

Staff Paper on Market Coupling dated August 2023

WCA and Joule Wise are honoured to have been called by the Honourable Commission to share their comments and thoughts on the Staff Paper on Market Coupling.

The challenge for the CERC is to find the right balance to foster **competition and innovation**, while guaranteeing the **fairness and transparency** of the power market.

Preliminary remarks

A single price formation for the day-ahead and real-time markets

- A mechanism establishing **a single price formation** for whole India seems consistent with the Market- Based Economic Dispatch (MBED). It will allow to strengthen the consistency between the power system operation and the design of the power market. It will also enable the development of market-based mechanisms to operate the power system, and even the emergence of regional market to foster the development of flexibility tools (more integration of Demand-Side Response, local price signal for congestion alleviation, etc.). A single price formation will provide a reliable price signal, which can be used as the underlying of power futures markets. Development of hedging mechanisms is indeed instrumental to sustain the Indian energy transition.
- Applied to India, a single price formation mechanism means "one delivery area, one price ". In other words, all the power exchanges will bundle their order books to calculate a single price per delivery area under the constraint of the capacity availability between these areas. This capacity is calculated ex-ante by the TSO.
- All the remaining (non-allocated on longer tenure) capacities between the states shall be granted to the coupling mechanism. A clear and transparent methodology is to be implemented to allocate on the different timeframes these inter-state capacities.
- The design of the right price / delivery zones is instrumental for a reliable reference price.

Comments

5.2.5. Under such a scenario (i.e. multi-exchange model), what significant benefits can be derived in terms of uniform price discovery, and which model suits best for India?

Market coupling is a « one-shot » optimization mechanism, integrating the functions of cross-border capacity allocation and energy order matching. Thus, a single price

formation mechanism allows the implicit allocation of physical transmission rights between different areas via the energy price calculation process. Allocation of the cross-border volume between different price / delivery areas and energy price determination are performed all together, at the same time, via a single matching process. This avoids **price or flow discrepancies** - e.g. exports from a high-price market area to a low-price market area or energy price differences between 2 areas while there is no congestion between these areas.

As a result, the **use of generation and transmission capacities is optimized at the country level**, which eases the integration of renewables, while guaranteeing the security and reliability of the power supply in a cost-efficient manner. Besides, cross-border capacities cannot be booked or scheduled adversely. All infrastructural investments will be taken from a more informed position and can be directed more efficiently.

Market coupling creates a liquidity pooling improving the quality of spot prices, thanks to a secure price formation mechanism and robust financial arrangements for the settlement of contracts traded on the exchanges.

Applied to India, a single price formation mechanism means "one delivery area, one price". In other words, all the power exchanges will bundle their order books to calculate a single price per delivery area under the constraint of the capacity availability these areas, which is calculated ex-ante by the TSO. It would be a major step to effectively create a single Indian power market!

Outcomes of market coupling

Regardless of the model, i.e. single or multi-exchange model, market coupling brings:

- **An efficient dispatch of the transactions**, to the extent that (i) the full remaining transmission capacity between the areas is optimized and (ii) transactions in opposite direction are fully netted. Power flows go from the lowest price area to the highest price area.
Therefore, market coupling optimizes the social welfare by maximizing the consumer and producer's surplus.
- **A fair access to markets**, which is not transaction-based as the transmission capacity is used by those transactions that value it most. There are therefore less opportunities for exercising market power.
- **Easy access to markets:** market participants can bid through (any of) the exchange(s) to execute a cross-border transaction. They do not need to bid on both market areas, neither to acquire cross-border capacity. Their daily operations are simplified, while there is no change in the participants' bidding habits and conditions on the Exchanges.
- **Efficient price signal:** the implicit congestion cost is equal to the price-difference between the two relevant markets. If there is no congestion, market coupling makes it more difficult to influence the price in an area, as

coupling results in matching of the highest purchase bids with the lowest sale bids regardless of where they have been introduced.

Build up a sound and fair reference price

Power exchanges are meant to provide a reference price - especially because of the principles of non-discrimination and publicity of the rules applied to each of their market members (regardless of who they are)-, which can also serve as a reference for the OTC dealers.

Spot, especially day-ahead, markets are essential to provide a reliable reference price for (i) long term markets and (ii) for Transmission System Operators (TSOs) to balance real-time the power system, as part of a set of arrangements where market parties are financially liable for their imbalances.

A reliable price reference should be constructed under a bottom-up approach, from short term to long term. Furthermore, price quality increases with **growing liquidity**. The higher the trading volume, and the number of active participants is, the better the price represents the current market situation.

Liquidity refers to the capacity of a market to enable its members to perform their orders quickly (*immediacy*), without significant impact on the price (*resilience*). In practice, each market party can close out an open position whenever it is no longer attractive, supporting risk management procedures.

Liquidity allows an exchange to establish an equilibrium between supply and demand in (almost) any scenario and to produce a so-called *reference price*. In addition, market liquidity is an enabler of the quality of the price, preventing extreme price volatility which would not be justified by market conditions.

A clear and transparent legal and regulatory framework is needed to build a liquid market. Apart from that, **market coupling** can **significantly boost the liquidity** of the overall market.

The current situation

The current price difference among the 3 power exchanges reflects a lack of efficiency of the power market, to the extent that the auctions do not produce the best merit order, given the generation mix, the load, and the transmission network capabilities at the whole country level. The current matching process is handled by each exchange and produces a sub-optimal result leading to an inefficient use of both transmission and generation capacities.

This is not the right economic signal for both financial and operational decisions (w.r.t. Deviation Settlement Mechanism).

Liquidity building shall not be impeded by regulatory distortions, leading to market inefficiency and consequently market failures. Sharing the order book between the exchange is the key condition to produce a fair price reflecting the Indian power market and power system conditions.

Effect of coupling on technological innovation and competition

5.3.2. Therefore, given the underlying economic principle of maximizing social welfare and optimal corridor utilization, which argument fits better in the Indian context?

Complex orders: a non-issue

Complex orders must suit to real market needs, be used and not negatively impact the price formation, i.e. complex orders are only compatible with liquid markets. And market coupling will boost the market liquidity. A larger pool of liquidity will allow to accommodate more types of orders than a single exchange could do. It means that, thanks to the implementation of a real market coupling, all market participants, regardless of their “exchange of choice”, could use all the offered orders.

In Europe, the market coupling has allowed the progressive (i.e. with the growing liquidity) introduction of more complex orders in all the market areas while before they either did not exist or were only offered in some already liquid areas.

It is true that market coupling will lead to standardize the products offered amongst all the power exchanges, increasing the level playing field and ensuring a fair treatment of all the market participants. This standardization shall not necessarily be handled with the least common denominator. The standardization shall be based on market criteria, market needs, performance indicators like price resilience, social welfare deviation, etc.

For example, with the storage technologies evolving the market participants would require products which allow them to buy and sell power during the same day and across different product segments. Such products could be offered by the market coupling operator as standardized products and market participants from all exchanges can use this product.

Innovation

Market coupling will create a momentum for the exchanges to develop new services, like reporting, data provision, or clearing and settlement to gain a competitive advantage vis-à-vis their competitors and differentiate themselves from the latter ones.

This will also create an incentive to propose a better trading platform / landscape. In this context, the design and provision of clearing services will be a competitive advantage for the Power Exchanges.

Last but not least, this will create an incentive to develop new and innovative markets to cope with more local needs that are not captured by the market coupling, like for instance flexibility markets, valuing demand-side management and all other kinds of flexible facilities (like battery storage systems).

Market coupling will force the power exchanges to be more efficient to keep their market shares, and therefore more customer oriented.

However, innovation shall not be restrained by ineffective regulatory constraints or burdens.

Trading fees shall not only matter: quality, reliability, and variety of offered services will make the competition between the Power Exchanges vibrant.

5.4.1. Given these requirements, what should be the ideal institutional/ structural design for market coupling and the extent of autonomy of various parties in such a design?

The current legislation in India supports the existence of several power exchanges covering the same delivery areas. It means that the order collection will be decentralized, while the operational arrangements for the matching process will have to be centralized. A smooth cooperation between the TSO, Grid India, and the power exchanges is a key element to achieve an efficient integration of the Indian power market.

Regulated / competitive activities

The allocation of inter-state capacities - i.e. the Market Coupling Operator (MCO) function - is a natural monopoly, while power exchange business can be seen as a competitive activity.

An independent MCO will facilitate the segregation between competitive and monopolistic activities. However, power exchanges will have to be duly involved in the preparation and validation of the operational processes, to the extent that price is a key asset for them.

Governance

A clear and lean governance should be agreed upon between the stakeholders involved in the single price formation mechanism; these stakeholders being the TSO, the power exchanges, but also the CERC and the market parties. The governance should clearly define the roles, the responsibilities and the **financial means allocated to the parties** in charge of implementing and operating the market coupling solution, as well as supervising its performance and fulfilment of its obligations.

In addition, contractual arrangements between the exchanges will have to be implemented to organize the financial cross-settlement of their trades.

Unlike other market coupling experiences in Europe, India is already a single power market with free trading between the different states. The main objective of this single price formation mechanism is, in that case, to better optimise the use of capacities across the states.

The centralization of the dispatch is already performed by one single TSO, Grid-India, responsible for the global balance of the power system. It could lead to a logical conclusion that a central matching process should also be implemented in an innovative way, so as to ensure a fair treatment of all the power exchanges, a complete integration of the physical network constraints and thus guarantee market parties a reliable price formation. This centralization could also ease a regional cooperation with neighbouring countries.

Enablers

However, it is worth mentioning here that this can only work if, and only if, third-party access to the grid is guaranteed to all market parties in a transparent, non-discriminatory, and fair manner. Besides, the calculation of the inter-state capacity to be allocated at different time horizon is instrumental to ensure a well-functioning of the coupling and the achievement of one of its objectives to optimize the use of this capacity: sufficient capacity shall be given to the coupling to foster the liquidity of the market and mitigate market power abuse. Otherwise regardless of the mechanism implemented, it will not achieve its objective to optimize the social welfare.

Benefits and costs

A decentralized MCO function means that costs are higher than for a single MCO, to the extent that coordination between the different MCOs needs to be handled, infrastructure to be replicated per MCO, etc.

One can argue that a centralized MCO can be a way to avoid adding an entry barrier for a new power exchange to the extent that any new entrant “will only” have to connect its trading system to the MCO and will not be required to replicate a MCO function in its infrastructure.

The central MCO, with the proper IT infrastructure and procedures (back-up, fallback), mitigates the operational risk to run coupling on different infrastructures and/or on a rotating basis. Staff training is also to be duly considered, as the more companies are involved in coupling operation, the more trained staff is needed, while this staff will not be on duty every day.

The supervision of a centralized MCO is also less expensive for the regulator.

Market integrity and transparency

A well-functioning market shall guarantee:

- a fair and orderly execution of the orders placed by the market parties;
- the secure delivery and payment of the trades;
- the **anonymity of the orders and transactions**.

Three essential attributes reflect the level of efficiency of a market:

- **Neutrality**: The rules which govern the market (especially trading and clearing but also coupling, including the inter-state capacity calculation) are

publicly known, available to all market parties and applied in the same way whoever these market parties.

- **Symmetry of information:** All parties have access to the same market information. In practice, each market party will always make the best possible decision at a given time, given the available public information.
- **Liquidity.**

A **proper supervision** must be set-up to guarantee the market integrity and transparency. Regulation must prohibit market manipulation, insider trading, market power and market abuse. Therefore, the CERC shall be able to investigate any suspicious case, and this includes the organisation and internal procedures of the exchanges to protect the anonymity and confidentiality of the bids and transactions. It is worth stressing here that the shareholders of the exchanges must not be granted access to such information and data.

5.5. Which algorithm should be adopted for a coupled market?

- ***Would it be advisable to select a suitable algorithm out of the three existing algorithms, or should a new algorithm be designed jointly by the exchanges/ by the market coupling operator, like the PCR EUPHEMIA (acronym of Pan-European Hybrid Electricity Market Integration Algorithm) being used to calculate day-ahead electricity prices across Europe.***
- ***To be able to match the bids received on the three exchanges, uniformity of bid types & relevant parameters is required. Would standardizing/ harmonising the bid types in DAM & RTM across the exchanges address the issue? If so, which bid types would be suitable for the various buyers and sellers?***

A single algorithm for a coordinated price discovery mechanism is necessary to ensure a fair price formation and a level playing field. The selection criteria shall be based on the high-level market coupling properties that must be agreed upon by all the stakeholders (power exchanges, Grid-India, the CERC).

As already stressed, market coupling will lead to standardize the products offered amongst all the power exchanges, increasing the level playing field and the fair treatment of all the market participants. This standardization shall not necessarily be handled with the least common denominator. The standardization shall be based on market criteria, market needs, performance indicators like price resilience, social welfare deviation, etc. The most advisable is to start with market participants' needs to design the right products and then make sure that they are supported by the algorithm and finally sufficient liquidity will allow a proper matching of the orders.

5.6. How will the clearing and settlement be carried out?

- ***While the power exchanges will be the counterparty to the market participants, would the Market Coupling Operator act as a counterparty to the power exchanges with regard to settlement rights and obligations?***
- ***Would it be advisable to allow the Market Coupling Operator to charge transaction fees from the power exchanges, which in turn charge related transaction fees from the market participants?***
- ***What should the grievance handling framework be?***

Cross-PX clearing

A clear mapping of the tasks needs to be performed to allocate the roles and responsibilities among the coupling stakeholders. Clearing is clearly not required to be a centralized and shared function. Clearing and settlement is clearly not part of the MCO function. Clearing and settlement models shall be organized by the exchanges themselves as a competitive differentiation factor. This service can be provided according to different models (a dedicated clearing corporation, the exchange acting as the central counterparty with possible different ways of sharing default risks with the market participants).

Besides, this allows the market participants to benefit from economies of scope as the exchanges do not only offer trading on coupled market(s).

What changes with coupling is the introduction of cross-power exchange clearing (cross-PX clearing), which is to be handled by the respective central counterparty of each exchange. The MCO entity is not involved.

Regulation of the MCO fee

The MCO function is a natural monopoly. The economic theory calls therefore for a regulation of its fee. The fee needs to be reviewed and approved by the CERC and different model can be applied (cost-based but with incentives based on KPIs, that can be operational, financial, etc.).

The collection of the MCO fee can be organized in different manners. This will be linked to who are the parties that shall bear its costs. The MCO function will perform 2 main tasks: matching of the bids from the power exchanges and allocation of the inter-state capacity. Therefore, it seems fair that the MCO budget be covered by both the TSO and the power exchanges.

In any case, the MCO entity shall get the financial and human resources to run its operation in a safe way.

Supervision

The CERC shall supervise the MCO function, as it is a natural monopoly.

It is worth stressing here that a proper supervision shall rely on a clear and steady legal and regulatory framework. This framework also encompasses the arrangements between the MCO entity, the TSO and the power exchanges to organize and operate the market coupling, as well the arrangements between the power exchanges themselves for the cross-financial settlement of the transactions.

5.7. Changes in the settlement process

Once a trade is completed on the platform of an exchange (regardless of how the matching is performed), the transaction is cleared and settled. Clearing ensures the proper fulfilment of each contract concluded or registered on the exchange. In its position as the central counterparty, the clearing house steps in after a trade has been concluded, becoming the contractual partner for both buyer and seller. In doing so the clearing house ensures the fulfilment of each trade (payment and delivery) and mitigates the counterparty risk.

The clearing house conducts all payment flows between the seller and the buyer (financial settlement) and guarantees the delivery of the traded electricity (physical settlement).

A clear role and responsibility sharing among the stakeholders is instrumental. Traders are market participants who can trade for themselves or as a service for third parties. They trade via a power exchange that checks that they fulfil legal, financial, operational requirements to trade. The MCO duty is to match orders while allocating the inter-state capacity. The MCO is not involved in the settlement process.

5.8. In which market segment should the coupling be introduced first?

Market coupling is technically possible for both auction and continuous markets. From a technical point of view, coupling of auction markets is a bit less challenging.

Liquidity and economic benefit shall drive the decision, meaning that it seems wise to start with the most liquid market, to the extent that this market will then provide the reference price for all other markets.

Conclusive remarks

A reform of the power market is a complex process, which shall rely on a common long-term view of the goals to be achieved among all the stakeholders involved (public authorities, regulators, market parties, TSO, power exchanges, etc.).

The introduction of market coupling mechanism markets shall rely on solid foundations and the following enablers can be highlighted:

- A non-discriminatory third-party access shall be guaranteed to all market parties.
- A clear regulatory and legal framework shall assign the roles and duties of all involved parties and guarantee that they would get the means (human and financial) to perform their duties. Any single price formation arrangement for the whole Indian power market requires a clear and transparent legal and regulatory framework (covering capacity allocation rules, trading, clearing and settlement).
- The roles and duties of the different stakeholders, being the power exchanges, the TSO and the market parties, should reflect the design of the market (or even markets) and be driven by efficiency and security of energy supply.
- The right incentives on market parties to balance their portfolio (imbalance settlement mechanism) need to be in place to foster day-ahead trading.
- A mechanism to transfer the long-term PPAs (which now represent by far the largest transacted volumes) onto the wholesale market shall be discussed, while guaranteeing the commitments towards the investors.
- Regulatory bodies will need to lower the entry barriers for new power exchanges and ensure that it aligns with their objectives for market fairness, integrity, and stability. This may involve the development of new rules and oversight mechanisms that consider a simplified ownership model. Entry of new power exchanges can lead to the expedited creation of new and innovative electricity products and lowering of costs for market participants. Such developments are typically slow in a monopolistic market.

The Indian power sector is facing fascinating challenges. The involvement of all the stakeholders, respecting the interests of each of them, will be important to design solutions, fitting the interests of the country.

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