



Ref: PTC/CERC/2022/Nov-3

Date: November 11, 2022

To
Shri. Harpreet Singh Pruthi,
Secretary
Central Electricity Regulatory Commission
3rd & 4th Floor, Chandralok Building,
36, Janpath, New Delhi-110001.

Subject: Comments on “CERC Staff Paper on Power Market Pricing”

Dear Sir,

This is with reference to Public Notice No. Eco-4/2022-CERC dated. 12th October 2022 inviting comments and suggestions from the stakeholders on a Staff Paper on "Power Market Pricing".

You are requested to kindly consider the enclosed annexure (Annexure-A) of our detailed comments and suggestions for your kind reference and perusal. If deemed appropriate, we are also available for an in-person interaction to clarify any aspect.

Thanking you,

Yours faithfully,

For PTC India Ltd,

A handwritten signature in black ink, appearing to read 'Rajesh Cherayil', written over a horizontal line.

(Rajesh Cherayil)

Chief Strategy Officer

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(Annexure-A)

Comments on the CERC Staff Paper on “Power Market Pricing”

Background: We welcome this initiative by the staff of the Central Electricity Regulatory Commission (CERC) to initiate a discussion on market prices in the Indian electricity markets. The volatility in market prices that we have witnessed in the calendar year 2022 especially in the backdrop of stiffening prices of global commodities directly affecting the energy sector (crude, gas and coal) have put a spotlight on the price discovery in the electricity markets especially on the power exchanges (PXs). However, we believe the paper needs to do additional analysis of the market behaviour of the participants on the exchange platform especially the interim shift in volumes from the Day Ahead Market (DAM) segment to the Term Ahead Market (TAM) segment when cap was introduced in the DAM segment. It would also be pertinent to study and analyse the market power of a few participants that set the prices on the exchange platform, which would assist in commenting about the effectiveness of the PXs in ensuring efficient price discovery because essentially the TAM segment based on continuous transactions is a bilateral market.

At an overall level, a deep study would also be necessary to capture similar shifts/ inter-se moves between over-the-counter (OTC) and PX markets. Primarily such shifts are for capturing price arbitrages. However, such movements caused due to price arbitrages can be at the cost of market stability.

Also, while discussing the Pay as Bid vs Pay as Clear structures, the reflexive nature of the market and the participants could have been simulated along with the Pay as Bid if implemented for Buyers along with the Sellers. Additionally, while we laud the paper in terms of correctly identifying two distinct segments of the market i.e. over the counter (OTC) and PXs, which offer/should offer standardized products, the role of the OTC segment with its assurance of a longer term bespoke supply has not been captured along with its relevance. We recommend therefore that a simulation may be carried out with back tested data while capturing the market power of the participants on the platform to make a more reasoned assessment.

1. **Preliminary comments on the sections that provide context for the discussion points**

(Annexure-A)

- i. **Clause 1.2 & 1.3:** The behaviour of the market participants as observed on power exchange(s):
 - i. leading to regulatory intervention to cap the prices at INR 12/kWh and;
 - ii. the behavior of shifting of volumes from the Day-Ahead Market (DAM) segment to the Term Ahead Market (TAM) segment when cap was introduced in the DAM segmentneed to be analysed in greater detail to validate the efficacy of power exchange platforms to discover prices efficiently and transparently and to check market manipulation by participants with market power.
- ii. **Clause 1.4:** Any discussion on pricing methodology should be based on a simulation of alternative pricing models with historical data. This simulation must be overlaid with the behavior of market participants by studying their historical market power (marginal sell volume and marginal demand) demonstrated through their submitted bids.
- iii. **Clause 1.5.1:** The market segments that have been represented may not be necessarily representative of long-term market trends because this behavior is visible during and immediately post a pandemic (Covid 19) phase, which resulted in a drop in demand, and shift of volumes to the short-term segment of the power exchange(s) (2020-21).
- iv. **Clause 1.6.1:** We appreciate the clear identification of Over-the-Counter (OTC) market as a distinct market segment of the power market. However, there is no analysis on the prices discovered on this market segment including aspects like the assured supply that should command a premium over the transactions of power exchange(s) or the discovery of prices on an OTC platform like DEEP. Therefore, we suggest that any discussion on prices on short-term market should include a commentary on the price and volume behavior observed in the OTC market segment.

Any discussion on the prices have to keep in context two important provisions of the Electricity Act namely Section 62 which assures a regulated return on assets

and Section 79 (1) (j) which states that trading margins may be fixed, if considered necessary. Therefore, it provides some context that the marginal volumes that should come into a complementary PX market should be the residual capacity over and above the one that generates regulated return (Section 62). In addition, it specifies the context that regulatory intervention for prices should only be necessitated if considered necessary (Section 79).

- v. **Clause 1.7.2:** Recently, the two exchange(s) Indian Energy Exchange (IEX) and Power Exchange of India Limited (PXIL) introduced a new type of contract namely Any Day Single Sided Contract (ADSS) which does not fit into the two identified segments of collective transactions and continuous transactions.
- vi. **Clause 2.4.4:** It has been stated “the increased prices of fuel, particularly imported coal led to a significant increase in marginal cost of the margin setting generators of market”. This along with the surge in demand led to high market clearing prices, frequently touching INR 20/kWh, i.e., the maximum quotable price. However, this needs to be validated by second order data of the identity of these marginal sellers and the volumes that they sold on the various segments of the power exchange(s) to definitively conclude that these sellers incurred higher variable costs due to the elevated prices of fuel.

2. Our detailed comments on the questions put forth for deliberations in the staff paper are listed below.

3.1 Does Pricing Methodology need a change?

- Considering the Indian power exchange(s) market, which are yet to mature in terms of volume (4-5% of the overall market) and number of participants, the Uniform Market Clearing Price (UMCP) seems a relatively better approach to manage the restricted market segment.
- The case for Pay-as-Bid pricing structure may be explored with the specific objective of reducing the overall producer(s) surplus (Pay-as-Bid for sellers) and consumer(s) surplus (Pay-as-Bid for buyers). However,

this surplus has to be appropriated for a specific objective if this pricing mechanism is selected for some segment of the market.

- One of the issues that may be identified with the introduction of Pay-as-Bid pricing structures is inefficient price discovery due to lack of liquidity in terms of lesser number of buyers and sellers. Introducing the concept of “Market Coupling” on Indian Power Exchanges(s) may address the issues of the present market depth in such a scenario.
- Another possible alternative for implementing a Pay-as-Bid methodology is as a supplementary option to the UMCP conjointly with the implementation of market coupling. Such a structure can be used for the residual sale of uncleared bids in real-time under a Pay-as-Bid price structure whereas the primary clearing will be under a UMCP regime.
- Such a Pay-as-Bid structure would also require a much more active forecast of buy/sell volumes by the market participants, which may require service providers and portfolio managers to assist the grid connected market participants. However, the Pay-as Bid structure may induce sellers to quote high prices resulting in elevated price discovery subverting the efficient price discovery mechanism.
- The segments like High-Price DAM (HP-DAM) may offer a better segment to implement the Pay-as-Bid pricing methodology as it is already a high price seller segment and UMCP in this segment might generate extra profits for high marginal sellers.

3.1.2 Any change in pricing methodology would necessarily result in a change in behaviour of the market participants. Sale prices that are likely to be quoted under a Pay-as-Bid regime are likely to stay elevated (and not just based on marginal cost of these sellers). This also requires an analysis of the kind of sellers (type of fuel, RE, imported coal, gas, hydro etc.) and the quantum available with them to participate on the power exchange(s). With our limited

(Annexure-A)



access to data, we were able to put together data on the energy generated from different kinds of power plants.

Month	THERMAL	NUCLEAR	HYDRO	Bhutan IMP.	R.ES	TOTAL (MU)	PX
March'21	106987	3081	8380	154	9502	128105	8648
March'22	108751	4358	10585	173	12015	135882	9935
Diff	1763	1277	2205	19	2513	7777	1287
% change	102%	141%	126%	112%	126%	106%	115%

April'21	103822	3293	8255	163	9975	125508	8294
April'22	111766	3472	11497	401	12842	139978	9268
Diff	7944	180	3243	238	2866	14471	974
% change	108%	105%	139%	246%	129%	112%	112%

May'21	87655	3928	11784	593	12926	116886	6963
May'22	108388	3471	12832	353	18955	144000	8880
Diff	20733	-457	1049	-240	6029	27113	1917
% change	124%	88%	109%	60%	147%	123%	128%

June'21	85468	3793	15998	1146	15247	121652	7455
June'22	105626	3814	13850	941	18598	142829	7594
Diff	20158	21	-2148	-205	3351	21177	139
% change	124%	101%	87%	82%	122%	117%	102%

Data source: CEA daily generation report

It is observed from the above data that excluding for the period of March'22, the excess energy traded on the power exchanges were mainly supplied from power plants based on fossil fuel sources. The data also shows that some portion of such supply has been contributed by Hydro projects and RES. However, it is required to analyse transaction wise volume traded on the power exchanges to definitively conclude on the contribution to traded volumes by the specific type of power plant based on fuel sources.

- 3.1.3 A quantitative assessment of the profits generated by such generators during this period needs to be compiled before confirming that excessive profits have been generated. Additionally, these profits have to be looked at in the context of the annual profits of such generators.

3.2 What should be the criteria for Regulatory interventions?

Regulatory interventions are necessarily taken with the objective of the end-consumers' benefits and to correct the market distortion especially those generated by uncontrollable macro variables. However, what exactly is market distortion and when is the right time to intervene is still a matter of debate especially in the context of allowing market mechanisms to provide feedback (Self-correcting systems). Considering the example cited of the Australian market, one of the suggested approaches may be to introduce automatic circuit breakers when the prices move to a certain identified level. These levels again might be kept on a threshold price of moving average of last seven (7) days or fifteen (15) days as has been suggested or any such feasible period to smoothen the prices and revive orderly conduct in the market.

- 3.2.1 Price signals are an output function of the behavior of the participants in the market. Abnormal price behavior rises out of market power, which is abused by certain participants. Therefore, regulatory monitoring needs to be strengthened especially in a scenario of high volatility in prices to track and restrain the behavior of the marginal participants who hold disproportionate market power.
- 3.2.4 (i) Regulatory interventions should be based on price signals when they deviate from "normal". We should establish long-term normal distribution of prices based on historical data and if the prices deviate by more than two standard deviations from the mean on a defined number of occasions, enhanced regulatory monitoring should be

initiated. Subsequently, if the prices move beyond three standard deviations of the mean on a defined number of occasions, regulatory intervention may be necessitated.

(ii) A dynamic price cap based on moving averages subject to an overall threshold cap of the variable cost of the most expensive marginal generator (DG, Naphtha etc.) would be one approach.

(iii) To propose a cap on infra-marginal generators during the period of extreme price volatility, we would need data to assess the quantum of "excessive profits" made by such generators. Any approach towards introducing multiple caps for different segments of generators may result in additional fragmentation of an already thin market.

(iv) Imposing windfall taxes on infra-marginal generators must be examined in terms of overall annual profits made by such generators over the long-term. This is because if these generators have suffered losses or subdued profits in time periods when demand was low it would be inequitable to levy windfall taxes during brief intervals of high prices.

(v) As an overall approach, introducing separate bands of tariff caps for various segments is likely to result in fragmentation of a market that currently has a limited number of participants.

3.3 How do we address the negative impact of price cap?

3.3.1 To ensure that generators with high variable costs are able to participate in the market, a dynamic price cap subject to an overall threshold cap of the variable cost of the most expensive marginal generator could be implemented as a part of the design. Nodal Agencies/ Statutory bodies have access to national level data for

variable costs of all generators and accordingly they are best placed to establish the threshold levels for the variable costs of the generators participating in the power markets of the country. This will eliminate few of the drawbacks of imposing the price cap and excluding generators with high variable costs.

3.3.2 (i) Evidence suggests that there are two primary reasons of high variable cost/conversion cost.

- In the case of thermal power plants based on imported fuel like coal and natural gas, it is the cost of fuel, freight and the impact of currency that determines the variable charge. However, it does not account for plant inefficiencies like station heat-rates, auxiliary consumption, plant load factors etc. and therefore it needs to be suitably adjusted while determining the variable charge.
- In the case of battery energy storage systems (BESS) and other new-technology based solutions (Green H2), the cost-curve of the technology is at elevated levels currently and consequently, they need the right price signals to encourage investments and participate in the market.

(ii) Liquidity is always expected to be a challenge in the high-price (HP-DAM) segment. Therefore, collective transactions methodology of double-sided auctions based on UMCP might not fructify into trades. However, the continuous transactions methodology currently deployed in the TAM segment, which matches the marginal seller with the marginal buyer, may result in transactions. Additionally, in the OTC segment, a market aggregator may aggregate such high price electricity and sell to demand that will also be sourced by the same aggregator. This has been successfully demonstrated in case of the stressed asset scheme initiated by the Ministry of Power.

(iii) One suggestion is to ensure that sellers do not shift directly to the HP-DAM segment and only uncleared and residual volumes from the

DAM segment should be allowed to participate in the HP-DAM segment. In addition, the minimum bid price for HP-DAM segment shall be equal to cap price in the DAM segment to encourage genuine participation of high-marginal cost sellers who will have their variable costs verified by the designated nodal agency (s) .

3.4 What should be the market design for incentivizing demand response and energy storage system (ESS)?

The Indian Market design should incorporate demand response as an essential element. This is becoming increasingly important because of

- a. the rapid integration of variable renewable energy in the grid with fluctuating supply profiles, and
- b. the high current cost of storage systems like pumped storage power plants (PSPP) and battery energy storage system (BESS)

Similar to a renewable procurement obligation (RPO), a demand response program should be mandated across all the state utilities with defined incentives.

- 3.4.4 (i) A new element in the Indian Power Market design namely, an Aggregator may be introduced. An Aggregator amongst other activities will aggregate power generating units and/or flexible power consumers and storage systems. This would require introduction of the Aggregator as an eligible entity recognized in the Grid Code. Coupled with a mandatory demand response programme, a market aggregator like a category-I Trading Licensee can assume this role effectively.