# IEX strives for RE integration into power exchanges

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**India's renewable energy target has been revised to 227 GW by 2022. How important will integration of RE in power exchanges be in achieving the ambitious target?**

The ambitious RE target of 227 GW by 2022 seems achievable but difficult because of the present over-supply situation and generation-demand gap in the sector. One of the more important challenges is how to operate power system with such high share of variable and intermittent generation resources. Presently, RE generation capacity is 70GW, out of which wind constitutes 34.1 GW and solar 21.7 GW. About 16 per cent of total installed capacity is intermittent. Of course, this is besides the little intermittency in conventional power plants. The demand side also has usual uncertainties, but that will also grow with more rooftop solar PV. Both these intermittencies will make the system operator's job more difficult. We see that power exchanges can provide a mechanism to handle at least the variable generation. Of course, variability in demand is also managed by Discoms through our day-ahead and intra-day markets.

Presently, renewable generation is not normally scheduled and despatched as conventional power plants because they have long-term PPA and solar or wind generation plants sell to Discoms and turn are exposed to variability. The plants do not get exposed to the impacts of variations and we should change this. If plants are asked to schedule and then are subjected to imbalance charges on their deviations, they will anticipate their generation better and then such forecast will help Discom to schedule and manage variations by despatching other conventional generators to handle both variations in demand and variable generation as well.

The same result can be obtained if all generators are asked to sell through exchange; they may get the market price through the market and price more or less than the contract price settled between Discom and generator. Such contracts-for-difference arrangement will help manage the large scale deployment RE.

Further, we also see that State's appetite to call for bids in due course, will subside. Recently, in India, solar prices have gone down to ₹ 2.45 per kWh, whereas in USA,it has touched a low of 2.1 cents per kWh (i.e. ₹ 1.43). Therefore, now, solar developers need not rely on Discoms bids or contracts. They can set up merchant capacities and sell power through our day-ahead markets. They will get better prices. In last 6 months, few solar generators have started selling power through our day-ahead market and they are fetching prices; much better prices, approximately ₹3.5 plus are entitled for RECs which can fetch additional ₹ 1, so net receivable is ₹ 4.5 per kWh. Our imbalance settlement mechanism DSM, as we call it, is not as rigid as compared to that we have for conventional power plants. All variable RE rich states have not come out with final regulations, out of 8 variable RE rich states, three states Maharashtra, Gujarat and Tamil Nadu have still not issued the final regulations allowing 15 per cent absolute error deviation with respect to operational capacity. The DSM charges are negligible for solar, though it can be higher for wind generation.

Further, exchanges provide intra-day market to take care of variability arising from sudden changes in wind pattern or clouds impacting solar generation.

**Presently, the power market is going the 'green' way for its generation. How has IEX facilitated this convergence in the power sector?**

IEX has been actively serving the renewable energy sector through REC (Renewable Energy Certificate) since 2012. Over the years, the acceptance of this particular segment has been progressing well and is one of the achievements which are giving signals to the market. The increasing inventory through the years gave signals to the market about very low levels of RPO compliance. Taking clues, MNRE pushed for RPO compliance and then State Commissions also seriously pulled up the Discoms. The State Commissions such as BERC, MERC, DERC and JERC (UTs and Goa) did commendable work in pushing their Discoms for RPO compliance.

In 2017, the overall demand had crossed the total supply in the system;out of 1.8 crore of total RECs, around 1.6 crore of REC were sold. Every year, about 45 lakh are issued for about 5,000MW of REC projects. However,

Continued to 44 →

the demand is expected to be more than the available RECs. So again, there is a demand of RE projects to register under RECs.This surge has facilitated the demand for RECs. Thus, IEX is facilitating development of RE through 'green' power market.

Many of renewable generators, particularly solar generators, have started selling in our normal day-ahead market (DAM). About 13 solar generator projects with total capacity of 515 MW are registered with IEX, three of them selling continuously and about ten sold for sometime before the commissioning of the complete plant. This year, the prices in the day-ahead market are higher by 40 per cent as compared to last year. So, renewable generators selling in DAM are getting better prices than solar bid prices. In this way, IEX has contributed to the renewable sector with liquid day-ahead market, competitive pricing and seamless transaction process.

### Please tell us about technical and economic viability of integrating renewable energy in power exchanges?

Availability of better forecasting techniques have made RE generators explore the market effectively. Earlier, these players were selling to distributions companies where they don't need to schedule power. Today, when they sell power in day-ahead market, they need to forecast and schedule accordingly. Particularly for the solar, we do see the viability for despatching renewable energy through power exchanges. However, the wind companies are unable to forecast their wind generation on day-ahead before the market. So, it is much easier for solar to integrate with the power exchanges than wind.

### What are the opportunities and challenges for the sector in the integration process?

There are few challenges that exist for the integration process. One of them is not been able to bring about the generating capacity required to integrate the market well; like, hydro is a type of source where one can ramp up and down very fast at a short notice, so is the gas-based plants. So, the sources that are required to integrate the market are few. Another challenge that we face is of deficiency of flexible generating resources which can provide secondary and tertiary reserves. We should bring right framework to incentivise investments in these resources. Once these resources become feasible and available, they will help manage sharp ramp-up of solar generation during morning hours and sharp decrease during evening hours. So, in order to make an optimal use of these resources without putting very high burden, there is a need to evolve framework, in order to bring new sources like energy storage, hydro, gas and consumers demand response.

Virtual Power Plants (VPP) are also effective market tool and also ancillary resource for helping system operators to manage the grid secure. VPP is aggregator which may constitute of several plants including combination of variable generation such as wind, solar and others for balancing resources such as hydro, gas, DR and electric storage which act like a single virtual power plant. It can buy or sell in the market, can act like balancing reserves for the system operator. It acts like balance responsible party (BRP) and manage its imbalance by varying outputs from other resources. It can take care of lower generation in one wind plant with other resources.

### IEX has been actively working towards integration of renewables. What are the initiatives undertaken for the same?

IEX, through its day-ahead market platform, has been making the RE generators aware of market opportunities through exchanges. The price discovered through exchanges is now better than the one offered through competitive bidding. So, the generators should find such markets lucrative for deriving better pricing for selling in the day-ahead market. This ensures efficient renewable integration. With the help of better forecasting tools, the integration gets seamless and efficient, thus adding to the capacity acceleration.

IEX has requested CERC and system operator i.e NLDC to bring down the gate closure from 3 hours to 1 hour for the intra-day market, which will prove to be helpful in managing their imbalances through buying and selling at short notice.

Further, we would like to make following suggestions for improving scheduling and intra-day market framework.

- No revision to be allowed postday-ahead scheduling: Currently scheduling is done on day-ahead basis and for long term contracts there is flexibility where they can revise the schedules in four time blocks. In this case, generators and beneficiaries when they seek revision, are passing on the risk of managing imbalances to the other party. This has also prevented sale of un-requisition power by the generators. Therefore, in order to correct this problem, we should not allow any revisions of schedules in long term and medium term PPA after the day-ahead schedules are issued.
- Transmission charges on net basis: Transmission charges should be applied on the net transaction done by a grid connected entity. This is very logical since the transmission network is used on the net transaction basis. For example, Discoms may be purchasing from generating stations under long term or medium term and selling on short-term day-ahead basis so as to correct their deviations, then they should not be applied transmission losses or charges for each transaction rather it should be on net of all transactions done till closure of all windows for revisions.
- Generators and consumers should be allowed to buy and sell respectively in intra-day market: In the current framework, generators are not allowed to buy and consumers are not allowed to sell power which prevents their ability to minimise their deviation. Therefore, it is proposed that they should be allowed to buy or sell at least in the intra-day market.
- Waiver of transmission charges on intra-day transactions: As practiced in developed in US markets, there is no transmission charges levied on intra-day transactions. Intra-day markets are only 3-4 per cent of day-ahead markets which in turn is about 3.7 per cent of overall generation. Overall intra-day market constitute of 0.2 per cent of total electricity generation, till it becomes bit more significant, transmission charges may be waived off.