Bidding Strategy I Day-Ahead Market

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In this presentation

- ✓ Type of Market Participants
- ✓ Bidding Strategy
  - ✓ Discom
  - ✓ OA Consumer
  - ✓ Generator

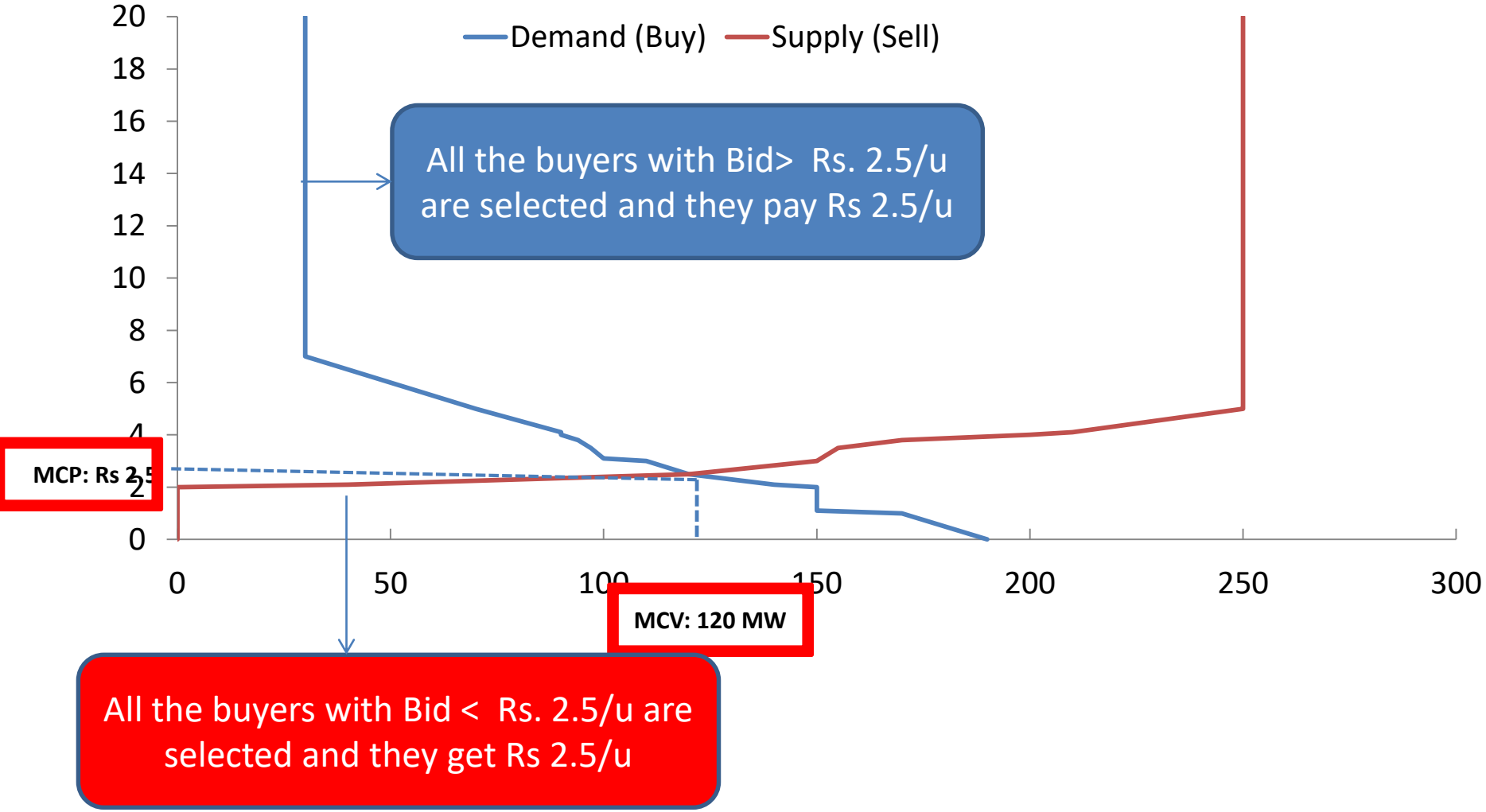
Market Participants

BUY	SELL
Electricity Trader/Member	Electricity Trader/Member
Open Access Consumer	CPP/IPP
Industries with CPP	Inter-State GS/State GS
DISCOM	DISCOM

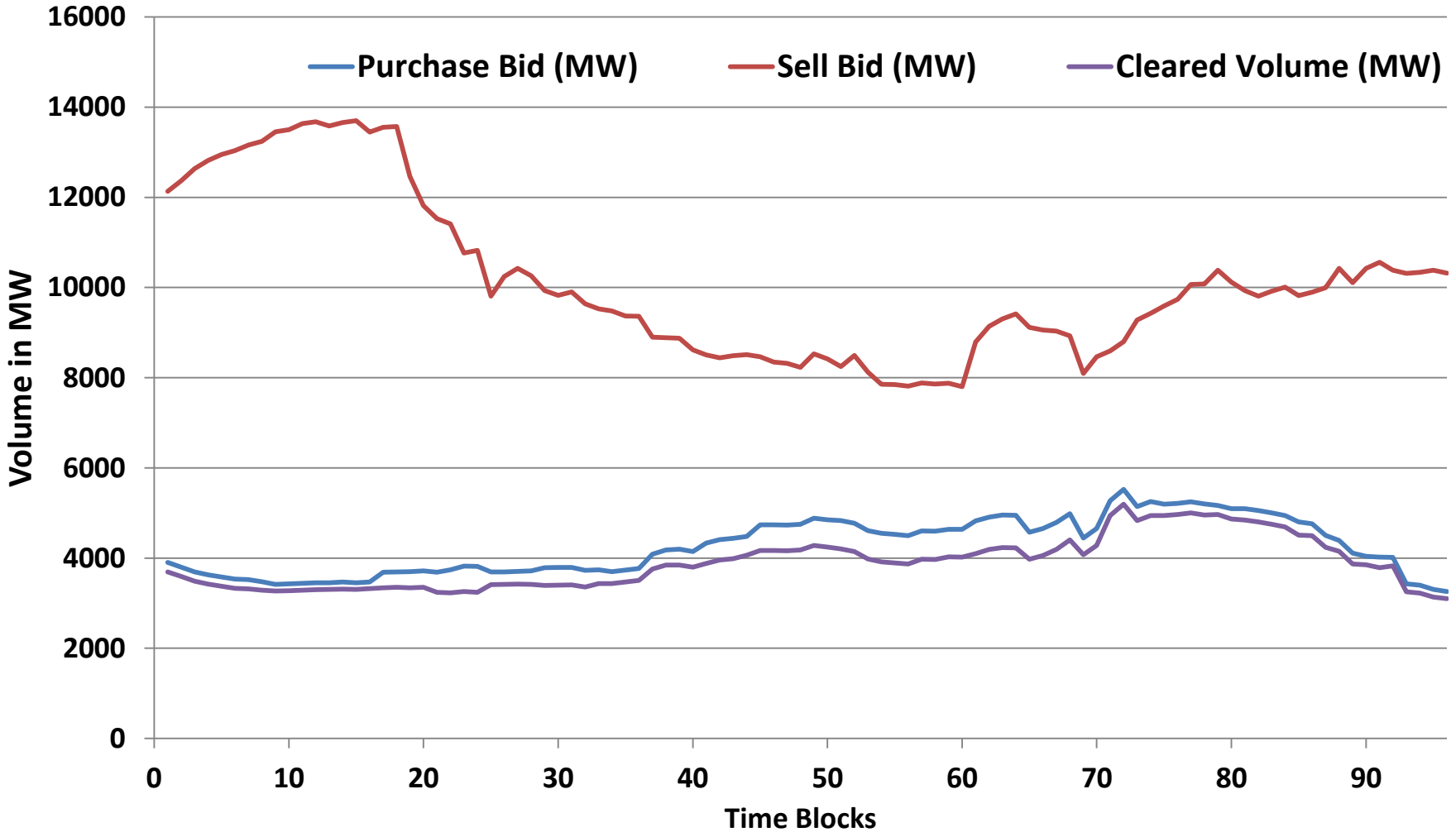
Power Purchase through IEX

- Power Exchanges provides a competitive option for purchase of power
- Better demand management can be done by purchase through power exchange
- High liquidity on exchange ensuring assured supply

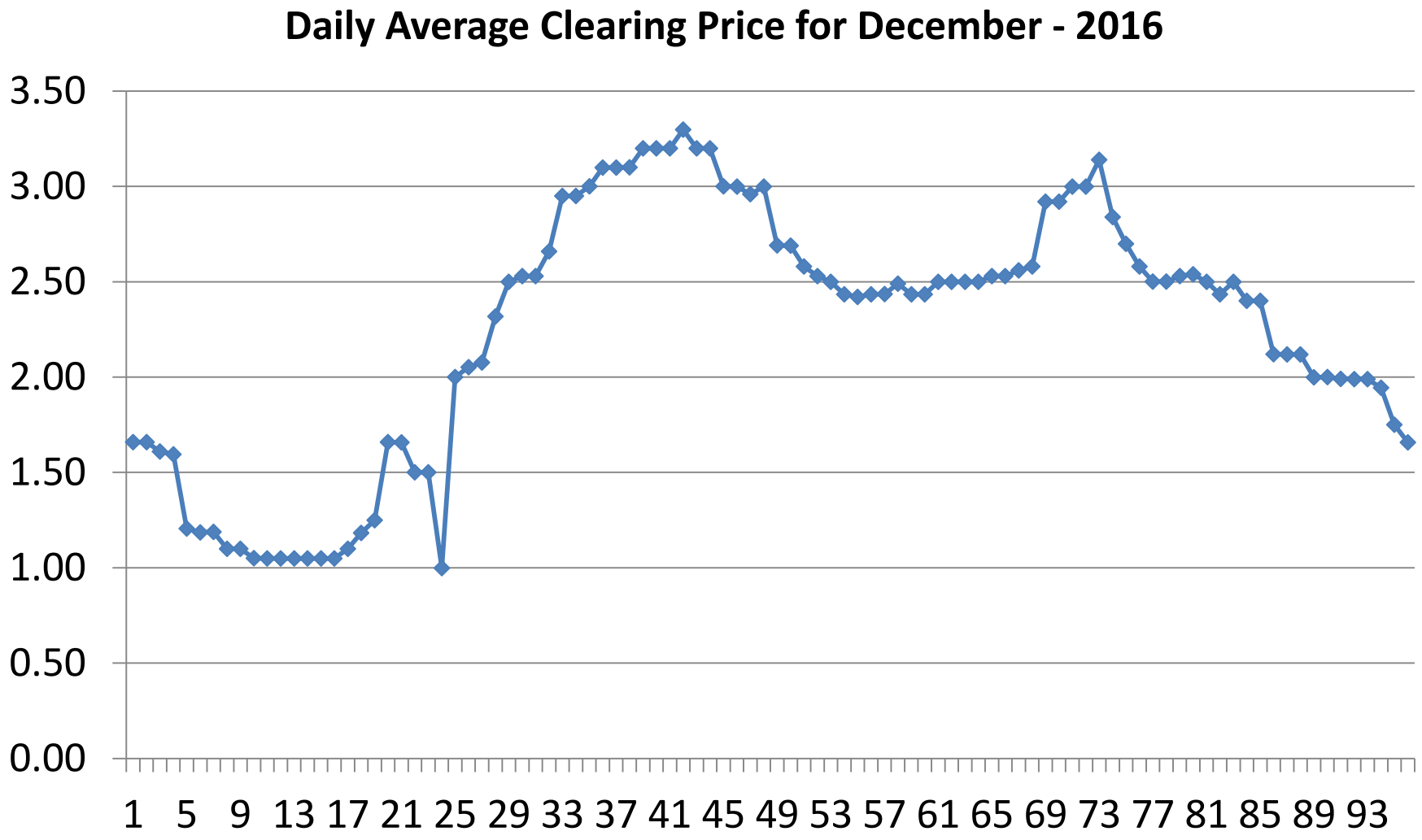
Uniform Price Discovery
Win-Win for both Buyer and Sellers



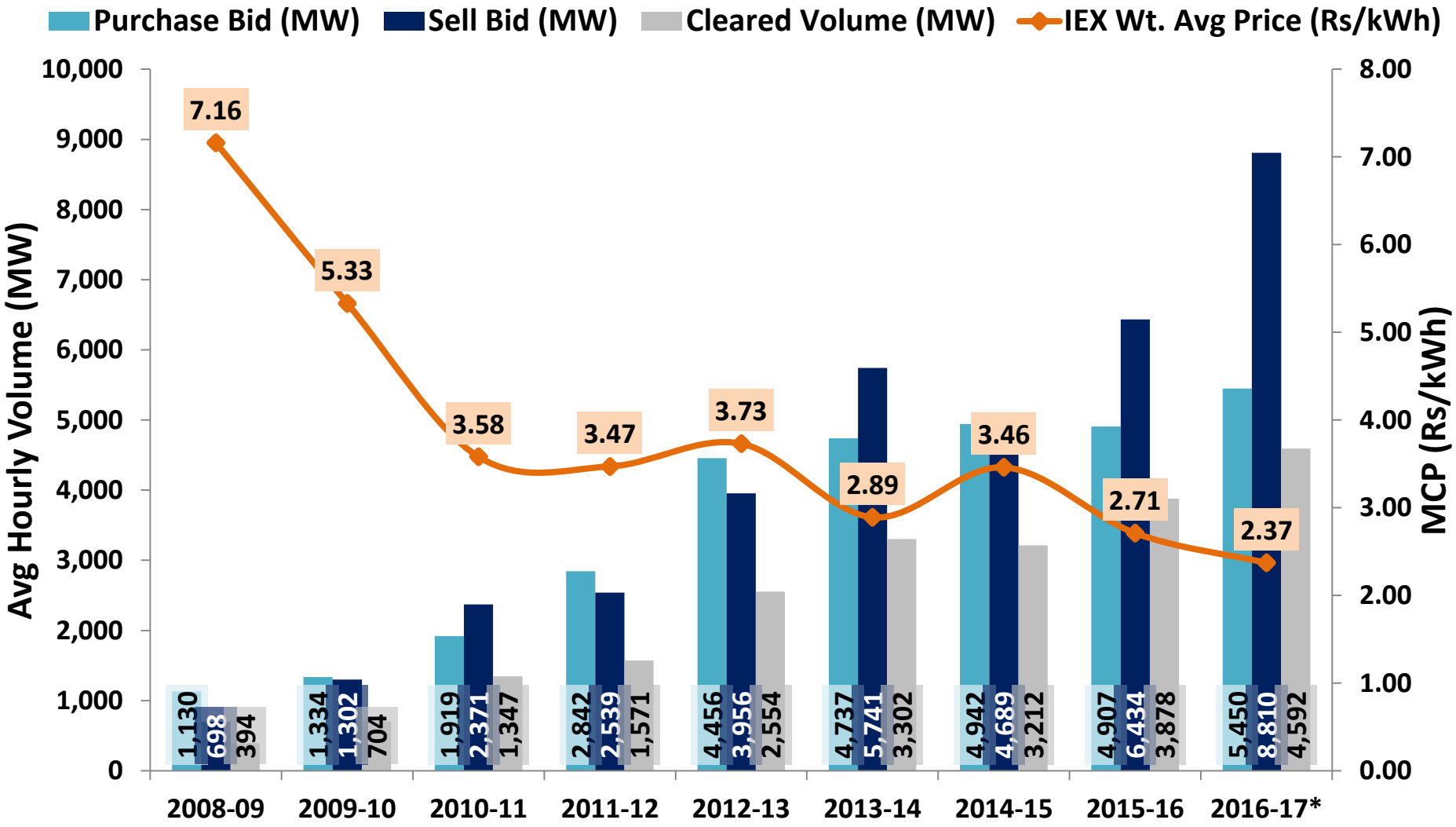
Volume profile on a typical day (01/11/2016)



15 min wise Price trend of a typical day in December'16 (22nd Dec – 16)

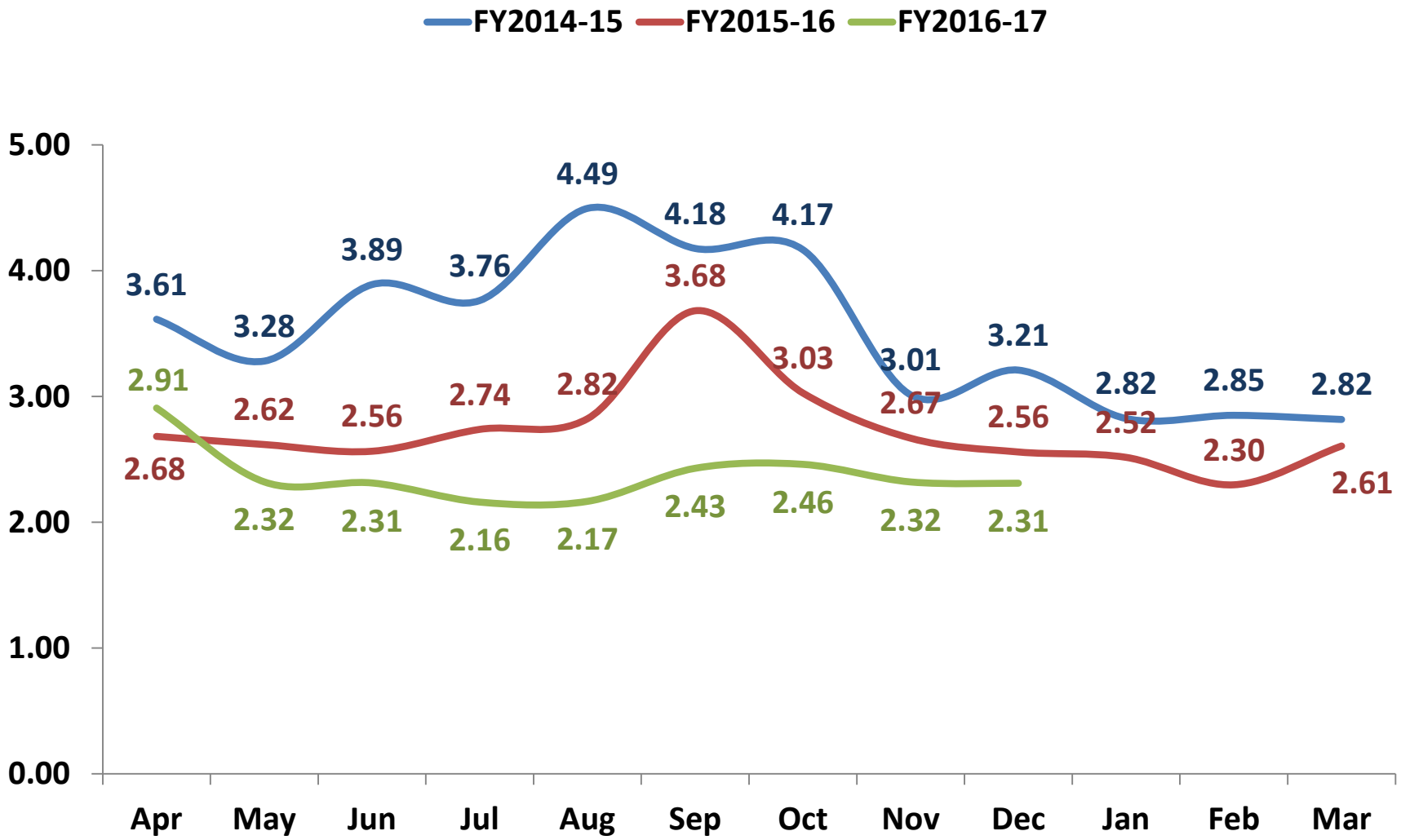


High Liquidity in Volume at IEX
(Avg. Hourly Volume in MW)



*Data upto Dec 31, 2016

Monthly Price Trend



Data as on 31 Dec 2016

DISCOM : Bidding Strategy

Discom's Options For Power Procurement

Long-term	• 25-year PPA - Tariff on cost-plus or competitive bid
Medium Term	• 3 Month- 3 Years • Tariff covers : Fixed Cost + Variable Cost+ Mark Up (< long term)
Short Term (OTC)	• Intraday- 3 Months to be procured through competitive bidding only • Single tariff covering Tariff covers Fixed Cost+
Day-Ahead Market (most preferred)	• Highly liquid and transparent marketplace • More accurate load management
Intra-day	• Last-minute adjustments (Gate closure 4 hours) • Less liquid

Option with the Discoms: Utilising Exchange Market

Two ways in which short term market can assist Discoms:

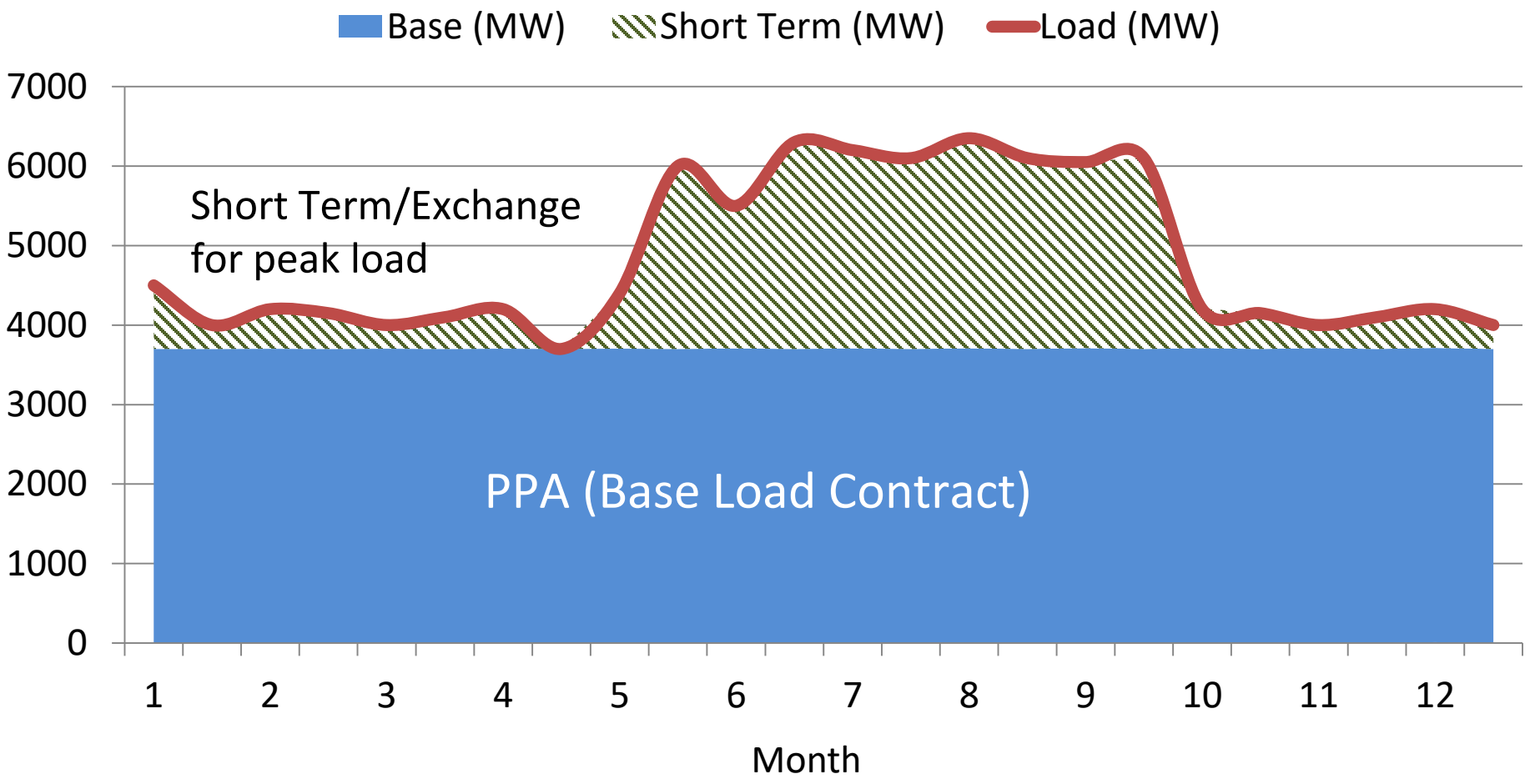
1. **Meeting demand shortfalls or selling surplus at the Exchange**
   i. Discoms should tie-up PPA only to manage their base demand
   ii. Many Discoms have tied PPAs to meet their peak demand as well. The Discoms have to pay the capacity charge for this quantum even in the off peak time.
   iii. So for optimum utilisation, Long Term PPA should be only for base demand and remaining energy (for peak and variations in forecast) should be bought through other available market options.

2. **Optimising the available energy by scheduling based on merit order including Exchange prices**
   i. Scheduling of power to be done on merit order basis after including the prices available at the Exchange

Meeting Shortages/Surplus through Short Term Market

Maximizing efficiency – Ideal Scenario (Monthly)

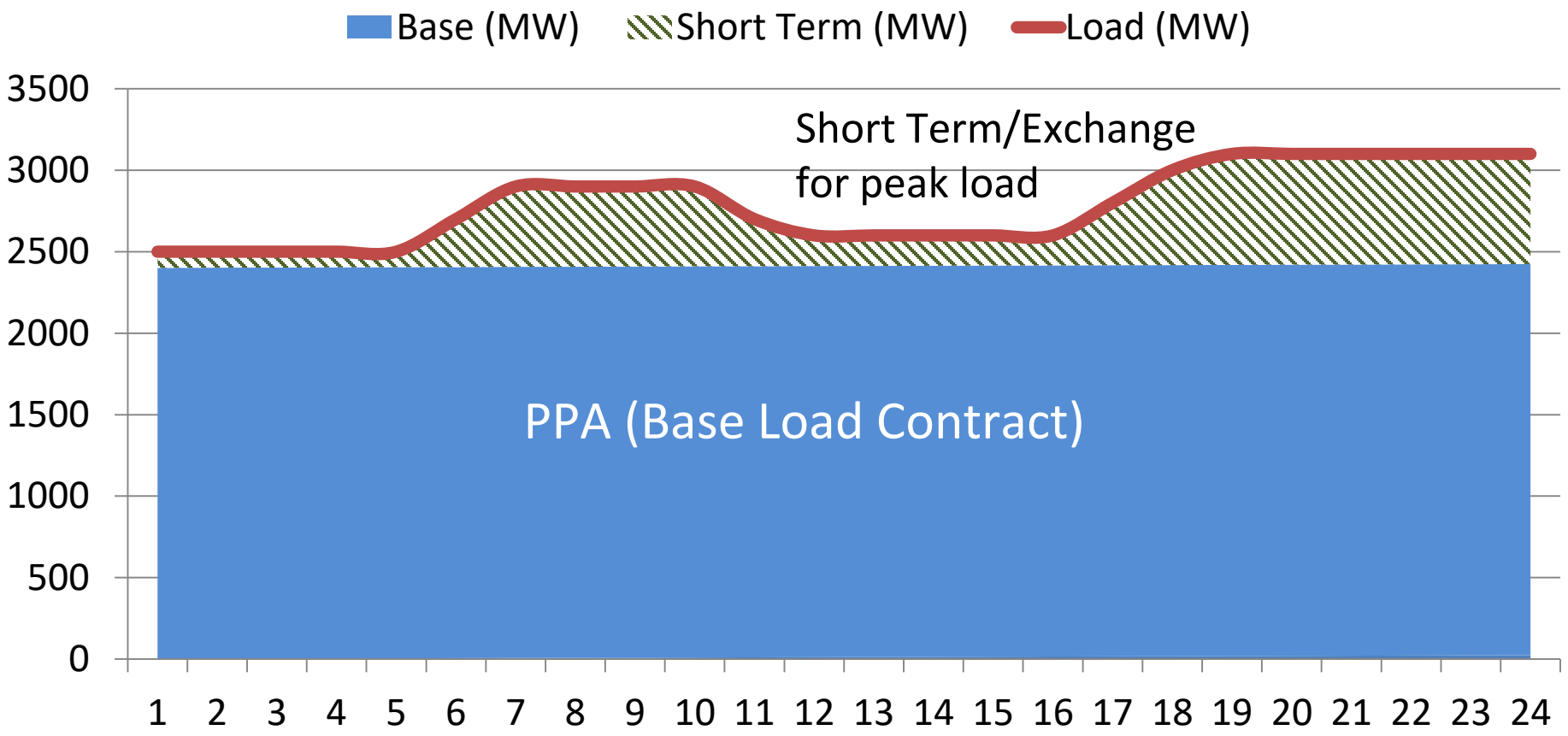
➔ **Surpluses/Deficits** - Balance physical supply and demand



Meeting Shortages/Surplus through STM

Maximizing efficiency – Ideal Scenario (Hourly)

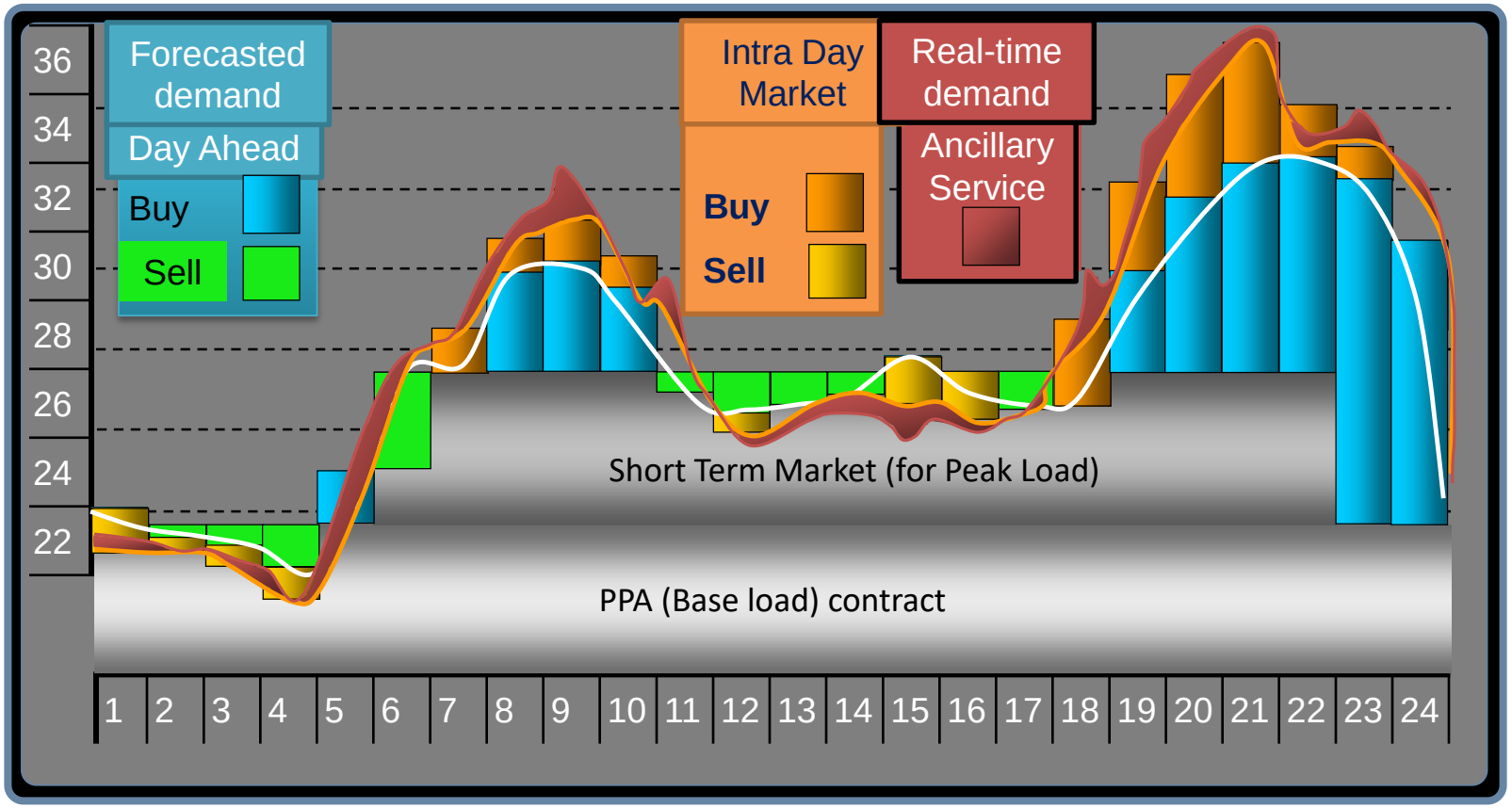
➔ **Surpluses/Deficits** - Balance physical supply and demand



Meeting Shortages/Surplus through STM

Maximizing efficiency – Ideal Scenario

➔ **Surpluses/Deficits** - Balance physical supply and demand



Forecasted Demand Curve of the Discom

Actual Demand

Real time variations

SMART Buy through IEX in Power Procurement

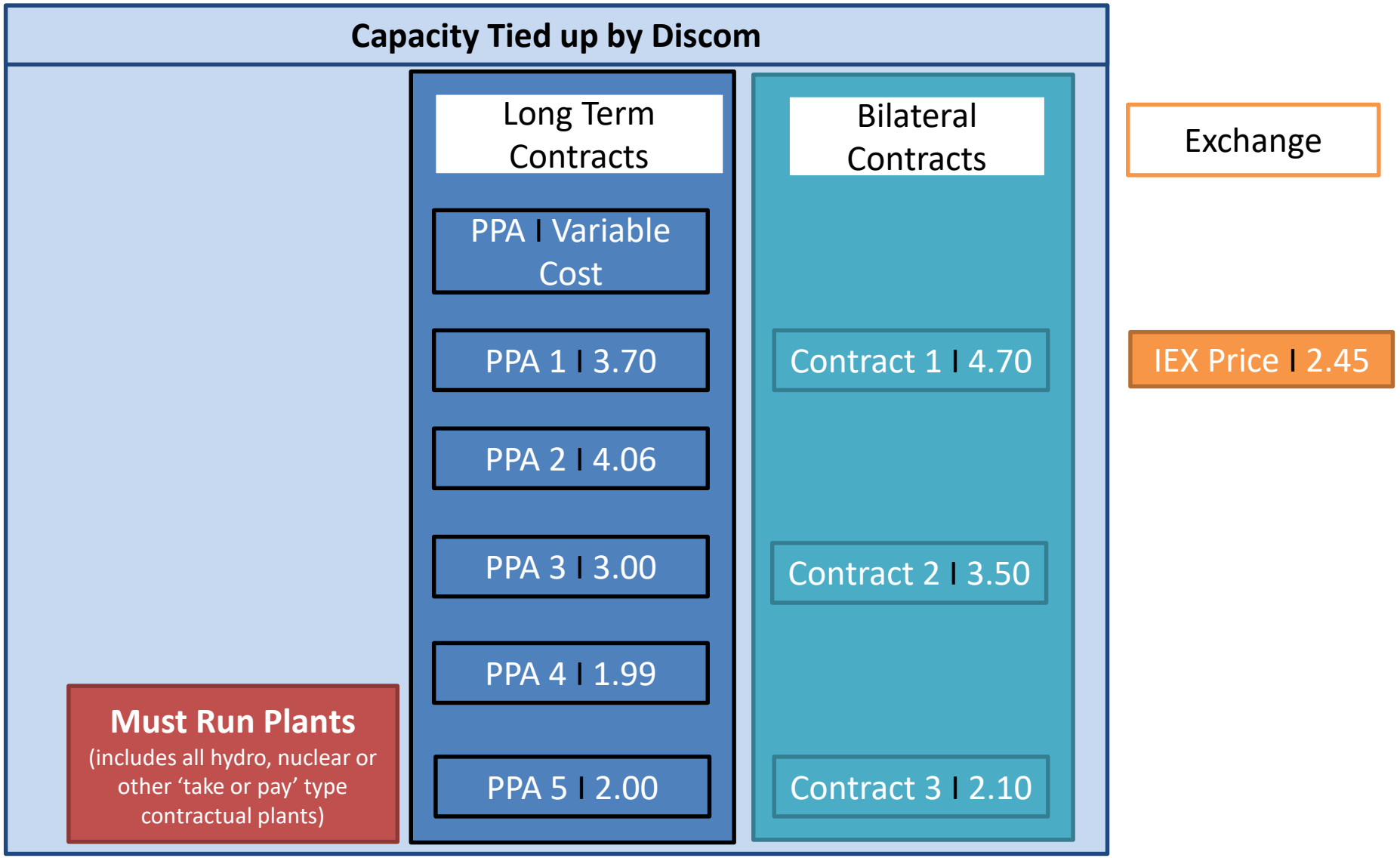
- **Under long term & medium term PPA : two part tariff**
  - **Capacity charges (commitment charges):** paid irrespective of whether discom purchase power from these plants or not
  - **Energy charges :** Paid corresponding to the number of units of power purchased from that particular plant

- **Discoms can replace costlier long term power by procurement from IEX, if,**
  - Energy charge of power plant is greater than IEX rates
  - During night hours prices at IEX are further low and savings can be enhanced

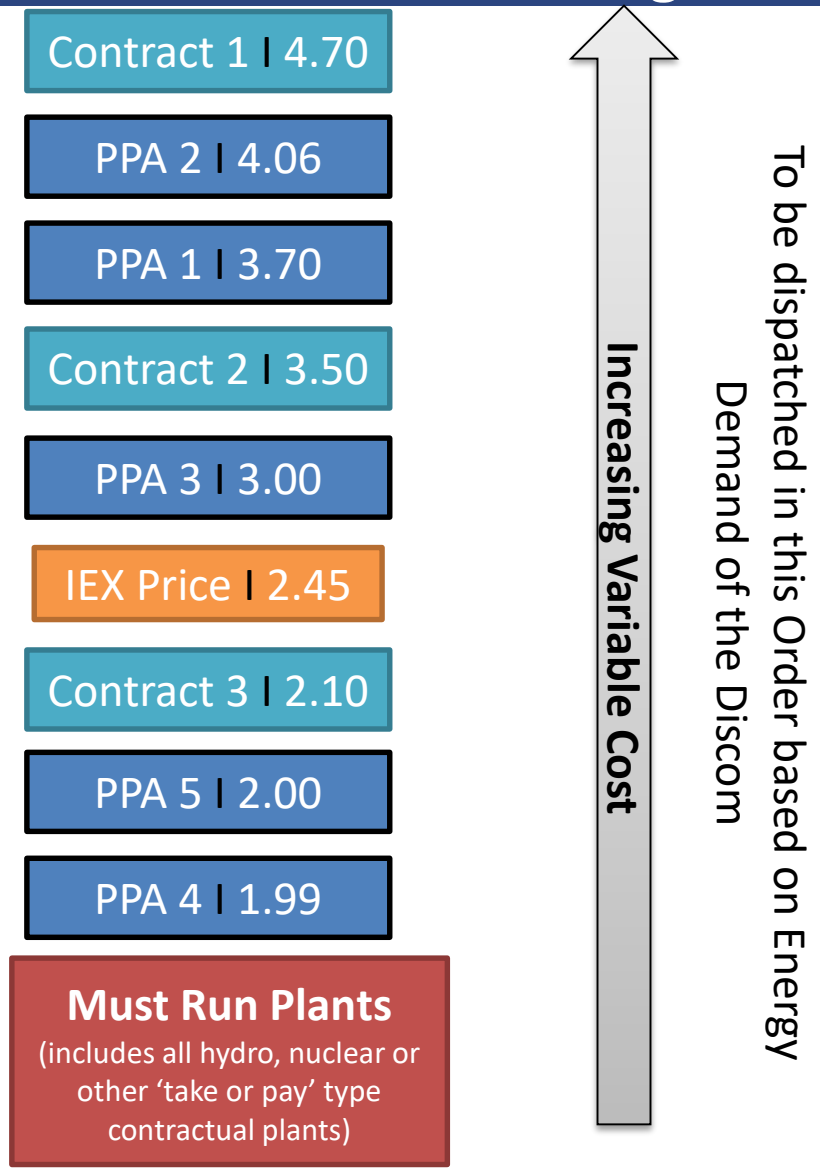
- **Discoms can replace ISGS first, keeping import constraint in consideration**

- **Discoms can continue paying fixed charge to Long Term PPAs and substitute where energy charge is higher than IEX price**

Merit order dispatch schedule to be prepared based on Variable cost and considering Exchange Prices

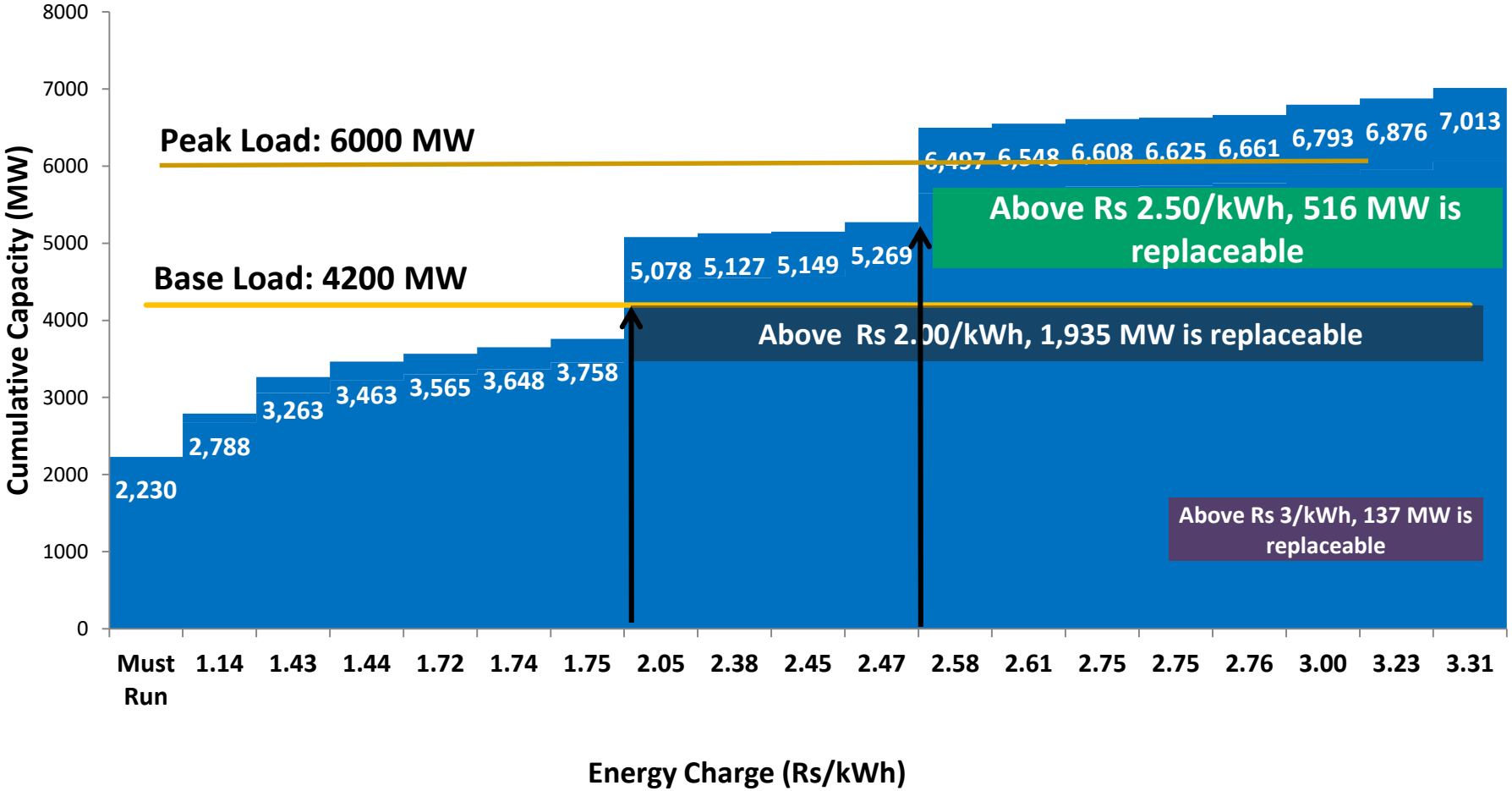


Merit order dispatch schedule to be prepared based on Variable cost and considering Exchange Prices



Merit Order for a Discom

Above Rs. 2/kWh, volume of 1935 MW is available for replacement and above Rs. 2.50 replaceable volume is about 516 MW



Power Purchase Optimization Process

- **Assess Generation availability and Demand Forecast for next day (15 min block)**
  - Generation data for Long Term (LT) I Medium Term (MT) I Short Term (ST)
  - Calculate Surplus and Shortage to prepare **"Regular Bid"**
- **Prepare schedule with maximum back down possible for LT & MT**
  - For every plant identify maximum back down possible considering all constraints
    - Technical I Must Run status I Contractual I Transmission (Intra / Inter-state)
    - Give technical minimum schedule to these plants and identify "**Replacement Bid"** quantum
- **Submit Bid at Exchange (1000 Hrs-1200 hrs)**
  - **Regular Bid:** For Regular Shortage/Surplus depending on the demand and Generation cost
  - **Replacement Bid:** Price sensitive bids (based on Variable cost) for every plant
  - Two Bid Options
    - Single Bid: For every 15 min time block separately. May lead to non uniform schedule
    - Block Bid**:** All or none principle for clubbed time blocks. Will ensure uniform schedule
- **Post IEX result- finalize schedule (after 1500 Hrs)**
  - **If Replacement bid not selected:** Revise the schedule from the plants whose bid is not selected
  - **If Replacement bid selected**: No change and retain the earlier schedule (max possible back down)

Consumer : Bidding Strategy

Industries' Options For Power Procurement

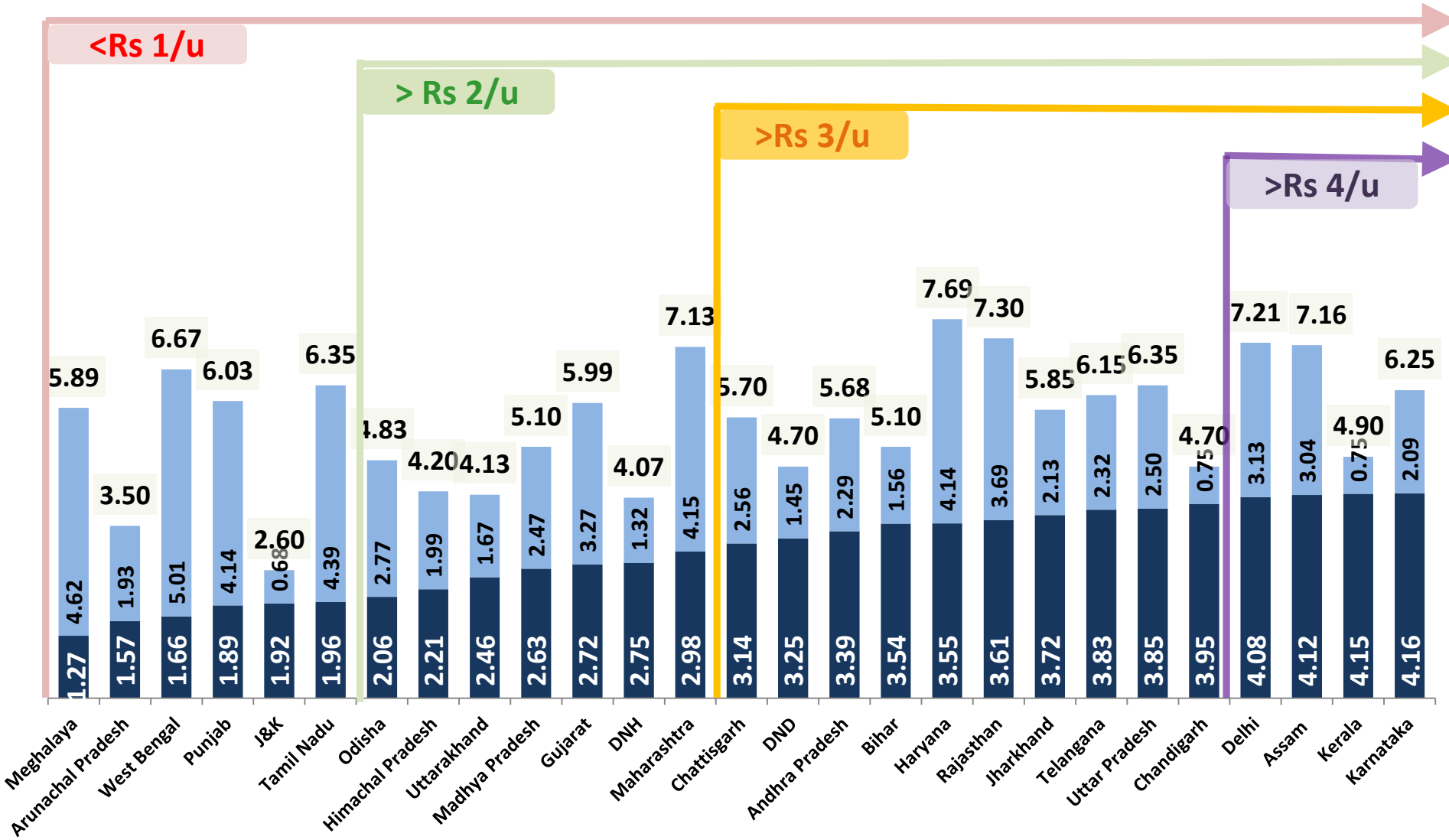
Discom (Existing)	• Regulated Tariff approved by Respective SERCs
Medium Term	• 3 Month- 3 Years • Tariff covers : Fixed Cost + Variable Cost+ Mark Up (< long term)
Short Term (OTC)	• Intraday- 3 Months to be procured through competitive bidding only • Single tariff covering Tariff covers Fixed Cost+
Exchange (most preferred)	• Highly liquid and transparent marketplace • More accurate load management through Day Ahead Market
Self Generation	• Costly fuel / less efficient units • Much higher costs

Open Access option

- **Full Open Access**
  - Surrender demand with the Discom and doesn't pay demand charges
  - No more a Discom consumer
  - Pays Wheeling charge
  - Discom no more a fall back option

- **Partial Open Access**
  - Maintain the Demand with Discom and continue to pay Demand Charges
  - Pays Wheeling charge
  - Discom is a fall back option, hence consume prefer this option

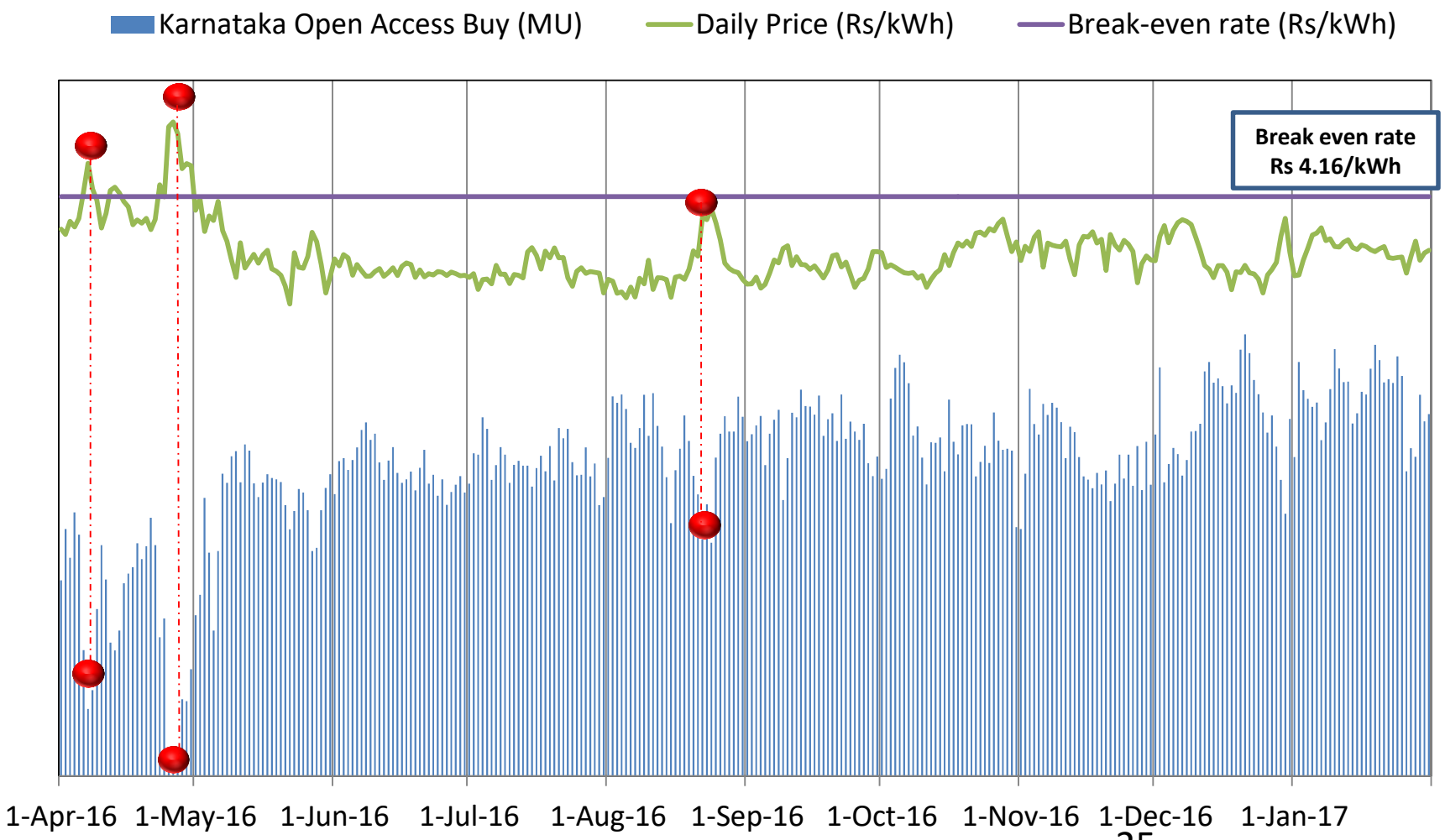
Bid Price & Cleared Price Sensitivity



Sorted in ascending order of break-even bid rate

OA Consumer Bid Consideration

- Consumer bid around the break even rate
- Bid only selected if the exchange price <= bid price

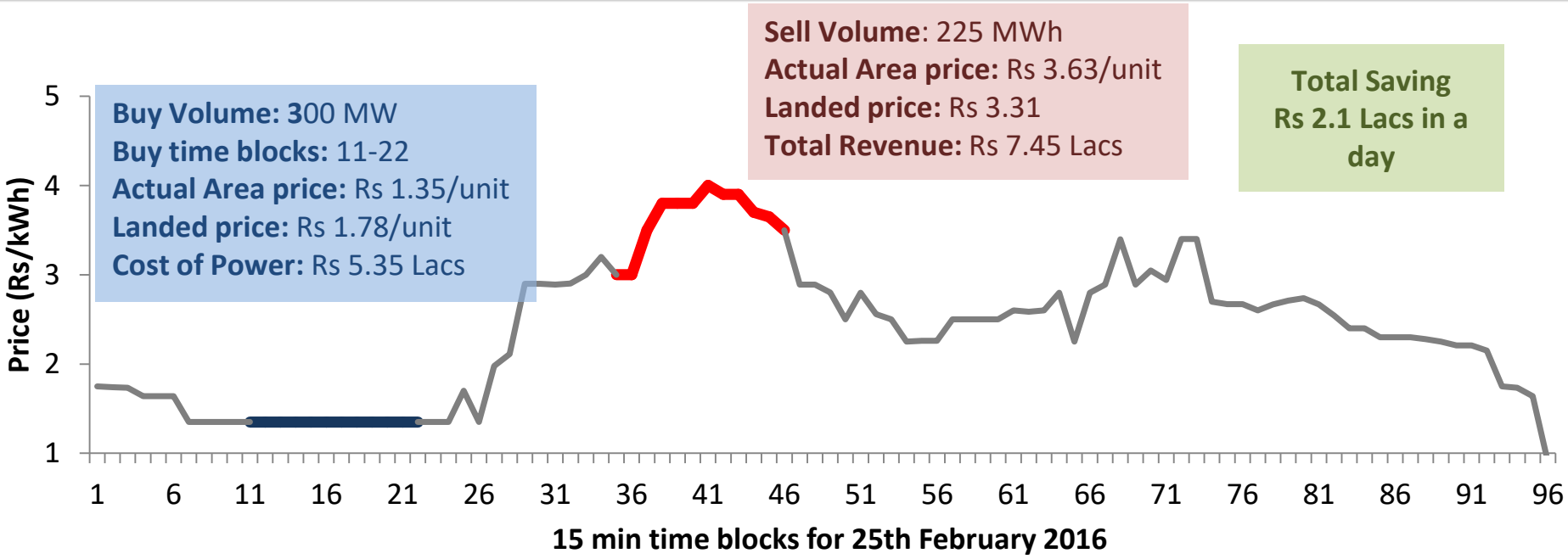


Generators : Bidding Strategy

Bidding Strategy/Consideration

- **Generators**
  - Bid at variable cost
    - For generation over and above the technical minimum
  - Bid < variable cost
    - Tied up part generation which is less than the technical minimum of the unit
    - Additional volume required to achieve technical minimum will be bid as must sell

Revenue Maximization through Pump Storage Power Plant



- There is a potential to operate PSP purely on merchant basis at IEX, by pumping water during 'off peak' (buy from IEX when prices are low) and generate during the 'peak' (Sell when prices are high).

- With the significant difference in the IEX prices in 'off-peak' & 'peak' duration there is scope of good revenue generation.

Thank You

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Bidding Consideration by Generator