



IEX BULLETIN

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Message from the Chairman and MD's Desk

“IEX is helping India achieve its sustainability aspirations”

Dear Friends,

As the year 2023 dawns upon us, I extend my heartfelt wishes to you and your loved ones for a fabulous year ahead. May the coming year be filled with peace, abundance, and good health for everyone.

The past year was momentous for India for more reasons than one. The economy made a remarkable rebound, surpassing UK to become the world's fifth largest economy and is now poised to become a 5 trillion-dollar economy in this decade.

India's G20 presidency is an unprecedented opportunity for the country to showcase its sustainability roadmap. This is complemented by India's National Statement at COP 27 that underlines the country's achievements in terms of far-reaching new initiatives in renewable energy, e-mobility, ethanol blended fuels, and green hydrogen as an alternate energy source.

India's power sector continued to witness significant developments in the last year as well, aimed at enabling the country to sustainably attain the status of a developed country by 2047. Electricity consumption during the calendar year 2022 grew around 9% on YoY basis, led by strong revival in economic activities. The total installed electricity capacity stood at 409 GW, of which about 41% is contributed by non-fossil fuel sources.

While the geopolitical headwinds had an impact on the supply side availability, the Indian energy sector resiliently adapted to



India's G20 presidency is an unprecedented opportunity for the country to showcase its sustainability roadmap.



the crises, helped by the proactive approach of the Government and Regulators.

Several regulatory and policy reforms continue to be implemented as part of the Government's thrust towards transforming the power sector in the country. Policy and regulatory initiatives such as Energy Conservation Act (Amendment) Bill 2022, Green Energy Open Access Rules, Reform-based result-linked power distribution scheme, Introduction of Long Duration Contracts, revised RPO trajectory, Market based Ancillary Service, General Network Access Regulations 2022 and the Grid Code, will go a long way in deepening the power market in the country. Similarly, the recently introduced REC Regulations will boost Renewable Energy Certificates' trading and put India firmly on track to achieve its green aspirations.

At IEX, we are supporting India's sustainability aspirations by offering renewable energy in the most flexible and efficient manner through our Green Market segments - Day-Ahead, Term-Ahead and Renewable Energy Certificates. With Nepal and Bhutan starting to trade power in India's day ahead market, we moved closer to achieving the vision of creating a robust regional power exchange in South Asia. Bangladesh is expected to join soon, leading to optimum utilisation of power resources in the region. The much-awaited Longer Duration Contracts was launched following the Regulator's approval, which will enable Discoms to procure power more efficiently.

Customer centricity is at the core of our existence. Our web-based bidding platform optimises the process of power procurement through personalised and deep data insights, and provides our customers secure, anytime-anywhere access to the trading system. It offers web-based financial reconciliation for online reconciliation of exchange-based transactions, and API-based automated bidding in the Integrated Day Ahead

Market and Renewable Energy Certificate segments. We also introduced value added services for renewable power producers to garner insightful forecasting services and solutions. In 2022, we introduced daily contracts of up to 90 days, weekly contracts for up to 12 weeks and monthly contracts extending to 3 months within our Long Duration Contracts segment.

IEX continues to fortify its position in the existing product segments and evaluate foray into adjacencies. Today, new products constitute nearly 40% of the total traded volume of electricity on the exchange. Encouraged by provisions in the Energy Conservation Act (Amendment) Bill 2022, IEX has formed a subsidiary company - International Carbon Exchange - to explore business opportunities in carbon market. In yet another initiative to lead by example, IEX recently became the first carbon-neutral Power Exchange in India. We continue to deepen the Gas market as well in the country, in line with the Government's vision to increase the share of Gas from the current 6% to 15% of the country's energy basket by 2030. In line with this, robust volume growth is expected for IGX over the next 5 years. I am delighted to share that we achieved financial breakeven within 1 year of launch of IGX. IGX achieved 121.5 lakh MMBtu trade volume in FY-22. I am pleased to note that it has already trebled the trade volumes in FY-23 YTD.

To achieve our goals, we continue to work closely with all our stakeholders to accelerate India's energy transition and build a safer, greener planet.

As we embark on the 15th year of operations, I would like to reiterate our commitment to build an efficient energy marketplace with technology and innovation at the core. This journey of transforming India's power markets could not have been possible without the proactive and conducive initiatives undertaken by the Government and Regulators. The support and guidance of our stakeholders and well-wishers have been invaluable for our achievements. I thank you all for the continued support and faith in this journey.

Once again, I wish you and your family a wonderful, healthy, and successful year ahead.

Best regards,

S. N. Goel

Chairman and Managing Director

REGULATORY NEWS

CERC Issues Order on Deviation Settlement Mechanism

CERC has issued an order dated 26.12.2022 in 16/SM/2022, giving directions in the interest of grid security w.r.t the Deviation Settlement Mechanism (DSM) implemented w.e.f. 05.12.2022. The key directions issued in the order are as follows:

- **Normal Rate of Charges for Deviation-** For a time block shall be subject to the cap of Rs. 12 per kWh, until further orders
- **Charges for Deviation -** In order to contain the trend due to combined effect of Over-Injection (OI) / Under-Drawal (UD) and ensure that the frequency remains within the operating band, the commission has decided as follows:
 - **System frequency \geq 50.05 Hz in a time-block:**
 - The general seller other than Run of River (ROR) generating station or a generating station based on MSW (Municipal Solid Waste) -
 - **For OI-** Shall be paid from the Deviation and Ancillary Service Pool Account at zero;
 - **For UI-** Seller shall be pay back to the pool for the shortfall against schedule at 50% of the reference charge rate
 - **In case of Under- Drawal** buyer shall be paid back from the Pool Account at zero, for deviation by way of under-drawal in such block;
 - **System frequency \leq 49.90 Hz in a block:** The general seller other than an ROR generating station or based on MSW shall be paid back from the pool at 150% of reference charge rate
- To come into effect from 00.00 hours of 28.12.2022 and remain in force until further orders by the commission in this regard

First Amendment to CERC Terms and Conditions for Dealing in Energy Savings Certificates Regulations, 2022

On 7 December 2022, the Central Electricity Regulatory Commission (CERC) issued the First Amendment to Terms and Conditions for Dealing in Energy Savings Certificates Regulations, 2022. The amendment defined the following:

- New term 'Floor Price' defined- Minimum price at which Energy Savings Certificate to be traded on the Power Exchanges
- Floor price for ESCerts to be fixed at 10% of price of one metric tonne of oil equivalent of energy consumed as notified by Central Government



POSOCO Modifies Detailed Procedure for Implementation of REC Mechanism

In December 2022, POSOCO modified detailed procedures for implementation of Renewable Energy Certificate mechanism in compliance of CERC REC Regulations, 2022. The procedural details highlighted are:

■ Eligibility-

- REGS (Renewable Energy Generating Station) participating in I-DAM and selling energy in the conventional segment of I-DAM in case of uncleared bids in RE segment of I-DAM. Such energy eligible for issuance of REC
- REGS not scheduling energy due to regulation of access to power in case of non-payment of dues as per LPSC Rules 2022 and selling energy directly or through an electricity trader or in the PXs, provided that such energy is not used for RPO compliance. Energy from such regulated capacity shall be eligible for issuance of REC

■ New terms 'Advance accreditation'/'Advance registration' defined-

- Above referred REGS can get itself accredited/registered under "Advance accreditation/registration". RPO to be considered based on the schedule power and deviation from schedule to be adjusted with RECs

■ Fee provided-

- One-time accreditation processing fees Rs. 10,000
- One-time accreditation charges Rs. 30,000
- Annual charges for accreditation Rs. 10,000

■ The REC certificate to be issued by trader/PX to have "Source of origin"

■ Definition of 'Hydro' aligned with MOP order dated 22 July 2022 & 19 September 2022

Delhi High Court Issues an Interim Order in IWPA/ISMA Petitions

Trading in the RECs issued prior to 31 October, 2022 to be suspended for a period of 6 weeks

CERC Issues Directions to Power Exchanges in Petition No. 375

On 26 December, 2022, CERC issued the following directions to IEX/Power Exchanges in petition no.375/MP/2022. The significant highlights of the direction being:

- **Mechanism for upcoming REC session on 28 December, 2022** - Price discovery and matching methodology in the REC market on Power Exchanges shall continue to be based on double sided closed bid auction mechanism, subject to final orders in this petition. Mechanism of pro rata allocation based on buyer's preference as proposed by IEX may be followed by the Power Exchanges to allocate cleared RECs among the buyers
- **Enabling REC registered projects for participation in Green Markets (viz. GDAM, GITD, GDAC & GTAM)**- Central agency has modified the detailed REC procedure wherein, the energy sold by RE capacity registered under REC mechanism in any conventional market (DAM/RTM/ TAM) at Power Exchange shall be eligible for issuance of RECs and in case the energy is sold in the Green Market by such RE capacity then no such RECs

will be issued against such energy sold in the Green Markets at Power Exchanges

- **Increasing frequency of REC sessions on PX-** Central Agency to examine the issue and to take-action based on public consultation
- **Reverse Auction Contract of RECs-** Power Exchanges to submit detailed proposal in this regard after public consultations which to be examined subsequently through separate proceeding
- Comprehensive report to be submitted by IEX and NLDC by 15 January 2023 on the interim mechanism
- IEX to seek public comments on the Petition

State Orders

PSERC Defines Single Renewable Purchase Obligation Trajectory

Punjab State Electricity Regulatory Commission (PSERC) in its Renewable Purchase Obligation and Compliance Regulation dated 12 December 2022, defined single renewable power purchase obligation trajectory for all obligated entities.

	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30
RPPO	27%	30%	33%	36%	39%	41%	43%

- Power from all hydro power plants to be considered for fulfilment of RPO
- Solar/wind with storage will be considered for RPO fulfilment
- RE generated by non-obligated entities under gross metering, net billing and net metering will qualify towards RPO compliance of Discom
- RE power purchase from PX by obligated entity shall be counted towards RPO compliance

WBERC Guidelines for Implementation and Smooth Transition of State Level Accounts for Deviation Settlement Charges in View of CERC DSM Regulations 2022

On 6 December 2022, the West Bengal Electricity Regulatory Commission (WBERC) issued guidelines for deviation settlement charges in view of CERC DSM Regulations 2022. The significant highlights of the guidelines are as follows:

- SLDC to consider 15-minute time block wise "Normal rate of charges for deviation" determined under CERC DSM regulations, 2022
- SLDC to consider "State Volume Limit" as 100 MW, in line with limit for higher charges specified for Buyers in CERC DSM regulations, 2022
- For imposing additional penalty of deviation when frequency is below 49.85 Hz or above 50.10 Hz the "Normal rate of charges for deviation" of respective time block will be considered
- This order shall come into effect from 00:00 hours of 5 December 2022

Telangana Discom Files Petition for Determination of Additional Surcharge for H1 FY 2024

The Telangana Discom has filed a petition for levy of additional surcharge on open access consumers at Rs. 9.86 per unit for H1 of FY 2023-24.

DRIVING TRANSFORMATION IN ENERGY MARKETS

How IEX Is Leveraging Cloud to Innovate and Meet Compliance Requirements

- **Sangh Gautam**

The article was originally published in CIO.inc on December 15, 2022

Energy exchanges are real-time markets that operate 24x7. They are customer-centric in their operations and cater to a vast ecosystem of players. Their priorities are high availability, customer centricity and compliance. The Indian Energy Exchange, IEX, leveraged the cloud to address this and to deliver innovative products.

Sangh Suman Gautam, Chief Technology Officer, IEX, told Information Security Media Group that the major driver for cloud adoption was agility.

"Agility [of the cloud] allows us to provision new customer-centric features to all our generators or to all our customers," Gautam says.

Agility was possible because the ecosystem of OEMs and vendors took a "cloud-first" approach, and most of their solutions are offered on the cloud.

"The uptime guarantees and scalability of the cloud are really helping," Gautam says.

IEX is a premier energy marketplace that provides a nationwide automated trading platform for the physical delivery of electricity, renewables and certificates. The company introduced cross-border electricity trade with a vision to create an integrated South Asian power market. It focuses on customer-centric technology, enabling efficient price discovery, thereby facilitating the ease of power procurement.

Apart from cloud, IEX has also adopted other technologies like blockchain, AI and ML to drive its transformation and sustainability initiatives.

"Technology innovation is driving transformation in energy markets and also helping achieve the ambitious sustainability aspirations in the power sector," Gautam says.

Gautam says IEX is using technology-driven solutions to introduce "innovative products" like peer-to-peer trading, decentralised Rupee hybrid models and sustainability solutions.

"Sustainability targets have been set globally, and the energy market is central or core to achieving those targets - which cannot be achieved without innovation," Gautam adds.

Compliance is a major challenge in the energy sector, and when new mandates are issued, energy exchanges need to comply at short intervals. The high availability and scalability features of the cloud help in adhering to compliance norms.



"We need to adopt new features and comply within a month or two. And the energy markets operate in real time, 24x7. Cloud-native solutions help in providing high availability," Gautam says.

Another key challenge that Gautam cites is new deployments without downtime. The scalable nature of cloud, DevOps and CI/CD pipelines address this, he says.

API-Based Approach

IEX got into the real-time market or RTM two years ago. RTM was a monumental task for IEX as it has a robust ecosystem of 7,500 entities, 57 distribution utilities, more than 600 generators and over 4,500 open access consumers. Its ecosystem is spread across 29 states and 5 union territories of India. The challenge was to get all these entities to work together. Speed was also a priority as the timeline for distributing power after an auction is shrinking. To address these challenges, IEX had to introduce innovations like mixed integer linear programming or MILP.

"Right now, it is a 15-minute market, but we are hearing discussions about a 5-minute market. We are expected to guarantee electricity within one hour of an auction," Gautam says.

To meet these requirements, IEX partnered with the National Load Dispatch Center and moved from a monolithic architecture to an API-based interface that enables real-time transactions.

On the innovation side, IEX introduced MILP in the country. This bought in some pricing transparency.

"The exchanges are known for their transparency. But to do this, we had to give it a mathematical framework, and that's where MILP helped," Gautam explains.

The operating models within the power sector are moving toward automation, supported by APIs.

IEX says the integration of ecosystem players using APIs was a success, and it is also using this approach to integrate its banks for seamless transactions.

Previously, the SAP system used for its banking operations and the Exchange system were working in isolation. But these have now been integrated through APIs.

Auto-Healing

The real-time market needs an auto-healing environment. So, IEX invested in RPA. It trained its internal teams and its vendors on RPA.

"We wanted to develop an architecture that would auto-heal a problem encountered in the system," Gautam says.

The idea was to save time and the number of steps taken by the L1 and L2 support teams to resolve the problem. Auto-healing eliminates manual intervention.

Digital Adoption

Gautam says all these innovations would have not been possible without driving internal digital adoption.

"The real value of digital adoption comes when your enterprise is also digitally adopted internally. And then, you can showcase that value to your customer. That's when you appreciate the maximum value," Gautam says in conclusion.



MARKET NEWS

The Indian Energy Exchange, India's premier energy exchange, achieved 8452 MU total volume in December 2022, including Green Power trade of 377 MU, and 4.87 lac RECs (equivalent to 487 MU).

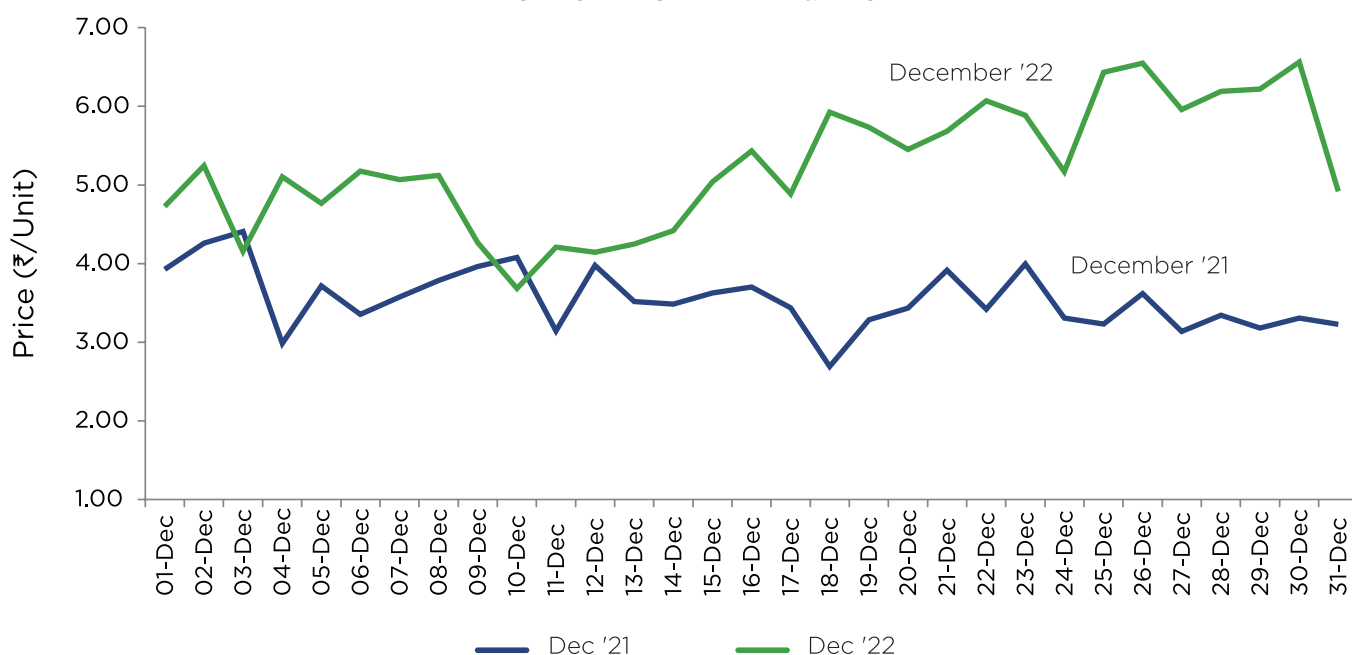
The total electricity volume on the Exchange in December '22 was 7964 MU, an increase of 8% on MoM and 4% on YoY basis. The overall volume on the Exchange in December '22 increased by 9% on MoM basis. However, it declined by 7% on YoY basis due to high REC traded volumes of 13.85 lacs in the previous year.

For the third quarter of the fiscal year 2023, IEX has recorded 24.2 BU volume and achieved 5% QoQ growth across all its market segments.

Continuing high spot e-auction coal prices and supply side constraints led to the average clearing price in the Day-Ahead Market rising to Rs. 5.23 in December, which was 14% higher on MoM basis and 48% higher on YoY basis.

Improving coal inventory at power plants is expected to result in lower clearing price on the Exchange and is expected to provide further cost optimisation opportunities to Discoms and open access consumers, resulting in higher volumes on the Exchange.

MCP FOR DECEMBER '21 & DECEMBER '22



During the month, IEX reaffirmed its commitment to the nation's sustainability aspirations by forming a wholly owned subsidiary company "International Carbon Exchange Private Limited" ("ICX") to explore business opportunities in the voluntary Carbon Market. It also became India's first carbon-neutral Power Exchange, using market based tradable instruments to offset its carbon emissions.

According to the power demand data published by the National Load Dispatch Center, the energy met at 121 BU during December '22, increased 10% on YoY basis.

DAY-AHEAD, TERM-AHEAD & REAL-TIME ELECTRICITY MARKET

The Day-Ahead Market volume decreased from 5087 MU in November 2022 to 5001 MU in December 2022, i.e 2% de-growth on MoM basis. The Day-Ahead Market volume was lower by 8% on YoY basis due to high prices resulting from a constrained supply scenario. The Day-Ahead Market achieved a cumulative trade of 14.4 BU in Q3 FY-23, registering a robust 30% QoQ growth. The market, however, declined 13% on YoY basis.

The Real-Time Electricity Market achieved 1763 MU volume during the month, registering 25% MoM and 17% YoY growth. There were 670 participants in this segment during the month. The consistent growth of real-time electricity market is an indication of growing reliance of the distribution utilities and industries to achieve power demand-supply balance in real-time in the most efficient manner. The Real-Time Electricity Market achieved a cumulative trade of 5435 MU in Q3 FY-23, increasing 13% YoY basis.

The Term-Ahead Market (TAM), comprising Intra-Day, Contingency, Daily & Weekly Contracts, and LDCs traded 822 MU during the month, an impressive increase of 50% on MoM basis, and 135% on YoY basis. The TAM segment registered a robust volume of 1991 MU in Q3 FY-23, registering 127% YoY growth.

GREEN MARKET: DAY-AHEAD & TERM-AHEAD

The IEX Green Market, comprising the Green Day-Ahead and Green Term-Ahead Market segments, achieved 377 MU volume during December '22, growing 2% on YoY basis. For the third quarter, the market achieved 1130 MU volume, registering a decline of 6% YoY.

The Green Day-Ahead Market achieved 241 MU volume with a weighted average price of Rs. 5.24 per unit. The market saw participation from 212 market participants during the month, with the highest number of participants in a single day at 153 on 21 December 2022.

The Green Term-Ahead Market achieved 137 MU volume with an average monthly price of Rs. 5.20/unit for Solar, Rs. 5.54/unit for Non-Solar and Rs. 5.81/unit for Hydro.

RENEWABLE ENERGY CERTIFICATE MARKET

A total of 4.87 lac RECs were cleared in the trading session at IEX held on Wednesday, 28 December '22 as compared to 13.85 lac RECs last year in December. The next REC trading session at the Exchange is scheduled on Wednesday, 25 January 2023.



TRADE INSIGHTS

CONVENTIONAL POWER MARKET

DAY-AHEAD POWER MARKET

Area Prices Price Snapshot (₹/kWh)

Area	Average	Minimum	Maximum
All India	5.24	2.00	12.00

VOLUME 1 MU = 1 Million kWh = 1 GWh

Volume	Sell Bids	Buy Bids	Unconstrained Volume	Cleared Volume
Total Volume (MU)	8,922	8,342	5,001	5,001
Average Daily (MU)	268	269	161	161

PARTICIPATION

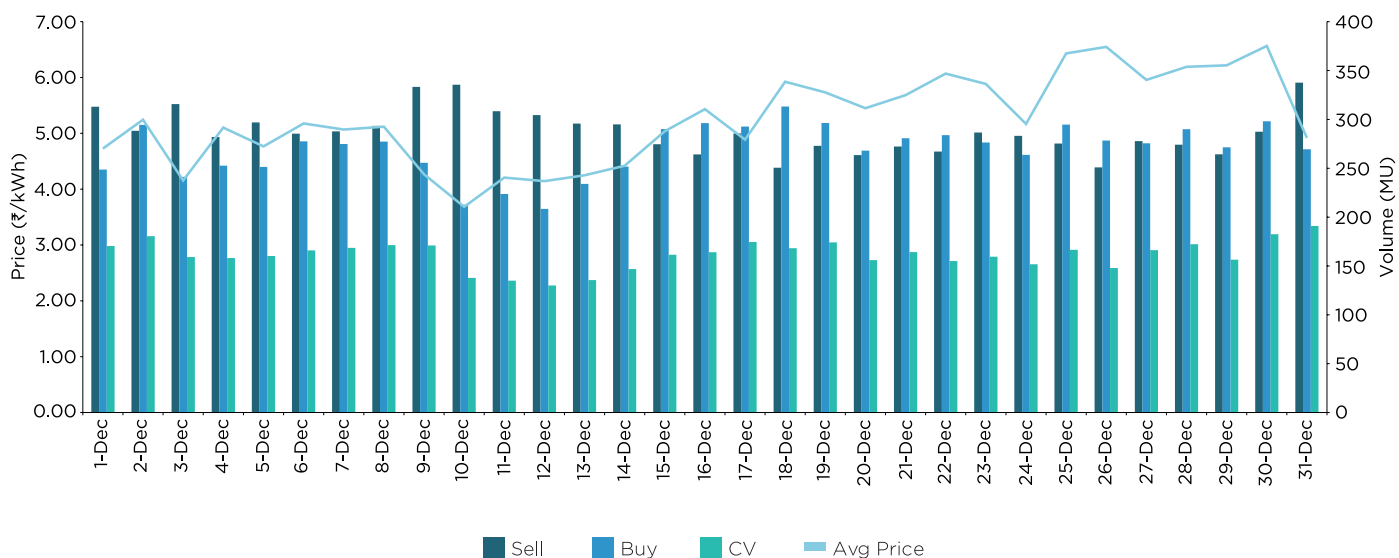
Total Registered Participants	7,300+	Open Access Consumers	4,600+	Private Generators	600+
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TERM-AHEAD POWER MARKET

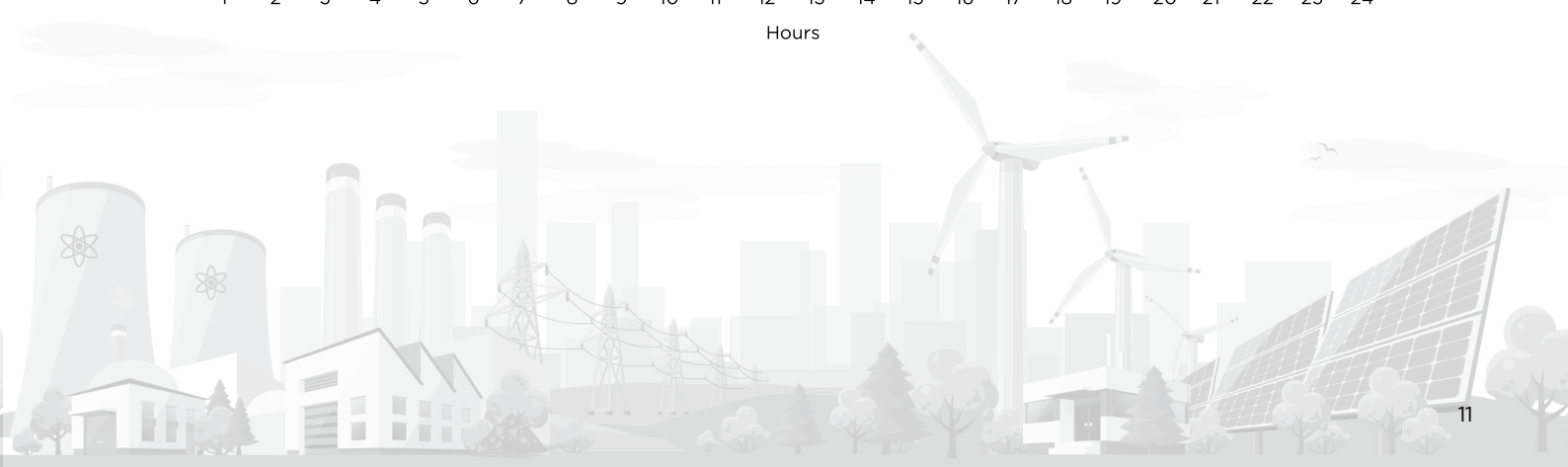
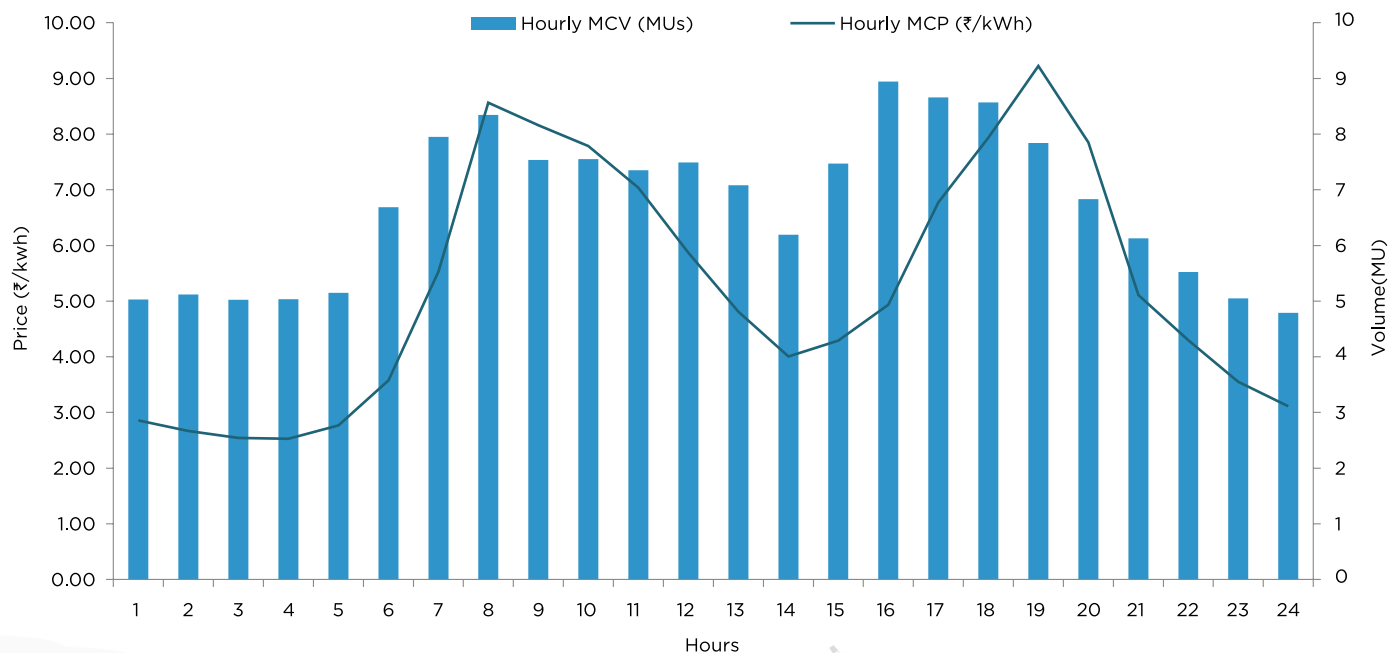
Contracts	Total Volume (MU)	Max. Price (₹/kWh)	Min. Price (₹/kWh)
Intra-Day	-	-	-
Day-Ahead Contingency	530.80	12	2.2
Daily	92.40	4.7	4.6
Weekly	100.80	4.7	4.6
Monthly	98.50	8.00	5.6
Total TAM Volume	822		

DAY-AHEAD MARKET

Daily Trade Details



Average Hourly Market Clearing Volume and Price



REAL-TIME ELECTRICITY MARKET: ANALYTICS

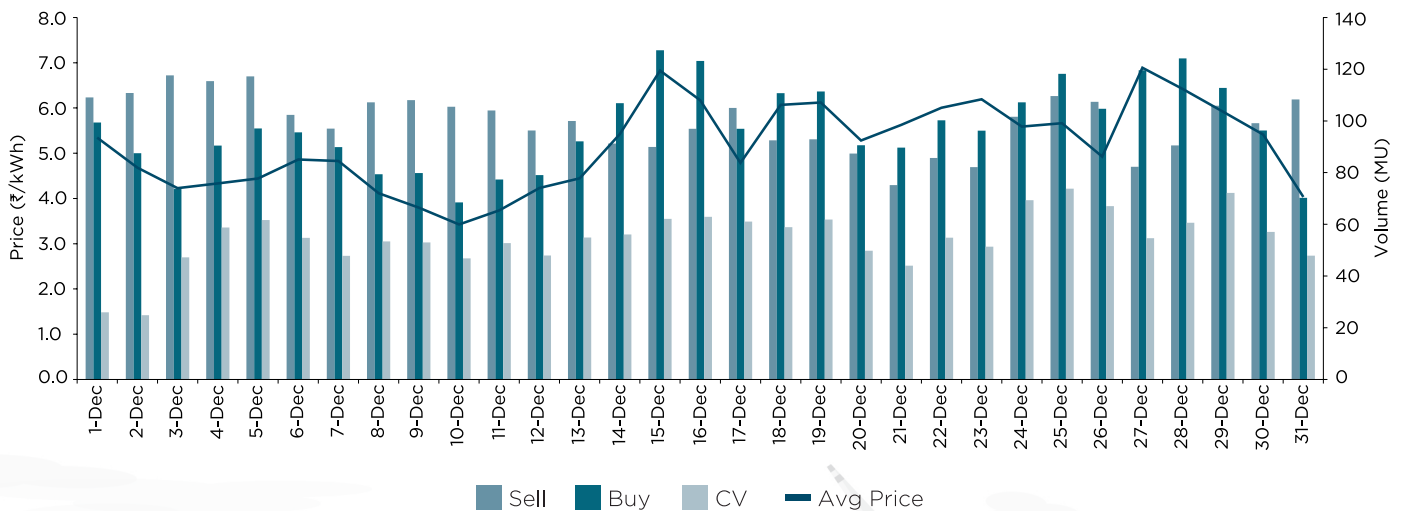
Area Prices Price Snapshot (₹/kWh)



VOLUME 1 MU = 1 Million kWh = 1 GWh



Daily Trade Details



GREEN MARKET

GREEN DAY-AHEAD MARKET

AREA PRICES

Price Snapshot (₹/kWh)

Area	Average	Minimum	Maximum
All India	5.40	2.90	12.00

VOLUME

1 MU = 1 Million kWh = 1 GWh

Volume	Sell Bids	Buy Bids	Unconstrained Volume	Cleared Volume
Total Volume (MU)	306	1,500	241	241
Average Daily (MU)	9.8	48.6	7.7	7.7

GREEN TERM-AHEAD MARKET

	Intra-Day (Solar)	Intra-Day (Non-solar)	Intraday (Hydro)	Day-Ahead Contingency (solar)	Day-Ahead Contingency (Non-solar)	Day-Ahead Contingency (Hydro)	Weekly (Solar)	Weekly (Non-solar)	Daily (Solar)	Daily (Non-solar)
Volume (MU)	-	-	-	4.5	102.4	25.3	-	-	-	5.3
Price (₹/ kWh)	-	-	-	5.2	5.5	5.9	-	-	-	5.7
Total Volume (MU)	137.5									



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available on Android and iOS



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