



This project is funded by  
the European Union



Concept Note: 5<sup>th</sup> EU-India workshop series on Energy Regulation

## Enablers for India's Renewable Energy Transition: Competition and Market Design for the Power Sector



## Background

Current EU-India climate and energy relations are guided by the EU-India Clean Energy and Climate Partnership, that was agreed at the EU-India Summit on 30 March 2016 with the aim of reinforcing cooperation to reinforce cooperation between the EU and India on clean energy and climate action with a view to ensure a secure, clean, affordable and reliable energy supply for all and to progress in the implementation of the Paris Agreement. This partnership was reconfirmed in the joint statement at the EU-India Summit in October 2017 and in July 2020.

As part of the annual EU-India policy dialogues, the Clean Energy and Climate Partnership in collaboration with the Florence School of Regulation (FSR) will host a series of online webinars to discuss topics pertinent to the India power sector. The webinar series will bring together experts from the EU and Indian side and will draw upon learnings from EU's Clean Energy Package, EU's Interconnection targets, EU's ten year network development plan, etc.

This webinar series is supported by the Ministry of Power (MoP), Central Electricity Regulatory Commission (CERC) and Power System Operation Corporation (POSOCO).

## Introduction

To enable the renewable transition of the India power sector and meet its Paris agreement commitments, India has taken several enabling regulatory and policy steps. Three such key steps have been introduction of competition, encouraging regional trade and greater push for distributed energy resources.

Since 2003, India has gradually introduced competition with regulatory oversight in different parts of the energy sector value chain. This has subsequently led to the development of competitive wholesale markets for electricity. Furthermore, in the context of competition, India and its neighbours in South-Asia and South-East Asia can gain from encouraging further developing regional markets for electricity and gas as well as consequently building the necessary infrastructure for supporting this regional markets. The MNRE's stated goal of 40 GW of rooftop solar by 2022 highlights the push for generation green distributed energy resources and an expansion of the role of the consumer in the near future.

The 5<sup>th</sup> EU-India workshop series will take place from April-July, 2021. The format of the online events would be structured as online debates wherein FSR will moderate and host the events with 3-4 panel discussants. The duration of each event will be 1.5 hours. The kick-off session of the [webinar series was conducted at the India Smart Utility Week, 2021](#), following which, 6 online debates will be organised starting mid-April. The topics identified for the six sessions are:

- Wholesale power markets - 14.00- 15.30 IST/10.30-12.00 CET, **April 30**, 2021
- Role of decentralised energy resources - 14.00- 15.30 IST/10.30-12.00 CET, **May 21**, 2021
- Renewable support mechanisms - 14.00- 15.30 IST/10.30-12.00 CET, **June 4**, 2021
- Ancillary Services - 14.00- 15.30 IST/10.30-12.00 CET, **June 18**, 2021
- Retail competition - 14.00- 15.30 IST/10.30-12.00 CET, **July 2**, 2021
- Regional electricity markets - 14.00- 15.30 IST/10.30-12.00 CET, **July 16**, 2021

## Online Debate 1: Electricity Trade – what does the future hold?

Most of the wholesale trade of electricity in India occurs bilaterally through long term power purchase agreements. However, power trade through exchanges has increased from 0.4% in 2009 to 4.2% in 2019, indicating a compound annual growth rate of 38%. There are currently two power exchanges in India (PXIL and IEX) with most trade occurring via IEX. The power exchange has over time introduced various product segments, namely the Day-ahead market, Term-ahead market, renewable energy certificates and most recently, the real-time market.

Thus, although currently limited in its market share of total energy traded, it can be observed that there is a growing interest in trading of electricity through power exchanges. The introduction of competition can lead to a more economically efficient outcome in electricity trade as has been discussed in depth in literature.

In line with these observations, the first instalment of the India series will focus on providing the participants with insights on the current state and the future trends of wholesale electricity markets in India. The two key questions are addressed during this debate:

- How do we enable a shift from PPAs to greater participation in trade on the power exchange?
- What are the possible next steps in evolution of India's power exchanges?

The debate will draw upon EU's experience with introducing competition in wholesale power trade. The debate will also focus on various products traded on the wholesale electricity market as well as experience with enabling more participation on the power exchanges and consequently greater liquidity in the power market.

### **Date:**

14.00- 16.00 IST/10.30-12.30 CET, April 30, 2021

## Online Debate 2: Distributed energy resources– which regulatory frameworks and reforms can enhance their role in India's renewable transition ?

Apart from the push for grid scale centralised renewable power generation, the government of India is also enabling the development of distributed energy resources (DER). This is evident by the 40GW rooftop solar capacity by 2022 target set by the Ministry of New and Renewable Energy (MNRE). Several other off grid applications such as solar water pumps for agriculture have also been incentivised.

The rise of distributed energy resources enable individual customers to play a greater role in the functioning of the power system. They become prosumers and further as 'prosumagers' when the generation of power is combined with storage units. DER can provide several valuable services to the grid at distribution and transmission level.

However, along with the benefits, DER also brings a set of regulatory, market design and technical challenges. Therefore, the second instalment of this series will focus on providing the participants with insights, from an Indian perspective on the opportunities and challenges from DER and discuss the expanding role of prosumers in the Indian context.

The two key questions that are addressed during this debate:

- How can we enable greater uptake of DER in rural and urban areas?
- How can utilities unlock the full benefit of DER for their operations?

The debate will draw upon EU's experience with the clean energy for all Europeans package in the context of active customers, demand response, dynamic prices in electricity retail, local energy communities, renewable energy communities etc.

**Date:**

14.00- 15.30 IST/10.30-12.00 CET, May 21, 2021

### Online Debate 3: What is the future of renewable support mechanisms in India?

In line with its Paris Agreement commitments, India has embarked upon a very ambitious decarbonisation pathway. The country is well on its way to reach the target of 175 GW installed renewable capacity by 2022. Consequently the next target is 450 GW of renewable capacity by 2030. In order to ensure that the targets are met, Government of India has been providing support for enabling investment in renewable projects through different means.

Currently, the central and state government has provided renewable support as feed-in tariffs where they set the price or through competitive auctions allowing project developers to bid for a suitable price. The government has also mandated renewable purchase agreements for discoms and even some capital subsidies. However, in a world where the levelized cost of electricity from renewables is dropping rapidly, renewable support mechanisms would have to evolve over the coming years to ensure high economic efficiency without slowing the speed of renewable development.

The fifth instalment of this series will focus on providing the participants with insights on the future of renewable incentives by trying to address topics such as the next step in the evolution of India's renewable incentive strategy, future opportunities, barriers and risks.

The two key questions that are addressed during this debate:

- How can we make renewable support mechanisms more accurate and efficient?
- How can renewable support mechanisms become enablers for innovation in India?

The debate will draw upon EU's experience with the evolution and development of renewable support mechanisms ranging from Feed-in tariffs to certificate markets for renewable energy. Furthermore, the debate will also consider the implications of the second renewable energy directive RED II and the European Green Deal.

**Date:**

14.00- 15.30 IST/10.30-12.00 CET, June 4, 2021

### Online Debate 4: How can ancillary services be procured more efficiently?

It is well known that system operators are required to balance the system in real-time to ensure operational security by keeping the frequency within the prescribed limits. In the era of the vertically utility, system balancing was a relatively simple engineering task. The unbundling of the

electricity sector necessitated a more closer scrutiny of system balancing. Today, with the advent and increase in penetration of intermittent renewable resources, the need for ensuring robust and well-functioning balancing mechanisms is more challenging than before.

In several advanced liberalised electricity markets, such as the EU, balancing mechanisms have evolved towards market-based designs. This is based on the realisation that what happens in real-time determines how the market parties behave in wholesale markets, i.e. the real-time balancing price back-propagates to the intraday, day-ahead and finally long-term prices. However, India's Deviation Settlement Mechanism (DSM) applies penalties and incentives for deviating from scheduled withdrawal/injection to ensure grid stability. This mechanism is linked to the frequency and independent of market condition. It is not inconceivable that in the future, the Indian's balancing mechanism may too evolve towards a market-based design.

The sixth instalment of this series will focus on providing the participants with insights on the possible future pathways for the evolution of the balancing mechanisms in India, current situation, barriers and opportunities.

The two key questions that are addressed during this debate:

- How will the growing share of renewables impact the need and cost of ancillary services in India (Will RES become Balancing service provider (BSP), Balance responsible parties (BRPs)?
- What are the next steps in introducing competition for ancillary services in India?

The debate will draw upon EU's experience with the different approaches to electricity balancing market design implemented in the EU such as central and self-dispatch models, pay-as-bid and marginal pricing, mandatory or market-based procurement schemes etc. Furthermore, the debate would also draw upon the guideline on electricity balancing (EB-GL) that consists of a set of EU-technical, operational and market rules to govern balancing markets.

**Date:**

14.00- 15.30 IST/10.30-12.00 CET, June 18, 2021

## [Online Debate 5: Retail electricity competition: what can it bring to India's ambitious renewable energy transition?](#)

As part of the liberalisation process, many countries have introduced wholesale and retail markets with widely varying design and implementation approaches. In India, the retail and distribution functions remain unbundled. However, Indian policymakers and regulators have been debating the idea of expanding competition in the electricity retail segment in the recent years.

The opinion globally on the retail liberalisation is diverse. Some experts argue that retail liberalisation does not lead to significant efficiency gains due to the transaction costs incurred by retailers, the homogeneity of the product (Bertrand Paradox), the absence of value-added services, and barriers to consumer switching, protection of vulnerable customers. While others point out the advantages of retail competition such as price determination by market forces, greater choice for customers, incentive for suppliers to innovate.

The seventh instalment of this series will focus on providing the participants with insights on the different aspects of retail competition that needs to be considered while assessing whether there

is a need for its introduction in the Indian context. Furthermore the discussion will delve into the next steps for transforming and preparing the retail energy segment of the power sector for the coming future with entry of disruptive technologies such as rooftop solar, electric vehicles and energy storage.

The two key questions that are addressed during this debate:

- Does India require competition in electricity regulation or better tariff design?
- If competition is included, how can the interests of industrial, rural and urban consumers be safe guarded and to what extent?

The debate will draw upon EU's experience with the gradual and varied implementation of retail competition in within the EU member states over the years during the process of liberalisation .

**Date:**

14.00- 15.30 IST/10.30-12.00 CET, July 2, 2021

### Online Debate 3: Electricity Trade beyond borders– what is the scope for India?

India is the biggest economy in the South Asian sub-continent. The geographical location of the South Asian subcontinent is such that the various countries in this region could trade electricity beyond its borders, especially with India. Furthermore, there is also the possibility of connecting with the south-east Asia region to create a broader regional power market and grid in the future.

The establishment of a well-functioning regional market can unlock the benefits from the corresponding economies of scale and coordination of dispatch in the generation, as well as region-wide reliability support. However, several barriers need to be addressed, such as 1) the development and enforcement of necessary treaties, laws, regulation and regional market rules. 2) Coordination between the national regulatory. 3) Alignment of technical standards and network codes.

Although these regional markets can be for electricity as well as gas, in this series, we will focus on electricity. Therefore, the third instalment of this series will focus on providing the participants with insights, from an Indian perspective, on the advantages, barriers and current state of development of regional markets for electricity in South Asia and beyond.

The three key questions that are addressed during this debate:

- How has greater cross-border interconnection supported in integration of renewable energy?
- Can resource adequacy planning at the regional level in south Asia with tools such as TYNDP, regional resource adequacy assessment etc aid in improving the regional security of supply?
- What role would regional security centres and network codes play in enabling greater regional integration considering?

The debate will draw upon EU's experience with the development and operation of a continent wide integrated electricity grid including the EU network codes, as well as institutions such as regional security coordinators, ENTSO-E, electricity market operations etc.

**Date:**

14.00- 15.30 IST/10.30-12.00 CET, July 16, 2021