

NEWSLETTER

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APEX Objective

To facilitate development and communication of ideas and practices in the operation of global competitive electricity markets. One of its primary intentions is to provide a platform for the sharing of information between its members.

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APEX Webinar Summary - Global Wholesale Electricity Market Designs

On September 16, 2021, APEX held a webinar on Global Wholesale Electricity Market Designs moderated by Omer Haroon Malik, Head Market Operations & Development, CPPA in Pakistan. The webinar’s objective was to further APEX’s mission to communicate ideas and practices in the operation of global competitive electricity markets and provide a platform for the sharing of information between its members.

The panel started with an introduction and some market statistics provided by Tauseef H. Farooqi, Chairman, NEPRA in Pakistan. NEPRA is in the process of gearing up for a competitive market in Pakistan. Tauseef described the Pakistan market transition towards more competition and the alignment of legal, policy & regulatory framework and under that framework, alignment of institutional roles. He discussed the role of regulators in competitive markets to protect consumers from abuse by firms with substantial market power and to regulate competitive markets primarily through market monitoring, market reporting, and enforcement and compliance. Statistics were provided comparing multiple countries generation, demand, population, and other economic indicators. Additionally, Tauseef discussed the Pakistan climate change initiatives.

Omer Haroon Malik provided information on diversification in global wholesale market design & design parameters. He discussed four pillars of competitive markets including transparency, reliability, innovation, and predictability. Omer discussed how the design of markets varies throughout the world and what key parameters make each market unique. Key things learned for Pakistan has been that designs cannot be pasted from other markets, the retail market opening should be gradual and start from bulk consumers, legal framework(Act/Policies) should be aligned and firmed up before market opening, and legacy PPAs



Stu Bresler

APEX Board Member
APEX Chairman
Senior Vice President Markets PJM

We have all heard the old saying many times that the only constant in the world is change. Certainly, that has never been more true than today when it comes to the energy markets our organizations operate and maintain. The resource mix in all of our regions is changing ever more rapidly in ways that will fundamentally alter how our systems are operated and how long-term investment decisions are made. Intermittent, renewable resources, storage and Distributed Energy Resources will present challenges, but also many important opportunities, to rethink the future of our markets. At PJM, we have embarked on a strategy centered on the three pillars of facilitating decarbonization, the grid of the future, and innovation, and we are embarking on initiatives to further these pillars to ensure the transition to the future grid is first and foremost reliable, and also as efficient as possible.

Our changing world makes APEX’s mission all the more relevant and important. We will continue to seek ways to facilitate the sharing of information, insights and experiences among our organizations so we can all learn from each other as we proceed on our own paths toward the future. While we have sincerely missed the opportunity to gather in person given the ongoing global pandemic, we hope to resume our annual, in-person conferences in the Fall of 2022. In the meantime, we continue to hold webinars for our members through which we continue our mission. We were excited to bring you the September webinar focused on several developing markets and hope those of you who were able to attend found it valuable. We are also excited to be holding the October webinar on the severe weather event in the United States last winter and hope that many of you will participate. Finally, we have begun the process of enhancing the APEX website in order to make it a more useful tool, and you can look forward to hearing more about that next year. I want to express my thanks to our volunteer Board members for their efforts in these areas, it is much appreciated!

I hope all of you are staying safe and well, and I thank you for your ongoing support of APEX. I can’t wait to have the opportunity to see you in person again!

In the Spotlight

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integration with the wholesale market depends upon market conditions.

Tamer Emre, Market Operations Director, EXIST in Turkey, discussed competitive markets transition and recent developments in the Turkish Market. Tamer provided some EXIST market statistics, position, and product structure. Some activities include wholesale energy and gas markets, renewable support systems, financial settlements, and customer platforms. The EXIST installed capacity is 98 GW and the market share is 56% Bilateral Contracts, 40% Day-ahead, 2% Balancing Power Market, and 2% Intra-day Market. Additionally, the Renewable Zone increased capacity from 11 GW to 51 GW from 2001 thru 2021. Some new initiatives in EXIST include a gas futures market, establishment of Guarantees of Origin (GOs) market, extension of GOs to new generation types, and a business development process on carbon markets. Tamer concluded with some observations on power market operations, clearing mechanisms, future market observations, the importance of renewables, transparency, and climate change.

Roberto D Addario, Sr. Transaction Advisor, MRC Consultants and Transactions Advisors discussed competitive markets transition and market evolution in the Argentinian market. He discussed that before the reform, the power sector in Argentina was deteriorating rapidly from pre-existing conditions. There was a general crisis with load shedding, increasing debt, a high deficit in the sector, and very high losses. The governance lost control of the companies and the tariffs became highly politicized. The government decided to introduce a deep and wide reform and privatization, based on the changing role of the government, creating a competitive wholesale electricity market, and establishing new rights and obligations. This

new market has produced excellent results for 10 years. Reforms and Privatization within the government and promoting of competition resulted in redefined roles and new entities including a Wholesale Energy Market (WEM) with one spot market and pool for buying and selling. He concluded with an emphasis that the initial evolution of the power sector shows that even in a developing country, a wide and deep electricity reform can work in a developing country. However, well-organized markets and effective regulation can be undermined by political interference.

Omer Haroon Malik discussed Pakistan's Competitive Wholesale Electricity Market Design and Evolution. The CTBCM is a wholesale market design with trading between generators, traders, suppliers, and bulk power consumers (>1 MW). The first stage of evolution was the CTBCM followed by Retail (<1M) in stage 2. Omer discussed some important design parameters followed by the determination of capacity prices. He then discussed the evaluation of approaches to the integration of Long Terms PPAs. Additionally, simulations showed that expected levels of renewables in the Pakistan market to be 55% by 2030, above the target of 30%. The market evolution in Pakistan includes an ancillary services market, DER aggregators, retail market opening, cost-based pool to price based pool transition, a short-term trading platform, and locations based pricing mechanisms.



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In the Spotlight

Integration of the Common Energy Market in Europe is nearing completion

The process of building the European electricity market involves 10 APEx members (Cropex, EPEX Spot, IBEX, Nord Pool, OMIE, SEMO, OPCOM, EXAA, GME), including TGE.

The common energy market is one of the EU's priorities. The integration is intended to ensure energy security in all Member States and to guarantee access to uniform, lower electricity prices for the consumers. This process was initiated over 20 years ago with the First Energy Package which led to the opening and liberalisation of the electricity and gas markets dominated by monopoly suppliers. Today we are getting closer to the ultimate goal.

The integration from the outset has advanced along two tracks, with a number of regional initiatives in support of cross-border connections being implemented alongside EU legislative measures that impose obligations on the Member States to implement specific solutions. The key initiatives aimed at the development of the energy community are implemented within the framework of SDAC (Single Day-Ahead Coupling based on the PCR solution) and SIDC (Single Intraday Coupling, formerly XBID). **The Polish Power Exchange has participated in the market integration process since 2010, strengthening its position on the international arena year after year.**

Exit point

In 2003, the Second Energy Package came into force, giving EU Member States and consumers a choice of gas and electricity supplier. It was, however, the Third Energy Package adopted in 2011, which formalised, among other things, the cooperation of national transmission system operators through the creation of the European Network of Transmission System Operators for Electricity (ENTSO-E), that turned out to be crucial for the creation of a common market. It also brought about the regulations establishing the Agency for the Cooperation of Energy Regulators (ACER), which is tasked with the monitoring the market and the activities of transmission system operators, as well as the Capacity Allocation and Congestion Management (CACM) code. It is considered a fundamental document for the integration as it provides a set of guidelines on capacity allocation and congestion management that define the basic principles for capacity allocation in the short-term wholesale markets (SDAC and SIDC). In accordance with the CACM regulation, the institution of NEMO, the Nominated Electricity Market Operator, was also established. **Towarowa Gielda Energii (TGE)**, among others, has been acting in this role since 2015.

NEMO

A Nominated Electricity Market Operator is an entity (usually an exchange) taking part in common market processes. It is responsible for accepting, matching and execution of bids and offers to buy/sell electricity on the day-ahead and intraday markets in international trade. The matching of orders from different bidding zones takes place in a central system common to all Operators, called EUPHEMIA.



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Integration of the Common Energy Market in Europe

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The key task of the NEMO is to ensure the smooth development and functioning of a common electricity market in Europe, including inter alia, the development and maintenance of algorithms, systems and procedures related to the cross-border market coupling mechanism, the setting of electricity prices or; processing of input data on available cross-border transmission capacities and their effective allocation at points of congestion.

SDAC, i.e. the day-ahead market based on the PCR solution (map)

An integrated day-ahead market enhances overall trade efficiency by promoting effective competition, increased liquidity and more efficient use of resources. It was established as a voluntary initiative by NEMOs and transmission system operators (TSOs) in 2014. The SDAC ensures the most efficient allocation of cross-border capacity made available by TSOs to participants in a common implicit auction, by coupling wholesale electricity markets from different bidding zones on both sides of the borders, using a common EUPHEMIA algorithm.

A decision was made to adopt the PCR model for the development of the SDAC market, which started with the implementation of the Multi-Regional Coupling (MRC) project including, in its final stage, the following countries: Portugal, Spain, France Italy, the Netherlands, Belgium, Luxembourg, Germany, Austria, Poland, Sweden, Lithuania, Estonia, Latvia, Finland, Denmark, Norway, Bulgaria, Greece, Slovenia, Croatia as well as Ireland and, until Brexit, the United Kingdom. The same model was used to establish the 4 Markets Market Coupling (4M MC), covering the borders between the bidding zones of the Czech Republic, Hungary, Romania and Slovakia.

Interim Coupling – another milestone in the integration of energy markets in Europe

On 17 June 2021, one of the most important initiatives, i.e. the Interim Coupling project successfully went live, which involved connecting the energy borders of the 4M MC countries with the MRC market area. Implicit net capacity auctions were introduced on six borders (PL-DE, PL-CZ, PL-SK, CZ-DE, CZ-AT, HU-AT), enabling the connection of Western and Eastern European energy markets. Thanks to the resulting integration it is possible to operate a single coupling mechanism for day-ahead markets in 23 European countries, which marks a real milestone in the process.

The players actively involved in the SDAC currently include:

- **TSOs:** 50Hertz Transmission, ADMIE, Amprion, APG, AST, CEPS, Creos, EirGrid, Elering, ELES, ELIA, Energinet, ESO, Fingrid, HOPS, Litgrid, MAVIR, PSE, REE, REN, RTE, SEPS, SONI, Statnett, Svenska Kraftnät, TenneT DE, TenneT NL, Terna, Transselectrica and TransnetBW
- **NEMOs:** BSP, CROPEX, SEMOpx (EirGrid and SONI), EPEX, EXAA, GME, HEnEx, HUPX, IBEX, Nasdaq, Nord Pool, OMIE, OKTE, OPCOM, OTE and **Polish Power Exchange (TGE)**.

SIDC, i.e. the intraday market based on the XBID solution (map)

The SIDC market is a joint initiative of NEMOs and TSOs. It creates a single pan-European intra-day electricity market whereby buyers and sellers of electricity may trade on a continuous basis for each hour of the day being a delivery day. Electricity trading is more efficient due to increased competition and improved liquidity resulting from the expansion of the trading area and the higher number of orders placed. Access to electricity is easier with the increased number of generation sources, and market participants can respond flexibly to unexpected changes in energy demand. The current model supports continuous trading taking place in real-time between participants across all zones of the entire market area.

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provided that the TSOs make transmission capacity available along the entire route between the interested parties to the transaction.

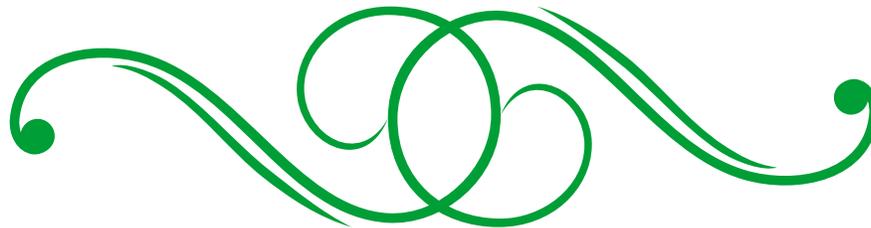
The first phase of the SIDC market went live in June 2018 and covered 15 countries (Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Luxembourg, Norway, the Netherlands, Portugal, Spain, Sweden). Seven other (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovenia) were covered by the second implementation wave in November 2019. More countries are planning to join, including Italy, Greece and Slovakia in 2021/22.

Currently, the entities actively involved in the SIDC market are:

- TSOs: 50HERTZ, ADMIE, AMPRION, APG, AST, ČEPS, CREOS, EirGrid, ELERING, ELES, ELIA, ELSO, ESO, FINGRID, HOPS, Litgrid, MAVIR, PSE, REE, REN, RTE, SEPS, SONI, STATNETT, SVENSKA KRAFTNÄT, TenneT DE, TenneT NL, TERNA, TRANSELECTRICA and TransnetBW.
- NEMOs: BSP, CROPEX, EirGrid, EPEX SPOT, GME

What is the next integration step in Europe?

The go-live of the Core Flow-Based Market Coupling (Core FB MC), expected in 2022, will be the final crowning component of the great European market project. This means integrating Central and Central-Eastern Europe into the MRC market. The Core FB MC will use all the functionalities implemented in the Interim Coupling and add a different approach to capacity calculation to optimise the technical flow requirements reported by individual TSOs, hence the term “flow-based”. However, the very core of the project, the expansion of the markets area, is already a fact with Interim Coupling.



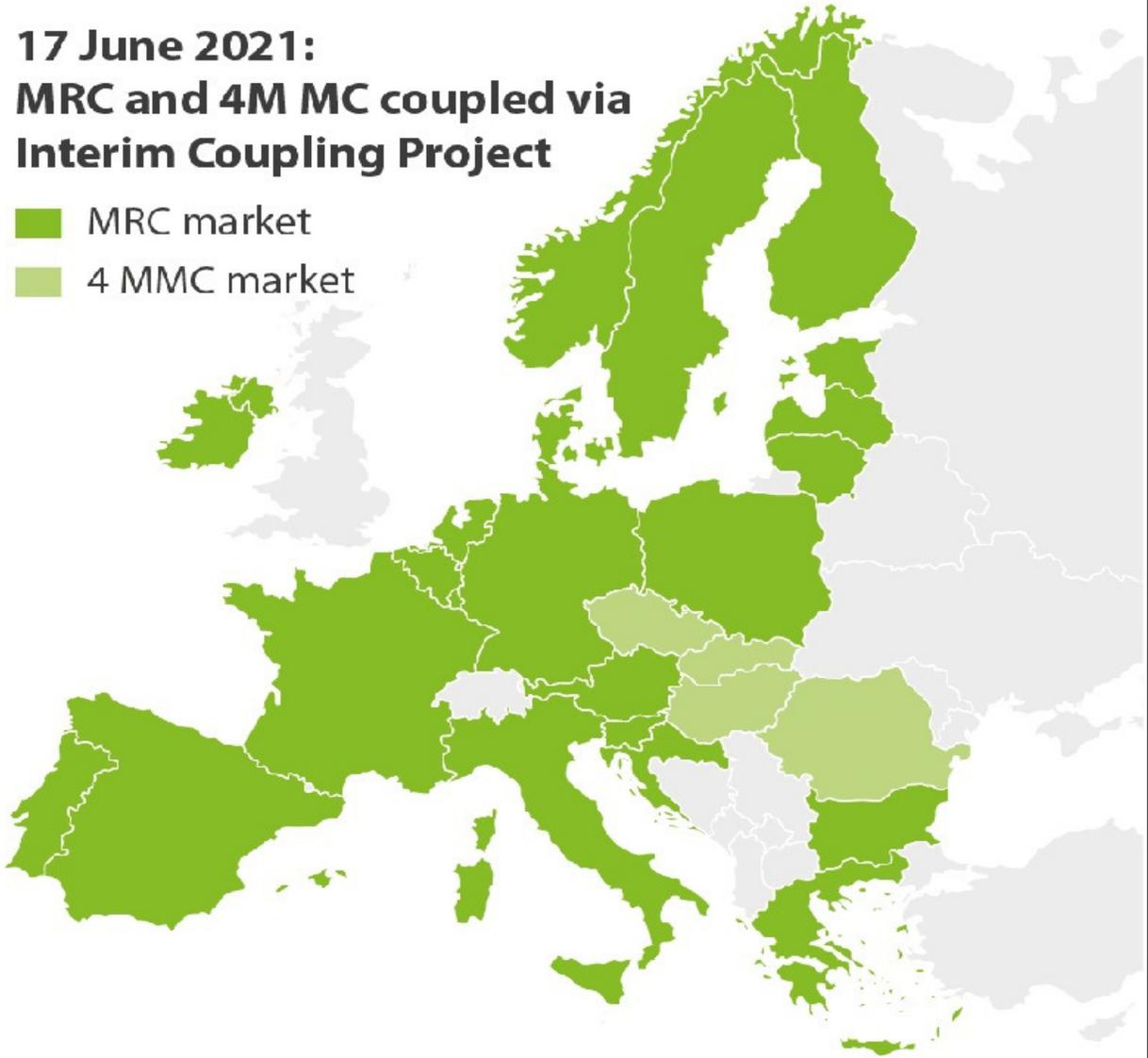
Webinar

APEX is excited to announce that multiple Webinars are being planned for the Fall of 2021.

If there is a topic you would like to hear, or would like to have your company featured **“In the Spotlight”** please send an email to: Linda.Spreeman@pjm.com.

**17 June 2021:
MRC and 4M MC coupled via
Interim Coupling Project**

-  MRC market
-  4 MMC market



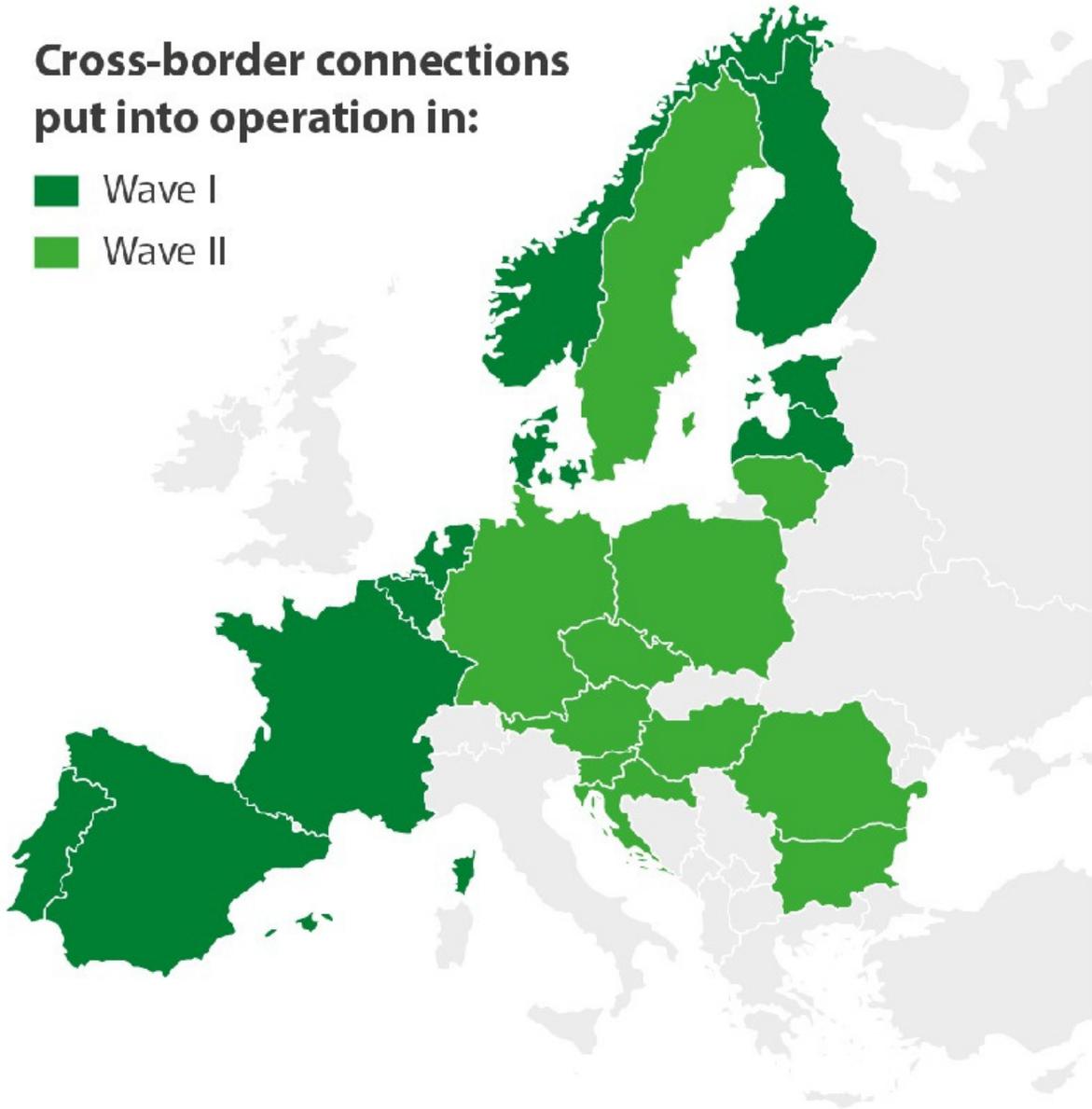
SDAC – Single Day-Ahead Coupling
(Day Ahead Market, PCR model)

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Cross-border connections put into operation in:

- Wave I
- Wave II



SIDC – Single Intraday Coupling (Intraday Market, XBID model)

Member companies who would like to submit an article for “In the Spotlight” or to provide any feedback are asked to contact: Linda.Spreeman@pjm.com.

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