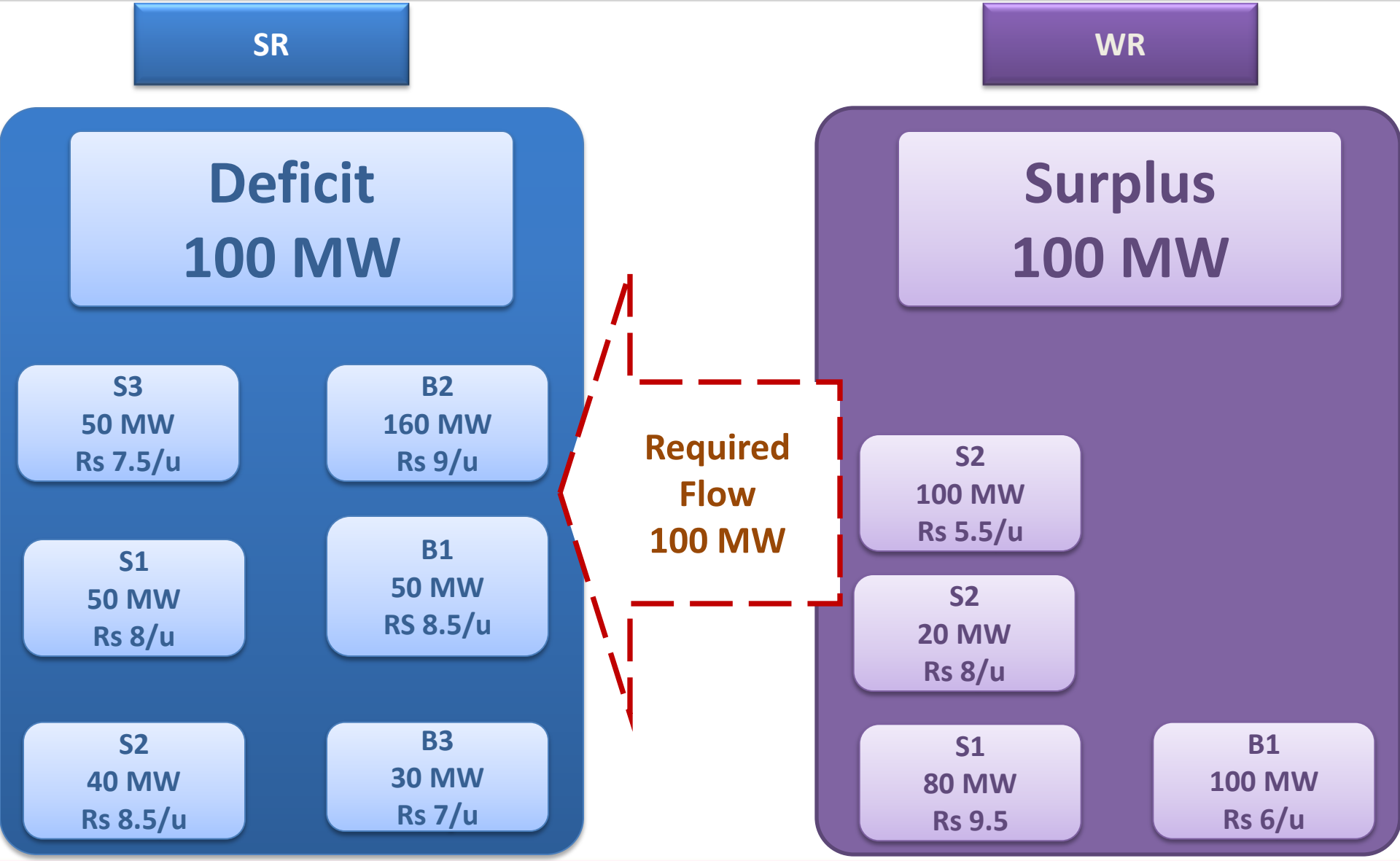
Open/Closed Auction

- Orders accumulated during call phase (no matching)
- Orders matched after call period
- Orders are used for calculation common price i.e. Equilibrium Price.
- All successful orders matched at Equilibrium Price.

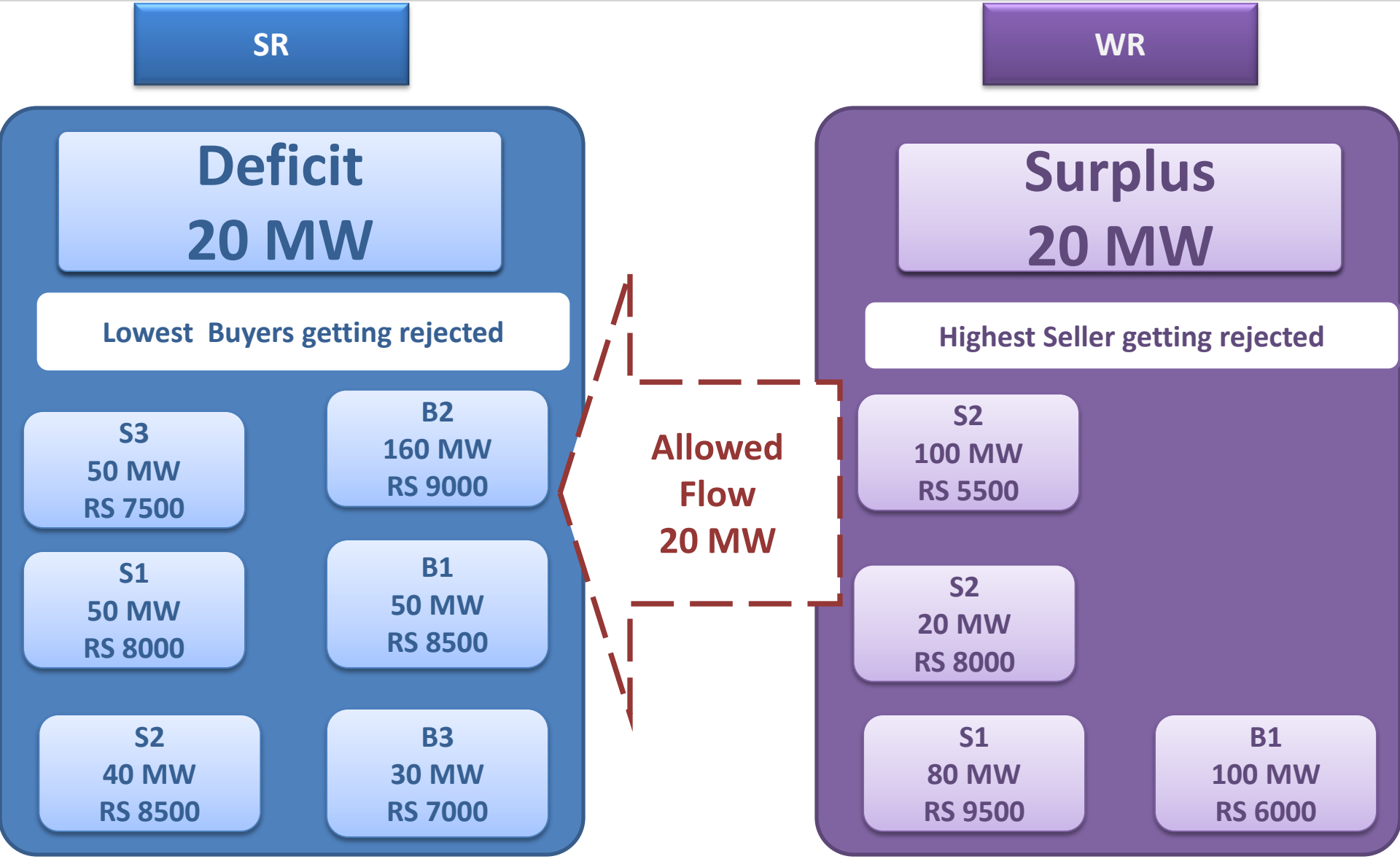
Continuous Trading

- Price-time priority based continuous matching
- The highest Buy order & lowest Sell order gets the priority
- If the prices are same then priority is given to the time of the order received.

Congestion Management

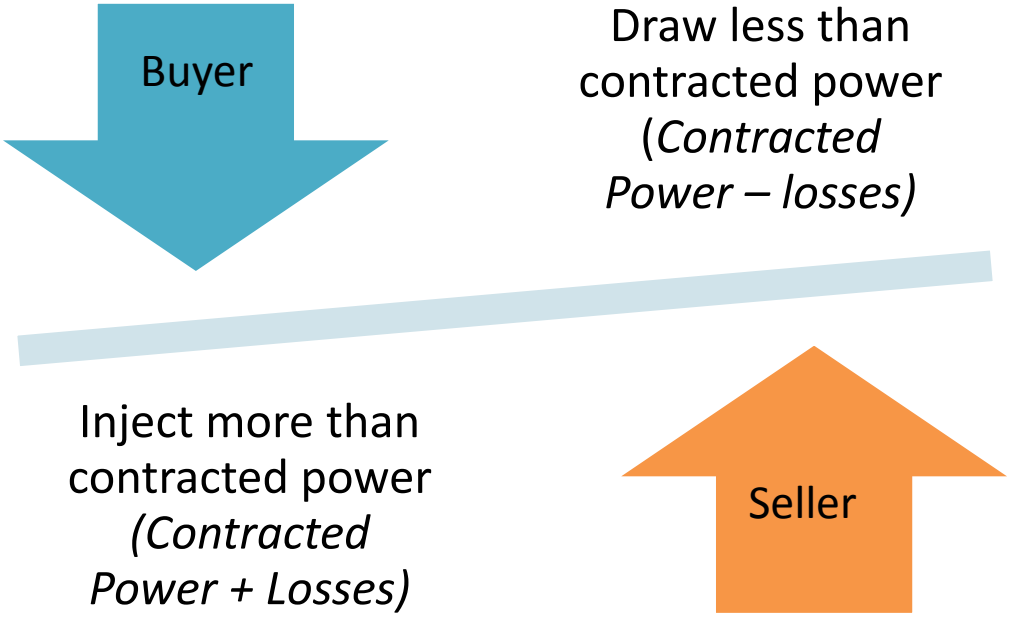


Congestion Management



Treatment of Losses

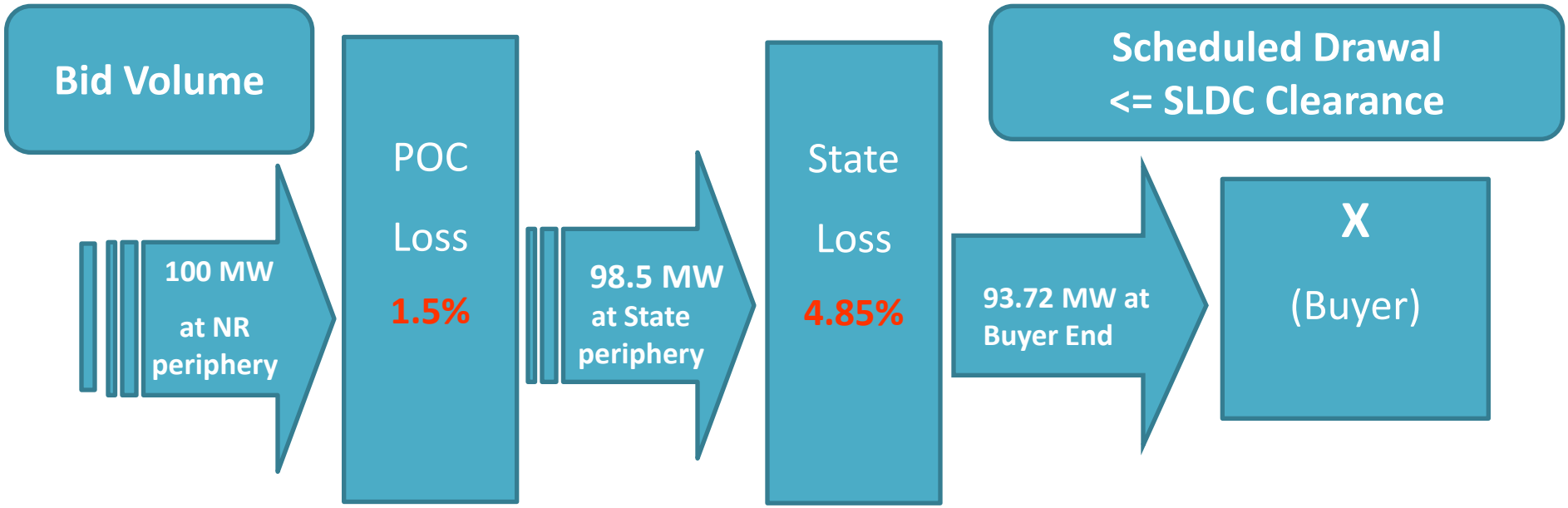
- **Both Buyers and Sellers to absorb losses**



- Average Transmission Losses of the Region where the Entity is geographically located.

Treatment of Losses… for buyer

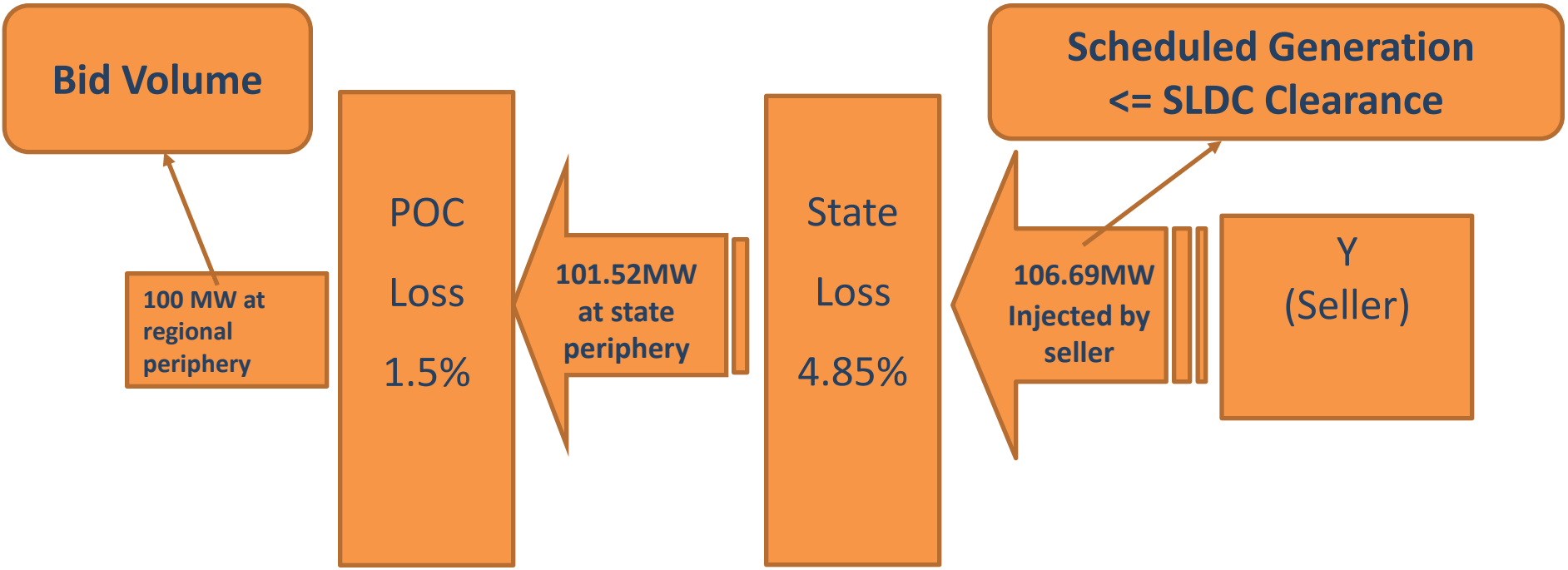
- POC Loss: 1.5 %
- S1 (State) loss: 4.85 %
- Buyer X bids for 100 MW at its respective regional periphery



Maximum Bid= Volume in standing clearance + Regional & State losses

Treatment of Losses… for seller

- POC Loss: 1.5%
- State loss: 4.85%
- Seller Y bids for 100 MW at its respective regional periphery



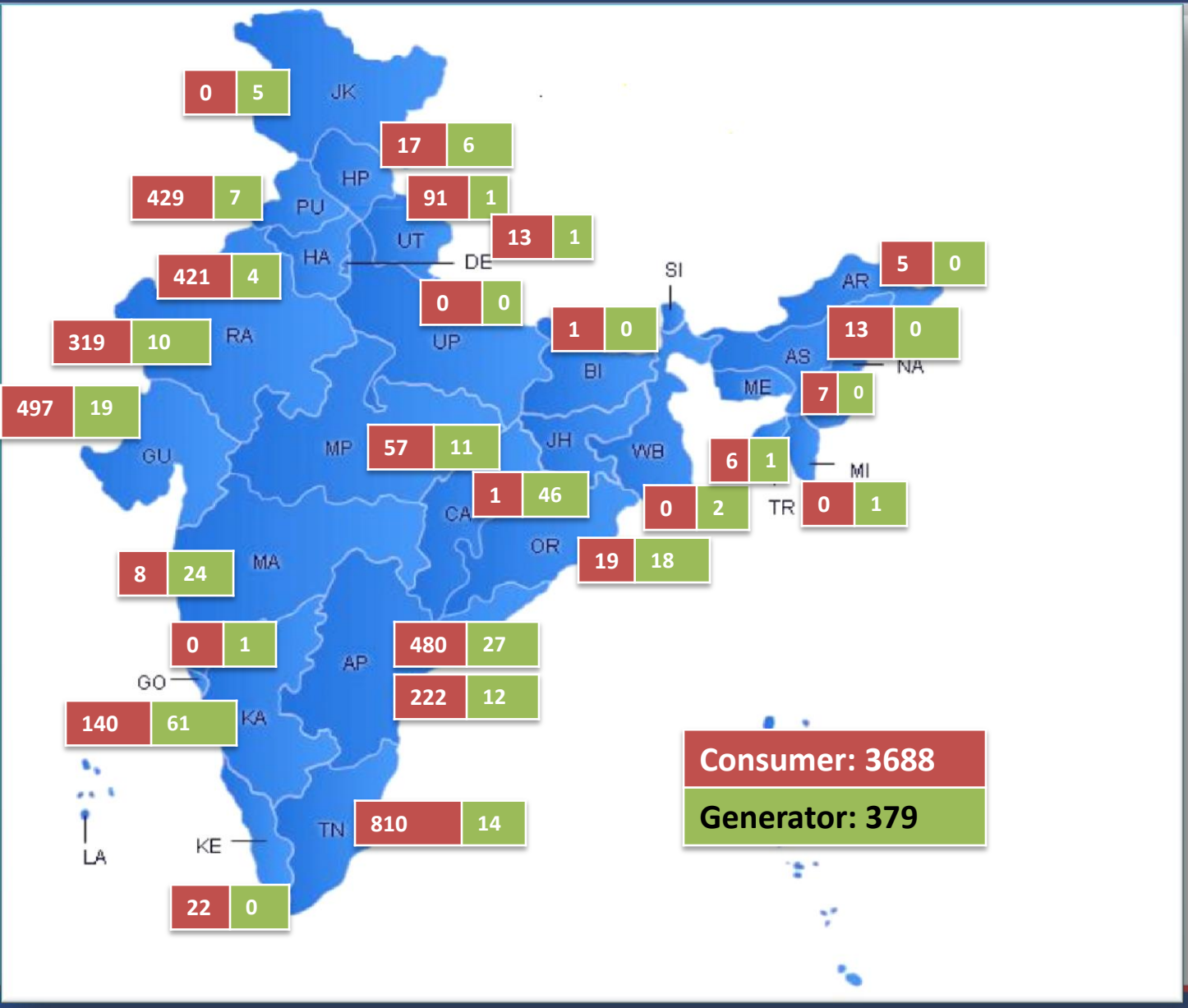
Maximum Bid= Volume in standing clearance – Regional & State losses

Key statistics: Electricity & REC Market

	ELECTRICITY	REC
 Market Share (FY15-16)	98%	63%
 State Utilities	29 States I 5 UTs	16 States I 5 UTs
 Generators	379	847
 Industrial Consumers	3688	2489
 Average Daily Volume	>90,000 MWh *Highest : 144,649 MWh*	**>6 million RECs** ***Highest:* 865,675 *RECs***

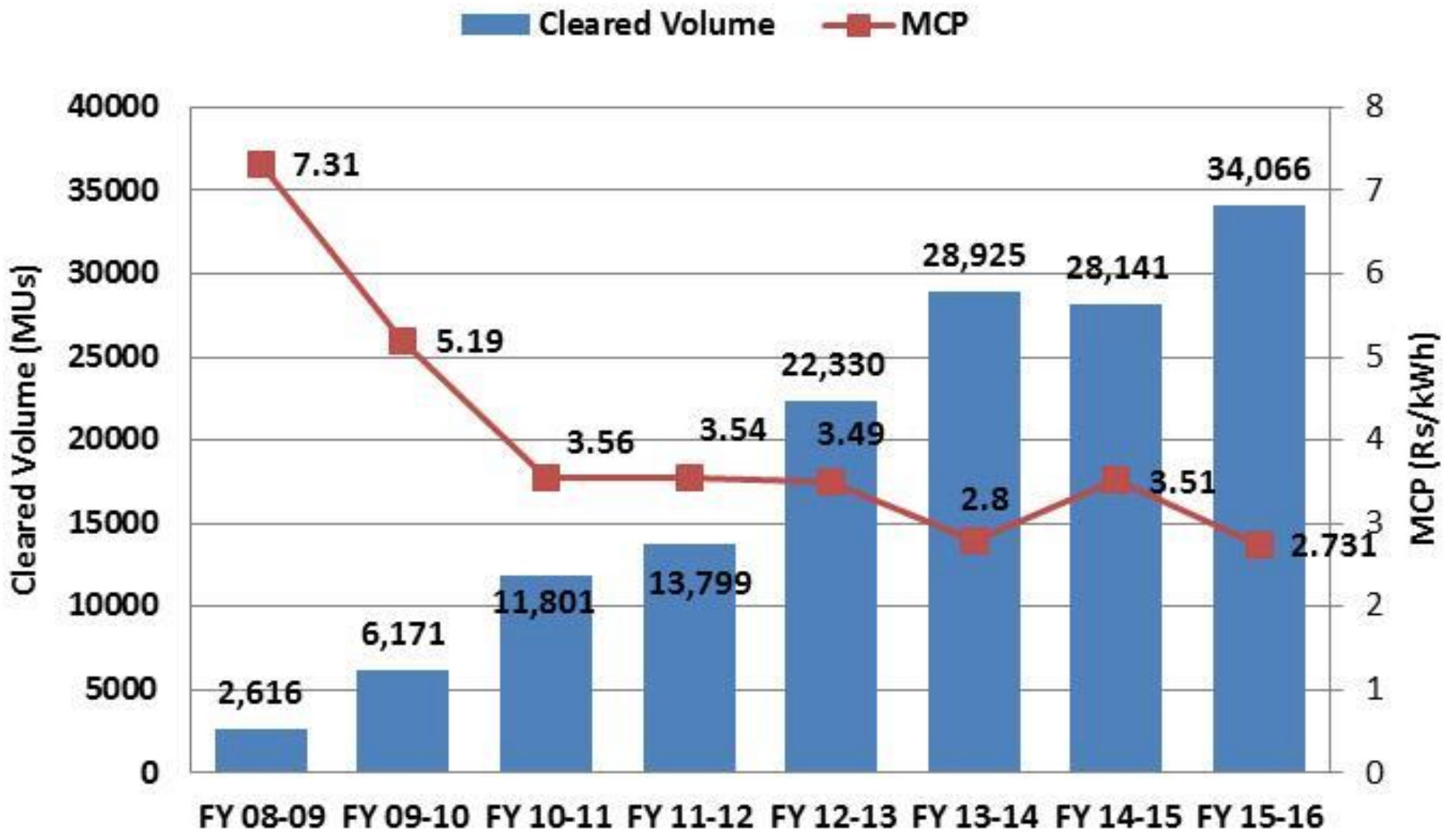
IEX Data as on 30 NOVEMBER, 2016

Participation at IEX



Volume

DAM Cleared Volume v/s MCP



IEX Membership Types

Proprietary Member

- Right to trade and clear on its own account
- Generator- Distribution licensees- IPPs - CPP- MPPs –O A consumers

Professional Member

- Trade and clear on behalf of its Clients
- NO CREDIT /FINANCING

Electricity Traders

- Trade and clear on behalf of its Clients
- CREDIT /FINANCING

Clients

Grid Connected

Generator, Distribution licensees, IPPs, CPP, MPP, OA consumers

Trader Client

With valid PPA

Financial Requirements

Membership Category: Proprietary / Professional Member The financial criteria for payment options available on IEX are:

Fees	Professional & Proprietary & Electricity Trader (Full Payment Option)	Proprietary member (Light Payment Option)
Admission fee	Rs. 35,00,000	Rs. 10,00,000
Interest Free Security Deposit	Rs. 25,00,000	Rs. 10,00,000
Annual Subscription Fees	Rs. 5,00,000	Rs. 2,50,000
Processing Fees	Rs. 10,000	Rs. 10,000
TOTAL	Rs. 65,10,000	Rs. 22,60,000
Exchange Transaction	2p/kWh	3p/kWh

How to Move Ahead…

Become Member or Client (of a Member)…options

- Rs 22.6 Lacs +3p/kWh transaction fee
- Rs 65.1 lacs + 2p/kWh transaction fee
- Client @ 1Lakh

Technical Requirements

- Standing Clearance from UTs/State SLDC
- ABT Meters
- Sufficient transmission capacity

Connectivity with exchange can be done in two ways

- Internet Immediate
- Leased Line

Start Buying from IEX or Sell surpluses to IEX

Thank You for your attention

www.iexindia.com

***Leader in Market Development*– India Power Awards '15**

Best Power Exchange in India
- **– Enertia Awards '14, '13 &'12**
- **– India Power Award 2014**
- **– Power Business View Award 2014**

Inc India Innovative 100 Award for 'Innovation in Product and Technology'

***Best Performing Power Exchange* – Power Line Awards '13 & '12**

DIVERSIFIED PARTICIPATION | LOW TRANSACTION COST | COMPETITION | TRANSPARENCY | ROBUST PRICE DISCOVERY