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

Transparency  Liquidity  Competition
IEX Volume Growth: Strong trend line

Electricity Volume

Source: IEX Data (DAM+TAM)
## Comparison: Market-wise Cleared Volume (MUs) (Apr-June)

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

<table>
<thead>
<tr>
<th>Product</th>
<th>Q1 FY18-19</th>
<th>Q1 FY19-20</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy Bid</td>
<td>17,504</td>
<td>15,251</td>
<td>-13%</td>
</tr>
<tr>
<td>Sell Bid</td>
<td>19,547</td>
<td>23,599</td>
<td>21%</td>
</tr>
<tr>
<td>Cleared Bid</td>
<td>13,936</td>
<td>11,985</td>
<td>-14%</td>
</tr>
<tr>
<td>MCP</td>
<td>4.13</td>
<td>3.29</td>
<td>-20%</td>
</tr>
</tbody>
</table>
### Key statistics: Electricity & REC Market

<table>
<thead>
<tr>
<th></th>
<th><strong>ELECTRICITY</strong></th>
<th><strong>REC</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market Share (FY18-19)</strong></td>
<td>97.5%</td>
<td>61%</td>
</tr>
<tr>
<td><strong>State Utilities</strong></td>
<td>29 States I 5 UTs</td>
<td>28 States I 5 UTs</td>
</tr>
<tr>
<td><strong>Generators</strong></td>
<td>487</td>
<td>1102</td>
</tr>
<tr>
<td><strong>Industrial Consumers</strong></td>
<td>4073</td>
<td>3167</td>
</tr>
<tr>
<td><strong>Average Daily Volume</strong></td>
<td>&gt;138,632 MWh</td>
<td>&gt;3 Crore RECs</td>
</tr>
<tr>
<td></td>
<td><em>Highest: 208,423 MWh</em></td>
<td><em>Highest: 32,39,142 RECs</em></td>
</tr>
</tbody>
</table>

*IEX Data as on 21 MAY, 2019*
## TAM Monthly Snapshot - June’19

<table>
<thead>
<tr>
<th>Contract Type</th>
<th>Total Volume (MWh)</th>
<th>Max Price (Rs./kWh)</th>
<th>Min Price (Rs./kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intraday</td>
<td>72,240</td>
<td>12.00</td>
<td>1.05</td>
</tr>
<tr>
<td>Day-Ahead</td>
<td>1,993,660</td>
<td>7.00</td>
<td>3.85</td>
</tr>
<tr>
<td>Daily</td>
<td></td>
<td></td>
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Increasing Participation

- Members+Clients
- Open access consumers
## Open Access Status across Indian States

### Northern Region

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<thead>
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<th>Generator</th>
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<tr>
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<td>A.P</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Karnataka</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Kerala</td>
<td>❌</td>
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### East & North Eastern Region

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<td>Assam</td>
<td>✓</td>
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</tr>
<tr>
<td>Bihar</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td>Manipur/Mizoram</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tripura/Sikkim</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>❌</td>
<td>❌</td>
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<tr>
<td>A.P.</td>
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<td>✓</td>
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<tr>
<td>Meghalaya</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Orissa</td>
<td>✓</td>
<td>✓</td>
</tr>
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</table>

- ✓ Allowed
- ❌ Not Allowed
Industrial segments with IEX

- Textile: 29%
- Manufacture: 15%
- Metal: 24%
- Chemical: 9%
- Auto Components: 6%
- Cement: 4%
- Paper: 3%
- Cotton: 1%
- Others: 9%
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

- Bidding
- Delivery
- Money
- Risks

On-line
- National
- Automated

Voluntary
Standardized Contracts
Central Counterparty

Delivery...
- Spot
- Intra-Day
- Day-ahead
- Forward
- Weeks
Power Exchange Characteristics

- **Easy Access**: Automated live trading system
- **Anonymous**: Closed bidding environment
  - Demutualised, with oversight committees set by regulator.
  - Standardised risk management, with regulatory oversight.
  - Trade results made public
- **Reliable**: Disaster Recover site
  - Established C&S, with no defaults till date
- **Secure**: Terminals connected through MPLS and SSL only.
  - Surveillance room with necessary security (Separate network, Restricted biometric access, Video & Audio recording).
  - Periodic IT system audit for data security, data integrity and operational efficiency. Automated audit trail
Power Exchange *facilitates*

- **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

**Surveillance Function:**
- Performed from a secure ‘Surveillance Room’ with restricted access
- Surveillance Committee reports to CERC quarterly

**C&S Function:**
- Separate Clearing & Delivery cells
- Risk Mgmt. Committee reports to CERC half yearly

- Results displayed on trading terminals
- Market results, including curves published online
- Monthly report to CERC
What benefits does the power exchange provide?

- Nation-wide voluntary access
- Delivery Based contracts
- E-trading
- Robust Platform
- No counterparty risk
Understanding exchange mechanism

- Congestion Management
- Risk Management
- Bidding and Matching
- Congestion Management
- Treatment of losses and charges
Surveillance department of IEX is under continuous online CCTV monitoring and recording

All Telephonic conversations are recorded with no outgoing 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 checklists which is authorized by HOD.

Concurrent Audit of the checklist by internal auditors
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**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery</td>
<td>Next day</td>
<td>0400-2400 Hrs same day</td>
<td>For next day</td>
<td>Continuous trading</td>
<td>From 2nd day to next 8 days</td>
</tr>
<tr>
<td>Auction Type</td>
<td>Closed Auction</td>
<td>Continuous trading</td>
<td>Continuous trading</td>
<td>Continuous trading</td>
<td>Block of Hours (Fixed)</td>
</tr>
<tr>
<td>Contracts</td>
<td>15 min</td>
<td>Hourly</td>
<td>Hourly</td>
<td>Block of Hours (Fixed)</td>
<td>All Days; 1200-1500</td>
</tr>
<tr>
<td>Trade Availability</td>
<td>All Days</td>
<td>All days</td>
<td>All Days; 1500-2300</td>
<td>All Days; 1200-1500</td>
<td>All Days; 1200-1600</td>
</tr>
<tr>
<td>Financial Settlement</td>
<td>Pay-In- D-1; Pay Out – D+1</td>
<td>Pay in: T+1</td>
<td>Pay in: T+1</td>
<td>Pay-In- D-1; Pay Out – D+1</td>
<td>Pay-In- D-1; Pay Out – D+1</td>
</tr>
</tbody>
</table>

**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+1

**Daily Contracts**

- Continuous trading
- Hourly
- All Days; 1200-1500
- Pay in: T+1
- Pay out: T+2

**Weekly Contracts**

- Open Auction
- Block of Hours (Fixed)
- Wed & Thurs; 1200-1600
- Pay-In- D-1; Pay Out – D+1
- Pay-In- D-1; Pay Out – D+1
Erstwhile Vertically Integrated Structure

Vertically Integrated State Electricity Boards (SEB)

Generation

Transmission

Distribution

Consumer

Consumer

Consumer
Introducing Competition

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unbundling of Utilities</strong></td>
<td>Separation of Vertically integrated utilities, transmission should be separated from generation &amp; supply</td>
</tr>
</tbody>
</table>
| **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
- The Electricity Act Amendment Bill, 2014
Market related legislations in India

**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
Framework for Development of Power Market
Legislative and Regulatory Framework

- **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
Evolution of Power Markets in India: Regulatory Framework

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)
Features of Power Market Regulations, 2010

- **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 1st 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

<table>
<thead>
<tr>
<th>Procurement Contracts</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| **Long Term** | • Escape volatility of short term and spot markets  
• Meets base load requirements  
• Transmission availability | • Capacity + Energy  
• Falling short term prices may make costly contracts obsolete and sunk |
| **Medium Term** | • Escape volatility of short term and spot markets  
• Meets intermediary load requirements, help escape long term commitment for such requirements | • Transmission availability after LT  
• Only to meet fixed seasonal or intermediary load requirements |
| **Short Term** | **Bilateral** | • No long term commitment  
• Flexible response to demand  
• Priority over PX, unless Spot | • Costlier than PX Spot  
• Congestion  
• Regulatory risks |
| **PX Spot** | • No long term commitment  
• Price transparency  
• Flexible response to demand | • Volatile  
• Congestion  
• Regulatory risks |
| **UI/DSM** | • Realtime load balance | • Volatility  
• Penalties |
Indian Power Market Development trend

Single buyer/seller

Multi Buyer/Seller

OTC Markets

Spot trading on Exchanges

Improved liquidity and Efficiency
## Open Access Status across Indian States

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</thead>
<tbody>
<tr>
<td>A.P.</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Karnataka</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Kerala</td>
<td>✗</td>
<td>✔</td>
</tr>
</tbody>
</table>
# Open Access: What a consumer pays

## Charges

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PoC charges</strong></td>
<td>• Inter-State Transmission charges payable by the open access consumer</td>
</tr>
<tr>
<td><strong>Transmission Charges or STU Charges</strong></td>
<td>• Payable to the state transmission utility for the use of the transmission system for availing power through open access.</td>
</tr>
<tr>
<td><strong>Wheeling charges</strong></td>
<td>• Charge to the Discom for conveyance of electricity through open access as determined by the SERCs</td>
</tr>
<tr>
<td><strong>Cross Subsidy Surcharge</strong></td>
<td>• Subsidising open access consumer has to pay a cross subsidy surcharge to the Discom.</td>
</tr>
</tbody>
</table>
| **Others**                            | • Additional Charges, if any  
• NLDC application fee, scheduling and operating charges, SLDC Charges  
• IEX transaction charges/Trading Margin |
Open Access: What a consumer pays

Losses

- 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.
Further in this presentation...

Introduction to Power Exchanges

- Overview of Power Exchange

Power Exchange Operations

- Surveillance
- Delivery and Scheduling
- Clearing and Settlement
Introduction to Power Exchange
IEX - India’s Premier Power Exchange

01 Fast Growing Sector & Conducive Government Policies
- Increasing power surplus to drive short term power trading market
- Robust transmission system
- Govt policies such as 27*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

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.

04 Diverse Participant Base Ensuring liquidity
- >5,800 registered participants including all distribution companies, >400 electricity generators and >3,800 industry/commercial consumers across county.

05 Rapidly Growing Trade Volumes
- Traded 40,528 MU in Electricity Contracts and 4.62 MU REC’s in FY17 with 4 year CAGR of 15.4% and 23.4% respectively since FY13

06 Robust and Scalable Technology
- Technology capable to handle 1 lakh participants against present participation of 5,800
- Capable to handle 30 bid areas as against present 13

(1) For 11 months FY17 (2) Participants are located across 29 states and 5 UTs also
Product Portfolio
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
Day Ahead Market (DAM)
- Trade for the following day
- Contracts for every 15 min, closed auction
- 4 types of contracts:
  - Intraday
  - Day Ahead Contingency
  - Daily
  - Weekly

Term Ahead Market (TAM)
- From 3 Hrs ahead to 11 days in advance

Renewable Energy Certificates (RECs)
- Trade green attributes of electricity
- 1 REC = 1 MWh of green energy
**Contract Characteristics**

**TERM AHEAD MARKET**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delivery</strong></td>
<td>Next day</td>
<td>0400-2400 Hrs</td>
<td>For next day</td>
<td>From 2\textsuperscript{nd} day to next 8 days</td>
<td>For next week</td>
</tr>
<tr>
<td><strong>Auction Type</strong></td>
<td>Closed Auction</td>
<td>Continuous</td>
<td>Continuous trading</td>
<td>Continuous trading</td>
<td>Open Auction</td>
</tr>
<tr>
<td><strong>Contracts</strong></td>
<td>15 min</td>
<td>trading</td>
<td>Hourly</td>
<td>Block of Hours (Fixed)</td>
<td>Block of Hours (Fixed)</td>
</tr>
<tr>
<td><strong>Trade Availability</strong></td>
<td>All Days</td>
<td>Hourly</td>
<td>All days</td>
<td>All Days; 1200-1500</td>
<td>Wed &amp; Thurs; 1200-1600</td>
</tr>
<tr>
<td><strong>Financial Settlement</strong></td>
<td>Pay-In- D-1; Pay</td>
<td>All days; 1500-2300</td>
<td>Pay in: T+1</td>
<td>Pay-In- D-1; Pay Out – D+1</td>
<td>Pay-In- D-1; Pay Out – D+1</td>
</tr>
<tr>
<td></td>
<td>Out – D+1</td>
<td>Pay out: T+1</td>
<td>Pay out: T+1</td>
<td>Pay Out – D+1</td>
<td>Pay Out – D+1</td>
</tr>
</tbody>
</table>

*Note: D = Delivery, T = Trade*
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:

<table>
<thead>
<tr>
<th>Fees</th>
<th>Professional &amp; Proprietary &amp; Electricity Trader (Full Payment Option)</th>
<th>Proprietary member (Light Payment Option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission fee</td>
<td>Rs. 35,00,000</td>
<td>Rs. 10,00,000</td>
</tr>
<tr>
<td>Interest Free Security Deposit</td>
<td>Rs. 25,00,000</td>
<td>Rs. 10,00,000</td>
</tr>
<tr>
<td>Annual Subscription Fees</td>
<td>Rs. 5,00,000</td>
<td>Rs. 2,50,000</td>
</tr>
<tr>
<td>Processing Fees</td>
<td>Rs. 10,000</td>
<td>Rs. 10,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>Rs. 65,10,000</td>
<td>Rs. 22,60,000</td>
</tr>
<tr>
<td>Exchange Transaction</td>
<td>2p/kWh</td>
<td>3p/kWh</td>
</tr>
</tbody>
</table>
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
Registration

**SELECTION OF MEMBER**
- 1 week

**METERING (unless already done)**
- 0.5-3 Months
  - Special Energy Meter

**SLDC Clearance/NOC**
- 1 Month
  - NOC from respective SLDC
  - Format PX 1

**Registration at IEX**
- 0.15 Month
  - Client registration for each point of drawal
  - Unique id created in Exchange system
Exchange Operations
DAM & TAM
Exchange Operations Covers -

- 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.)

<table>
<thead>
<tr>
<th>Price Tick (Rs.)</th>
<th>0</th>
<th>1</th>
<th>1.1</th>
<th>2</th>
<th>2.1</th>
<th>2.5</th>
<th>3</th>
<th>3.1</th>
<th>4</th>
<th>4.1</th>
<th>5</th>
<th>---</th>
<th>---</th>
<th>----</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio A, MW</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Portfolio B, MW</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Portfolio C, MW</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>-40</td>
<td>-60</td>
<td>-80</td>
<td>-81</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
</tr>
</tbody>
</table>

### Bid Quantum by different portfolios

- Portfolio A, MW
- Portfolio B, MW
- Portfolio C, MW

### Total Buy Quantum received, MW

<table>
<thead>
<tr>
<th>Total Buy Quantum received, MW</th>
<th>120</th>
<th>100</th>
<th>80</th>
<th>80</th>
<th>70</th>
<th>60</th>
<th>60</th>
<th>50</th>
<th>40</th>
<th>40</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio A, MW</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-40</td>
<td>-60</td>
<td>-80</td>
<td>-81</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
</tr>
<tr>
<td>Portfolio B, MW</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>-60</td>
<td>-80</td>
<td>-81</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
<td>-120</td>
</tr>
<tr>
<td>Portfolio C, MW</td>
<td>0</td>
<td>-20</td>
<td>-31</td>
<td>-80</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
</tr>
</tbody>
</table>

### Total Sell Quantum received, MW

<table>
<thead>
<tr>
<th>Total Sell Quantum received, MW</th>
<th>120</th>
<th>100</th>
<th>80</th>
<th>80</th>
<th>30</th>
<th>0</th>
<th>-20</th>
<th>-31</th>
<th>-80</th>
<th>-100</th>
<th>-100</th>
<th>-100</th>
<th>-100</th>
<th>-100</th>
<th>-100</th>
</tr>
</thead>
</table>

### Net Transaction, MW

- Market clearing price (MCP) **2.5**

![Market Clearing Volume (MCV)](image)
Day Ahead Market-Collective Transaction Trading process

- **Bidding**: 10:00 am to 12:00 pm
  - Bids for 15-min each or block bids can be placed

- **Matching**: 12:00 pm to 1:00 pm
  - MCP & MCV calculated

- **Review corridor and funds availability**: 1:00 pm to 2:00 pm
  - Corridor availability and funds verified

- **Result**: 3:00 pm
  - Final ACV and ACP calculated. Market splitting if congestion

- **Confirmation**: 5:30 pm
  - Collective transaction confirmation by NLDC

- **Scheduling**: 6:00 pm
  - Final Schedule sent to RLDC for incorporation
Trade, Scheduling and Clearing Process

- Scheduling
- PIPO & Obligation Reports
- Final Result
- Provisional Result
- Surveillance check for Bidding as per NOC
- Matching

NOC submission to Delivery Dept.

Member
Day Ahead Market-Collective Transaction

Bid Types

- 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

**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:**
- **Buy Bid:** Bids specifying a price not lower than the Clearing Price are accepted. Accepted Bids are valued at Market/Area Clearing Price. Hence Buyer Surplus is the Difference between the submitted price and the market price, multiplied by the quantity actually purchased.
- **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.

**Selection Criteria:**

<table>
<thead>
<tr>
<th>Block No.</th>
<th>Full Selection</th>
<th>Partial Selection</th>
<th>Rejection</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:45-01:00</td>
<td>If CP&gt;=3000</td>
<td>If 2999&lt;CP&lt;3000</td>
<td>If CP&lt;=2999</td>
</tr>
</tbody>
</table>
| 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:

<table>
<thead>
<tr>
<th>BID...</th>
<th>Standard/User...</th>
<th>Block</th>
<th>From Period</th>
<th>To Period</th>
<th>Price</th>
<th>Quantity</th>
<th>Linked To</th>
</tr>
</thead>
<tbody>
<tr>
<td>E5</td>
<td>Standard</td>
<td>Evening Peak</td>
<td>17:00</td>
<td>22:00</td>
<td>5000</td>
<td>-50.0</td>
<td></td>
</tr>
<tr>
<td>E6</td>
<td>Standard</td>
<td>Evening Peak</td>
<td>17:00</td>
<td>22:00</td>
<td>7000</td>
<td>-50.0</td>
<td></td>
</tr>
</tbody>
</table>

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 |
|------------|----------------|------------------|---------------|-------------|-------|----------|-----------|
| Price      | 4879           | 4879             | 4879          | 4980        | 5249  | 5389     | 6400      | 6401       | 6401         | 6800           | 6600           | 6600         | 6600         | 6251         | 6251         | 6250         | 6250         |

Average Price: 5875.9

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 1st 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 2nd 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:

<table>
<thead>
<tr>
<th></th>
<th>Quantity (MW)</th>
<th>Price (Rs./MWhr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER Seller-1</td>
<td>200</td>
<td>2000</td>
</tr>
<tr>
<td>ER Seller-2</td>
<td>100</td>
<td>3000</td>
</tr>
<tr>
<td>SR Seller-1</td>
<td>100</td>
<td>3000</td>
</tr>
<tr>
<td>SR Seller-2</td>
<td>100</td>
<td>4000</td>
</tr>
<tr>
<td>SR Buyer</td>
<td>300</td>
<td>4000</td>
</tr>
<tr>
<td>ER Buyer</td>
<td>100</td>
<td>3000</td>
</tr>
</tbody>
</table>
Understanding Price Matching

Market Clearing Price (MCP) = Rs. 3000/MWhr
Market Clearing Volume (MCV) = 400 MW
Price 3000
Buy Quantity 400.00
Sell Quantity 400.00
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.

### ER-Surplus Region

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

### SR-Deficit Region

<table>
<thead>
<tr>
<th>Price (Rs./kWh)</th>
<th>0</th>
<th>999</th>
<th>1000</th>
<th>1999</th>
<th>2000</th>
<th>2999</th>
<th>3000</th>
<th>3001</th>
<th>3999</th>
<th>4000</th>
<th>4001</th>
<th>6000</th>
<th>8000</th>
<th>10000</th>
<th>20000</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR Seller-1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
</tr>
<tr>
<td>SR Seller-2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
<td>-100</td>
</tr>
<tr>
<td>SR Buyer</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
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### Final Results after Market Splitting

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<th>ACP Surplus Region (ER)</th>
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### Status of Buyers and Sellers

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Term-Ahead Market
Price Discovery and Bidding

www.iexindia.com
TAM Market Segments

**Weekly**
Trade power for an entire week (on Wed & Thur, 12 – 1600 hrs)
- **Open Auction**

**Daily**
Trade power for an entire day (delivery starts after 2 days from trade day till T+9)
- **Continuous**

**DA Contingency**
Trade power for an entire day on hourly basis, 1 day ahead
- **Continuous**

**Intraday**
Trade power for same day on hourly basis
- **Continuous**
Types of Contracts

- **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)
Trading of Intra-day Contracts

Trading Hour

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

0:30-1 1-2 2-3 3-4 4-5 5-6 6-7 7-8 8-9 9-10 10-11 11-12 12-13 13-14 14-15 15-16

16-17 17-18 18-19 19-20

Delivery Hours: 20 (04-24)

4-5 5-6 6-7 7-8 8-9 9-10 10-11 11-12 12-13 13-14 14-15 15-16 16-17 17-18 18-19 19-20

20-21 21-22 22-23 23-24

Contracts available for delivery on the same day
Intra-day & DAC contracts with current trading system

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Trading of Weekly & Daily Contracts

- **Daily Contracts** - T+2 to T+9

- **Weekly Contracts** - Trading on every Wednesday and Thursday for Delivery From Monday to Sunday.
Term Ahead Market-Bilateral Transaction

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.
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.
Delivery and Scheduling
Process Under Collective Transaction-Day Ahead Market
Scheduling Process of DAM Market

1. Permission to Trade under open Access
   - Seller
     - Independent Power Prod.
     - Captive Power Plants
     - State Utilities
     - Central Gen. Station
   - Buyer
     - Industrial Consumers
     - State Utilities
2. Bidding
3. Transmission Capacity
4a. Trade Result
4b. Trade Result
5. Trade Result
6. Trade Result
7a. Schedule of Regional Entities
7b. Schedule of State Utility & Intra State Entities
8. Actual Injection
8. Actual Drawal

Deviation = Schedule - Actual Injection/Drawal
Settled @ Deviation Charges with RLDCs and SLDCs
BothBuyersandsellers to absorb losses

- Draw less than contracted power \((Contracted \ Power - \text{losses})\)
- Inject more than contracted power \((Contracted \ Power + Losses)\)

- 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

**Bid Volume**

- 100 MW at NR periphery

**POC Loss**

- 98.5 MW at State periphery

**State Loss**

- 93.72 MW at Buyer End

**Scheduled Drawal ≤ SLDC Clearance**

- X (Buyer)

**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

**Bid Volume**
- 100 MW at regional periphery

**POC Loss**
- 101.52 MW at state periphery

**State Loss**
- 106.69 MW

**Scheduled Generation <= SLDC Clearance**
- 106.69 MW injected by seller

**Y (Seller)**

**Maximum Bid**
- Volume in standing clearance – Regional & State losses
Trade Selected:
100 MW Sell

PoC/CTU Charges @ Rs. 80/MWhr

Scheduling & Operating Charges @Rs. 1000/Day

Punjab Loss - 6.6%

PoC/NR Loss - 3%

Indian Energy Exchange

Trade Selected:
100 MW Sell

200 MW

Trade Selected:
200 MW Buy

Western Region

Madhya Pradesh

Eastern Region

West Bengal

Northern Region

Punjab

Eastern Region

West Bengal

Northern Region

Punjab

Western Region

Madhya Pradesh
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Note: Table represents the interchange values between different regions with abbreviations NR, SR, ER, AR, WR, and their corresponding states or regions.
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.

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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**

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**Scheduling Request for**

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<th>Sum of injection by all Sellers (MWH)</th>
<th>Sum of Drawal by all Buyers (MWH)</th>
<th>Net injection(+) or Drawal(-) (MWH)</th>
<th>Number of Regional Entities Involved</th>
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**Open Access Charges**

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

**Transaction Ref. No.**

**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.
4.1 Concerned RLDCs shall accommodate the Schedule of Collective Transactions in the respective Regional Entity’s and inter-Regional Schedules, which would be issued finally by RLDCs at 18:00 Hrs of each day.

4.3 RLDCs shall incorporate all buyers within a State (clubbed together as one group) and all sellers within a State (clubbed together as another group), in the schedules of the Collective Transactions.

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</tbody>
</table>

Trade at Regional Periphery for a Regional Entity
Process Under Bilateral Transaction-Term Ahead Market
Bids in different contracts are accepted & traded

Format I (RLDC) & Format II (SLDC) are generated & sent to members

Members sent SLDC consent to IEX

Application is punched in nodal (buyer) RLDC website

Acceptance by Nodal RLDC to IEX

Acceptance is sent to buyer & seller

Financial Settlement

Daily Obligation, Final Buy sell report sent to members

Taking care of Real Time Curtailment if any

Margin is collected from buyer
Format I

INTRA DAY: T
DAC: T
WEEKLY: T
DAILY: T
T: TRADE DATE
### Format II

**INTRA DAY:** T  
**DAC:** T  
**WEEKLY:** T  
**DAILY:** T  
**T:** TRADE DATE
**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**

<table>
<thead>
<tr>
<th>From Date</th>
<th>To Date</th>
<th>From</th>
<th>To</th>
<th>Scheduling Requested (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-Jul-2013</td>
<td>17-Jul-2013</td>
<td>19:00</td>
<td>21:00</td>
<td>75.0</td>
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<tr>
<td></td>
<td></td>
<td>21:00</td>
<td>23:00</td>
<td>100.0</td>
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<td></td>
<td></td>
<td>23:00</td>
<td>24:00</td>
<td>80.0</td>
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</tbody>
</table>

### Open Access Scheduling Accepted

<table>
<thead>
<tr>
<th>From Date</th>
<th>To Date</th>
<th>From Time (hh:mm)</th>
<th>To Time (hh:mm)</th>
<th>Capacity Approved (MW)</th>
<th>MWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-Jul-2013</td>
<td>17-Jul-2013</td>
<td>19:00</td>
<td>21:00</td>
<td>75.0</td>
<td>150.00</td>
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<td></td>
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<td>23:00</td>
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<td>200.00</td>
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<td>23:00</td>
<td>24:00</td>
<td>80.0</td>
<td>80.000</td>
</tr>
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</table>

**Total MWh (To be scheduled)**: 430.000

### Transmission Charges

- **Transmission Charges**
  - Rates (Rs./MWh): 151.3
  - MWh: 430.000
  - Total (Rs.): 650,590.00

### Operating Charges

- **RLLDC/SLDC**
  - Rates (Rs./Days): 2000.0
  - No. of Days: 1
  - Total (Rs.): 2000.0

- **Total Of (ii)**: 4000.00

- **Non-Refundable Application Fee (if not paid earlier)**: 5000.00

**Grand Total (i+ii+iii)**: 139118.00

**POSOCO Portion**: Rs. 7000.00

**Others**: Rs. 132118.00

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

**To:** INDIAN ENERGY EXCHANGE LTD

**MLDCs:** Gujarat SLDC, Maharashtra SLDC
<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Type</th>
<th>Application ID</th>
<th>Contract</th>
<th>Deal ID</th>
<th>Rate</th>
<th>Traded Qty</th>
<th>Qty for Schedule</th>
<th>Trade Value</th>
<th>Initial Margin</th>
<th>Basis Margin</th>
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<tbody>
<tr>
<td>W2MH0RET0001</td>
<td>Buy</td>
<td>1130717001</td>
<td>JUL13-H21-I17-WR</td>
<td>130717-5</td>
<td>2500</td>
<td>75</td>
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<td>-187,500.00</td>
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<td>JUL13-H20-I17-WR</td>
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<td>JUL13-H24-I17-WR</td>
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<td>JUL13-H23-I17-WR</td>
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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

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<tr>
<th>Application No.</th>
<th>Acceptance No.</th>
<th>Contract Trade Date</th>
<th>Participant Portfolio</th>
<th>Reliance Energy Trading</th>
<th>Reliance Infra</th>
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<td>1130717001</td>
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**Open Access Scheduling Accepted**

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<th>From Date</th>
<th>To date</th>
<th>From Hour</th>
<th>To Hour</th>
<th>Sch. Qty (MW)</th>
<th>Sch. Qty.(MWh)</th>
<th>Total MWh</th>
<th>Route</th>
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**Transmission Charges**

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<th>Trans. Sys.</th>
<th>Rate</th>
<th>Amount</th>
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<td>MH, PoC (Dra)</td>
<td>151.3</td>
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Total: 66056.00

Non-Refundable application Fees: 5000.00

**Payment Schedule**

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<th>PIPO Date</th>
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<tbody>
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<td>ST Fees</td>
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**Tradewise Obligation**

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<th>Total Approved Qty. (MWh) RLDC</th>
<th>Total Accepted Qty. (MWh)</th>
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Total: 430.00

**Daily Obligation**

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<th>Payln Date</th>
<th>Trd Qty-MWh</th>
<th>Final Sch. Qty</th>
<th>Invoice</th>
<th>Fees</th>
<th>ST on Fees</th>
<th>Cash</th>
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Total: 430.00

-1036000.00 -860.00 -1062.96 -1045862.96
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
Clearing and Settlement
Clearing & 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

1. **Member**
   - New Client Application form
   - NOC

2. **Membership Dept.**
   - IOM for New Client Creation

3. **Market Operations**
   - A/C Mapping of new client
   - A/C Mapping Confirmation with Clr Bank

4. **C&S Dept.**
   - IOM for New Client Creation in Trading Engine

5. **Surveillance Dept.**
   - New Client Creation & Activation

6. **Delivery Dept.**
   - Client registered in IEX
• 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

**NLDC Charges**
- Application Fees will be paid in advance = T
- NLDC Scheduling & Operational Charges = T+1
- Transmission Charges CTU = T+1

**SLDC Charges**
- SLDC Scheduling & Operational Charges = T+1
- Transmission Charges STU = T+1
- Area Transmission Charges (ATU) = T+1
- Area Load Dispatch Centre (ALDC) = T+1

**RLDC Charges**
- Application Fees/PoC/SLDC/RLDC charges = Within 3 working days of Acceptance

T = Trade Date
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**

- **DAM**
  - Pay in = T
  - Pay out = T + 2

- **TAM**
  - **Intraday**
    - Pay in = T + 1
    - Pay out = T + 1
  - **DAC**
    - Pay in = T + 1
    - Pay out = T + 2
  - **Daily**
    - Pay in = D - 1
    - Pay out = D + 1
  - **Weekly**
    - Pay in = D - 1
    - Pay out = D + 1

- **REC**
  - Pay in = T
  - Pay out = T + 1

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

T = Trade
D = Delivery
## Members

### 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 =< 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

<table>
<thead>
<tr>
<th></th>
<th>Proprietary/Trading Licensee Members</th>
<th>Professional Members</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Margin</strong></td>
<td>Basis/Additional Margin</td>
<td>Initial Margin</td>
</tr>
<tr>
<td><strong>Day-Ahead</strong></td>
<td>Margin equal to Last 7 Days Average of Buy turnover</td>
<td>As per Bank Balance including Hair Cut Factor</td>
</tr>
<tr>
<td><strong>TAM-Intraday</strong></td>
<td>105% of order</td>
<td>105% of order Value</td>
</tr>
<tr>
<td><strong>TAM-DAC</strong></td>
<td>100% of order Value</td>
<td>100% of order Value</td>
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<tr>
<td><strong>TAM-Daily</strong></td>
<td>5% of order Value</td>
<td>5% of order Value</td>
</tr>
<tr>
<td><strong>TAM-Weekly</strong></td>
<td>5% of order Value</td>
<td>5% of order Value</td>
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<tr>
<td><strong>REC</strong></td>
<td>100% of order Value</td>
<td>100% of order Value</td>
</tr>
<tr>
<td><strong>Member Client RMS</strong></td>
<td>Credit facility can be provided by Trader Member to their clients</td>
<td>No credit or funding facility by Professional Members to their clients</td>
</tr>
</tbody>
</table>
All these transactions are processed electronically through an interface between the exchange & banks.
Continuous communication with Users

IEX Daily SMS Service for Trade Details

Email
sms@iexindia.com

IEX Monthly Bulletin

Email
bulletin@iexindia.com

IEX 15 min Trade Prices displayed on its website

Email
info@iexindia.com