Indian Gas Exchange
(an IEX company)

Welcomes you to the launch of India’s first online gas trading platform

June 2020
In this presentation

- About IEX
  - Indian Gas Market Overview
  - IGX: Introduction and Value Offerings
  - IGX: Market Model and Operational Framework
- Way Forward

Appendix
About IEX: IEX is operating Electricity Exchange successfully for last 11 years

✓ Market Share: 97%
✓ Facilitates trades for 40% of Short-term Market
✓ Average daily trade: 6000 MW+
✓ High Participation: 4000+ (Electricity Market)
✓ Record Daily Volume: 308 MUs (12,900MW)

4000+ Industries | 55 Discoms (all) | 100+ ESCert Entities
400+ Generators | 1500+ RE Generators & Obligated entities

✓ Publicly listed company (NSE and BSE)
✓ IEX is regulated by the CERC (Central Electricity Regulatory Commission)
In this presentation

About IEX

Indian Gas Market Overview

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IGX: Market Model and Operational Framework

Way Forward

Appendix
Indian Gas Market: Moving towards gas based economy (6% to 15% share)

**Total gas consumption in India FY19**

166 mmscmd

**Share of gas in Indian energy mix**
6.2%

**Indian gas consumption split (mmscmd)**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>130</td>
<td>140</td>
<td>160</td>
<td>170</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
<td>Power</td>
<td>140</td>
<td>150</td>
<td>160</td>
<td>170</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
<td>CGD</td>
<td>150</td>
<td>160</td>
<td>180</td>
<td>190</td>
<td>200</td>
<td>220</td>
</tr>
<tr>
<td>Refinery</td>
<td>160</td>
<td>170</td>
<td>190</td>
<td>200</td>
<td>210</td>
<td>230</td>
</tr>
<tr>
<td>Petchemicals</td>
<td>170</td>
<td>180</td>
<td>200</td>
<td>210</td>
<td>220</td>
<td>240</td>
</tr>
<tr>
<td>Others</td>
<td>180</td>
<td>190</td>
<td>210</td>
<td>220</td>
<td>230</td>
<td>250</td>
</tr>
</tbody>
</table>

**Natural gas consumption (MMSCMD)**

Source: CRIS analysis

**LNG spot historical trend**

Source: CRIS analysis

**Consumption (MMSCMD)**

- Total Consumption
- Domestic Gas Consumption
- LNG Consumption
- Sector's Share

**Source:** PPAC

**Sector's share**

- Total LNG Import (MMTPA)
- LNG Spot (%)
Natural gas infrastructure in India is witnessing significant investments in pipelines & LNG import terminals

Significant natural gas pipeline expansions planned by various entities

A number of LNG import facilities planned to meet expected future demand

**Pipeline network (km)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Existing</th>
<th>Under construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2019</td>
<td>17,000</td>
<td></td>
</tr>
<tr>
<td>FY2022e</td>
<td>32,000</td>
<td>+88%</td>
</tr>
</tbody>
</table>

**LNG imports capacity (MMTPA)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Ennore</th>
<th>Karaikal</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2019</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>FY2022e</td>
<td>62.5</td>
<td>+66%</td>
</tr>
</tbody>
</table>

Source: IGX Analysis
Demand estimation: Sector wise demand built-up

- **Fertilizers**
  - 10% import substitution by new capacity by 2030
  - Agricultural growth rate to remain ~2-3%

- **CGDs**
  - New CGDs to be operational from 2022-23
  - Boost in demand due to urbanization and demand shift to natural gas in existing CGDs

- **Industrial**
  - Industrial growth to remain linked to the long-term GDP growth rate for India

- **Petrochemicals**
  - Govt. initiatives (Make in India, PPCIR), economic growth to push the production capacity

- **Power industry**:
  - Revival led by peak demand growth and support for RE integration
  - Capacity replacement to the extent of retirals

Sources: NITI Aayog, McKinsey, BCG, IEA Energy Outlook, IGX Analysis
Significant pain points exist in the current market which restrict the country to realize its full potential

- **No Transparency**
  in pricing of gas due to bundled contracts,
  No visibility to consumers on element wise pricing (commodity and transmission)-
  lowering their ability to negotiate

- **No Flexibility**
  for market players to procure gas on day-ahead or week-ahead basis,
  Depriving consumers of fine tuning their requirement

- **No Direct access**
  to buyers to buy gas directly from the market, increasing suppliers’ bargaining power and hence higher prices to consumers (specially to marginal buyers)

- **High transaction costs**
  Negotiations, GTA signing, payment settlements are time consuming

- **No Payment Security**
  Sellers exposed to counter party default risk
Indian Gas Exchange (IGX)

OUR VISION
To lead India’s transition towards a gas-based economy by architecting next generation solutions for natural gas trading and access.

01  1\textsuperscript{st} natural gas trading exchange

02  Automated platform with cutting edge technology

03  Efficient & transparent market driven price discovery mechanism

04  Indigenous price discovery
Indian Gas Exchange (IGX) is backed by IEX, the leading power exchange in India

- 10+ years of successful operations of a power trading platform
- Superior exchange technology, sourced from a leading global player
- Strong connect across market participants, specially industries
- Robust market model customized to suit Indian market players’ requirements
- Financially backed by strong players
Led by an able management team

Rajiv Srivastava, Director
Rajiv is also the MD and CEO of our parent company, Indian Energy Exchange. He has more than 25 years of experience in the technology sector.

Rajesh Mediratta, Director
Rajesh is also the Director of Strategy of our parent Company, IEX. He has more than 30 years of experience in the power sector and more than 10 years of experience in running the power exchange.

Vineet Harlalka, Director
Vineet is also serving as the Chief Financial Officer, Company Secretary and Compliance Officer of our parent Company, IEX. He has more than 20 years of experience in the field of finance, taxation, and treasury.

Deepak Mehta, Head of BD
Deepak has over 20 years of experience in the oil & gas industry and commodities.

Prasanna Rao, Head-Market Operations
Prasanna has more than 20 years of experience in market operations of equity, commodity and power exchanges.

Vikas Guliani, VP-Regulatory & BD
Vikas has over 15 years of experience in the oil and gas industry.
In this presentation

About IEX

Global and Indian Gas Market Overview

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Way Forward

Appendix
Market Model: Physical Trading hubs

- Transmission Pricing is route based, therefore multiple physical hubs.
- Can move to Virtual hubs, if we adopt Unified Tariff or Entry-Exit pricing

<table>
<thead>
<tr>
<th>Hub</th>
<th>Delivery point</th>
<th>Planned launch date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dahej</td>
<td>Ex terminal, after regas</td>
<td>Immediate</td>
</tr>
<tr>
<td>Hazira</td>
<td>Mora interconnection point</td>
<td>Immediate</td>
</tr>
<tr>
<td>Kakinada</td>
<td>Gas land fall point (Kakinada/ Oduru)</td>
<td>Immediate</td>
</tr>
<tr>
<td>Dabhol/Jaigarh</td>
<td>Interconnection point of ‘Jaigarh-Dabhol tie-in connectivity pipeline’ &amp; ‘DBPL’ pipeline</td>
<td>Q2 2020</td>
</tr>
<tr>
<td>Kochi</td>
<td>Ex terminal, after regas</td>
<td>Q3 2020</td>
</tr>
<tr>
<td>Ennore</td>
<td>Ex terminal, after regas</td>
<td>Q3 2020</td>
</tr>
<tr>
<td>Mundra</td>
<td>Ex terminal, after regas</td>
<td>Q3 2020</td>
</tr>
</tbody>
</table>
## Market Model: Trading products and timetable

<table>
<thead>
<tr>
<th>Exchange products</th>
<th>Trading hours (IST)</th>
<th>Tenor</th>
<th>Trading window (S)</th>
<th>Trading window (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day-ahead *</td>
<td>10:00 – 12:00</td>
<td>1 Gas Day</td>
<td>D-1 business days</td>
<td>D-1 business days</td>
</tr>
<tr>
<td>Daily</td>
<td>10:00 – 12:00</td>
<td>1 Gas Day</td>
<td>D-9 business days</td>
<td>D-2 business days</td>
</tr>
<tr>
<td>Weekly</td>
<td>10:00 – 12:00</td>
<td>7 Gas Days</td>
<td>D-5 business days</td>
<td>D-5 business days</td>
</tr>
<tr>
<td>Weekdays</td>
<td>10:00 – 12:00</td>
<td>5 Gas Days</td>
<td>D-5 business days</td>
<td>D-5 business days</td>
</tr>
<tr>
<td>Fortnightly</td>
<td>10:00 – 12:00</td>
<td>13-16 Gas Days (1-15 &amp; 16-EoM)</td>
<td>D-6 business days</td>
<td>D-6 business days</td>
</tr>
<tr>
<td>Monthly</td>
<td>10:00 – 12:00</td>
<td>Calendar Month</td>
<td>D-9 business days</td>
<td>D-9 business days</td>
</tr>
</tbody>
</table>

* Subject to getting capacity booking confirmation for next day
IGX Governance Structure

Bye-laws: contain the essential rules for the organization of IGX, the tasks of its committees/bodies as well as the preconditions for access to trading.

Circulars: IGX communication with its members and/or clients

Market Rules: Govern the day to day operations of IGX, rules of trading, the relationship between IGX and its members/clients.

Contract Specifications: As part of the market rules, include the rules regarding execution of trading and, in particular, the trading forms, the order types and the execution of orders.

Members/clients
Market Model: Delivery types

Contract types by type of delivery

Ex-hub transactions

1. Features
   - Transmission capacity booking to be handled by the Buyer (as Shipper).

2. Pre-requisites for trading
   - The bidder should have a valid GTA and/or CT with the transporter.

3. Post-trading
   - **Delivery:** Bidder will send trade nomination to the transporter to schedule delivery.
   - **Financial settlement:** of transportation tariff etc. between bidder and transporter, of commodity between seller and buyer.
   - **Imbalance settlement:** with transporter will be handled by buyer/seller.

Delivered transactions

- Transmission capacity booking to be handled by IGX
- Bidder should sign a Gas Transportation Undertaking (GTU) with IGX; IGX will sign GTA & CT Agreement with transporter on behalf of Buyer.

- **Delivery:** IGX will send trade nomination to transporter on behalf of buyer to schedule delivery.
- **Financial settlement:** of transportation tariff between IGX & transporter, of commodity between seller & buyer through IGX. IGX to keep appropriate margins.
- **Imbalance settlement:** done with transporter by IGX. IGX to keep appropriate margins.
## Market Model: Salient Features

### Salient features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical</strong></td>
<td>All trades for firm delivery. Non-transferable.</td>
</tr>
<tr>
<td><strong>Automated Platform</strong></td>
<td>Facilitates - Trading, Delivery and financial settlement</td>
</tr>
<tr>
<td><strong>Entities</strong></td>
<td>Sellers- to put bid for sale of gas at delivery point (post re-gas) Buyers- to put bid for buying gas at delivery point</td>
</tr>
<tr>
<td><strong>Lot Size</strong></td>
<td>1 lot = 100 MMBTU (per day)</td>
</tr>
<tr>
<td><strong>Partial selection</strong></td>
<td>Possible (Trade/Selected volume &lt; Bid Quantity)</td>
</tr>
<tr>
<td><strong>Bid unit</strong></td>
<td>INR/MMBTU</td>
</tr>
<tr>
<td><strong>Price tick</strong></td>
<td>1 INR/MMBTU</td>
</tr>
<tr>
<td><strong>Price discovery</strong></td>
<td>Auction - Uniform price, Closed, double-sided auction</td>
</tr>
<tr>
<td></td>
<td>• Bids collected during Call period and then matched</td>
</tr>
<tr>
<td><strong>Types of delivery</strong></td>
<td>Delivered transactions. Gas and transmission capacity together</td>
</tr>
<tr>
<td></td>
<td>Ex-hub transactions. Gas only. Capacity will be organized by Buyer</td>
</tr>
<tr>
<td><strong>Imbalance management</strong></td>
<td>Through the exchange for delivered transactions</td>
</tr>
<tr>
<td></td>
<td>Out of exchange for Ex-hub transactions</td>
</tr>
<tr>
<td><strong>Margins</strong></td>
<td>Buyers to pay upfront cash margins for Day Ahead and Daily Contracts; and</td>
</tr>
<tr>
<td></td>
<td>cash + non-cash margins for Weekly, Fortnightly and Monthly contracts</td>
</tr>
</tbody>
</table>
Market Model: Auction types and typical trade flow

**Uniform price double sided closed auction**
- Orders not disclosed to market participants.
- Single Market Clearing Price and trade quantity are informed only after Market is closed.
- Single price to buyers and sellers
- Bid price decision on own requirement basis since no market information

**Single sided auction**
- Either Buyer or Seller can initiate an auction based on their own customized requirement.
- In case, Buyer initiates the auction then Sellers will register their counter-offer & compete to get selected

**Typical trade flow**

- **Bidding**
  - Buy/sell bids through/by members

- **Matching**
  - Provisional MCP & MCV calculated

- **Pipeline availability**
  - Pipeline availability confirmed with pipeline operators

- **Result**
  - Final MCP & MCV calculated

- **Confirmation**
  - Confirmation by pipeline operators

- **Scheduling**
  - Final schedules communicated to participants
Closed-double sided auction mechanism

<table>
<thead>
<tr>
<th>BUY</th>
<th>Buyer Selection</th>
<th>BUY</th>
<th>Seller Selection</th>
<th>Seller Welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 MMBTU @ Rs 530</td>
<td>100</td>
<td>100 MMBTU @ Rs 530</td>
<td>0 = (430-350)*100 = 8,000</td>
</tr>
<tr>
<td>B</td>
<td>300 MMBTU @ Rs 450</td>
<td>300</td>
<td>200 MMBTU @ Rs 370</td>
<td>0 = (430-370)*200 = 12,000</td>
</tr>
<tr>
<td>C</td>
<td>300 MMBTU @ Rs 430</td>
<td>200</td>
<td>300 MMBTU @ Rs 400</td>
<td>0 = (430-400)*300 = 9,000</td>
</tr>
<tr>
<td>D</td>
<td>200 MMBTU @ Rs 370</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td>100 MMBTU @ Rs 350</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td>200 MMBTU @ Rs 370</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td></td>
<td></td>
<td>300 MMBTU @ Rs 400</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
<td>300 MMBTU @ Rs 450</td>
<td></td>
</tr>
</tbody>
</table>

Cleared volume: 600 MMBTU  
MCP: Rs 430/MMBTU
IGX Updates

- Market Advisory Committee (MAC) formed and meetings held on 20th Feb & 30th May.
  - MAC is represented by participants across Industry such as GAIL, BPCL, Shell, PLL, PIL, H-Energy, GSPCL, MGL, IGL, Torrent Gas, Adani Gas, NFL, NTPC, Reliance Industries, Saint Gobain etc.

- Market Rules & Bylaws in place; available at Website (www.igxindia.com)

- 3 Mock trading session held (20th Mar, 9th Apr & 21st May) with significant participation from industry.

- Onboarding of New Members & Clients:
  - 10 Members (Adani, Manikaran, GMR, Zak, Kreate, Gita, Abja, APGPCL, APPCL, Torrent Power)
  - 300+ clients (MNGL, Bhagyanagar Gas, Haryana Gas, IRM, GSFC, GNFC, Saint Gobain, Piramal, Asahi Glass, Kajaria, HSIL etc.)

In this presentation

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Way Forward

Appendix
IGX would provide value to the customers and serve the nations interest

<table>
<thead>
<tr>
<th>Increased investments in E&amp;P sector</th>
<th>Optimal utilization of infrastructure</th>
<th>Increased industrial growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IGX would provide price signals to the market, attracting investments in upstream sector.</td>
<td>• IGX would also meet the latent demand, thus increasing the infrastructure utilization (terminal and pipelines).</td>
<td>• Even small industries can use exchange to procure gas at competitive prices, increasing their utilization and spurring industrial growth.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Revival of gas-based power plants</th>
<th>Reduction in fertilizer prices and subsidy bill</th>
<th>CGD companies can better serve customers-</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Exchange can provide gas at competitive rates for grid balancing purpose in upcoming high RE scenario</td>
<td>• Fertilizer industry can reduce their prices/subsidy burden on GoI by taking advantage of competitive prices at IGX</td>
<td>• By catering to variability in commercial &amp; industrial demand in CGDs</td>
</tr>
</tbody>
</table>
MoPNG aims to operationalize trading hub/exchange.

...in identifying & realizing key enablers that are required for market development

Independent system operator
(For coordination, scheduling, energy accounting etc.)

Third party access to infrastructure

Bulletin board and open access code for transparent access

Transmission tariff rationalization

Rationalization of transmission tariff in progress

Uniform taxation (GST)

Govt looking at bringing natural gas under GST

Gas allocation for trading hub

Minimum gas allocation for trading hub

Government and regulator have taken significant strides...

Developing the enabling regulatory framework for gas hub/exchange
Way Forward

1. Expand coverage and market
   - Add new hubs
   - Launch new products (LNG, FO, LSHS etc.)

2. Best in class, futuristic technology Infrastructure
   - Technology & analytics solutions for customers
   - Enhancements to the trading platform

3. Strengthen the organisation
   - Capacity building, hi-performance culture
   - Talent acquisition, development and retention

4. Ecosystem development
   - Policy advocacy
   - Regulatory advocacy
Thank you

For any clarifications or suggestions please write to:
info@igxindia.com

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