

# Power Markets and Exchange Operations

# Company Snapshot



**97%** Market Share + **5000 MW** average daily trade

**6000+** Participants

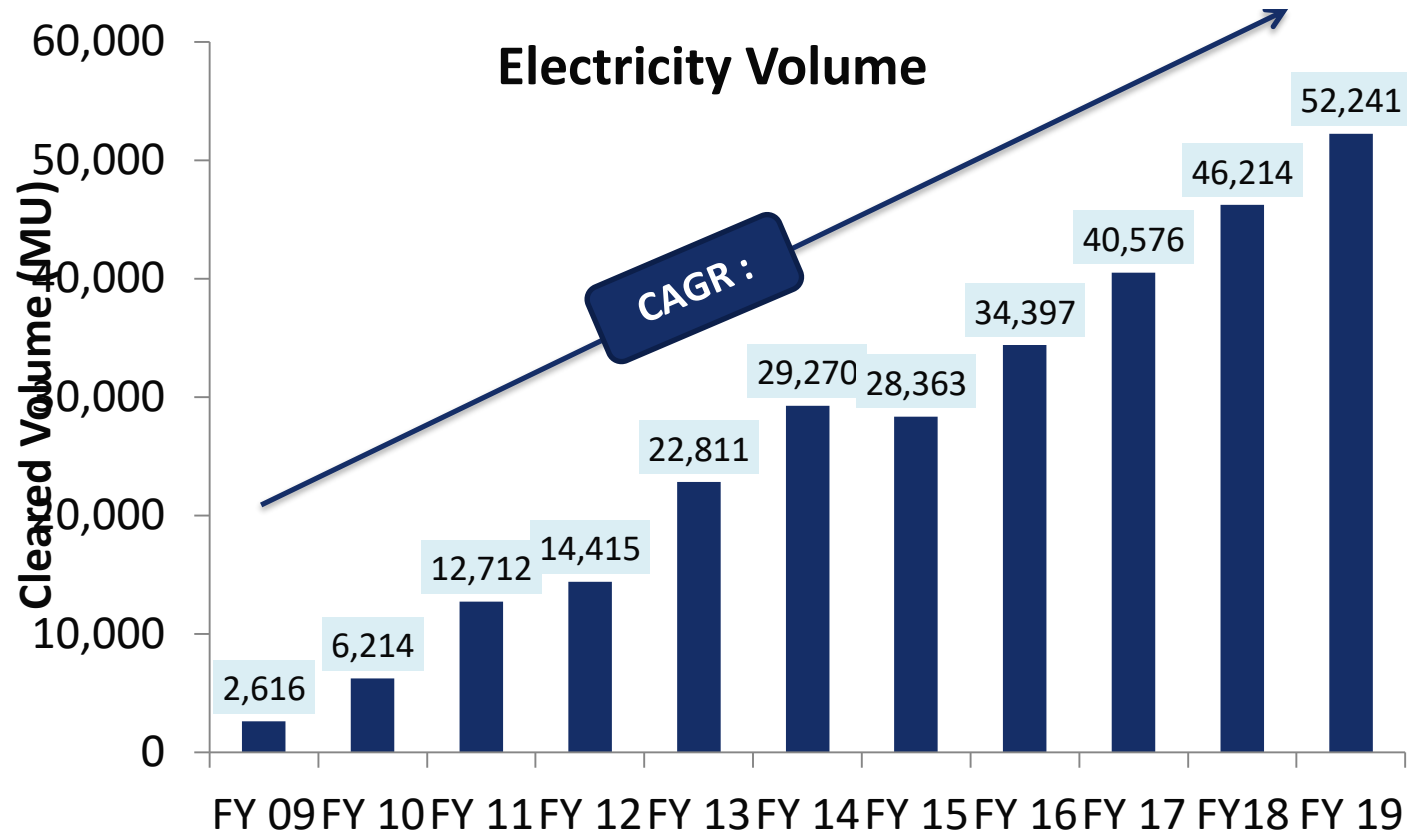
**4000+** Industries    **70+** Commercial    **50+** Discoms

**400+** Conventional Generators    **1500+** RE

Participants

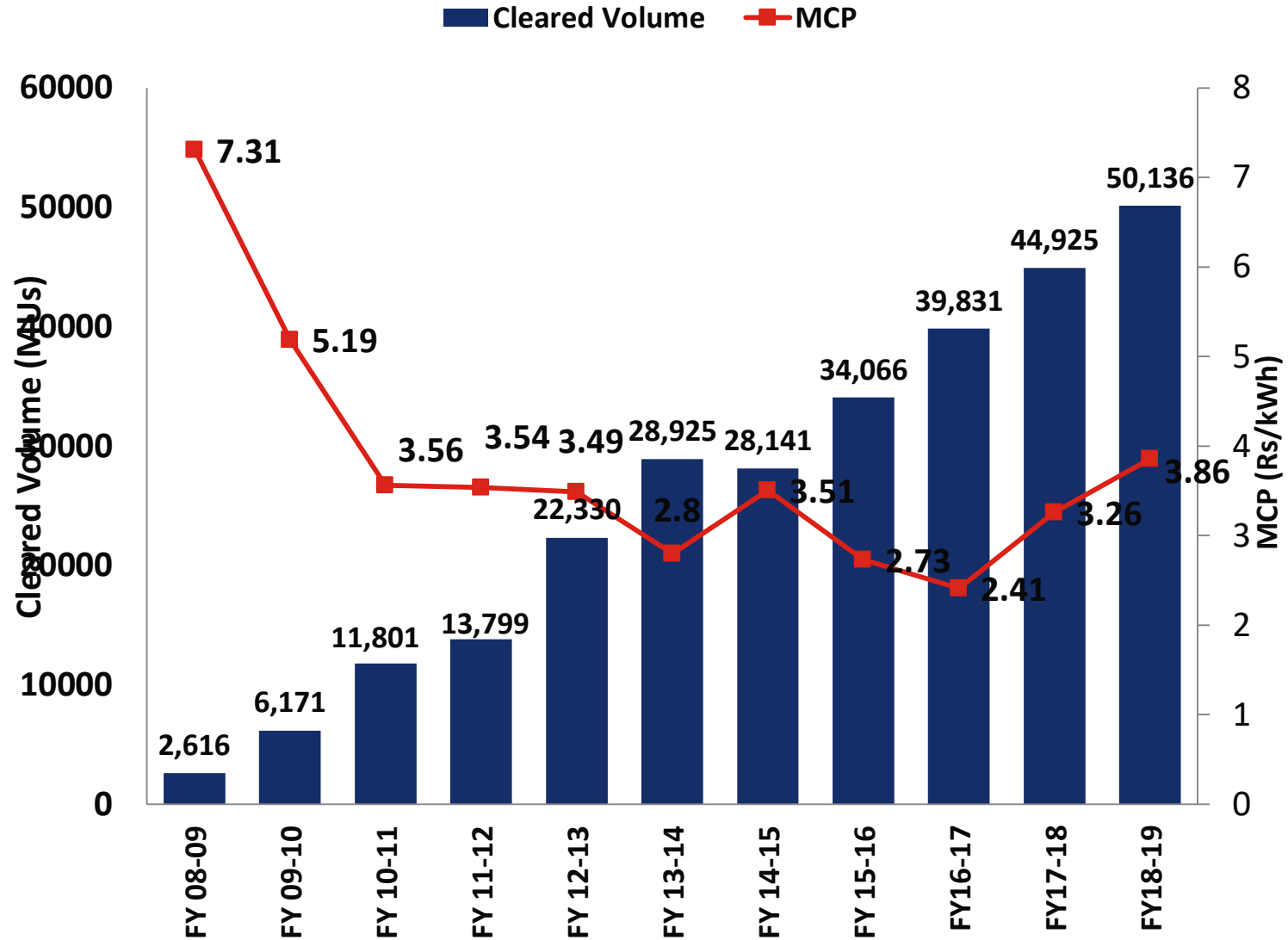


## IEX Volume Growth : Strong trend line

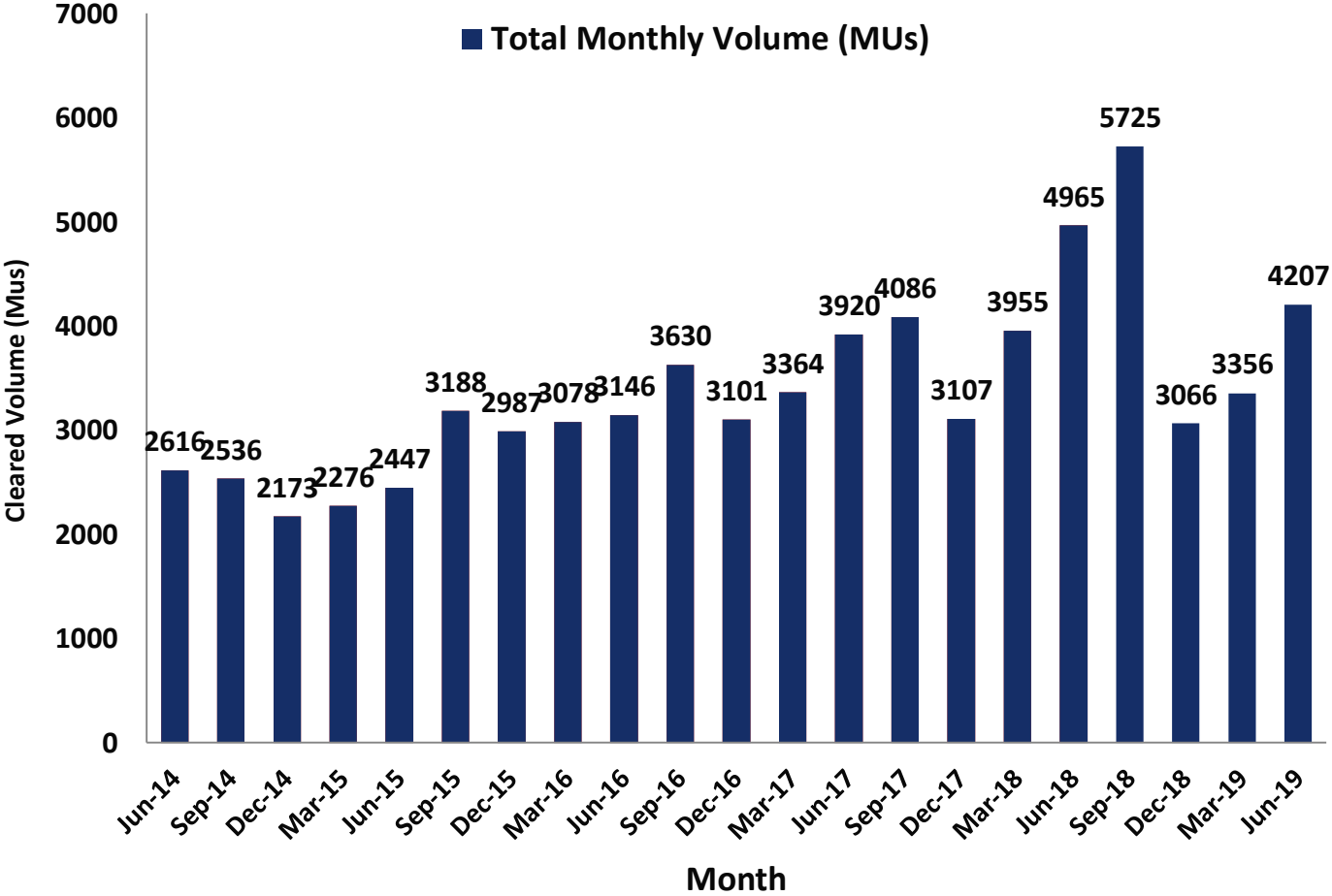


Source: IEX Data (DAM+TAM)

# DAM Cleared Volume v/s MCP



# IEX Monthly Cleared Volume



# Comparison: Market-wise Cleared Volume (MUs)

(Apr-June)








Product	Q1 FY18-19	Q1 FY19-20	% Change
DAM	13,936	11,985	-14%
TAM	475	1009	113%
<b>Electricity</b>	<b>14411</b>	<b>12,994</b>	<b>-10%</b>
<b>REC</b>	<b>2,009</b>	<b>1,196</b>	<b>-40%</b>

Product	Q1 FY18-19	Q1 FY19-20	% Change
Buy Bid	17,504	15,251	-13%
Sell Bid	19,547	23,599	21%
Cleared Bid	13,936	11,985	-14%
MCP	4.13	3.29	-20%



# Key statistics: Electricity & REC Market

	<b>ELECTRICITY</b>	<b>REC</b>
 <b>Market Share (FY18-19)</b>	97.5%	61%
 <b>State Utilities</b>	29 States   5 UTs	28 States   5 UTs
 <b>Generators</b>	487	1102
 <b>Industrial Consumers</b>	4073	3167
 <b>Average Daily Volume</b>	>138,632 MWh <i>Highest : 208,423 MWh</i>	>3 Crore RECs <b>Highest: 32,39,142 RECs</b>

*IEX Data as on 21 MAY, 2019*

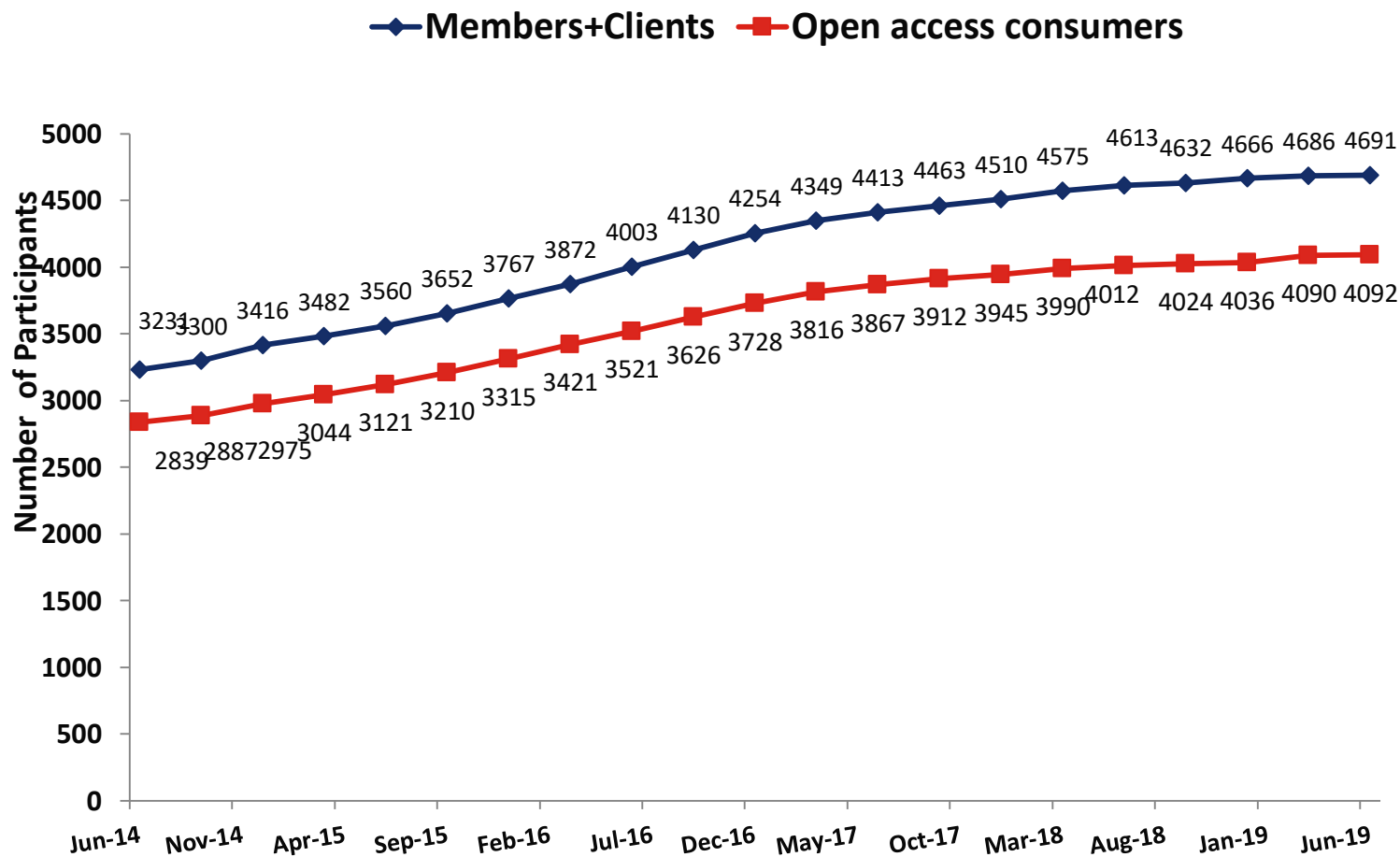
# TAM Monthly Snapshot -June'19

<b>Contract s</b>	<b>Total Volume (MWh)</b>	<b>Max Price (Rs./kWh)</b>	<b>Min Price (Rs./kWh)</b>
Weekly			
<b>Intraday</b>	<b>72,240</b>	<b>12.00</b>	<b>1.05</b>
Day- Ahead Continge ncy	1,99,3 60	7.00	3.85
Daily			





# Increasing Participation



# Open Access Status across Indian States

## Northern Region

States	Generator	Consumer
Haryana	✓	✓
Punjab	✓	✓
Rajasthan	✓	✓
HP	✓	✓
J&K	✓	✗
Uttaranchal	✓	✓
Delhi	✓	✓
UP	✓	✓

## Western Region

States	Generator	Consumer
M.P	✓	✓
DNH & DD	✗	✓
Gujarat	✓	✓
Chhattisgarh	✓	✓
Maharashtra	✓	✓



✓ Allowed

✗ Not Allowed

## East & North Eastern Region

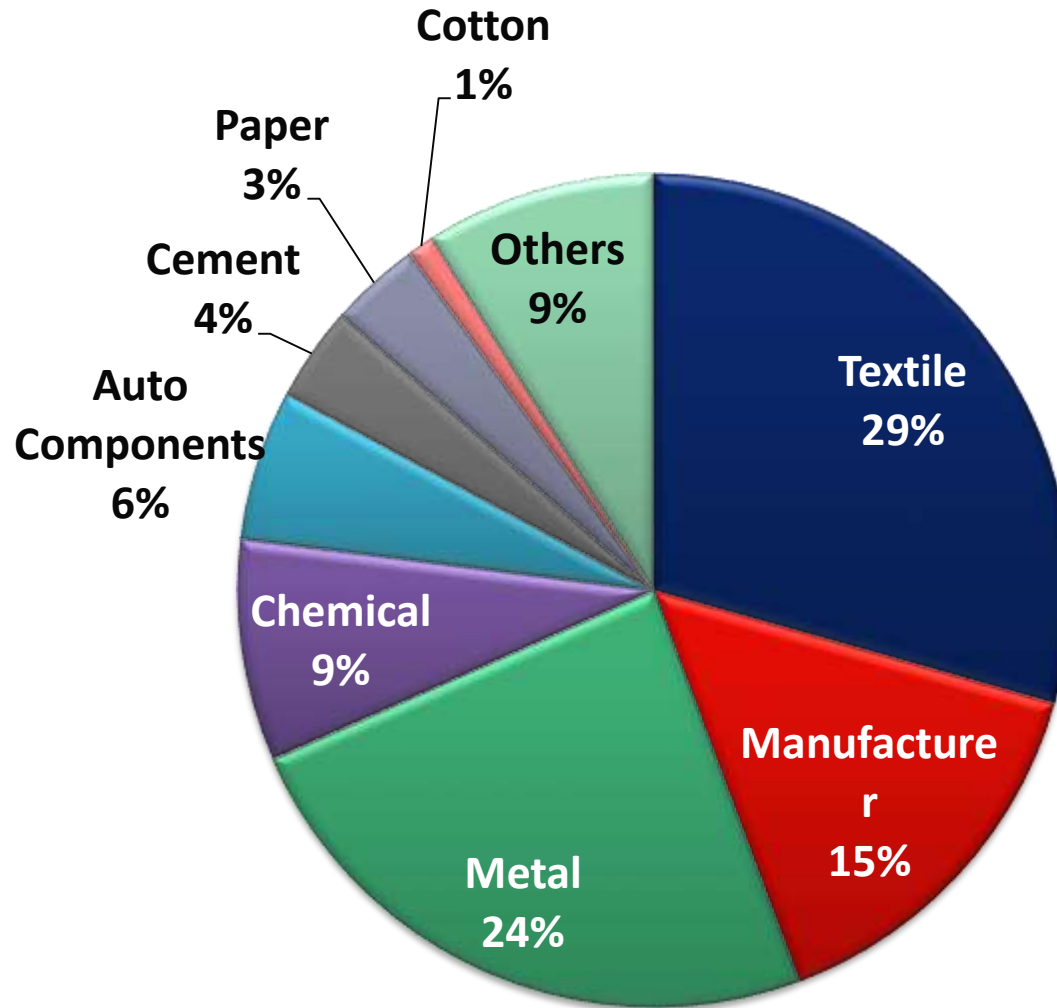
States	Generator	Consumer
Assam	✓	✓
Bihar	✗	✓
Manipur/Mizoram	✓	✓
Tripura/Sikkim	✓	✓
Jharkhand	✗	✗
A.P.	✓	✓
Meghalaya	✓	✓
Orissa	✓	✓

## Southern Region

States	Generator	Consumer
A.P	✓	✓
Karnataka	✓	✓
Tamil Nadu	✗	✓
Kerala	✗	✓



# Industrial segments with IEX



# Indian Electricity Markets

# Markets



“Market is a mechanism for matching supply and demand for a commodity through the discovery of an equilibrium price”

## Requisites for Creation & Classification of Markets

Quality

Quantity

Price

Date of Delivery

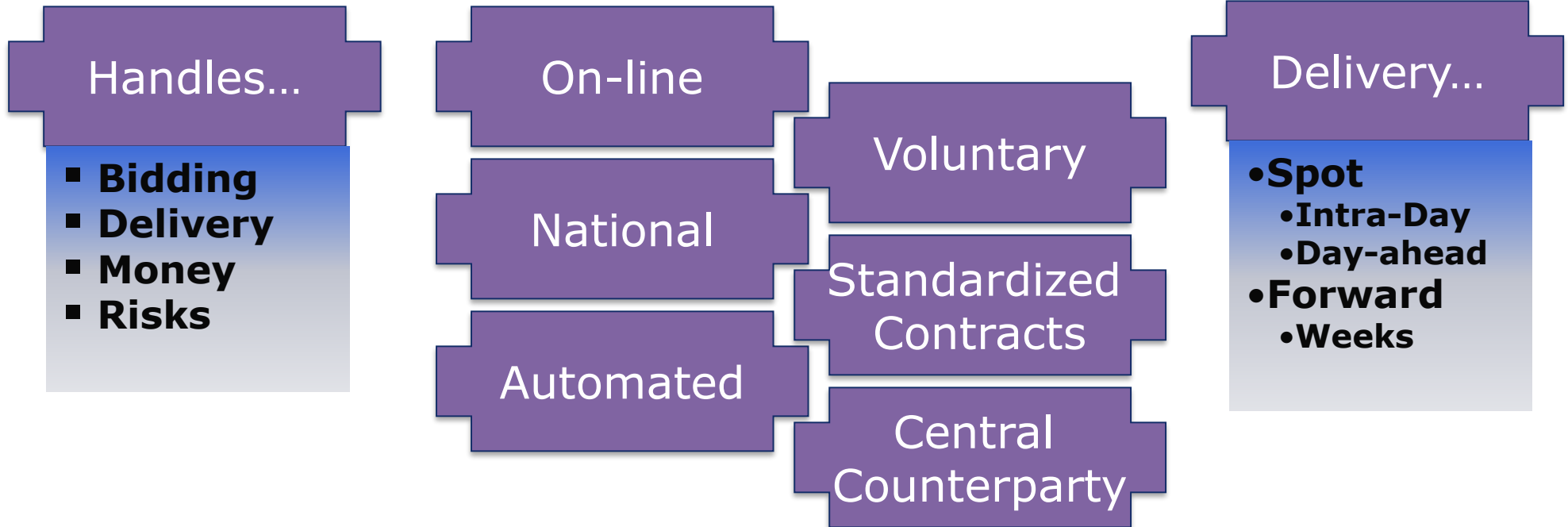
Mode of Settlement

Conditions to Contract

# Exchange: A Competitive 'Market'

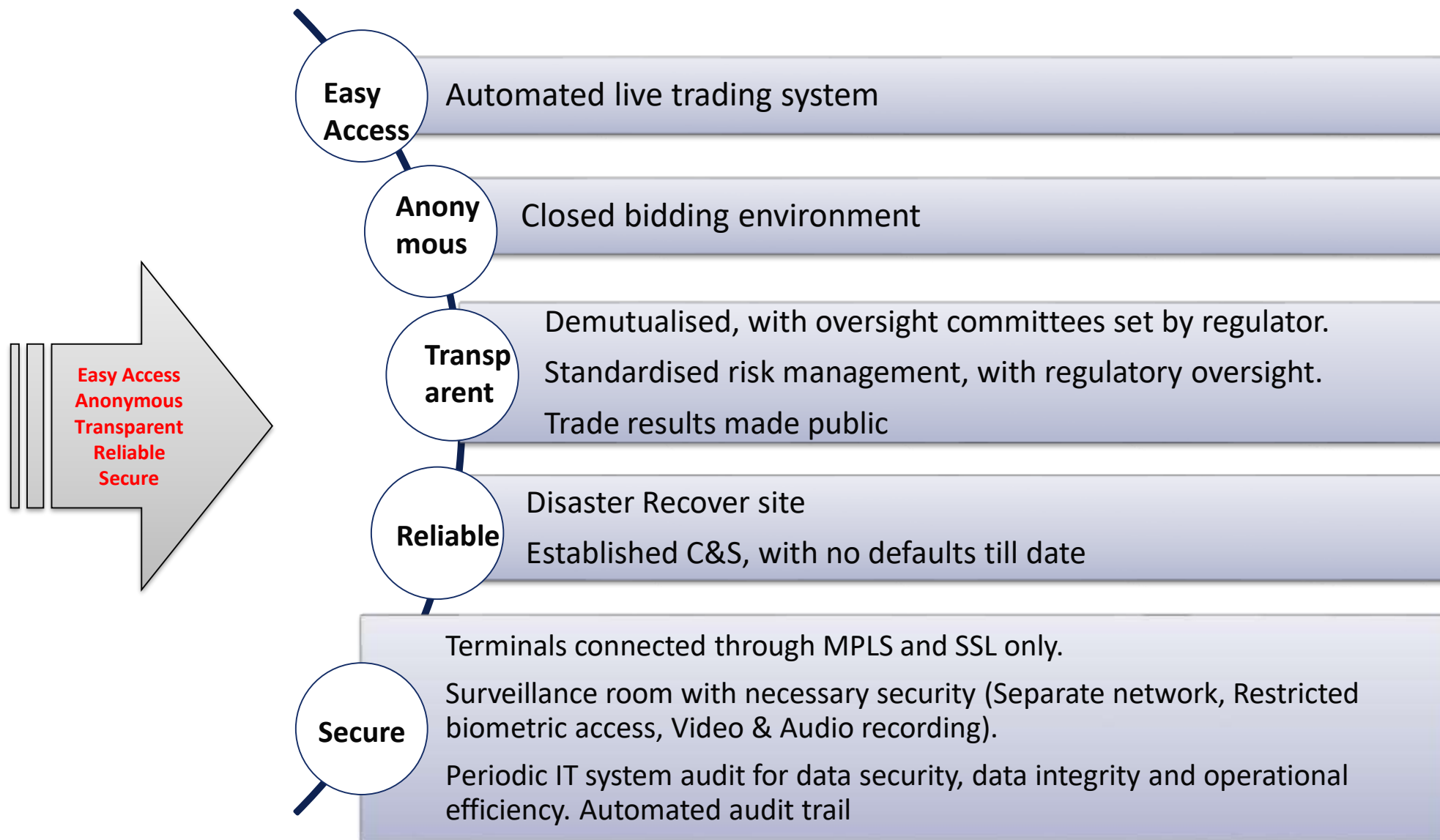
- Exchanges provide a **transparent, competitive and efficient platform** for transactions in any market – Stock or commodity. Same is true for power sector.
- The concept of Exchanges in Power Sector was initially **introduced in 1990-91 in Europe.**
- **Now, worldwide Power Exchanges are operating in almost 40 countries.**
- Power Exchanges are **most preferred option for sale and purchase of Power.**
- In India, **after Electricity Act, 2003 market framework for Exchange operations was put in place.**
- Exchanges in India started operations from 2008.

# Power Exchange- *Organized Marketplace*



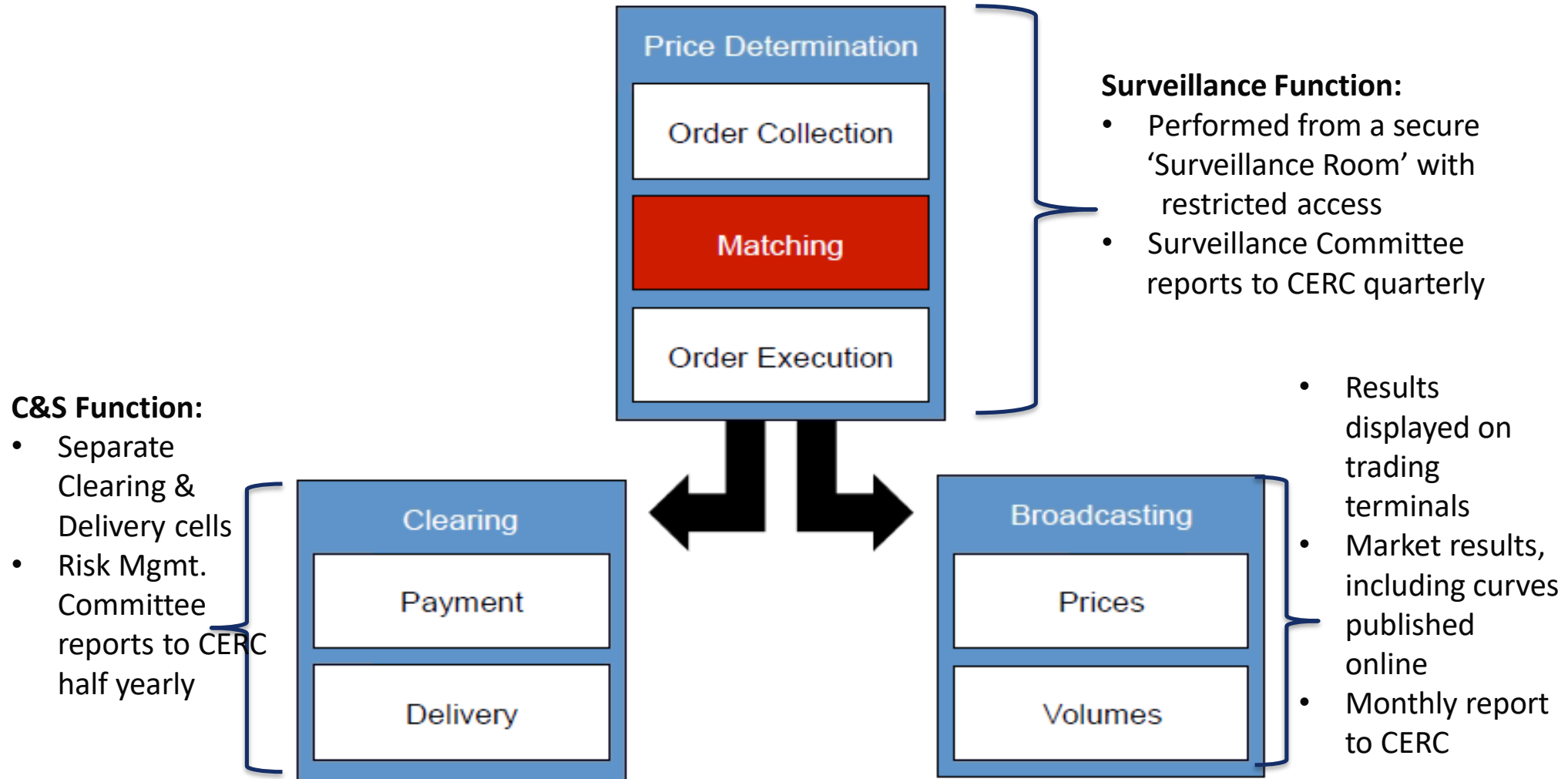


# Power Exchange Characteristics



- **Price Transparency**
  - Ability to know the price of electricity in the market
  
- **Risk Management**
  - Manage price/ delivery risk
  - Secure and Regulated market
  
- **Guaranteed performance of trades**
  - Credit tracking mechanism
  - Default Mitigation mechanism
  
- **Lower Transaction Cost**
  
- **Flexibility**
  - Term of delivery
  - Time of Closure
  
- **Access to a wider/ larger market spectrum**

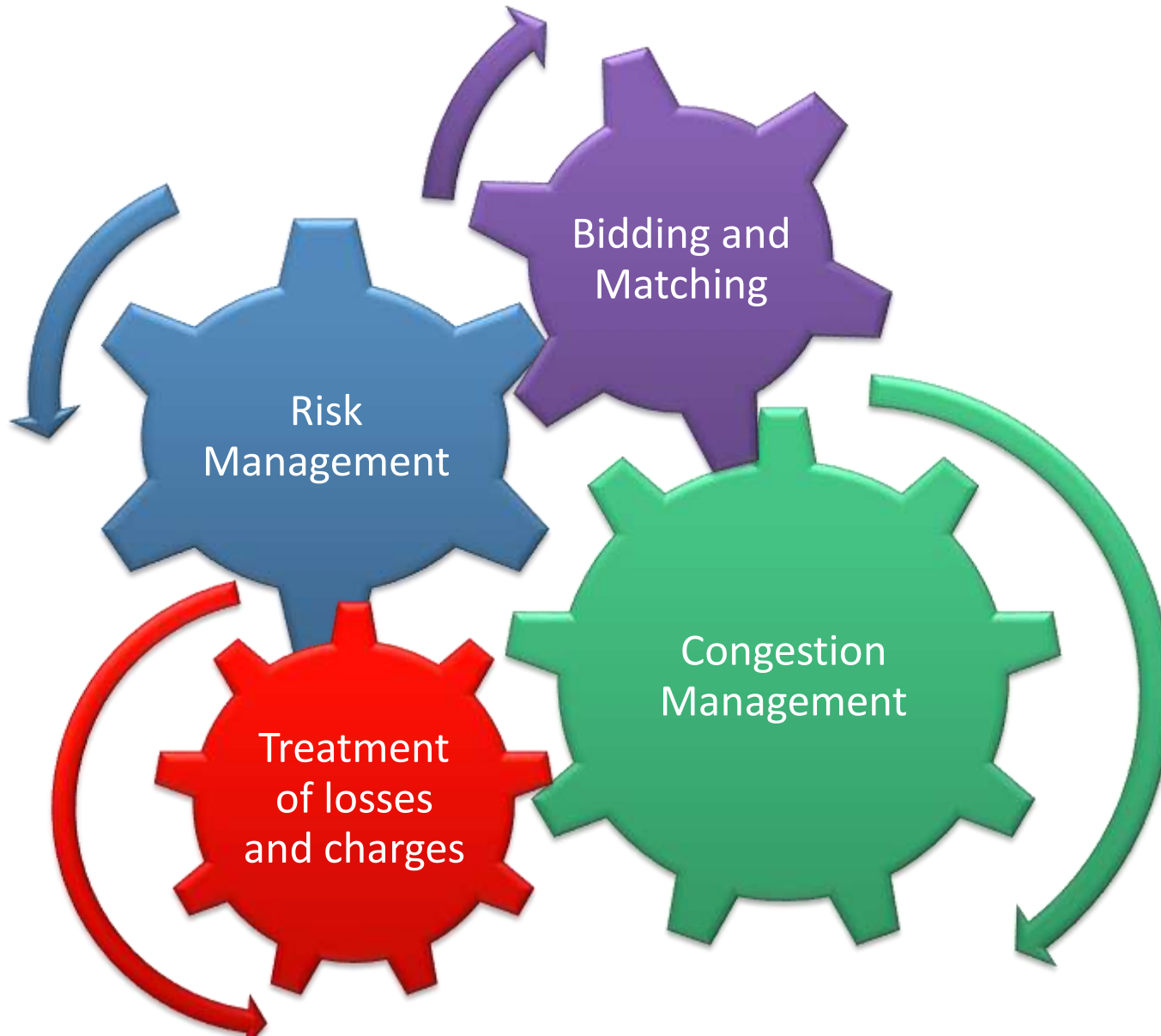
# Power Exchange- Operations



# What benefits does the power exchange provide?



# Understanding exchange mechanism



- Surveillance department of IEX is under continuous online CCTV monitoring and recording
- All Telephonic conversations are recorded with no out going facility
- The Heart of the exchange i.e. Surveillance room, is secured by limited and authorized access and that too with Biometric sensor access
- All authorized persons of Surveillance room are not allowed to use any communicating medium (mobile phones)
- All process flow is documented in the form of check lists which is authorized by HOD.
- Concurrent Audit of the checklist by internal auditors

# Product Segments

## Day Ahead Market (DAM)

Trade for the following day

Contracts for every 15 min, closed auction

## Term Ahead Market (TAM)

From 3 Hrs ahead to 11 days in advance

4 types of contracts

- **Intraday**
- **Day Ahead Contingency**
- **Daily**
- **Weekly**

## Renewable Energy Certificates (RECs)

Trade green attributes of electricity

1 REC = 1 MWh of green energy

# Contract Characteristics



## TERM AHEAD MARKET

- Contract Characteristic
- Delivery
- Auction Type
- Contracts
- Trade Availability
- Financial Settlement

**Day Ahead Market**

- Next day
- Closed Auction
- 15 min
- All Days
- Pay-In- D-1; Pay Out – D+1

**Intraday Contracts**

- 0400-2400 Hrs same day
- Continuous trading
- Hourly
- All days
- Pay in: T+1  
Pay out: T+1

**Day Ahead Contingency**

- For next day
- Continuous trading
- Hourly
- All Days;  
1500-2300
- Pay in: T+1  
Pay out: T+2

**Daily Contracts**

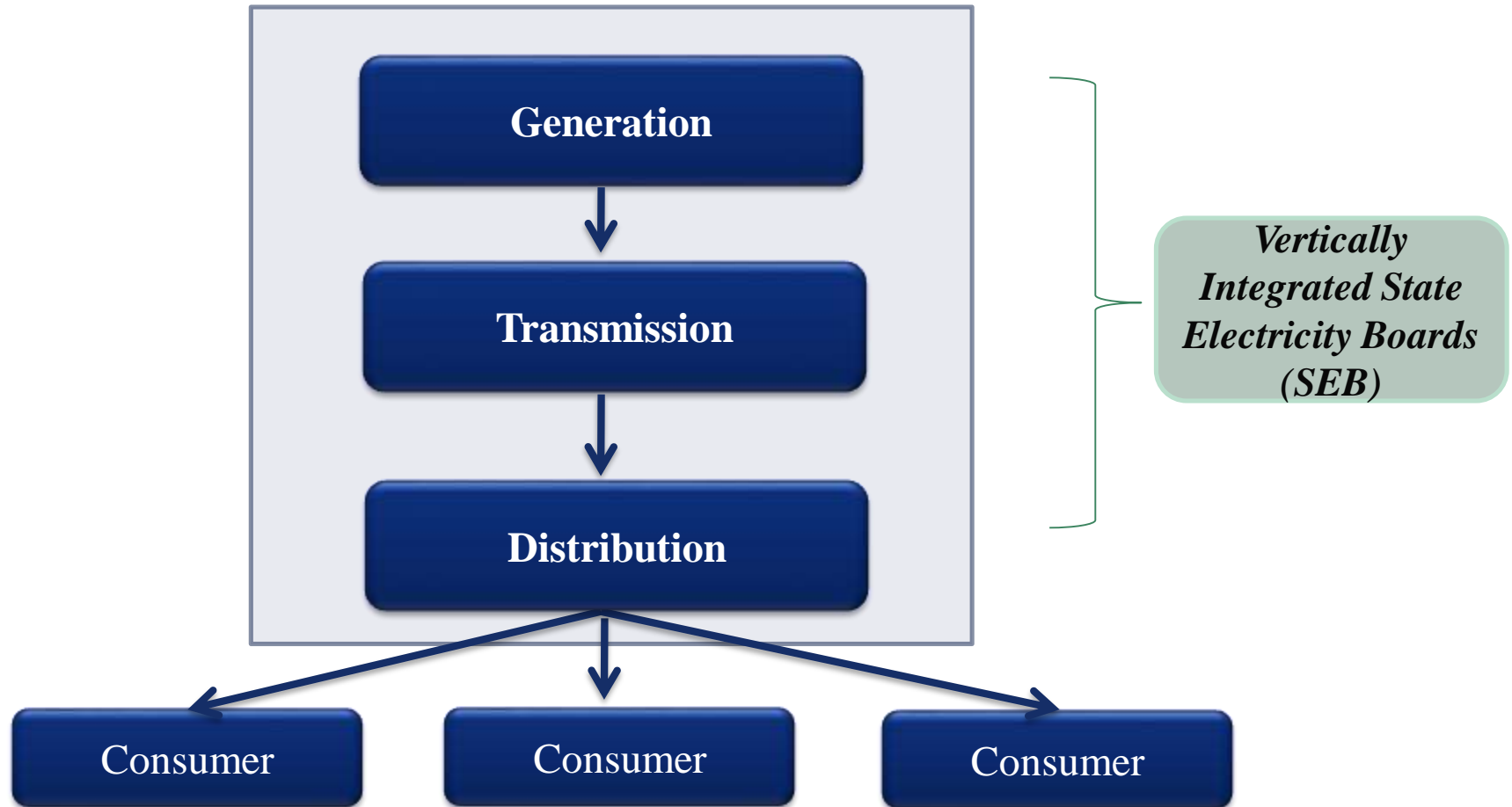
- From 2<sup>nd</sup> day to next 8 days
- Continuous trading
- Block of Hours (Fixed)
- All Days;  
1200-1500
- Pay-In- D-1; Pay Out – D+1

**Weekly Contracts**

- For next week
- Open Auction
- Block of Hours (Fixed)
- Wed & Thurs;  
1200-1600
- Pay-In- D-1; Pay Out – D+1



# Erstwhile Vertically Integrated Structure



## Electricity Market

### Production Function

- Generation

### Transportation Function

- Transmission
- Distribution

Natural Monopolies

### Merchant Function

- Wholesaling (Supply)
- Retailing (Demand)

**Step-1:** Introduce competition in Supply side so as to decrease electricity prices.  
(Demand side competition doesn't result in reduction of prices unless production is competitive)

**Step-2:** Introduce competition in Demand Side so as to pass the gains in supply side directly to consumers

# Pre requisites for a competitive market

## Unbundling of Utilities

- Separation of Vertically integrated utilities, transmission should be separated from generation & supply

## Multi Buyer Model

- Choice to consumers to buy from any generator or third party
- Choice to generator to sell to any buyer

## System operator

- Independent System Operator:  
To maintain grid security and reliability, transmission allocation

## Open Access

- Open Access in Transmission & Distribution Network

## Imbalance Settlement Mechanism

- Deviation or Imbalance settlement mechanism to ensure discipline
- Balance Responsible Party ( Control Areas)

## Trading

- Recognizing trading as a distinct activity

## Autonomous Regulator

- To overlook the working of the Market

## Advantages of an Organized Power Market

- Market Participants can efficiently manage their portfolios by choosing different products available under long term , medium term and short term duration.
- Provides an exit route for PPAs.
- Efficient Market provides transparency and which may lead to easy financing .
- Markets are driven by the force of economies i.e. demand and supply and hence the prices are derived.
- Market Participants e.g. DISCOMS may reap benefits of real time balancing.
- Typically lower unit pricing compared to standard electricity supply contracts.
- Derivative products may provide an avenue to hedge against spot-price volatility

## ■ EA 2003 and enabling provisions on Power Market

The intent and object of the EA 2003 is to develop power market through increased competition, more players and protect consumer interests

- Development of Power Market – EA 2003, Section 66, “The Appropriate Commission shall endeavor to promote the development of power market...”, guided by ***the National Electricity Policy***
- Suitable safeguards to prevent adverse effect on competition
- Recognized Trading as a distinct activity. Defined under section(2) (47): “Purchase of electricity for resale thereof”
- Adequate and progressive provisions governing open access both:
  - » to transmission networks (inter-state and intra-state) and
  - » to distribution networks

## ■ **National Electricity Policy 2005 – Para 5.7**

“ To promote market development, 15% of the new generating capacities, be sold outside long term PPAs”.

-As the power markets develop, it would be feasible to finance projects with competitive generation costs outside the long term PPAs....this will increase the depth of power markets....and in long run would lead to reduction in tariff”

## ■ **Open Access Regulations , 2004 & 2008**

- Universal Open Access to transmission networks
- Separate procedures for ‘Day-Ahead Market( collective transactions) and OTC transactions

# Evolution of Electricity Regulations

The Indian Electricity Act, 1910

The Electricity (Supply) Act, 1948

Electricity Laws (Amendment Act), 1991

Electricity Laws (Amendment Act), 1998  
And Electricity Regulatory Commissions Act, 1998

**The Electricity Act, 2003**  
(Consolidates above laws)

**Open Access Regulations, 2004**

**Power Exchange Guidelines, 2008**

**Power Market Regulation, 2010**

**MoL Notice of Open Access Circular , Nov,2011**

**The Electricity Act Amendment Bill , 2014**

## Electricity Act, 2003

- De-licensing of generation
- Development of a multi-buyer multi-seller market in power
- Trading – licensed activity.

## National Electricity Policy, 2005

- Sec 5.7.1 (f) Enabling Regulations for inter and intra state trading and also regulations on power exchange shall be notified by the appropriate commission within six months

## National Tariff Policy, 2006

- Promote Merit Order
- Competitive Bidding compulsory
- Cross Subsidy Surcharge formula



- **Intent of the Act was to promote competition** by “freeing” all possible avenues of procurement and sale of power:
  - De-licensing of generation (Sec-7)
  - Development of a multi-buyer multi-seller market in power (Restructuring of SEBs – Sec 131)
  - Trading – licensed activity (Sec-12).
  - **Non Discriminatory open access to transmission (Sec 38-40) and Open Access in Distribution (Sec-42)**
  
- **Autonomous Regulatory Commission (Sec 76)** to overlook functioning of Power markets
  
- **Development of Power Market**
  - Section 66 of the Electricity Act 2003 gives powers to the regulatory commissions to develop the power market including trading

- Electricity Act, 2003

*Open Access means “The non discriminatory provision for the use of transmission lines or distribution system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the appropriate commission”*

- **Open Access to transmission network was introduced after the Electricity Act,2003**

- Open Access to inter-state transmission immediately allowed by the Centre

- **CERC (Interstate Open Access) Regulation, 2008**

- Facilitates bilateral transactions
- Non – discriminatory use of transmission lines
- Nominated SLDC/RLDC to carry out transactions

## 2004: First CERC OA Regulations

- Reservation of transmission capacity: Long Term and Short Term Access
- Short term open access granted on inherent margins

## 2005: Trading License Regulations

## 2008 & 2009: CERC OA Regulations and Amendments

- Defined 'Power Exchanges'
- Transaction categorized as Bilateral or Collective (thru PXs)
- Transmission charges: 'PoC' Method for collective transactio

## Role of PXs defined and norms for setting up and operating PX

- Procedure for application, eligibility criteria, shareholding pattern, Net worth, risk management by PX,

## CERC approval for setting up a PX and oversight for contracts offered

## Objectives for PX

- Ensure fair, neutral, efficient and robust price discovery
- Provide extensive and quick price dissemination
- Design standardised contracts and work towards increasing liquidity in contracts

## Defined principle of price discovery for the exchange

- Economic principle of social welfare maximisation
- **Closed double sided bidding, uniform price discovery, market splitting for congestion management**

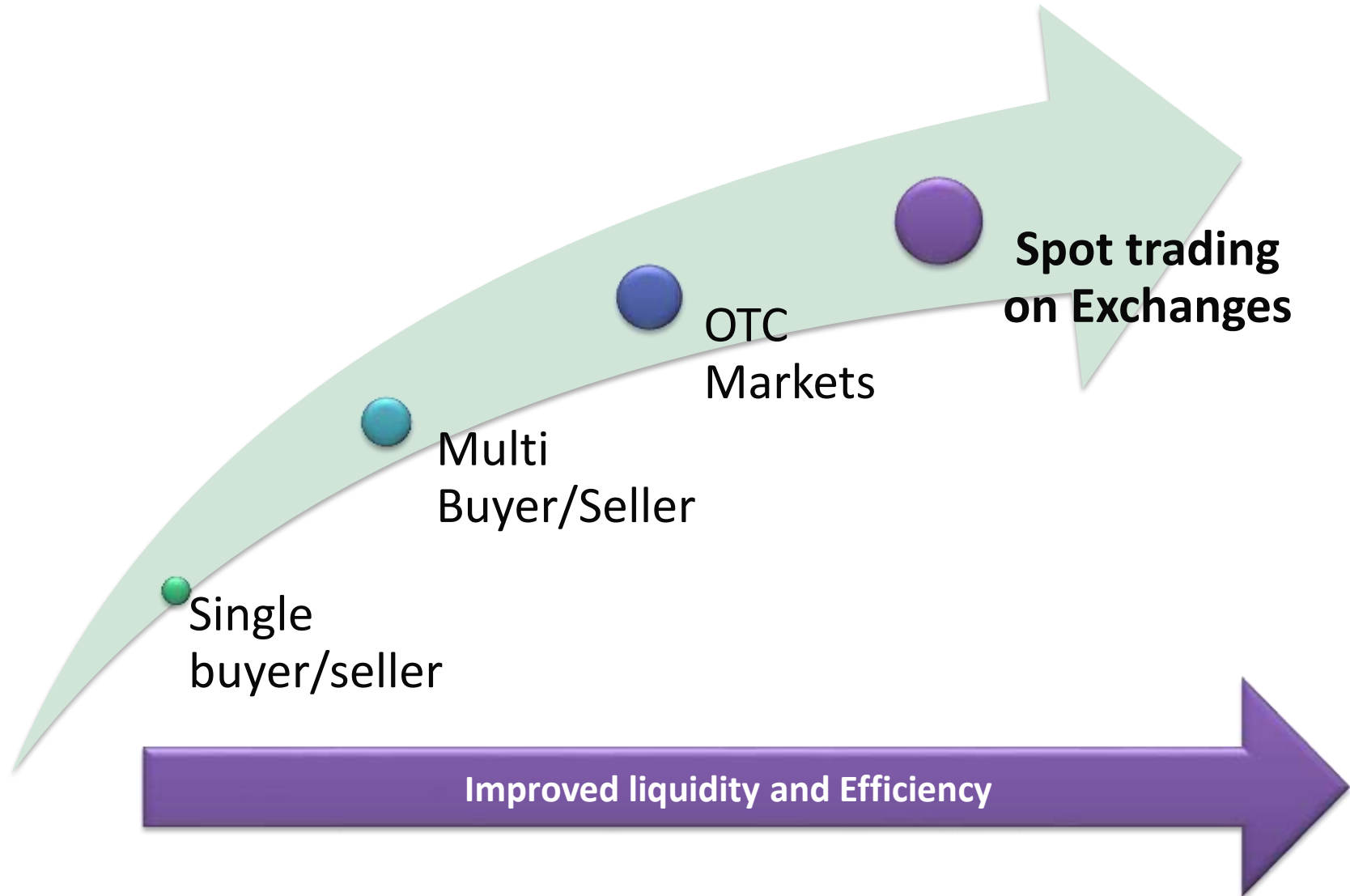
# Open Access in Inter-State Transmission

- Regulation Implemented w.e.f. 6-May-2004, revised Regulations w.e.f 1<sup>st</sup> April 2008 and amended in May 2009.
- **Transmission Capacity Reservation Categories**
  - Monthly bilateral
  - Advance /FCFS
  - Day ahead bilateral
  - Collective Transactions through Power Exchange
  - Intra day bilateral
- **Nodal Agency**
  - Bilateral : RLDCs & Collective : NLDC
- **Transmission Charges moved from “Contract Path” to “Point of Connection” for Collective/Bilateral**
- **Other Commercial Issues**
  - Handing deviations from schedule
  - Handing reactive energy supply/drawl
  - Payment security
  - Collection and disbursement of charges

# Power Procurement options

Procurement Contracts		Pros	Cons
<b>Long Term</b>		<ul style="list-style-type: none"> <li>• Escape volatility of short term and spot markets</li> <li>• Meets base load requirements</li> <li>• Transmission availability</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity + Energy</li> <li>• Falling short term prices may make costly contracts obsolete and sunk</li> </ul>
<b>Medium Term</b>		<ul style="list-style-type: none"> <li>• Escape volatility of short term and spot markets</li> <li>• Meets intermediary load requirements, help escape long term commitment for such requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Transmission availability after LT</li> <li>• Only to meet fixed seasonal or intermediary load requirements</li> </ul>
<b>Short Term</b>	<b>Bilateral</b>	<ul style="list-style-type: none"> <li>• No long term commitment</li> <li>• Flexible response to demand</li> <li>• Priority over PX, unless Spot</li> </ul>	<ul style="list-style-type: none"> <li>• Costlier than PX Spot</li> <li>• Congestion</li> <li>• Regulatory risks</li> </ul>
	<b>PX Spot</b>	<ul style="list-style-type: none"> <li>• No long term commitment</li> <li>• Price transparency</li> <li>• Flexible response to demand</li> </ul>	<ul style="list-style-type: none"> <li>• Volatile</li> <li>• Congestion</li> <li>• Regulatory risks</li> </ul>
<b>UI/DSM</b>		<ul style="list-style-type: none"> <li>• Realtime load balance</li> </ul>	<ul style="list-style-type: none"> <li>• Volatility</li> <li>• Penalties</li> </ul>

# Indian Power Market Development trend



# Open Access Status across Indian States

## Northern Region

States	Generator	Consumer
Haryana	✓	✓
Punjab	✓	✓
Rajasthan	✓	✓
HP	✓	✓
J&K	✓	✗
Uttaranchal	✓	✓
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## Western Region

States	Generator	Consumer
M.P	✓	✓
DNH & DD	✗	✓
Gujarat	✓	✓
Chhattisgarh	✓	✓
Maharashtra	✓	✓



✓ **Allowed**
✗ **Not Allowed**

## East & North Eastern Region

States	Generator	Consumer
Assam	✓	✓
Bihar	✗	✗
Manipur/Mizo	✓	✓
Tripura/Sikkim	✓	✓
Jharkhand	✗	✗
A.P.	✓	✓
Meghalaya	✓	✓
Orissa	✓	✓
West Bengal	✓	✗

## Southern Region

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A.P	✓	✓
Karnataka	✓	✓
Tamil Nadu	✗	✓
Kerala	✗	✓



## PoC charges

- Inter-State Transmission charges payable by the open access consumer

## Transmission Charges or STU Charges

- Payable to the state transmission utility for the use of the transmission system for availing power through open access.

## Wheeling charges

- Charge to the Discom for conveyance of electricity through open access as determined by the SERCs

## Cross Subsidy Surcharge

- Subsidising open access consumer has to pay a cross subsidy surcharge to the Discom.

## Others

- Additional Charges, if any
- NLDC application fee, scheduling and operating charges, SLDC Charges
- IEX transaction charges/Trading Margin

- An open access consumer has to bear in kind the following losses as defined by the relevant regulations

### **Point of connection (PoC) loss**

- Inter-State transmission system loss

### **Transmission loss or state loss**

- Consumer to absorb apportioned energy losses in the transmission system as per the relevant regulations

### **Wheeling loss**

- Technical losses in the distribution system determined at various voltage level by the state commissions.



Introduction to  
Power Exchanges

- Overview of Power Exchange



Power Exchange  
Operations

- Surveillance
- Delivery and Scheduling
- Clearing and Settlement

# Introduction to Power Exchange

01

## Fast Growing Sector & Conducive Government Policies

- Increasing power surplus to drive short term power trading market
- Robust transmission system
- GoI policies such as 24\*7 power for all, Make in India will lead to increase in demand.

02

## India's first & largest power exchange

- Trusted exchange with high brand loyalty.
- Dominant market share of 94.9% of traded volumes in India in DAM, TAM and REC combined<sup>(1)</sup>

06

## Robust and Scalable Technology

- Technology capable to handle 1 lakh participants against present participation of 5800
- Capable to handle 30 bid areas as against present 13

05

## Rapidly Growing Trade Volumes

- Traded 40,528 MU in Electricity Contracts and 4.62 MU RECs in FY17 with 4 year CAGR of 15.4% and 23.4% respectively since FY13

04

## Diverse Participant Base Ensuring liquidity

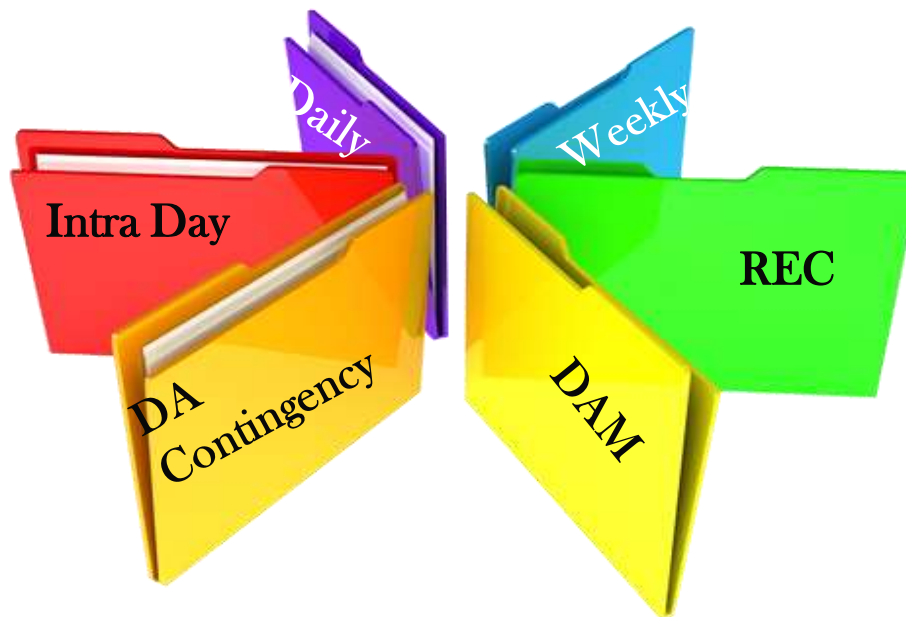
- >5,800 registered participants including all distribution companies, >400 electricity generators and >3,800 industry/commercial consumers<sup>(2)</sup> across country.

03

## Efficient Price Discovery and Flexibility

- Transparent & automated online platform providing efficient price discovery
- Provides flexibility of granular trading in variety of electricity products to manage requirement efficiently.





# Product Portfolio

# Who Can become Members of IEX ?

## Entities eligible for Membership:

- Inter-State Generating Stations (ISGS)
- Distribution Licensees
- State Generating Stations
- IPPs
- CPPs and IPPs  
*(with consent from SLDC)*
- Open Access Customers  
*(with consent from SLDC)*
- Electricity Traders / Brokers

# Product Segments

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- **Daily**
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## Renewable Energy Certificates (RECs)

Trade green attributes of electricity

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# Contract Characteristics



## TERM AHEAD MARKET

- Contract Characteristic
- Delivery
- Auction Type
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- Trade Availability
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**Day Ahead Market**

- Next day
- Closed Auction
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- 0400-2400 Hrs same day
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**Day Ahead Contingency**

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- All Days;  
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- Pay in: T+1  
Pay out: T+2

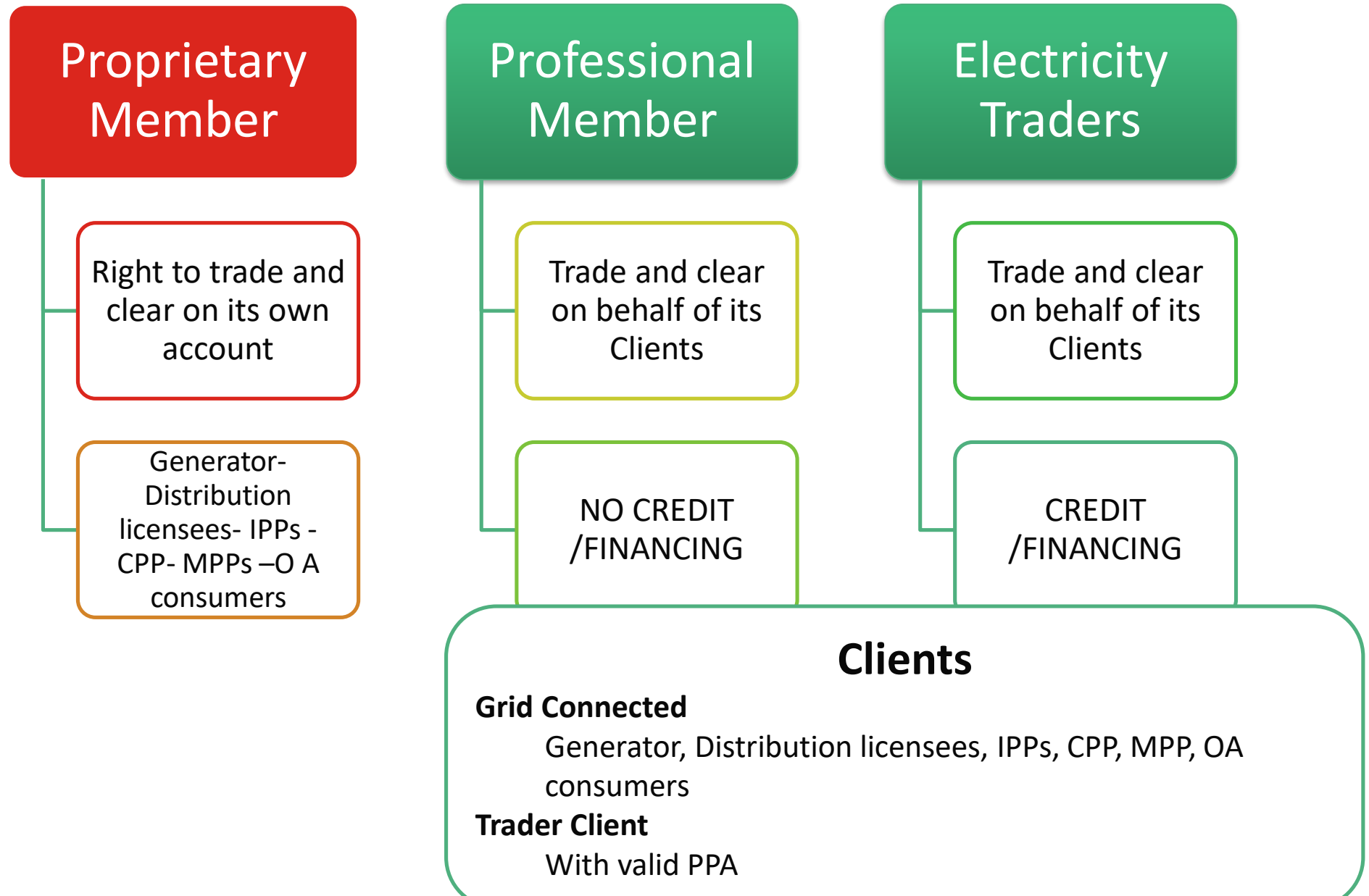
**Daily Contracts**

- From 2<sup>nd</sup> day to next 8 days
- Continuous trading
- Block of Hours (Fixed)
- All Days;  
1200-1500
- Pay-In- D-1; Pay Out – D+1

**Weekly Contracts**

- For next week
- Open Auction
- Block of Hours (Fixed)
- Wed & Thurs;  
1200-1600
- Pay-In- D-1; Pay Out – D+1

# IEX Membership Types



# Financial Requirements

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

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

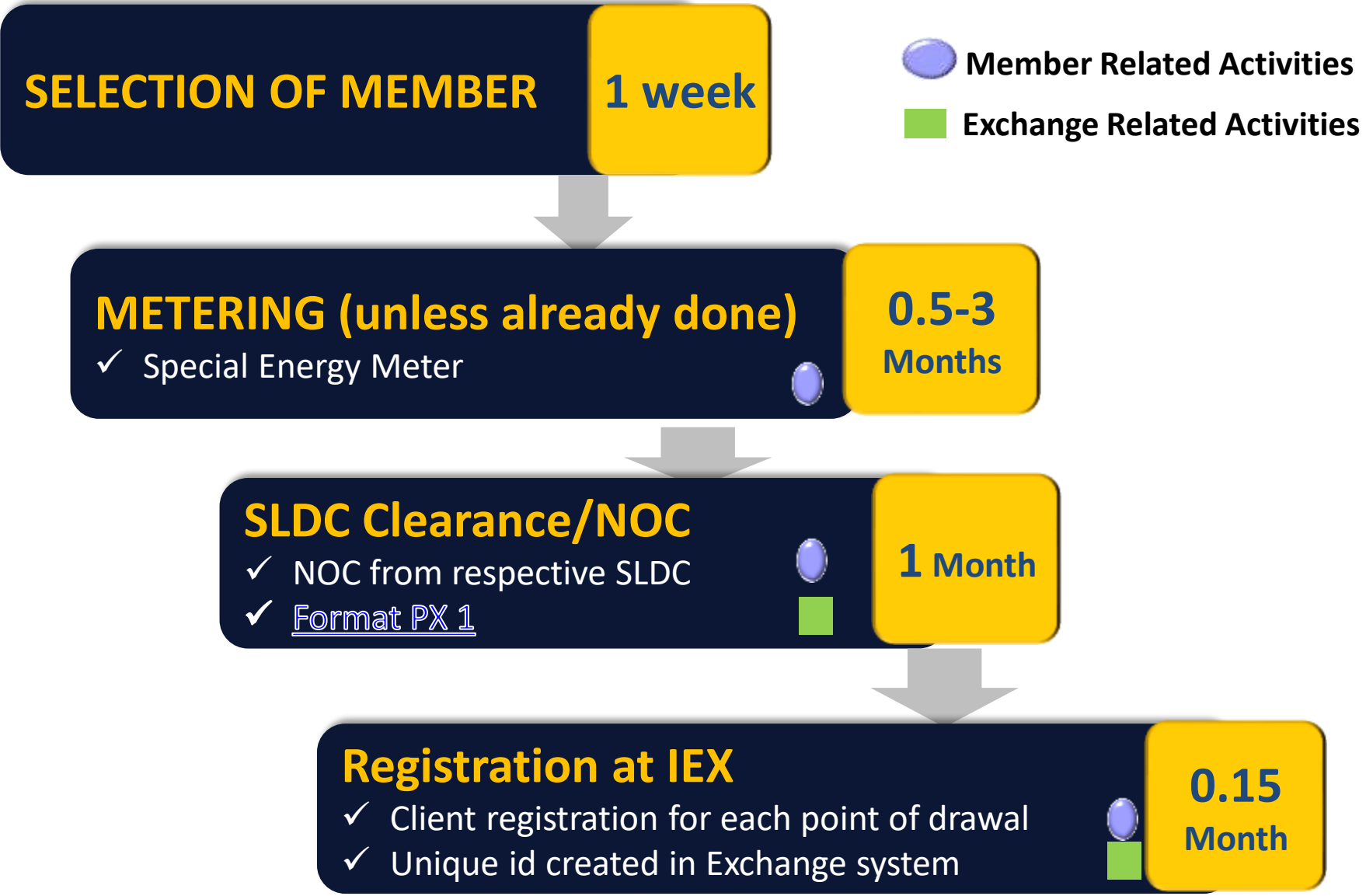
- Standing Clearance from UTs/State SLDC
- ABT Meters
- Sufficient transmission capacity

## Connectivity with exchange can be done in two ways

- Internet Immediate
- Leased Line

## Start Buying from IEX or Sell surpluses to IEX

PRE - TRADING



# Exchange Operations DAM & TAM

- Surveillance
- Delivery and Scheduling
- Clearing and Settlement

# Surveillance



# Features of Day Ahead Market

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

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

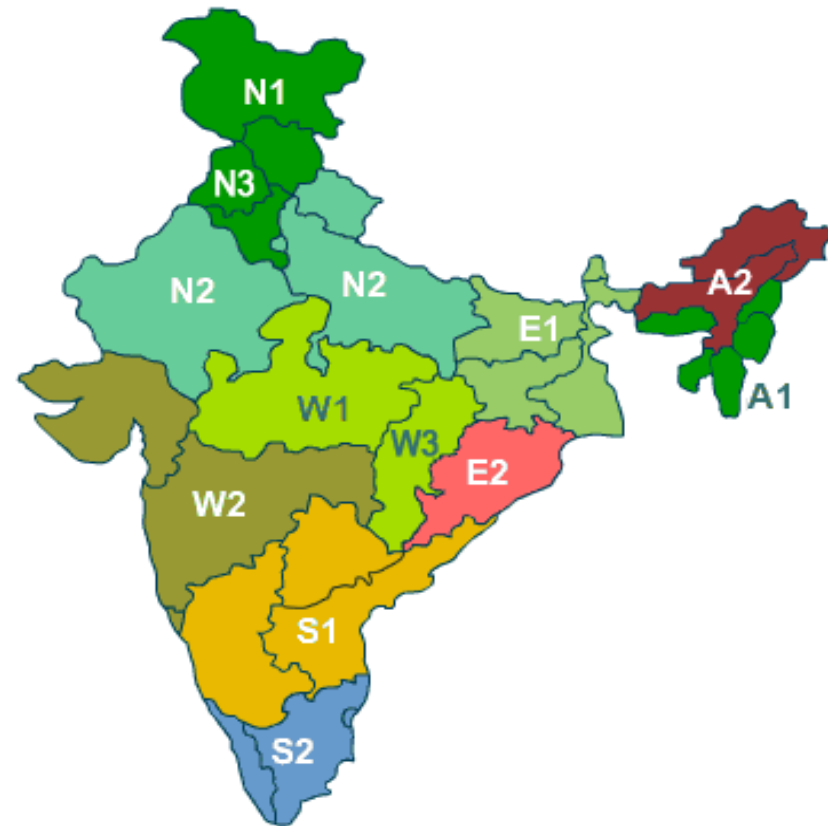
13 Bid area defined

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

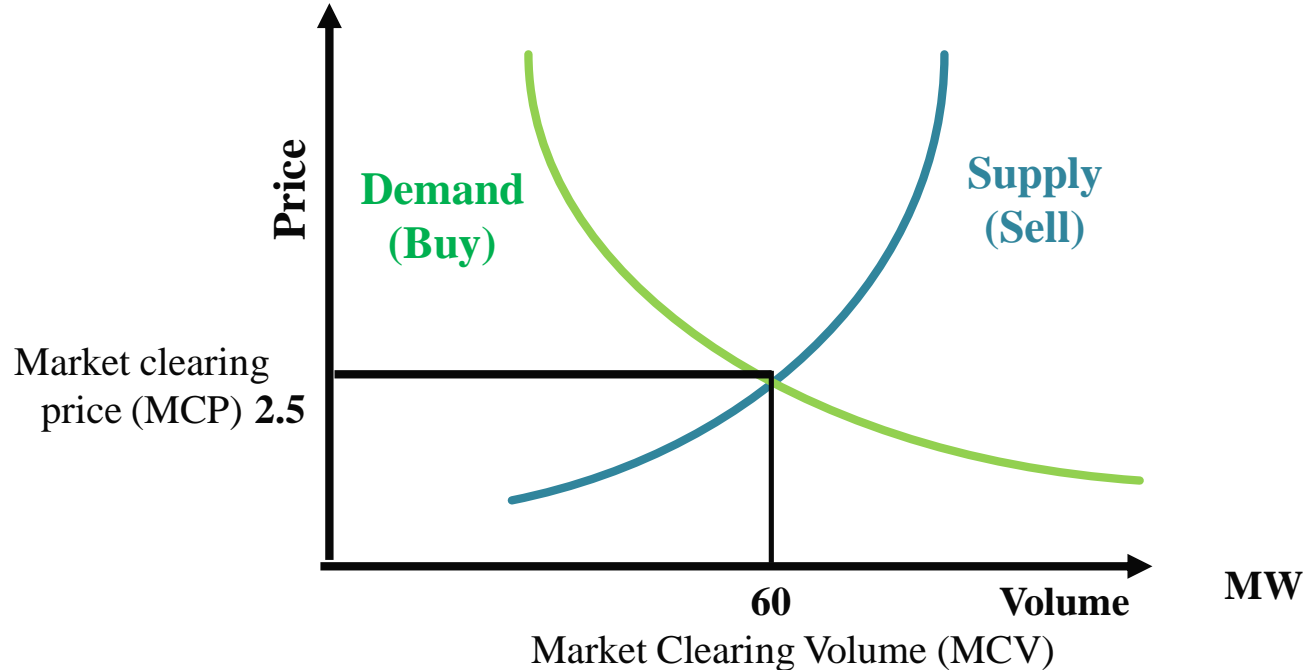
Minimum Price & Volume Step = 0.1p \* 0.1 MWh



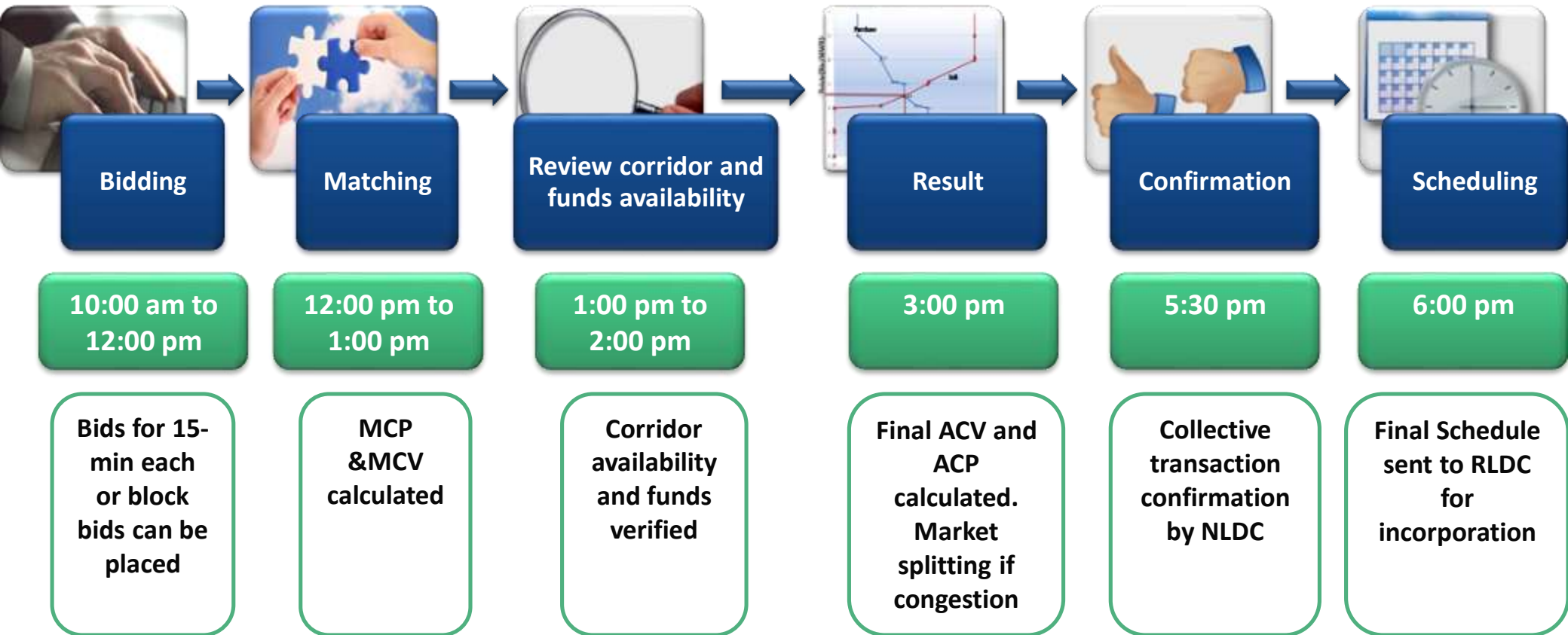
**13 Bid Areas**

# Model Price Calculation algorithm

		Price Tick (Rs.)														
Bid Quantum by different portfolios		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	30	0	-20	-31	-80	-100	-100	-100	-100	-100	-100



# Day Ahead Market-Collective Transaction Trading process

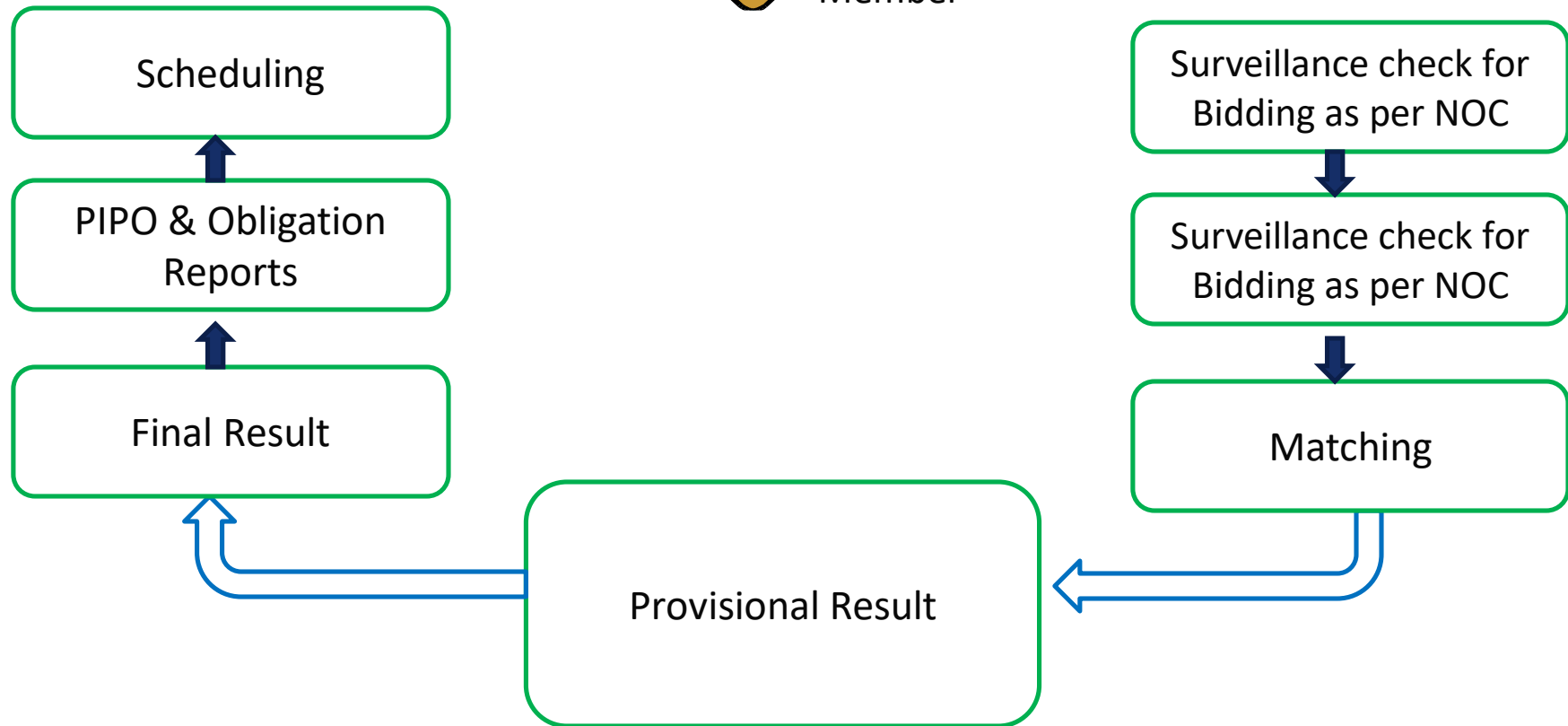


# Trade, Scheduling and Clearing Process



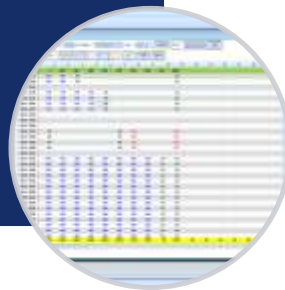
NOC submission to Delivery Dept.

Member



- Bids for each 15 min can be entered
- Varying price and quantum pairs
- Allow partial execution

Single Bid



- All or None Type
- Fixed Price and Quantity Pair
- No partial execution

Block Bid



# Understanding of Single Bid

	1	2	3	4	5	6	7	8	9	10	11
Period	0	2999	3000	3001	3999	4000	4001	5999	6000	6001	20000
00:00 - 00:15	100.0								100.0	0.0	0.0
00:15 - 00:30	200.0		200.0	100.0		100.0	0.0				0.0
00:30 - 00:45	100.0		100.0	0.0							0.0
00:45 - 01:00	0.0	0.0	-100.0								-100.0
01:00 - 01:15	0.0	0.0	-100.0		-100.0	-200.0					-200.0
01:15 - 01:30	0.0							0.0	-100.0		-100.0
01:30 - 01:45	200.0		200.0	0.0	0.0	-150.0					-150.0
01:45 - 02:00											
02:00 - 02:15											

**Buy Bid:** One or more quantity-price pairs, each specifying the maximum price at which the participant is willing to buy the corresponding quantity of electricity and are submitted independently for each delivery period i.e. 15 min block.

**Sell Bid:** One or more quantity-price pairs, each specifying the minimum price at which the participant is willing to sell the corresponding quantity of electricity and are submitted independently for each delivery period i.e. 15 min block.

**Selection Criteria:=**  
 Sell Bid-Bids specifying a price not higher than the Clearing Price are accepted  
 Accepted Bids are valued at Market/Area Clearing Price.  
 Hence Seller Surplus is the Difference between the submitted price and the market price, multiplied by the quantity actually sold.

Block No.	Full Selection	Partial Selection	Rejection
00:45-01:00	If CP>=3000	If 2999<CP<3000	If CP<=2999
01:00-01:15	i) For 200 MW; CP>=4000 ii) For 100 MW; 3000<=CP<=3999	i) Between 200 &100 MW 3999<CP<4000 ii) Between 100 & 0 MW 2999<CP<3000	i) For 200 MW; CP<=3999 ii) For 100 MW; CP<=2999
01:15-01:30	If CP>=6000	If 5999<CP<6000	If CP<=5999

# Understanding of Block Bid

A block bid is used for the procurement or sale of power which is specific to a block of hours (e.g. base load, peak or user defined). A block bid can either be a buy order or a sale order for a block of hours. Either all hours of the block order are jointly successful or all of these block hours are jointly rejected. A block bid is selected if the bid price is better than the average system price of power in respective block hours.

## Example of Sell Block Bid:-

BID...	Standard/User...	Block	From Period	To Period	Price	Quantity	Linked To
E5	Standard	Evening Peak	17:00	22:00	5000	-50.0	
E6	Standard	Evening Peak	17:00	22:00	7000	-50.0	

## System Price:-

Time Period	17:00 - 17:15	17:15 - 17:30	17:30 - 17:45	17:45 - 18:00	18:00 - 18:15	18:15 - 18:30	18:30 - 18:45	18:45 - 19:00	19:00 - 19:15	19:15 - 19:30	19:30 - 19:45	19:45 - 20:00	20:00 - 20:15	20:15 - 20:30	20:30 - 20:45	20:45 - 21:00	21:00 - 21:15	21:15 - 21:30	21:30 - 21:45	21:45 - 22:00	Average Price
Price	4879	4879	4879	4879	4980	5249	5400	5369	6400	6400	6401	6401	6600	6600	6600	6600	6251	6251	6250	6250	<b>5875.9</b>

Selection Criteria:- A sell (respectively buy) bid is said to be selected if the submission price of the bid is below (respectively above) the average system price.

Result for 1<sup>st</sup> Block Bid-

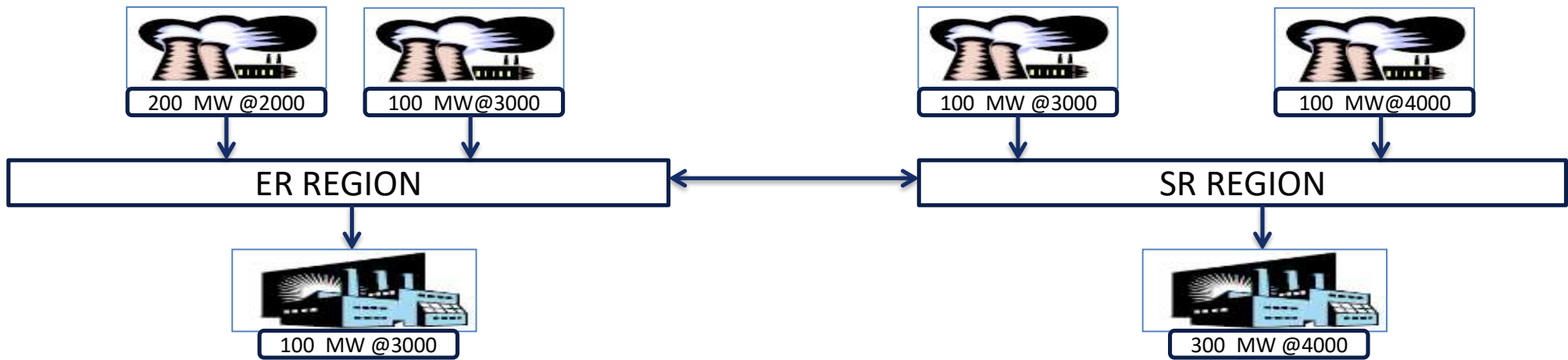
E5 at 5000 for 50 MW Sell is at below price than Average Price of Rs. 5875.90; hence will be selected.

Result for 2<sup>nd</sup> Block Bid-

E6 at 7000 for 50 MW Sell is at above price than Average Price of Rs. 5875.90; hence will be rejected.

# Illustration of Price Matching and Market Splitting

- Two regions have been considered i.e. ER and SR.
- Four Sellers and Two Buyers in a 15-Min Block are taken with following Bid Scenario: -



	Quantity (MW)	Price (Rs./MWhr)
ER Seller-1	200	2000
ER Seller-2	100	3000
SR Seller-1	100	3000
SR Seller-2	100	4000
SR Buyer	300	4000
ER Buyer	100	3000



# Understanding Price Matching

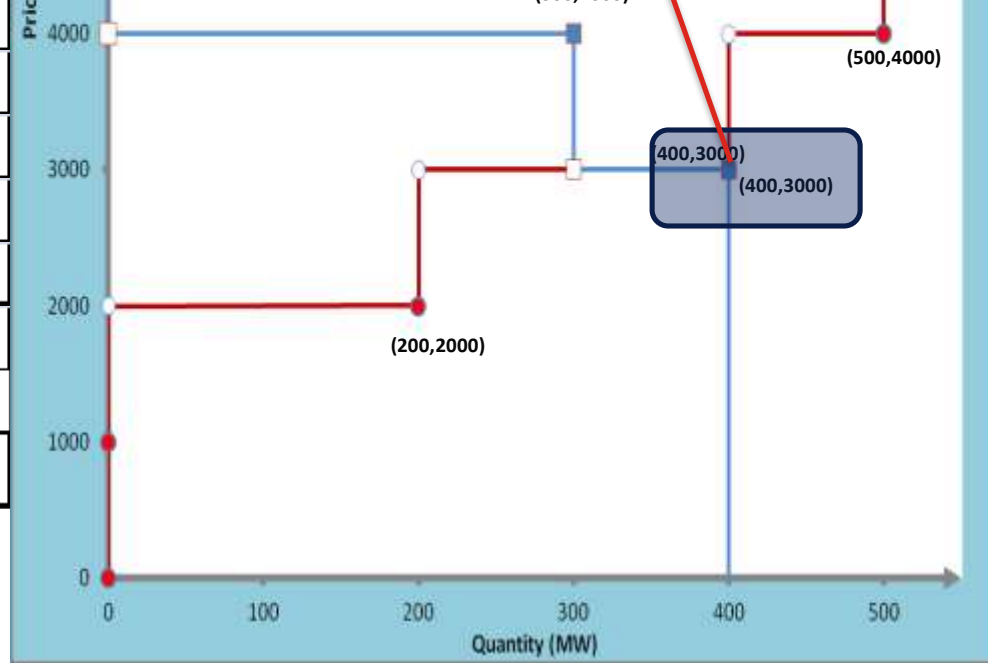
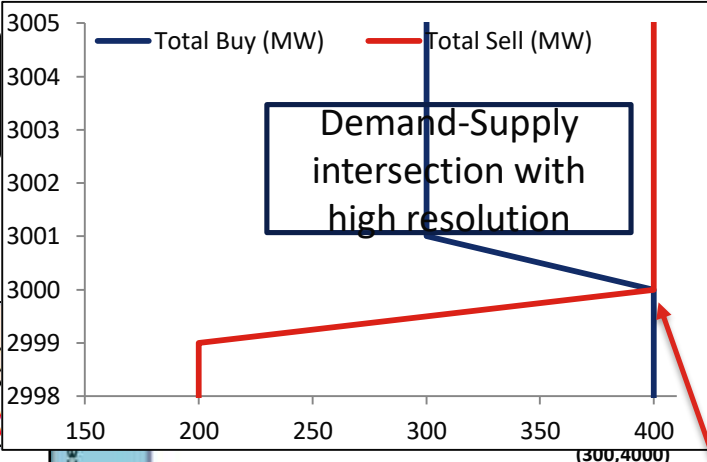
**ER Seller-1**  
200 MW@  
2000/MW hr

**ER Seller-2**  
100 MW@  
3000/MW hr

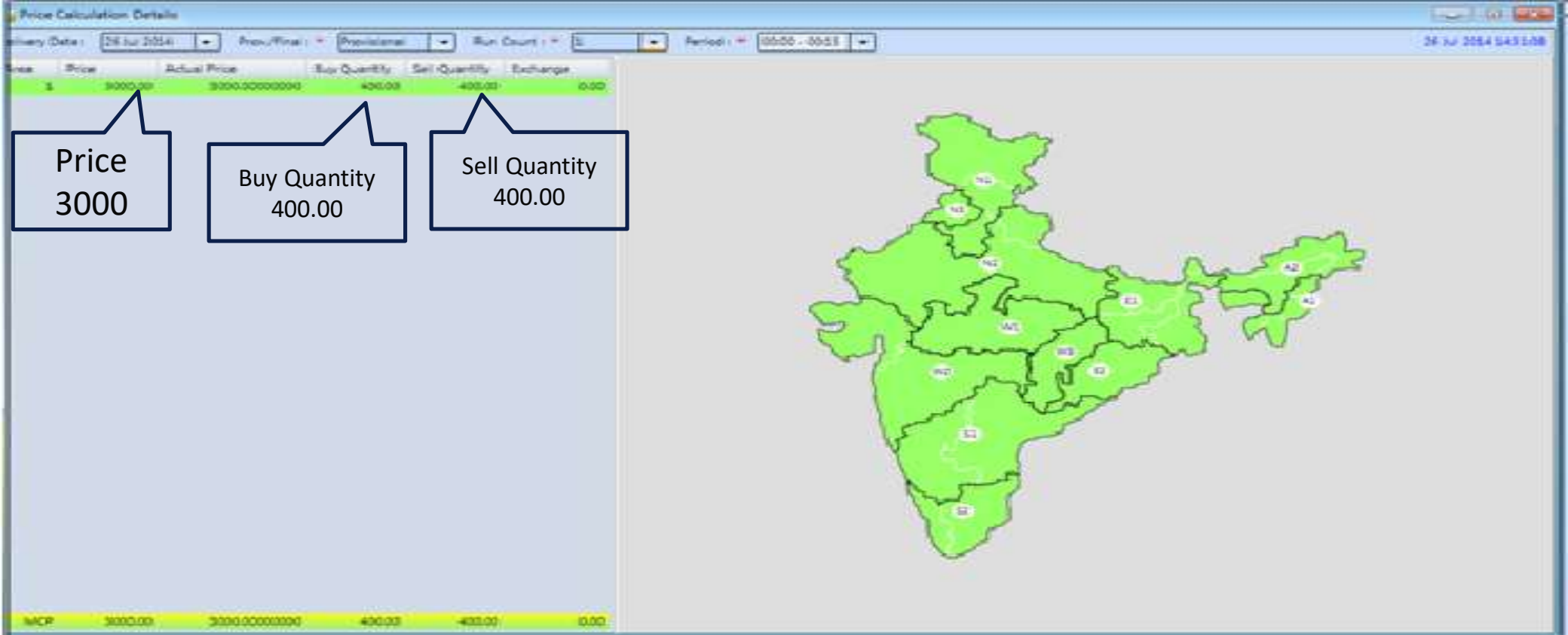
**SR Seller-1**  
100 MW@  
3000/MW hr

**ER Buyer**  
100 MW@  
3000/MW hr

Price (Rs./MWh)	0	999	1000	1999	2000	2999	3000	3001	3999	4000	4001	6000	8000	10000	20000
ER Seller-1	0	0	0	0	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
ER Seller-2	0	0	0	0	0	0	-100	-100	-100	-100	-100	-100	-100	-100	-100
SR Seller-1	0	0	0	0	0	0	-100	-100	-100	-100	-100	-100	-100	-100	-100
SR Seller-2	0	0	0	0	0	0	0	0	0	-100	-100	-100	-100	-100	-100
SR Buyer	300	300	300	300	300	300	300	300	300	300	0	0	0	0	0
ER Buyer	100	100	100	100	100	100	100	0	0	0	0	0	0	0	0
Total Buy (MW)	400	400	400	400	400	400	400	300	300	300	0	0	0	0	0
Total Sell (MW)	0	0	0	0	-200	-200	-400	-400	-400	-500	-500	-500	-500	-500	-500
Net (Buy-Sell)	400	400	400	400	200	200	0	-100	-100	-200	-500	-500	-500	-500	-500



**Market Clearing Price (MCP)= Rs. 3000/MW hr**  
**Market Clearing Volume(MCV)= 400 MW**



Price  
3000

Buy Quantity  
400.00

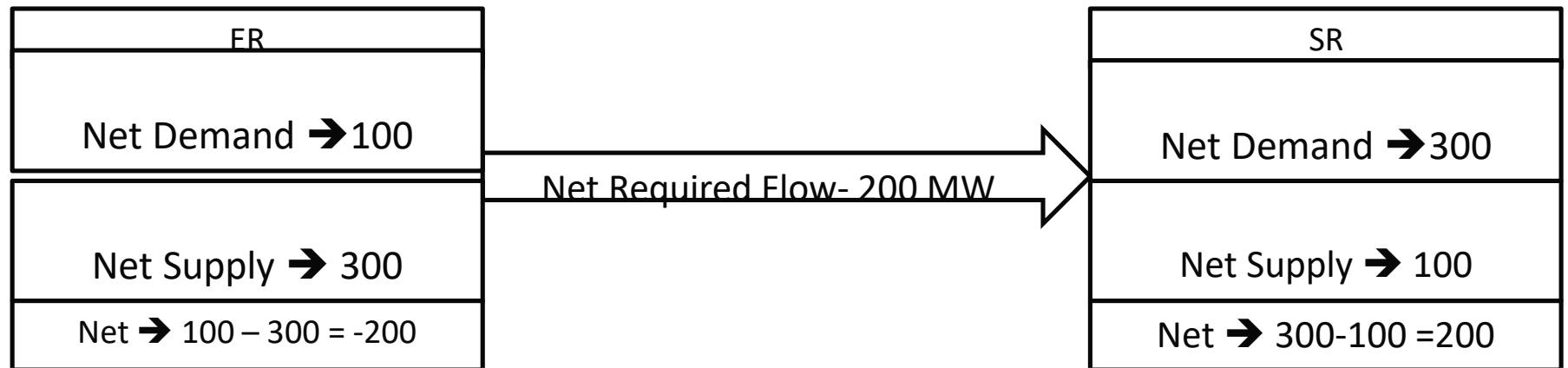
Sell Quantity  
400.00



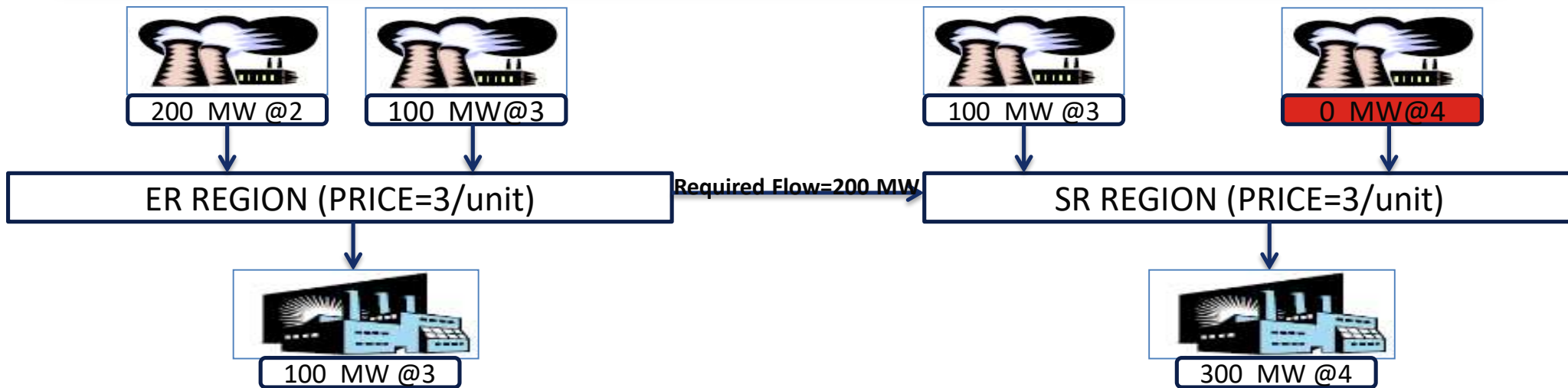
Buy Sell Clear

MCP : 3000.00 INR/MWh

# REQUIREMENT OF CORRIDOR FROM NLDC




Demand and Supply gap in two regions get balanced by unconstrained flow between the two regions hence a common MCP is derived.



# Constraint Solution (Market Splitting)

Congestion was reported by NLDC from ER to SR corridor and flow is constrained to 100MW. Due to flow constraint, system will “Split” the market in to two regions i.e. Deficit (SR Region) and Surplus region (ER Region),and will again run the calculation chronology for both the regions separately considering the flow constraint and will derive the ACP and ACV.

<b>ER-Surplus Region</b>	Price (Rs./kWh)	0	999	1000	1999	2000	2999	3000	3001	3999	4000	4001	6000	8000	10000	20000
	ER Seller-1	0	0	0	0	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200
	ER Seller-2	0	0	0	0	0	0	-100	-100	-100	-100	-100	-100	-100	-100	-100
	ER Buyer	100	100	100	100	100	100	100	0	0	0	0	0	0	0	0
	Net (Buy-Sell)	100	100	100	100	-100	-100	-200	-300	-300	-300	-300	-300	-300	-300	-300


**Flow Towards SR of 100 MW**

<b>SR-Deficit Region</b>	Price (Rs./kWh)	0	999	1000	1999	2000	2999	3000	3001	3999	4000	4001	6000	8000	10000	20000
	SR Seller-1	0	0	0	0	0	0	-100	-100	-100	-100	-100	-100	-100	-100	-100
	SR Seller-2	0	0	0	0	0	0	0	0	0	-100	-100	-100	-100	-100	-100
	SR Buyer	300	300	300	300	300	300	300	300	300	300	0	0	0	0	0
	Net (Buy-Sell)	300	300	300	300	300	300	300	200	200	200	100	-200	-200	-200	-200

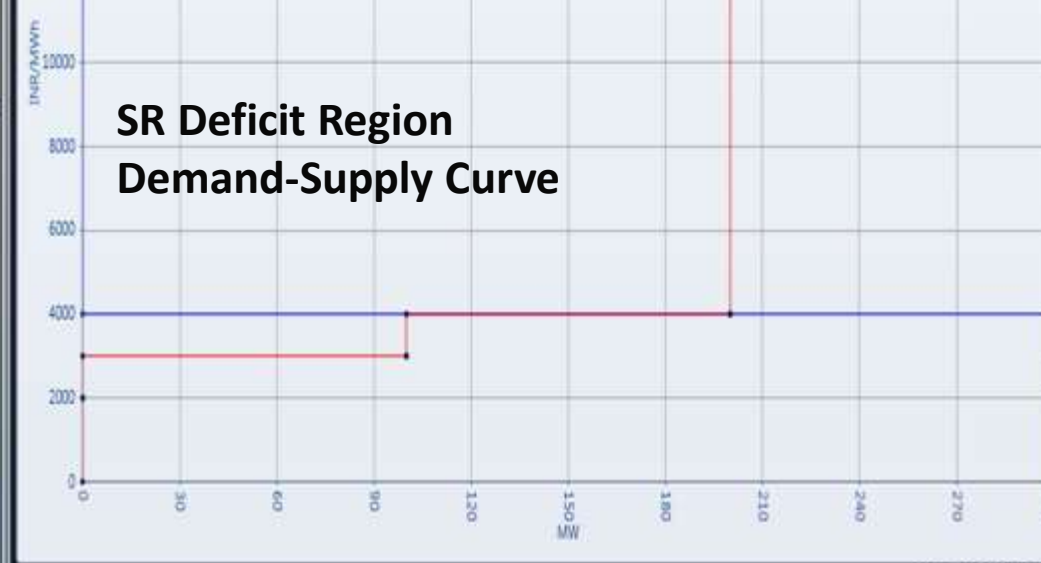
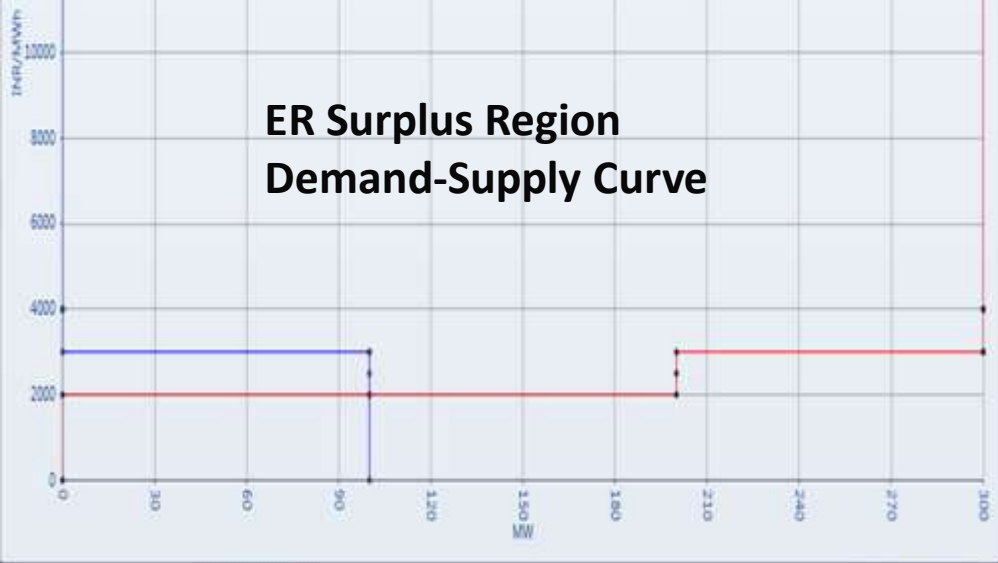
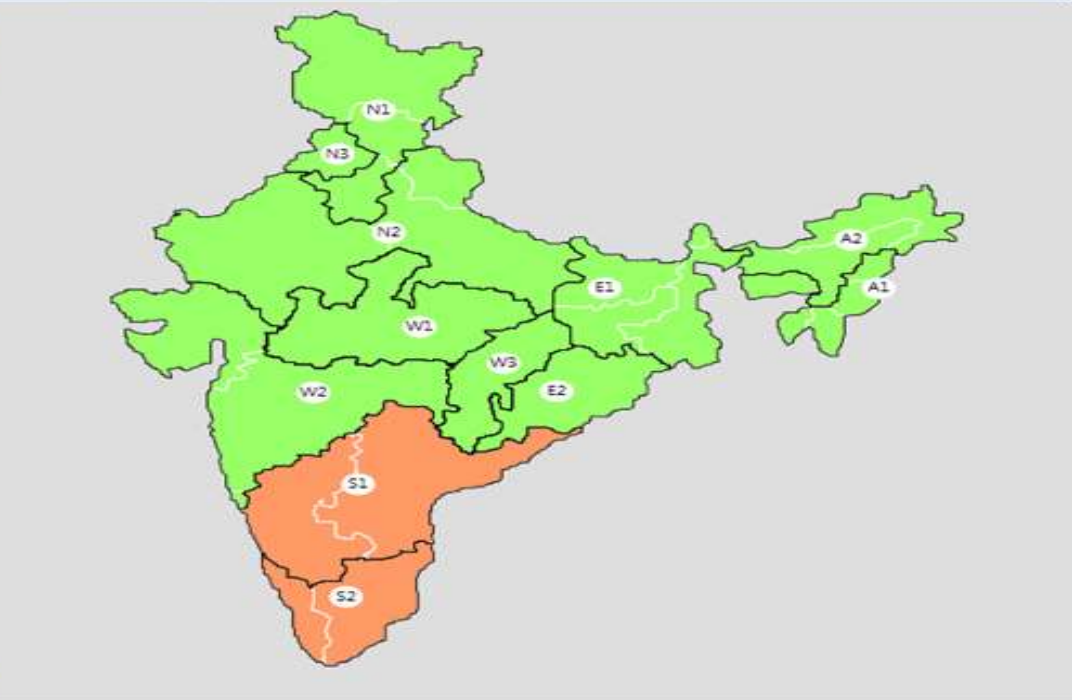
# Final Results after Market Splitting

ACP Surplus Region (ER)	ACP Deficit Region (SR)
2499.50 (Rs/MWh)	4000.00 (Rs/MWh)

## Status of Buyers and Sellers

	Quantity (MW)	Price (Rs./MWhr)	Selection
ER Seller-1	200	2000	Yes
ER Seller-2	100	3000	No (Status changed)
SR Seller-1	100	3000	Yes
SR Seller-2	100	4000	Yes
SR Buyer	300	4000	Yes (Status changed)
ER Buyer	100	3000	Yes

Area	Price	Actual Price	Buy Quantity	Sell Quantity	Exchange
1	2499.50	2499.50000000	100.00	200.00	-100.00
2	4000.00	4000.00000000	300.00	200.00	100.00
<b>MCP</b>					
	3000.00	3000.00000000	400.00	400.00	0.00



MCP : 3000.00 INR/MWh  
ACP : 2499.50 INR/MWh



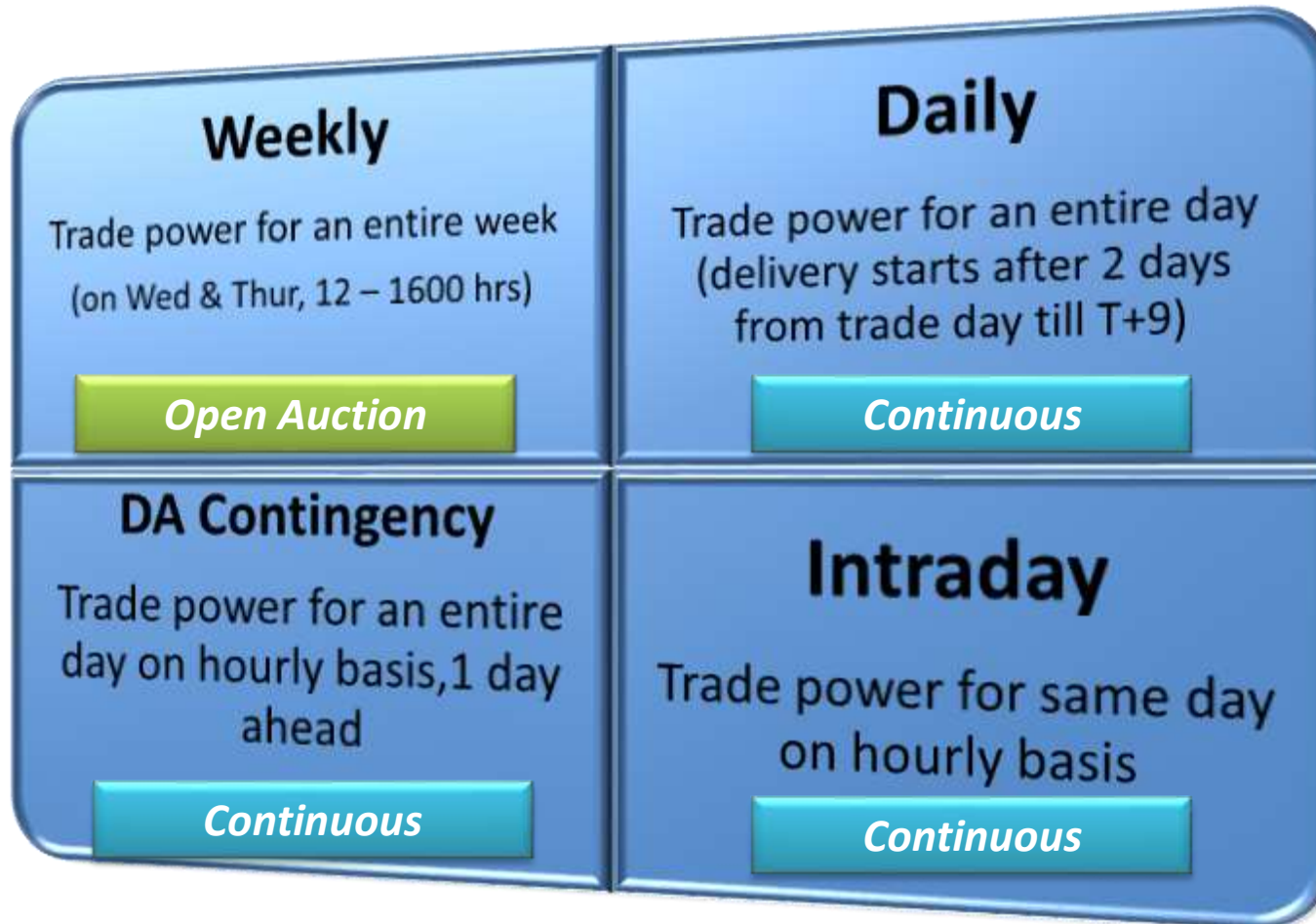
MCP : 3000.00 INR/MWh  
ACP : 4000.00 INR/MWh



# Term-Ahead Market

## Price Discovery and Bidding

# TAM Market Segments





- **Weekly and Daily**
  - FBA -- Firm Base – 24 Hrs
  - FNT -- Firm Night – 8 Hrs (0-7 & 23-24)
  - FDY -- Firm Day – 11Hrs (7-18)
  - FPK -- Firm Peak – 5 Hrs (18-23)
  
- **Day Ahead Contingency and Intra-Day**
  - Hourly ( DAC-24 hrs & Intraday-04-24)

**Region Specific Contracts**

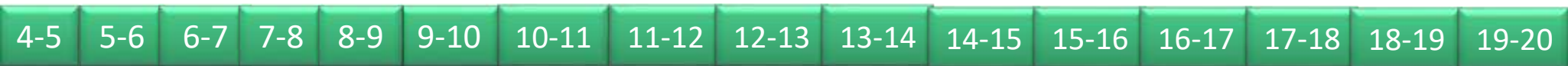
# Trading of Intra-day Contracts

## Trading Hour

Trading Hours:19.5  
(00:30-20:00)



Delivery  
Hours:20  
(04-24)



Contracts available for delivery on the same day<sup>74</sup>

# Intra-day & DAC contracts with current trading system



Trading Date	Trading Time	Intra-Day contracts	Trading Time	DAC contracts
17-04-2016	00:30 - 01:30	H5 to 24 (of 17-04)	15:00-21:30	H1 to 24 (of 18-04)
17-04-2016	00:30- 02:30	H6 to 24 (of 17-04)	15:00-22:30	H2 to 24 (of 18-04)
17-04-2016	00:30- 03:30	H7 to 24 (of 17-04)	15:00-23:00	H3 to 24 (of 18-04)
17-04-2016	00:30- 04:30	H8 to 24 (of 17-04)		
17-04-2016	00:30- 05:30	H9 to 24 (of 17-04)		
17-04-2016	00:30- 06:30	H10 to 24 (of 17-04)		
17-04-2016	00:30- 07:30	H11 to 24 (of 17-04)		
17-04-2016	00:30- 08:30	H12 to 24 (of 17-04)		
17-04-2016	00:30- 09:30	H13 to 24 (of 17-04)		
17-04-2016	00:30- 10:30	H14 to 24 (of 17-04)		
17-04-2016	00:30- 11:30	H15 to 24 (of 17-04)		
17-04-2016	00:30- 12:30	H16 to 24 (of 17-04)		
17-04-2016	00:30- 13:30	H17 to 24 (of 17-04)		
17-04-2016	00:30- 14:30	H18 to 24 (of 17-04)		
17-04-2016	00:30- 15:30	H19 to 24 (of 17-04)		
17-04-2016	00:30- 16:30	H20 to 24 (of 17-04)		
17-04-2016	00:30- 17:30	H21 to 24 (of 17-04)		
17-04-2016	00:30- 18:30	H22 to 24 (of 17-04)		
17-04-2016	00:30- 19:30	H23 to 24 (of 17-04)		
17-04-2016	00:30- 20:30	H24 to 24 (of 17-04)		

- Daily Contracts-  
T+2 to T+9
- Weekly Contracts-Trading  
on every Wednesday and  
Thursday for Delivery From  
Monday to Sunday.

### 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.

# Matching Rules- Continuous Trading

- a) Order is immediately checked whether it can be matched
- b) Orders are matched first based on price and then on time priority
- c) The best buy order (highest price) is matched with the best sell order (lowest price)
- d) An order may match partially with another order resulting in multiple trades.

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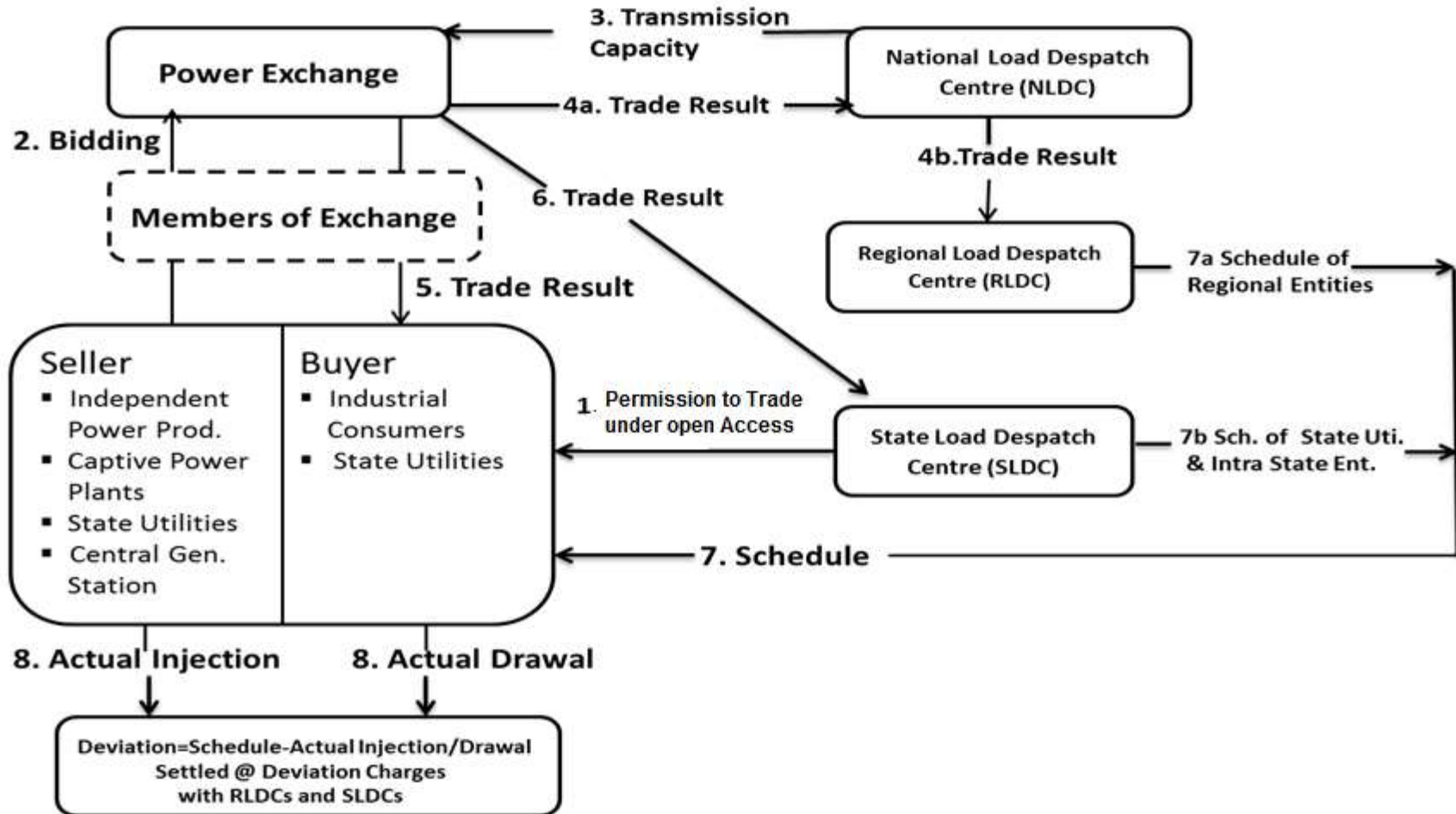
# Delivery and Scheduling



## **Process Under Collective Transaction-Day Ahead Market**

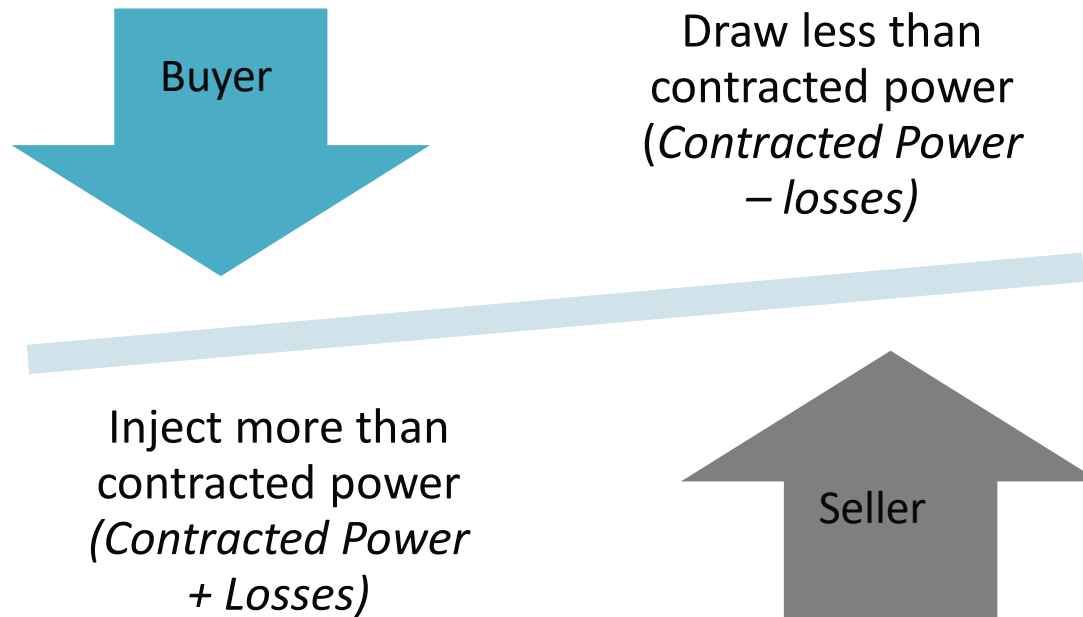


# Scheduling Process of DAM Market



# Treatment of Losses

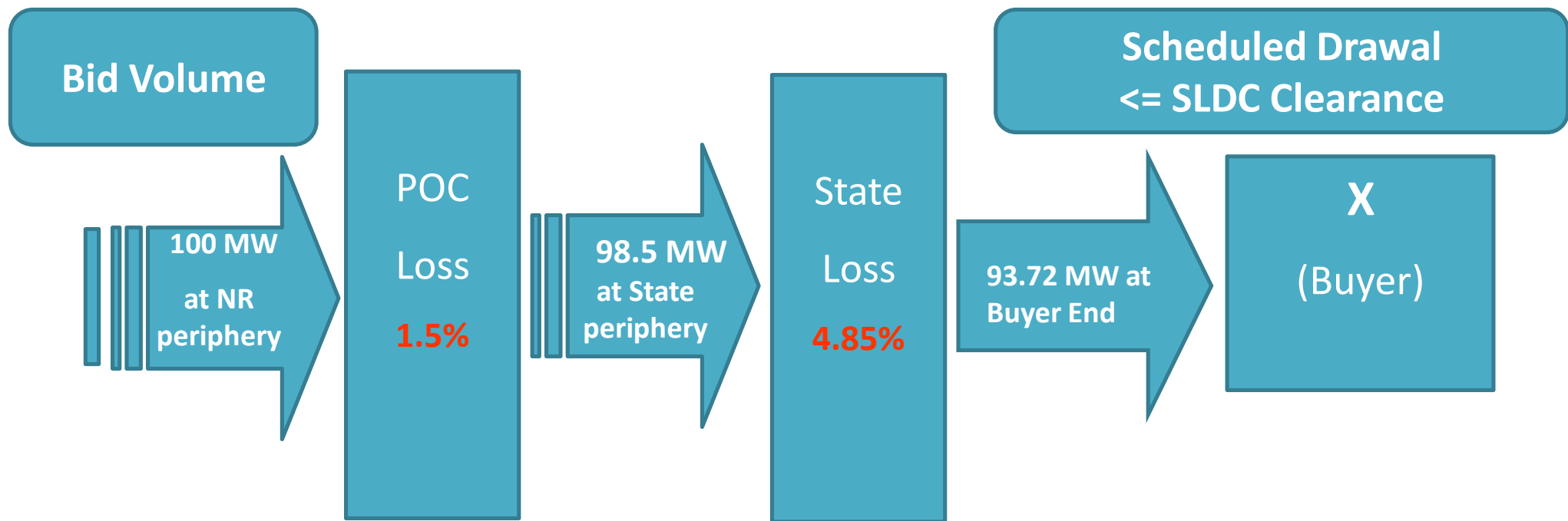
- Both Buyers and Sellers to absorb losses



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

# Treatment of Losses... for buyer

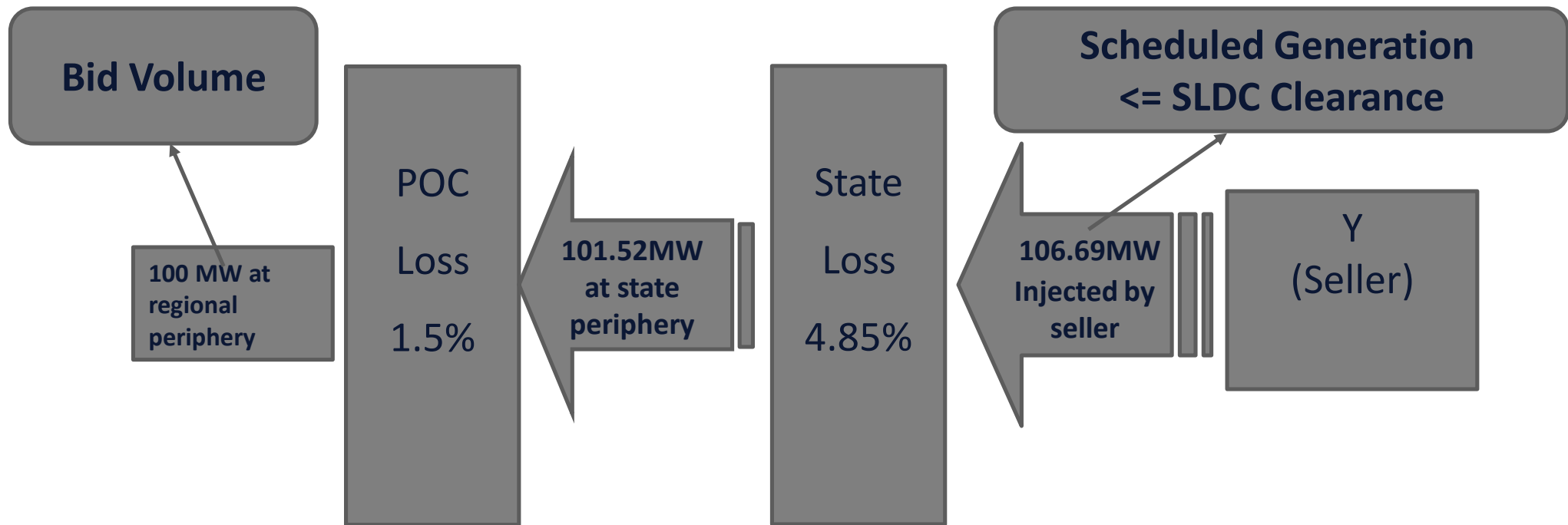
- POC Loss: 1.5 %
- S1 (State) loss: 4.85 %
- Buyer X bids for 100 MW at its respective regional periphery



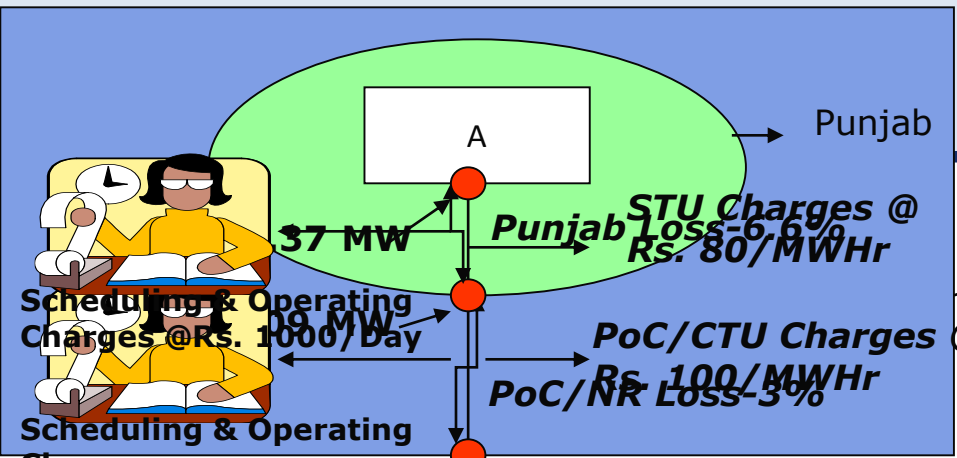
Maximum Bid= Volume in standing clearance + Regional & State losses

# 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



Northern Region

Eastern Region

West Bengal

B

Western Region

Madhya Pradesh

C

Indian Energy Exchange

# TRADE SELECTED FOR SCHEDULING

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
<b><u>Portfolio</u></b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b><u>Total</u></b>	
<b><u>NER P1</u></b>	0	-10	-10	-10	-10	-10	-10	0	0	0	0	0	0	0	0	0	0	0	-12	0	0	0	0	0	0	<b><u>-72</u></b>
<b><u>ER P2</u></b>	0	0	0	0	0	0	50	50	50	100	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	<b><u>450</u></b>
<b><u>ER P3</u></b>	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	0	0	0	0	0	0	-20	-20	<b><u>-380</u></b>
<b><u>NR P4</u></b>	0	-300	-300	-300	-300	-300	-150	-200	-200	-200	-100	-100	-100	-100	-100	-100	-400	-400	-400	0	0	0	0	0	0	<b><u>-4050</u></b>
<b><u>SR P5</u></b>	0	235	235	235	235	235	35	0	0	0	0	20	20	136	136	136	361	317	305	10	10	10	0	0	0	<b><u>2674</u></b>
<b><u>SR P6</u></b>	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	-55	<b><u>-1325</u></b>
<b><u>SR P7</u></b>	75	150	150	150	150	150	150	150	150	150	75	55	150	39	39	39	114	150	150	45	45	45	75	75	0	<b><u>2522</u></b>
<b><u>WR P8</u></b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<b><u>0</u></b>
<b><u>WR P9</u></b>	0	0	0	0	0	0	0	25	25	8.4	0	0	1.7	0	0	0	0	0	0	0	0	0	0	0	0	<b><u>60.27</u></b>
<b><u>WR P10</u></b>	0	0	0	0	0	0	0	50	50	17	0	0	3.5	0	0	0	0	0	0	0	0	0	0	0	0	<b><u>120.5</u></b>



# Submission of Final Report to NLDC



**3.6 The details for Scheduling Request for Collective Transaction shall be submitted by Power Exchange (s) to the NLDC as per Format-PX-III: "Scheduling Request for Collective Transaction to NLDC". Power Exchange shall club together all Buyers within a State in one group and all Sellers within a State in another group for the purpose of Scheduling RLDCs.**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	NR	injection	0	0	0	0	300	300	300	300	300	300	300	300	300	300	300	300	300	300
2	NR	Drawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	SR	injection	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2
4	SR	Drawal	75.2	75.2	75.2	75.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2	385.2
5	ER	injection	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
6	ER	Drawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	WR	injection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	WR	Drawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	AR	injection	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10
10	AR	Drawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	NR to WR	NR->WR	0	0	0	0	300	300	300	300	300	300	300	300	300	300	300	300	300	300
13	WR to NR	WR->NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	ER to NR	ER->NR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	NR to ER	NR->ER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	SR to WR	SR->WR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	WR to SR	WR->SR	0	0	0	0	300	300	300	300	300	300	300	300	300	300	300	300	300	300
18	ER to SR	ER->SR	20	20	20	20	30	30	30	30	30	30	30	30	30	30	30	30	30	30
19	SR to ER	SR->ER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	ER to WR	ER->WR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	WR to ER	WR->ER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	AR to ER	AR->ER	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	10
23	ER to AR	ER->AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
25	Regional Entity	90 N	32 S	15 E	12 W	16 A	15													
33	NORRI2	Drawal	NULL																	
34	NORRJ0	injection	0	0	0	0	300	300	300	300	300	300	300	300	300	300	300	300	300	300
35	NORRJ0	Drawal	NULL																	
36	NORRL0	injection	NULL																	
37	SORAP0	Drawal	0	0	0	0	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2	235.2
38	SORGO0	injection	NULL																	
39	SORCO0	Drawal	NULL																	

Regional Entity Wise Details at Regional Periphery (Trade)



**3.5 The Application for Scheduling of Collective Transaction shall be submitted by the Power Exchange(s) by 15:00 Hrs each day, to the NLDC as per Format-PX-II: “Application for Scheduling of Collective Transaction”, for transactions to be implemented on the following day.**

## APPLICATION FOR SCHEDULING OF COLLECTIVE TRANSACTION

**Application No.- 00IEX**

**Date:**

**Name of Power Exchange:- Indian Energy Exchange**

**Scheduling Request for -**

Region:	Sum of injection by all Sellers (MWH)	Sum of Drawal by all Buyers (MWH)	Net injection(+)/ Drawal(-) (MWH)	Number of Regional Entities Involved	
				Injection	Drawal
Northern	0.00	0.00	0.00	0	0
Western	0.00	0.00	0.00	0	0
Southern	664.80	3369.80	-2705.00	1	3
Eastern	2220.00	0.00	2220.00	2	0
North-Eastern	485.00	0.00	485.00	1	0
<b>TOTAL</b>	<b>3369.80</b>	<b>3369.80</b>	<b>0.00</b>	<b>4</b>	<b>3</b>

### Open Access Charges

1. Application Fees : Rs. 5000.00
2. Transmission Charges : Rs. 202188.00
3. Operating Charges : Rs. 35000.00

**Transaction Ref. No.**  
TO BE PAID BY

**It is hereby certified that**

- a) The request for scheduling submitted has been arrived at after a transparent process of bidding.
- b) The request for scheduling is within the available margins on respective transmission systems.

*3.7 NLDC shall send the details (Scheduling Request of Collective Transaction) to different RLDCs by 16:00 Hrs for final checking and accommodating them in their schedules. RLDCs shall confirm its acceptance to NLDC by 17:00 Hrs.*

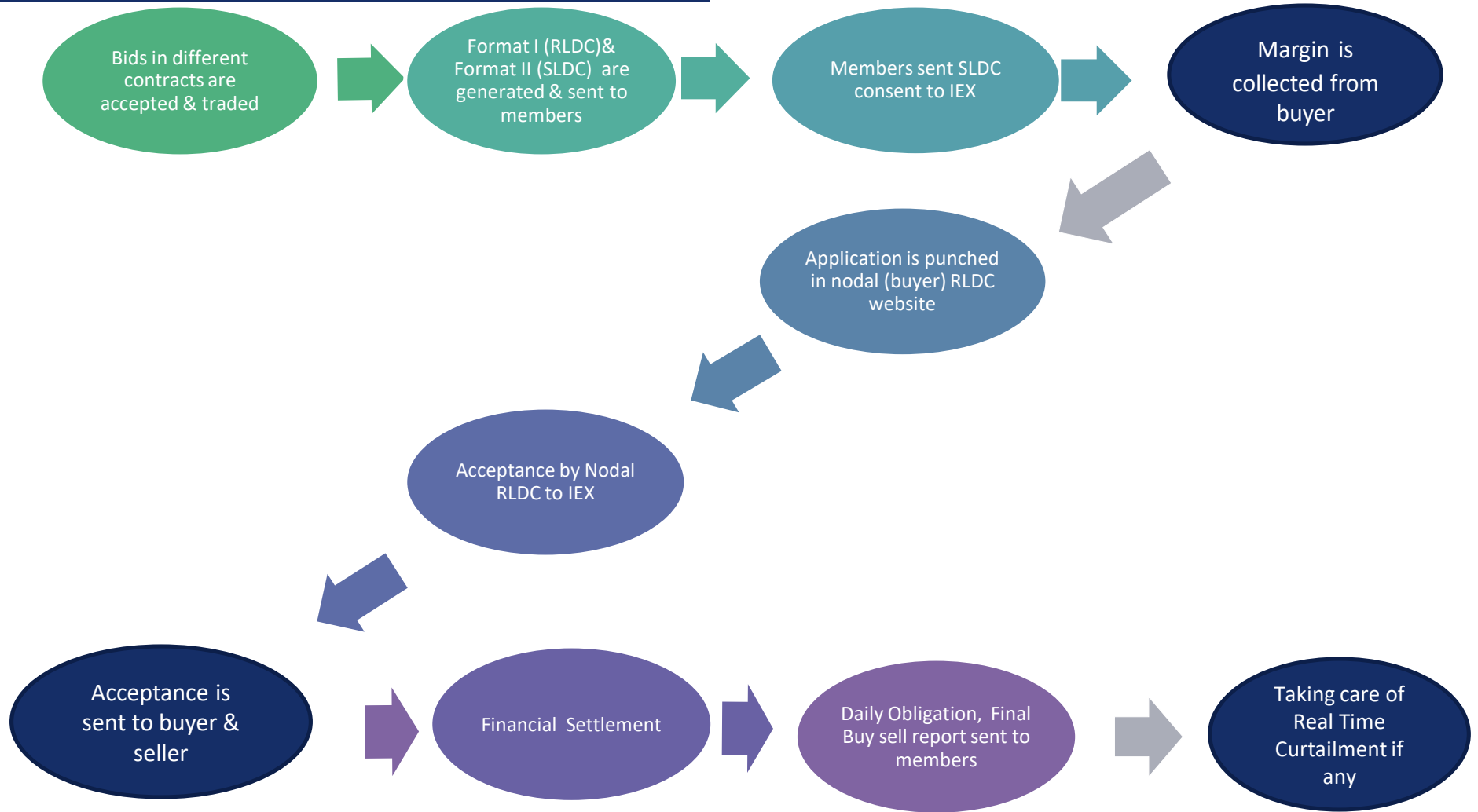
*3.8 After getting acceptance from the RLDCs, NLDC shall convey the acceptance of scheduling of Collective Transaction to Power Exchange(s) by 17:30 Hrs.*





## **Process Under Bilateral Transaction-Term Ahead Market**

# Delivery Process-TAM



# Format I

INTRA DAY : T

DAC : T

WEEKLY: T

DAILY: T

T: TRADE DATE

## OPEN ACCESS (BILATERAL TRANSACTION)-APPLICATION FOR SCHEDULING

To: WRLDC

Transaction Type: Contingency

For Month- Jul-13

1	Application No:	IEXL/130717001	Date	17-Jul-13
2	Applicant Name	Indian Energy Exchange	Registration Code	WRPX0001EXL

3	Scheduling Request	DATE		Hours		MW*
		From	To	From	To	
		17-Jul-13	17-Jul-13	1900	2100	
		17-Jul-13	17-Jul-13	2100	2300	100.00
		17-Jul-13	17-Jul-13	2300	2400	80.00

\* MW at the Regional Periphery

4	Buyer/Seller Details:		
		Injecting Entity	Drawee Entity
	Name of Entity	Gujarat Urja Vikas Nigam Limited (GUVNL)	Reliance Infra (Reliance Infra)
	Utility in which it is embedded	GETCO	MSETCL
	Concerned SLDC/ Region	Gujarat/WR	Maharashtra/WR
	Whether Internalized(Yes/No)	Yes	No
5	Applied route (from injection point to drawal point)		Gujarat State Periphery-GETCO-WR-MSETCL-MSETCL (T)-TPCL(T)- R Intra(T)- R Intra (D)
6	If re-routing to be considered, please specify the alternate Route(s)		

7	Payment details of Non-Refundable Application Fee(Rs. 5000/-)
---	---

8	Declaration: The provisions of the Electricity Act 2003, IEGC, CERC regulations & CTU Procedures with respect to bilateral transactions in inter state transmission as ammended from time to time are hereby understood and would be binding.
	Signature (With Stamp)
	Date:- 17-Jul-13 Place: New Delhi
	Name: Praganna Rao Designation: AVP (Market Operations)

8	For use of Nodal RLDC:
	Approval No:( If approved) Or reason of refusal(if refused)

Enclosures: 1. Consent of SLDCs

Copy to:  
1 Maharashtra SLDC  
2 Gujarat SLDC  
3 WR

# Format II



Office of The Chief Engineer  
Maharashtra State Load Dispatch Center  
Thane-Skopur Road, P.O. Airoli,  
Near Mumbai Port - 400 708



INTRA DAY : T

DAC : T

WEEKLY: T

DAILY: T

T: TRADE DATE

1	Application No:	IEXL/130718004	Date: 18-Jul-13
2	Applicant Name:	Indian Energy Exchange Limited	
3	Registration Code:	WRPX000IEXL	

Buyer/Seller Details			
	Injecting Entity		Drawee Entity
4	Name of Entity	Himachal Pradesh SEB	Reliance Infra
	Utility in which it is embedded	HP STU	MSETCL
	Concerned SLDC/ Region	H.P. / NR	Maharashtra / WR
	Whether Internalized(Yes/No)	No	Yes

5					
Concurrence Requested by SLDC(Where point of Injection/Point of Drawl is located):					
SLDC Ref. No.:					Date:
DATE		Hours			
From	To	From	To	MW*	
16-Jul-13	16-Jul-13	1800	1900	38.00	
16-Jul-13	16-Jul-13	1900	2000	70.00	
16-Jul-13	16-Jul-13	2000	2200	80.00	
16-Jul-13	16-Jul-13	2300	2400	80.00	

6					
Concurrence Accorded by SLDC(Where point of Injection/Point of Drawl is located):					
SLDC Ref. No.:					Date:
DATE		Hours			
From	To	From	To	MW*	
16-Jul-13	16-Jul-13	1800	1900	35.00	
16-Jul-13	16-Jul-13	1900	2000	70.00	
16-Jul-13	16-Jul-13	2000	2200	50.00	
16-Jul-13	16-Jul-13	2300	2400	50.00	

\* MW at the Regional Periphery  
A curtailed concurrence (or no concurrence) is being granted on account of  
MAHARASHTRA STATE TRANSMISSION SYSTEM IS INTERNALISED PER  
REL

<< Authorized Signatory for SLDC where point of injection/drawl is located >>  
Consent No. MSLDC/SHTR/13/DA-616  
Signature (With Stamp) SHIFT INCHARGE  
Name & Designation S. L. D. C.  
S.D. Ranade M.S. TRANS. CO. LTD.  
Executive Engineer KALWA.  
16/July/2013

# Format VI

INTRA DAY : T

DAC : T / T+1

WEEKLY: T+2/ T+3

DAILY: T+3

T: TRADE DATE

## OPEN ACCESS (BILATERAL TRANSACTION)- ACCEPTANCE FOR SCHEDULING Western Regional Load Despatch Centre, Mumbai

Nodal RLDC:	WRLDC	Date: 17-Jul-13
Acceptance No:	WRLDC/2013/17847/C	Date: 17-Jul-13
WRLDC Ref No:	4436/SD	Registration Code: WRPX000IEX
Ref: Original Application Number	IELX/I130717001	
1. Name Of Applicant:	INDIAN ENERGY EXCHANGE LTD	
2. Injecting Entity/State/Region:	Gujrat Urja Vikas Nigam Limited/Gujarat/WRLDC	
3. Drawee Entity/State/Region:	R-INFRA (MSEB)/Maharashtra/WRLDC	
4. Wheeling Regions:	Nil	
5. Open Access Scheduling Requested:		

From	To	Hours		Scheduling Requested (MW)	T
		From	To		
17-Jul-2013	17-Jul-2013	19:0	21:0	75.0	1
		21:0	23:0	100.0	2
		23:0	24:0	80.0	8

### 6. Open Access Scheduling Accepted

From (Date)	To (Date)	Time Period		Capacity Approved (MW)	MWh
		From Time (hh:mm)	To Time (hh:mm)		
17-Jul-2013	17-Jul-2013	19:0	21:0	75.0	150.000
		21:0	23:0	100.0	200.000
		23:0	24:0	80.0	80.000
Total MWH(To be scheduled)					430.000

### 7. Bidding Details: None

### 8. Payment Schedule

Payment Due Date : 20-Jul-2013

(i)Transmission Charges			
Trans. Systems	Rates(Rs./MWh)	MWh	Total(Rs.)
<b>(b) Inter-State(PoC Charges)</b>			
Injection Charges ( Gujarat )	151.3	430.000	65059.00
Withdrawl Charges ( Maharashtra )	151.3	430.000	65059.00
Total Of (b)			130118.00
<b>(ii)Operating Charges</b>			
RLDC/SLDC	Rates(Rs./Days)	No Of Days	Total(Rs.)
Maharashtra SLDC	2000.0	1	2000.00
WRLDC	2000.0	1	2000.00
Total Of (ii)			4000.00
<b>(iii)Non-Refundable Application Fee(if not paid earlier)</b>		5000.0	5000.0
Grand Total(i+ii+iii)			139118.00

POSOCO Portion Rs. 7000.00

Others Rs. 132118.00

Note: This acceptance is subjected to provisions of CERC (Open Access in Inter-State Transmission) Regulations, 2008 and amendments thereof.

To:INDIAN ENERGY EXCHANGE LTD

MLDC,,Gujarat SLDC, Maharashtra SLDC



# Form T-2

Participant's Report  
(As per Trades)



Form T-2

Date:- 17-Jul-13

Name of Participant	Reliance Energy Trading
Number of Portfolio	1
Trade Date	17-Jul-2013
Total Trades	5

Total Margin	-1,087,800.00
Initial Margin	-1,087,800.00
Basis Margin	0.00

Portfolio	Type	Application ID	Contract	Deal ID	Rate	Traded Qty	Qty for Schedule	Trade Value	Initial Margin	Basis Margin	Basis Margin Cash
W2MH0RET0001	Buy	I130717001	JUL13-H21-I17-WR	130717-5	2500	75	75	-187,500.00	-196,875.00	0.00	0.00
			JUL13-H20-I17-WR	130717-4	2500	75	75	-187,500.00	-196,875.00	0.00	0.00
			JUL13-H24-I17-WR	130717-3	2000	80	80	-160,000.00	-168,000.00	0.00	0.00
			JUL13-H22-I17-WR	130717-2	2510	100	100	-251,000.00	-263,550.00	0.00	0.00
			JUL13-H23-I17-WR	130717-1	2500	100	100	-250,000.00	-262,500.00	0.00	0.00
W2MH0RET0001 Sum								-1,036,000.00	-1,087,800.00	0.00	0.00

INTRA DAY : T

DAC : T

T: TRADE DATE

WEEKLY: T

DAILY: T

# Form T-7



INTRA DAY : T+1

DAC : T+1

WEEKLY: T+2/ T+3

DAILY: T+3

T: TRADE DATE

<b>Application No.</b>	I130717001	<b>Contract</b>	Intraday	<b>Participant</b>	N2DLORET	<b>Reliance Energy Trading</b>		
<b>Acceptance No.</b>	17847C	<b>Trade Date</b>	17-Jul-13	<b>Portfolio</b>	W2MHORET0001	<b>Reliance Infra</b>		
<b>Open Access Scheduling Accepted:</b>								
<b>From Date</b>	<b>To date</b>	<b>From Hour</b>	<b>To Hour</b>	<b>Sch. Qty (MW)</b>	<b>Sch. Qty.(MWh)</b>	<b>Total MWh</b>	<b>Route</b>	
17-Jul-13	17-Jul-13	1900	2100	75.00	150.00	430.00	WR	
17-Jul-13	17-Jul-13	2100	2300	100.00	200.00		WR	
17-Jul-13	17-Jul-13	2300	2400	80.00	80.00		WR	
<b>Transmission Charges</b>				<b>Operating Charges</b>				
<b>Trans. Sys.</b>	<b>Rate</b>	<b>Amount</b>		<b>SLDC/RLDC</b>	<b>Rate</b>	<b>Amount</b>		
				Maha SLDC	2000.00	2000.00		
MH_PoC (Dra)	151.3	65059.00		WRLDC(1/2)	1000.00	1000.00		
				Intervening Region				
<b>Total</b>		<b>65059.00</b>		<b>Total</b>		<b>3000.00</b>		
Non- Refundable application Fees- 5000.00								
<b>Payment Schedule</b>								
<b>Cash</b>	<b>PIPO Date</b>	<b>Amount</b>						
Invoice		-1038000.00						
Fees		-8600.00						
ST Fees		-1062.96						
STOA Charges	18-Jul-13	-73059.00						
<b>Total</b>		<b>-1118721.96</b>						
<b>Tradewise Obligation:</b>								
<b>Contract-ID</b>	<b>Deal ID</b>	<b>Rate (Rs/MWh)</b>	<b>Trd Qty (MW)</b>	<b>Total Applied Qty. (MW) Pro.</b>	<b>Total Approved Qty.(MWh) RLDC</b>	<b>Total Accepted Qty.(MWh)</b>	<b>Total Invoice Qty.(MWh)</b>	<b>Amount</b>
H20	130717-4	2500	75.00	75.00	75.00	75.00	75.00	-187500.00
H21	130717-5	2500	75.00	75.00	75.00	75.00	75.00	-187500.00
H22	130717-2	2510	100.00	100.00	100.00	100.00	100.00	-251000.00
H23	130717-1	2500	100.00	100.00	100.00	100.00	100.00	-250000.00
H24	130717-3	2000	80.00	80.00	80.00	80.00	80.00	-160000.00
<b>Total</b>			<b>430.00</b>	<b>430.00</b>	<b>430</b>	<b>430</b>	<b>430</b>	<b>-1036000.00</b>
<b>Daily Obligation:</b>								
<b>Delivery Date</b>	<b>PayIn Date</b>	<b>Trd Qty-MWh</b>	<b>Final Sch. Qty</b>	<b>Invoice</b>	<b>Fees</b>	<b>ST on Fees</b>	<b>Cash</b>	
17-Jul-13	18-Jul-13	430.00	430.00	-1036000.00	-8600.00	-1062.96	-1045662.96	
<b>Total</b>		<b>430.00</b>	<b>430.00</b>	<b>-1036000.00</b>	<b>-8600.00</b>	<b>-1062.96</b>	<b>-1045662.96</b>	

# Daily Obligation

INTRA DAY :  
T+1 (BUYER &  
SELLER)

DAC : T+1 (BUYER)/  
T+2 (SELLER)

WEEKLY: D-  
1 (BUYER) /  
D+1 (SELLER)

DAILY: D-1 (BUYER)  
/ D+1 (SELLER)

D: DELIVERY DATE  
T: TRADE DATE



Member's Datewise Obligation  
Date: - 17-07-13

## TAM PayIn(-)/ PayOut(+) Date:- 18-Jul-13

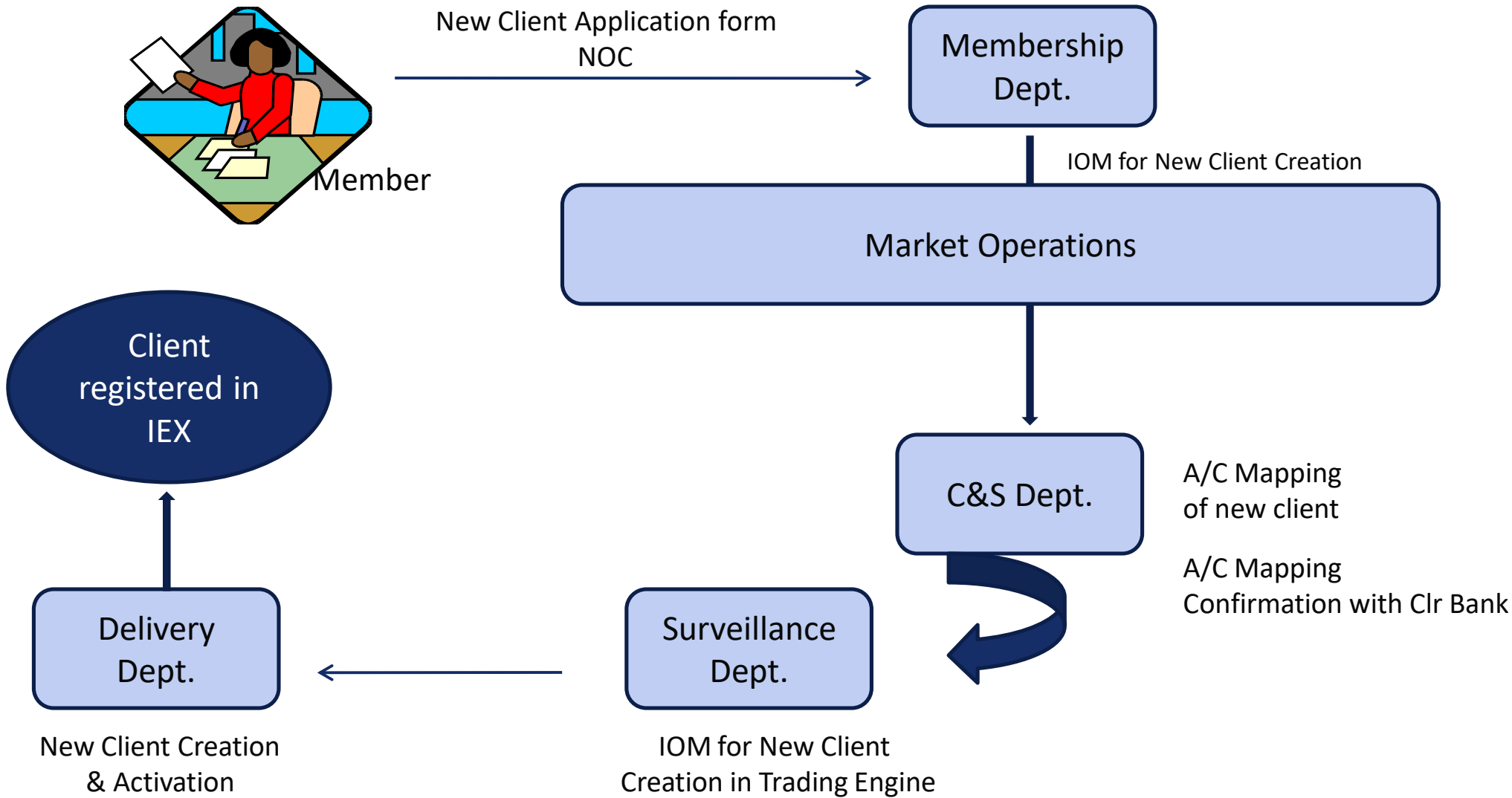
Participant ID	N2DL0RET	Name	N2DL0RET
----------------	----------	------	----------

Amount		Cash/NC	
Application-ID	BS	Category	Cash
1130717001	B	Initial + Basis Margin Available	1087800
		Less	
		Charges	-73059
		Fees	-8600
		Invoice	-1036000
		Service Tax	-1062.96
<b>1130717001 Total</b>			<b>-30921.96</b>
<b>Grand Total</b>			<b>-30921.96</b>

# Clearing and Settlement

- ▶ Settlement Account Mapping & Client Fees Recovery
- ▶ Fund Management
- ▶ Congestion Revenue
- ▶ Charges – NLDC/RLDC/SLDC
- ▶ Pay in/ Pay out – DAM/TAM/REC
- ▶ Margins-DAM
- ▶ Real Time Curtailment
- ▶ Reconciliation

# Client Registration Process



- Exchange empanelled Clearing Banks
- Automated movement of funds
- Exchange Members to open settlement account
- Funds pay in & pay out to be done through such settlement account
- Electronic transfer of funds obligation
- Exchange has the right over Member's Settlement account
- Daily reconciliation with Bank

# Charges – DAM/TAM

## NLDC Charges

- Application Fees
- NLDC Scheduling & Operational Charges
- Transmission Charges CTU

## SLDC Charges

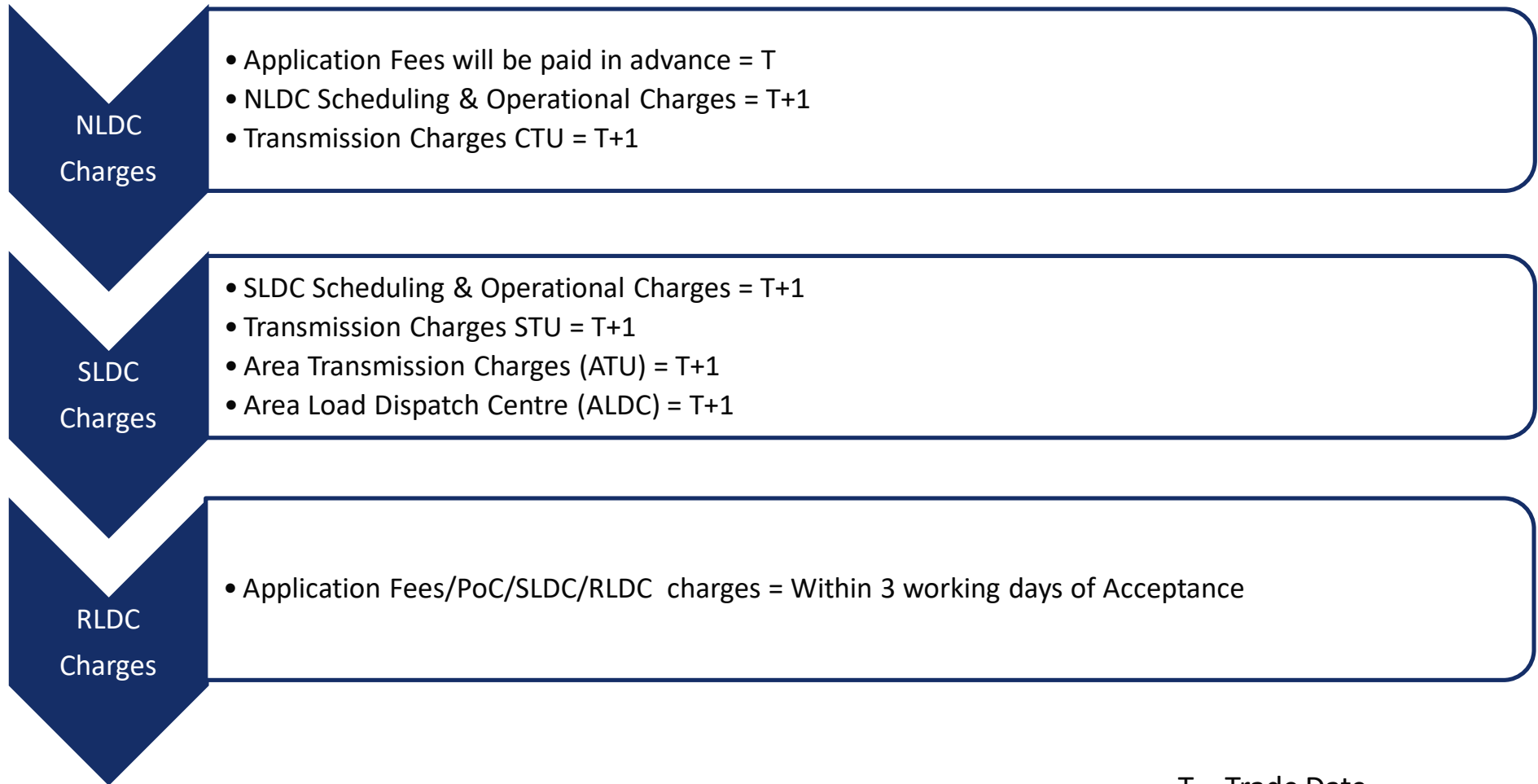
- SLDC Scheduling & Operational Charges
- Transmission Charges STU
- Area Transmission Charges (ATU)
- Area Load Dispatch Centre (ALDC)

## RLDC Charges

- Application Fees
- PoC/SLDC/RLDC charges



# Timelines of Charges – DAM/TAM



T = Trade Date

# Calculation of Charges – DAM

NLDC Application Fee = 5,000/ (No of Successful Portfolios).

- Injection PoC Charges

- Drawal PoC Charges

NLDC Scheduling & Operating Charges –Buy = Rs 1 \*(Total traded buy quantity in MWh)\*

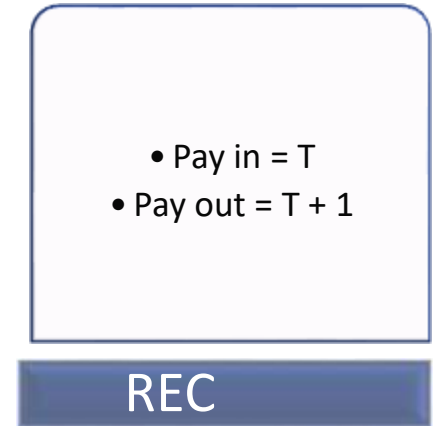
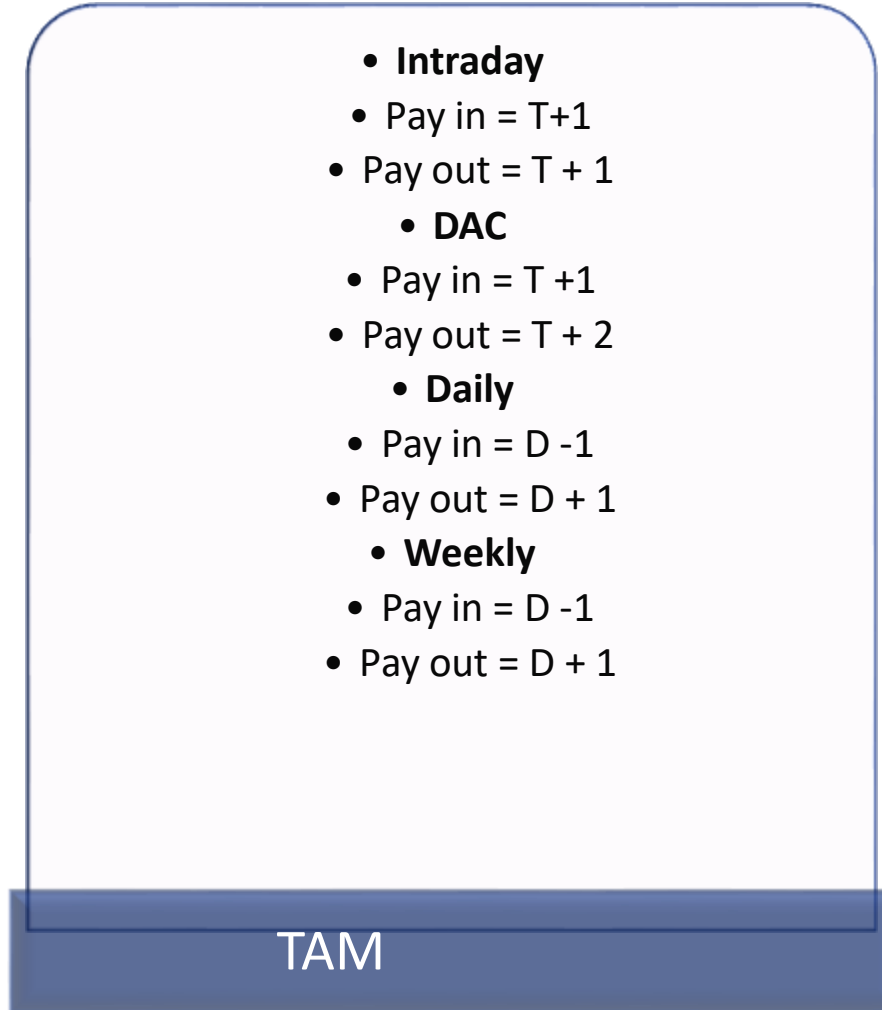
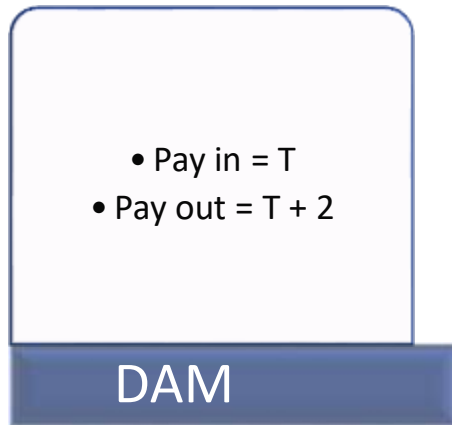
\* Subject to ceiling of Rs 200

NLDC Scheduling & Operating Charges –Sell = Rs 1 \*(Total traded sell quantity in MWh)\*\*

\* Subject to ceiling of Rs 200

State Transmission/Distribution Charges and Scheduling and Operating Charges are as per the Rate specified in Standing Clearance.

# Time Lines - Pay in / Pay out



In case of Holiday PI/PO will be on next working Day

T = Trade  
D = Delivery

## Trader Member


- D-1 At 09:30 Hrs : Pre-trade Margin Check.
  - equal to the initial margins or average of last 7 days' trading value, whichever is more.
- D-1 At 12:30 Hrs : Preliminary Obligation Margin Check
  - Preliminary Obligation  $\leq$  Funds Available (incl initial margin)
  - Block funds.
- D-1 At 15:30 Hrs : Pay-ins
- At D+1 14:00 Hrs : Pay-out.

## Professional Member

- D-1 At 09:30 Hrs : Pre-trade Margin Check.
  - equal to the 100% of the bid value to be provided by Client directly to IEX in Client Settlement account
- D-1 At 15:30 Hrs : Pay-ins
- At D+1 14:00 Hrs : Pay-out.

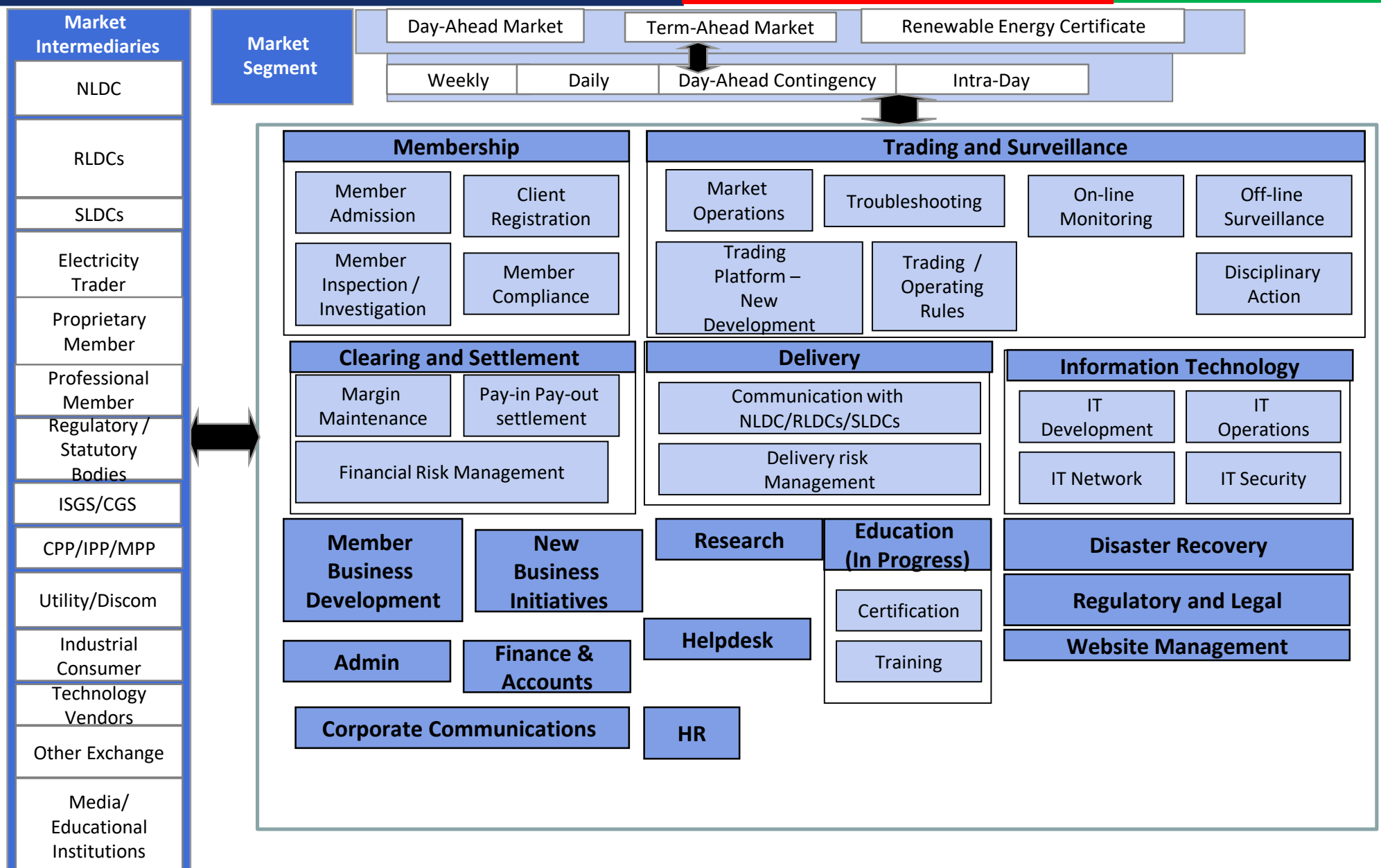
# Risk Management in DAM/TAM

	Proprietary/Trading Licensee Members		Professional Members	
	Initial Margin	Basis/Additional Margin	Initial Margin	Basis/Additional Margin
Day-Ahead Market	Margin equal to Last 7 Days Average of Buy turnover		As per Bank Balance including Hair Cut Factor	
TAM-Intraday	105% of order	-	105% of order Value	-
TAM-DAC	100% of order Value	-	100% of order Value	-
TAM-Daily	5% of order Value	50% of Trade Value	5% of order Value	50% of Trade Value
TAM-Weekly	5% of order Value	50% of Trade Value	5% of order Value	50% of Trade Value
REC	100% of order Value	-	100% of order Value	-
Member Client RMS	Credit facility can be provided by Trader Member to their clients		No credit or funding facility by Professional Members to their clients	



All these transactions are processed electronically through a interface between the exchange & banks

# Exchange Process Landscape





***IEX Daily SMS Service for  
Trade Details***

***Email***

***[sms@iexindia.com](mailto:sms@iexindia.com)***



***IEX Monthly Bulletin***

***Email***

***[bulletin@iexindia.com](mailto:bulletin@iexindia.com)***



***IEX 15 min Trade Prices  
displayed on its website***

***Email***

***[info@iexindia.com](mailto:info@iexindia.com)***