

# White Paper

## An efficient power market for a reliable power system

### Introduction

This White Paper attempts to contribute to the current works on the reform of the Indian power sector. This reform is an essential step for India, as it will help to attract new investments in the energy sector to both tackle the demand growth, and the challenges of the energy transition.

This reform will (among other things) introduce new tools for the system operator to balance the Indian power system, will reinforce the financial liability of the market parties for their imbalances and last but not least will pave the way for the trading of physical futures. However, the effective development of a futures market can only be achieved, with a liquid, and transparent spot market.

Within the framework of the reform, this paper aims to stress some key aspects to be considered when designing the new arrangements and tools to be implemented to build a secure, reliable and efficient power system, supported by transparent and liquid markets. These aspects are mainly rooted in the European experience.

## 1. Build up sound and fair reference prices

### 1.1. Complementarity and consistency

Short and long-term markets meet different needs of the market parties. While short-term contracts are mostly used to hedge volume risk, long-term contracts are used to hedge price risk and direct investments. Both types of contracts contribute to the global security of supply over different timeframes. They can be traded on organized marketplaces (power exchanges) or Over The Counter (OTC). The 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 who they are)-, which can also serve as reference for the OTC dealers<sup>1</sup>.

The complementarity and consistency of the spot and futures products listed on organized marketplaces are fundamental features, when designing such markets. The consistency concept is also to be extended to the market tools used by the TSOs, to balance the power system (like balancing or ancillary services markets.)

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<sup>1</sup> The purpose of this paper is not to deal with pros and cons of OTC vs organized marketplaces. We can nonetheless stress that OTC proposes non-standardized contracts, negotiated directly or via a platform and terms of the contracts, especially prices, are not public.

Actually, 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.

## **1.2. Quality and reliability**

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 number of active participants is, the better the price represents the current market situation. Reliable trading and clearing arrangements and systems are also essential in this process, especially when it comes to futures trading.

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, relying on market liquidity, the price quality prevents also 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, certain arrangements can significantly boost the liquidity like a single price formation mechanism between different areas, optimising the power flows and the energy prices between these areas (*the so-called “market coupling” arrangement*). A discussion should also be open on the integration and compatibility of the present and future Power Purchase Agreements into a more market-based environment. It is indeed important to ensure a certain level of consistency between the different mechanisms in place, to support the national energy policy and investment incentives schemes.

## **2. A single price formation mechanism to increase liquidity**

### **2.1. Concept and benefits**

The « one-shot » optimization mechanism, integrating the functions of cross-border capacity allocation and energy orders matching is usually called “market coupling” or “market splitting”. Thus, a single price formation mechanism allows the implicit allocation of physical transmission rights between different areas via the energy price calculation process. Cross-border volume (i.e. between different price / delivery areas) calculation 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 price differences when there is no congestion.

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.

In Europe, where market coupling has been implemented for more than 25 years for day-ahead markets, it is performed via a daily auction<sup>2</sup>. It has created 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<sup>3</sup>.

Applied to India, this single price formation mechanism would mean “one delivery area, one price “. In other words, all the power exchanges would bundle their order books to calculate a single price per market area under the constraint of the available capacities between these areas, which are calculated ex-ante by the TSO. It would be a major step to effectively create a single Indian power market!

## **2.2. Governance**

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 and the power exchanges is a key element to achieve an efficient integration of the Indian power market.

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, and also its supervision. In addition, 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 optimize the use of capacities across the states; centralization of the dispatch is already performed by one single TSO, POSOCO, 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 neighboring countries.

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<sup>2</sup> A quite similar concept applies also for intra-day markets, but via continuous trading.

<sup>3</sup> Please refer to the following article to find numerical analysis of market coupling benefits in Europe : <http://www.eprg.group.cam.ac.uk/wp-content/uploads/2015/02/EPRG-WP-1504.pdf>

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. Otherwise regardless of the mechanism implemented, it will not achieve its objective to optimize the social welfare.

### 3. Market supervision

#### 3.1. Key attributes of a market

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 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 whatever 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:** 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.

For these reasons, an organized market operated by a power exchange is not a marketplace without rules! On the contrary, a proper supervision has to be set-up in order to guarantee that the exchange fulfills its mission which is to provide a reference price, reflecting the market conditions, as well provide sufficient confidence to market parties regarding its organization and functioning.

#### 3.2. A clear regulatory and legal set of rules

Prohibition of insider trading / market abuse together with the obligation to publish “inside information” are closely linked to the topic of transparency. While the first one is aimed at market integrity and the need of regulators to collect the relevant data in order to fulfill their monitoring function, the second one is aimed at creating a level playing field for all market parties by giving them fair and equal access to trading data (e.g. prices and volumes) and fundamental data (e.g. planned electricity production).

Taking the example of Europe, the European regulation calls for the setup of a market surveillance office in all the power exchanges, working closely with the national and European regulatory authorities (both energy and financial). The market surveillance has to monitor the market functioning, i.e. check if the price reflects the market conditions, any participant has significant power on the price formation or benefits from specific information. Any suspicious case is to be reported to the national regulatory authority for further investigation and sanctions, if the case may be.

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 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.

Compatible regulation of the energy and financial sectors is crucial. Loopholes and regulatory arbitrage resulting in unclear responsibilities should be avoided.

Market surveillance is a shared function between the regulatory authorities (energy and finance) and the power exchanges. However, their roles and powers differ being at power exchange's or at regulators'.

## **Conclusion and key success factors**

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.).

Introduction of new market tools and markets, especially a single price formation mechanism between different market areas and derivatives markets, shall rely on solid foundations and the following enablers:

- 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 TSOs and the market parties, should reflect the design of the market (or even markets) and be driven by the search for efficiency and security.
- the right incentives on market parties to balance their portfolio (imbalance settlement mechanism) need to be in place to foster day-ahead trading.

Indian power sector is facing fascinating challenges. The involvement of all their stakeholders, respecting the interests of each of them, will be important to design solutions, fitting the interests of the country. Experience learns that a stepwise approach is the most successful.

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