

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Suo- Motu Petition No. 127 /2011

**Coram: Dr. Pramod Deo, Chairperson
Shri S.Jayaraman, Member
Shri V.S.Verma, Member
Shri M.Deena Dayalan, Member**

Date of Order: 24-5-2011

In the matter of:

Modification in Market Design of Day Ahead Market in Power Exchanges:-(a) Modification of Time block for bidding from one hour to fifteen minutes; and (b) Introduction of Evening Market

And

In the matter of:

1. Indian Energy Exchange Limited, New Delhi
2. Power Exchange of India Limited, Mumbai
3. National Power Exchange of India Limited, New Delhi
4. Power System Operation Company Limited, New Delhi

.....Respondents

ORDER

Power System Operation Company Limited (POSOCO) in its letters dated 26.3.2010 and 18.5.2010 had submitted its suggestions to the Commission for modification in bidding time block from one hour to 15 minutes for day ahead market and for introduction of evening market respectively. Based on the suggestions, a Staff Consultation Paper titled as "Modification in Power Market Design - Evening Market, Fifteen minutes bidding time block and Ancillary market on Power Exchange" was published on the website of the Commission on 13th August 2010. A public hearing on the subject was conducted by the Commission on 9th September, 2010. Thereafter matter was discussed in the Central Advisory Committee (CAC) meeting held on 29th September, 2010 with the agenda "How to make power

markets more efficient". The CAC recommended for modification in the bidding time block from one hour to fifteen minutes, though no consensus in the matter related to evening market could be arrived.

2. We have considered the written and oral responses to the Staff Consultation Paper and the views expressed by the learned members of the CAC on the issues relating to modification in bidding time block from one hour to 15 minutes for day ahead market and for introduction of evening market. The summarized comments, both written and oral, of the participants in the public hearing are enclosed as **Annexure I** to this order. Our analyses of the issues and decisions thereon have been discussed in the succeeding paragraphs of this order.

(A) Modification in bidding time block from one hour to fifteen minutes in the day ahead markets run on power exchanges

3. The proposition from POSOCO regarding modification in bidding time block from one hour to fifteen minutes in the day ahead markets run on power exchanges emphasizes on harmonization between the bidding in power exchanges and scheduling for physical delivery as prescribed in the IEGC. The bidding in the day ahead market on Power exchanges is on an hourly bidding basis whereas the scheduling philosophy for physical delivery of power under IEGC is on a 15 minute time interval. Moving towards 15 minute time block for bidding was planned as a part of the road map while commencing operations of power exchanges. Several other advantages of fifteen minute bidding have been cited by POSCO and the other participants in the public hearing. These are summarized below:-

- (a) This will lead to better management of ramp up rates against present kink at hour boundaries. A gradual ramp up and ramp down will be easy to manage for participants. Load curve of utilities does not recognize hour boundaries. It will be easier to undertake portfolio management at finer level and better management of imbalances by utilities.
- (b) This will encourage participation of renewable energy in power exchange.
- (c) Fifteen minute bidding will make Unscheduled Interchange and power exchange prices comparable as UI is calculated on a fifteen minute interval.
- (d) This will be advantageous for peak load management as Eastern & North Eastern states have early sunsets compared to southern states.
- (e) This will provide market participants more flexibility in bidding.

4. There are also comments from stakeholders which are not in favour of 15 minute bidding. These are as follows:-

- (a) Objectives of Grid/System operations and market operations are different. The objective of market is large participation therefore design should be simple to understand and easy to use whereas grid operation will always be a complex issue with specialized knowledge. We do not need to harmonize them.
- (b) Market will lose its simplicity and intuitiveness.

- (c) Participants will find it difficult to bid in 96 time blocks. Bidding may become more error prone due to large amount of data to be input regularly. It may also require auction time to be extended.
- (d) Contingency / Intraday market already exist and that can be modified to a 15 minute market to address the concerns of system operator on ramp up and kinks.
- (e) Market closer to real time rather than day ahead market needs to be 15 minute market as this would be used to balance the demand and supply.
- (f) Developing real-time balancing market /Ancillary markets with quick response generating capacity available with system operators is only solution to handle high ramp rates – modifying with day ahead market is not the right approach to solve this problem.
- (g) Wind / solar generator presently do not come on exchange nor will they as renewable generators prefer preferential tariff or the competitive bids undertaken for solar generators by NVVN. Also amendments in IEGC will allow them only a 30% deviation from schedule, deviation beyond this limit will lead to penalty.
- (h) Substantial capacity of grid connected solar power is expected only after two years as these are in initial stages of development. The proposition can be considered at a later stage.

- (i) Discoms need to do much better demand-supply forecast to really use 15 minute market effectively. However discoms do not do 15 minute forecasting presently.
- (j) This will require change in the trading software and rigorous testing of the new software before any modification can be implemented.

5. There was a neutral suggestion to make fifteen minute bidding optional and not mandatory for the participants.

6. We have analyzed comments of all the participants. We are of the opinion that harmonization of bidding and physical scheduling of power is a good market design and complements grid reliability and security. Apart from that, there are several other benefits of moving to a 15 minute bidding regime as are stated as under:-

- (a) This will help in attracting wind generators and solar generators to power exchanges. Wind generator and solar generators which are untamable resources and dependent on wind velocity and sunlight availability respectively for carry a higher risk in bidding and committing supply for time blocks of 1 hour. Further, these generators are small in size and loss of opportunity for even a single time block of 15 block has a high impact on the generators in terms of UI liability. Smaller bidding time blocks will increase their comfort to bid and will attract them to the day ahead market. This is also relevant especially in the context that there is a greater push towards renewable at all policy making levels.

- (b) Hourly bids results in the high ramp rates at the hour boundary (kink), particularly at the start and the end of the morning and evening peak hours. In real time load ramp is seasonal and linked to sunrise/sunset etc which is a gradual process. Implementation of 15 minute bidding interval in the Power exchange(s) would increase the operational flexibility, accommodate the ramp rate and reduce the UI.
- (c) This will increase the operational flexibility of the system operator and the utilities. As the utilities move closer to the day of operation, the uncertainty in forecasted demand is reduced and maximum flexibility is needed in the day ahead procurement to balance their portfolio. This inflexibility manifests as imbalances in real time operation thereby posing a threat to grid security. This will get address with 15 minute bidding time block.
- (d) It is well known that value of electricity is dependent on the time when it is consumed. At a granular level it means that the value does not necessarily remain the same for each 15-minute time block and hence 'hourly bids' do not truly reflect the perceived value. Allowing 15-minute bidding to participants will help them manifest their value for electricity with time more precisely and would thus result in better price discovery.
- (e) The 15 minute bidding could also help in handling transmission congestion issue. If the corridor is available for a period shorter than the hour the corridor can then be used.

- (f) As regards large amount of data handling during bidding process, this can be addressed through automated data uploading process and use of technology.
- (g) As regards loss of simplicity of the market or difficulty in comprehending information of 96 time blocks, it may cause initial difficulty to open access customers but the generators and utilities who are a much larger part of the market are used to handling power scheduling data for 96 time blocks while interacting with SLDC/ RLDC.

7. Regulation 11 of Power Market Regulations provides for the market design in day ahead market for power exchanges and Regulation 13 provides for physical market design to complement security and reliability of power system. Under these provisions, the Commission has decided to modify the bidding time block in day ahead market in Power Exchanges from one hour to 15 minutes.

8. We direct the Power Exchanges to change the bidding time blocks from one hour to 15 minutes in day ahead market and submit an implementation plan to the Commission which should include any operationalisation issues like extension time period for auction or unconstrained price discovery process or price discovery process with transmission corridor availability etc. The implementation plan shall be submitted by 30.6.2011 and the process of changeover shall be completed within a period of six months from the issue of this order. Accordingly, we direct the Power Exchanges to:

- (a) Undertake all requisite modifications in the software application of the trading system, clearing and settlement system and any other applications needed.
- (b) Undertake the testing of the new trading system and validation of test results before actual introduction of 15 minutes bidding. The test results shall be submitted to the Commission for perusal.
- (c) Carry out mock tests with participants for a smooth transition from one hour to 15 minute bidding.
- (d) Modify the contract specification in day ahead market to reflect 15 minute contract duration.
- (e) Modify the relevant provisions in the Bye laws, Rules and Business Rules of the exchange and submit to the Commission for approval.

9. We also direct POSOCO (NLDC) to discuss the procedural changes with the Power exchanges and accordingly modify the Detailed Procedure for Scheduling of Collective Transactions issued in accordance with CERC Open Access in inter-state transmission) Regulations, 2008 and as amended from time to time and submit the same for approval to the Commission by 15.6.2011

(B) Introduction of Evening Market in Power Exchange

10. The Commission has received a proposal from POSOCO, the system operator regarding introduction of Evening Market on Power Exchanges. It was proposed that an evening market will be another iteration of the morning market conducted in the evening hours (It would have a double sided closed bid auction with Scheduling of

Collective Transactions) and all rules, procedures, price discovery mechanism would remain exactly the same as the morning day ahead market. However the process will be independent of the morning market and participants would have to bid again in the evening session. All the processes including trading session, risk management, clearing and settlement, physical settlement would be handled separately by the power exchanges and system operator. Also application fee, Transmission and Operating charges will be the same as morning day ahead markets. The Transmission Corridor for evening market would be the balance corridor available after morning day ahead market schedule is completed.

11. The comments in favor of introduction of evening market given by POSCCO and other stakeholders in the public hearing are summarized under-:

- (a) There is a large volume which remains uncleared in the morning session. It is likely that more volume will be cleared in the market as a whole since evening market may help uncleared energy of morning session to be cleared in the evening session.
- (b) This will help DISCOMS to take a more informed decision in the market especially with respect to weather related information and hence the expected load pattern the next day. It will thus facilitate demand-supply balancing of their portfolios for the next day.
- (c) It is likely to lead to better utilization of available margins on unutilised transmission corridors.

- (d) This will provide all participants another opportunity to optimize their portfolio which is one of the purposes of a balancing market.
- (e) It is likely to shift transaction volumes from the Unscheduled (UI) to the scheduled market which will improve grid reliability.
- (f) This will provide more choice to consumers and higher consumer satisfaction as it provides participants a second chance to bid.

12. The concerns raised by stakeholders in the public hearing against evening markets are summarized below:-

- (a) The morning day ahead session is a closed bid auction. The dominant strategy in a closed bid auction of bidders is to bid at marginal cost. However, evening market it may lead to non serious and speculative bidding in the morning session.
- (b) Evening market may possibly increase volume but division of liquidity is a certainty which will affect price discovery.
- (c) This is against the principle of non discriminatory open access as Power exchanges are being given undue preference in transmission corridor allocation.
- (d) It is possible that with introduction of evening market a large proportion of morning market may turn completely to an evening market with a shift in volumes.

- (e) There would be two benchmark reference prices - Morning market price and Evening market .This may confuse the market participants.
- (f) It may lead to speculative trading in power as participants can buy in the morning session and sell in the evening session (or vice versa) and yet have net no delivery liability .
- (g) Since intraday and contingency market already exists there will be no additional benefit of introducing the evening market.

13. We have considered the pros and cons of introduction of evening markets in the Power Exchanges. We are of the view that the liquidity in the day ahead morning market is still low and the introduction of evening market will split liquidity further and adversely impact the robustness of price discovery in the morning session. As for the concern regarding uncleared energy in morning session of day ahead market, the existing intra-day and contingency market need to be effectively used to attract such uncleared energy.

14. We direct that the proposal for introduction of evening markets be kept in abeyance at present. The power exchanges and POSOCO are directed to analyse the reasons for low liquidity in the intra-day and contingency market and submit their report by 30.06.2011.

Sd/-
M.Deena Dayalan
Member

sd/-
V.S.Verma
Member

sd/-
S.Jayaraman
Member

sd/-
Dr. Pramod Deo
Chairperson

Summary of Written and Oral Comments of Public Hearing on “Modification in Power Market Design of Day Ahead Market in Power Exchange” held on 9th September 2010.

15 Minute Bidding time block instead of 1 hour in Day Ahead market			
Sl. No	Name of Stakeholder	Suggestion	Remarks
1	Power System Operation Corporation Limited (POSOCO)	Yes	<ol style="list-style-type: none"> 1. Introduced the idea through it letter to Commission 2. Will lead better management of ramp up rates as presently there is a kink at hour boundaries. A gradual ramp up and ramp down will be easy to manage for participants. 3. Load curve of utilities does not recognize hour boundaries. It will be easier to undertake portfolio management at finer level 4. Better management of imbalances by utilities 5. Will encourage participation of renewable energy in Power exchange. 6. UI prices are for 15 min block . PX prices are for 1 hour blocks. 15 Minute bidding will make these comparable.
2	Power Exchange of India Limited	Yes	<p>Currently sellers and buyers at regional level are issued schedules (by National Load Dispatch Centre or Regional Load Dispatch Centre) on a 15 minute time block and settlement is also carried out at 15 minute interval. It would be helpful to maintain uniformity for participants of the Power Exchanges to trade through the 15 minutes time block.</p>

3	Indian Energy Exchange Limited	No	<ol style="list-style-type: none"> 1. Market design should be simple to understand and participate and Complex Markets are risky to regulate and operate. 2. Should not mix grid operation issues with market design. 3. Demand forecast on 15 min basis not prevalent even on day ahead basis therefore continue Hourly Bids in day ahead market and up to very close to actual delivery. 4. For precisely adjusting portfolio closer to delivery in real time : contracts can be based on 15 min time block in day ahead contingency and intraday markets 5. Contingency / Intraday market already exist and that can be modified to a 15 minute market to address the concerns of system operator on ramp up and kinks 6. Wind / solar generator presently do not come on exchange nor will they as renewable generators prefer preferential tariff or the competitive bids undertaken for solar generators by NVVN. Also amendments in IEGC will allow them only a 30% deviation from schedule, deviation beyond this limit will lead to penalty.
4	Tata Power Trading Company Limited	Conditional Yes	<ol style="list-style-type: none"> 1. Should be made optional to the bidders and not mandatory 2. Gives the participants more flexibility 3. Should be same for Morning market being 1 hour bidding and evening market being 15 minute bidding;
5	PTC India Limited	-	No comments
6	Andhra Pradesh Power Co-ordination Committee	Yes	<ol style="list-style-type: none"> 1. Advantages for peak load Management. The Eastern & North Eastern states have early sunsets compared to southern states. 2. The load flow curve will smoothen and true value of energy vis-a-vis time can be found out. 3. When prediction on day - ahead basis

			even in hourly basis is not accurate and becoming difficult at times, then predictions based in 15 min block may not be difficult
7	Gujarat Urja Vikas Nigam	Conditional Yes	Both the sessions of day ahead market should either be on hourly bidding or on 15 minutes time block based bidding
8	NTPC	Neutral	<ol style="list-style-type: none"> 1. May not help renewable bidding as mentioned in paper . 2. Does not agree that this will lead to Improved operational flexibility of generator in ramp up/ down
9	vTrium Energy Pvt Ltd, Singapore (Energy Advisory)	Yes	Will help to reflect dynamic pricing in power exchange
10	Sajag Nagrik Manch ; Pune	No	<ol style="list-style-type: none"> 1. Will create chaos 2. Will lead to higher price volatility 3. Discom cannot manage the complexity of 15 minute market structure
11	Karnataka Electricity Regulatory Commission	Conditional Yes	Either 15 minute or 30 minute bidding should be for both Morning and Evening markets
12	NDPL	Yes	No justification given

Introduction of Evening Markets			
Sl. No	Name of Stakeholder	Suggestion	Remarks
1	Power System Operation Corporation Limited (POSOCO)	Yes	<ol style="list-style-type: none"> 1. Uncleared volume of morning can be cleared in evening market. 2. Will provide another opportunity to optimize their portfolio, freedom and choice in the market 3. DISCOMs can take more informed decision based on weather condition etc 4. Transmission corridor margins will be better utilized 5. Will shift UI volume to organized markets 6. Unlikely that volume will go down so can be tried. Also present infrastructure can be leveraged 7. Scheduling in short time frame already being done 8. Multiple benchmark prices already exist due to multiple exchanges
2	Power Exchange of India Limited	No	<ol style="list-style-type: none"> 1. Volume may shift form morning to evening market and morning trades will not be at marginal cost. 2. Price distortions may arise as sellers will want to sell closer to delivery 3. Speculative trades possible 4. Confusion due to different prices 5. Banking hours will be an issue and will lead to higher margins being charged 6. Should support the existing platform 7. Financial grant required for Commission if CERC insists on this
	Indian Energy Exchange Limited		<ol style="list-style-type: none"> 1. Increase in volume is only a likelihood but division of liquidity is a certainty which will adversely affect price discovery 2. Will create confusion in market due to multiple prices and complicate bidding strategies 3. Instead of multiple closed auction ,

3		No	<p>continuous trading is proposed</p> <ol style="list-style-type: none"> 4. Possibility of speculative trades is high 5. Effective price discovery will be harmed and vs an advantage of 5 hours closer to delivery 6. Will create confusion in market , will require lot of education to the participant s 7. Real time Balancing market can be created separately
4	Tata Power Trading Company Limited	No	<ol style="list-style-type: none"> 1. Will not increase liquidity 2. Is against the principle of non discriminatory open access and give undue preference to PX 3. Preference to PX adversely affects business of licensed traders 4. Market still in nascent stage and not ready for this
5	PTC India Limited	No	<ol style="list-style-type: none"> 1.The serious fallouts far outweigh the limited benefits 2.The present market design should not be disturbed with experimentation 3.Uncleared volume analysis should be over a long duration 4.Two benchmark prices will be misleading
6	Reliance Energy Trading Ltd	No	<ol style="list-style-type: none"> 1. Undue preference to PX affects the business of licensed traders.
7	Andhra Pradesh Power Co-ordination Committee	Neutral	<ol style="list-style-type: none"> 1.Will be effective as morning prices will be known 2.Uncleared morning volume can be cleared 3.Gaming between morning and evening market can happen
8	Gujarat Urja Vikas Nigam	No	<ol style="list-style-type: none"> 1. SLDC will not be comfortable ltp schedule power till 11;00 PM 2. Will shift volume from morning to evening markets 3. Bidding strategy of participants in morning market will change 4. Speculative trades may happen 5. DISCOM which are mostly government utilities are not ready for

			6. Unmatched volumes of morning are not lost volume as this is not a price consumer is ready to buy or supplier ready to sell
9	NTPC	No View	1. Bilateral day ahead market will become non functional 2. Speculative trades in morning market will increase 3. STOA regulation for collective transactions will need to be reviewed.
10	vTrium Energy Pvt Ltd, Singapore (Energy Advisory)	No	1. Will make day ahead market redundant be 2. Day ahead auction window can be increased and will serve the purpose
11	Sajag Nagrik Manch ; Pune	No	1. SLDC will not be able to manage based on experience in 2. Fund transfer will be difficult in evening 3. Contingency market already exist , so no additional benefit of evening market
12	Karnataka Electricity Regulatory Commission	Conditional yes	1. A price cap and volume cap based on morning price should be fixed for evening market 2. Margins should be collected in advance as banking should will be closed 3. Intraday market should not be closed if they are working well.
13	NDPL	Yes	Will provide additional opportunity to DISCOMs to manage demand and address any contingency