APEx
Association of Power Exchanges

NEWSLETTER
Volume XXIII | June 2025

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ASSOCIATION OF POWER EXCHANGES

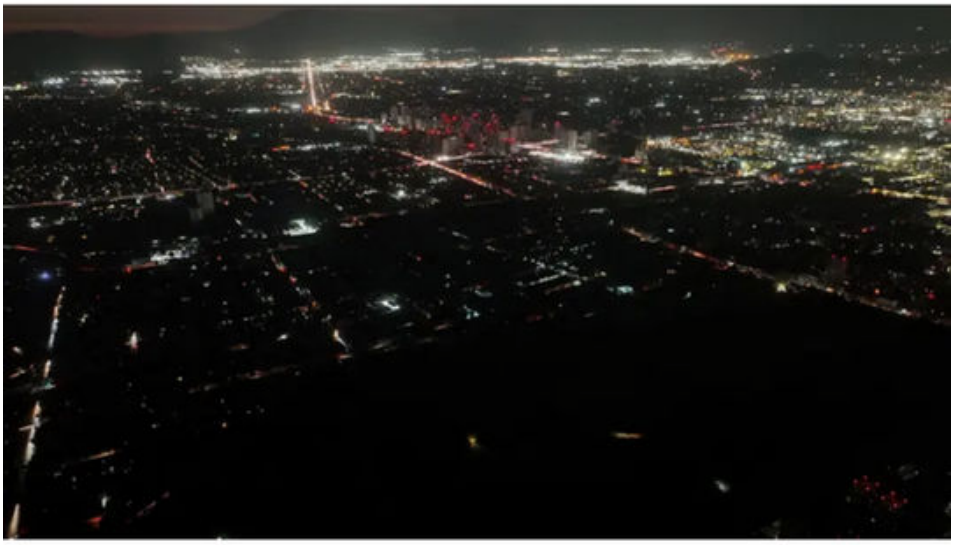
APEx Objective

To facilitate the 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.

In the Spotlight

Distributed Energy Resources and System Resilience: Lessons From Chile's February 25, 2025, Blackout

On February 25, 2025, Chile experienced a significant blackout event that tested the resilience of our national electricity system. While the causes of the incident are still under investigation, preliminary analyses point toward the complexities and challenges inherent to managing an increasingly uncertain, dynamic and decentralized power grid.



Santiago de Chile during the power outage

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Stu Bresler

Chairman BoD - APEx
EVP Market Services & Strategy
PJM Interconnection

The board of directors of the Association of Power Exchanges (APEx) is actively planning for our upcoming 2025 conference! We are very excited to be holding our annual event jointly in 2025 with GO15, the worldwide organization of very large power grid operators. We are grateful to the Korea Power Exchange for hosting our conference, and we are looking forward to an engaging and informative few days from October, 27–29 in Seoul, South Korea.

The value and importance of these opportunities to exchange ideas and learn from our peers around the world could not be more evident. The challenges we face in the power industry have never been greater, given the confluence of several significant trends. In the United States, we are faced with the ongoing deactivation of large quantities of existing generation supply resources, a relatively slow pace of new resources coming on to the system, and load growth at a rate that we have not seen in decades. Ensuring that the supply resources and transmission facilities are available to meet future demand requirements at the desired pace and locations will require coordinated efforts from many industry players across all segments, including leveraging advanced technologies and the flexibility that the load itself can provide.

Holding the conference jointly with GO15 provides the unique opportunity to incorporate the transmission planning and operations challenges into our exploration

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GO15

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2025 ANNUAL CONFERENCE

OCT. 27-29

SEOUL, SOUTH KOREA

DISCUSSIONS AND INSIGHTS

- OPERATIONAL MARKETING
- FUTURE CONTROL ROOM OPERATIONS
- IMPACT OF AI ON MARKETS
- CHALLENGES IN THE SUPPORT OF ENERGY TRANSITION

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Continued – Director's Column

of the challenges our markets face. We all operate our markets in order to reinforce transmission grid reliability in the most cost-effective manner possible. The interplay of markets and reliable grid operations is critical to the success of that important mission.

The challenges we face in the United States are not unique to our nation. Many of the same challenges have been increasing around the world, and experiences and approaches of our industry colleagues are important inputs to the strategies we will all employ to successfully meet these challenges.

I encourage the entire APEx membership to ensure that representatives from your organizations are in attendance at the upcoming conference to share your knowledge and expertise with your peers around the world. We all have much to offer and to learn from each other, and just as in years past, this year's event is a prime opportunity to share our collective wisdom. I look forward to seeing many of you in Seoul in October!

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Continued – Lessons From Chile's February 25, 2025, Blackout

he February 25, 2025, blackout reminds electric system operators that we need to rethink resilience strategies in the face of a rapidly evolving energy landscape. One of the most critical challenges is to understand the role of distributed energy resources (DERs) and how they can contribute to a more robust and stable grid.

Power systems were historically built based on a centralized model, with large generation plants transmitting power over long distances to end users. This model relied heavily on the predictability and controllability of a limited number of major generation assets and high-voltage transmission infrastructure. However, the transition toward decentralized energy models, driven by technological innovation, environmental goals and changing consumer behaviors, is transforming the traditional operation paradigm.

In Chile, DER are mainly small and medium distributed generators (known as PMGD) that currently represent a 20% share of daytime demand with an installed capacity of 3,000 MW. Solar photovoltaic, wind, small hydro and biomass distributed resources are deployed throughout the entire distribution grid, supplying energy locally to consumers.

In theory, this distributed generation may enhance system resilience, offering flexibility, redundancy and rapid local recovery capabilities; however, the February 25 blackout exposed a critical technical gap: the lack of effective mechanisms for real-time monitoring and for coordinating DER during large-scale system disturbances. Today, distributed generators are not required or incentivized to actively support system stability during critical events. Without real-time visibility by the system operator, adequate protection, system controls and clear protocols for emergency response, DER will not only remain underutilized when they could make a meaningful difference, but they may actually cause disturbances.

To address these challenges, it is essential to establish and enforce technical standards that apply uniformly to all generating resources, regardless of their size or location. In Chile, the Coordinador Eléctrico Nacional has proposed standards for both grid-forming and grid-following inverter capabilities, recognizing that both grid-scale and distributed renewable resources shall contribute to system inertia, fast frequency support, and dynamic voltage control (under normal and emergency conditions), as well as system recovery following contingencies. Ensuring inverter-based renewable power plants meet rigorous technical requirements will be fundamental to building a resilient, secure, and clean energy future.

As system operators, we face the challenge — but also the opportunity — to redefine the role of DER. This will involve:

- Designing technical standards that ensure distributed generators can contribute to voltage and frequency support
- Developing communication infrastructures that allow real-time monitoring and control energy resources.

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Continued – Lessons From Chile's February 25, 2025, Blackout

- Creating market mechanisms and incentives that value resilience services from DER
- Building regulatory frameworks that align distributed generation with systemwide reliability objectives
- Evaluating the creation of the DSO (Distribution System Operator) to better manage distribution grids and energy resources

Ultimately, the blackout of February 25 shall serve as a catalyst for change and improvement across the entire chain value. Distributed energy resources should not be seen as passive elements outside of the high-voltage transmission system, but as active participants in ensuring a stable, resilient and sustainable energy system.

As system operators and members of the APEx community, we play a vital role in sharing lessons, fostering innovation and building best practices. Working together, we can strengthen the foundations of a modern and reliable electricity grid by embracing the full potential of DER.

Juan Carlos Olmedo
APEx Director, Coordinador Eléctrico Nacional, Chile
Climate Governance Initiative Ambassador

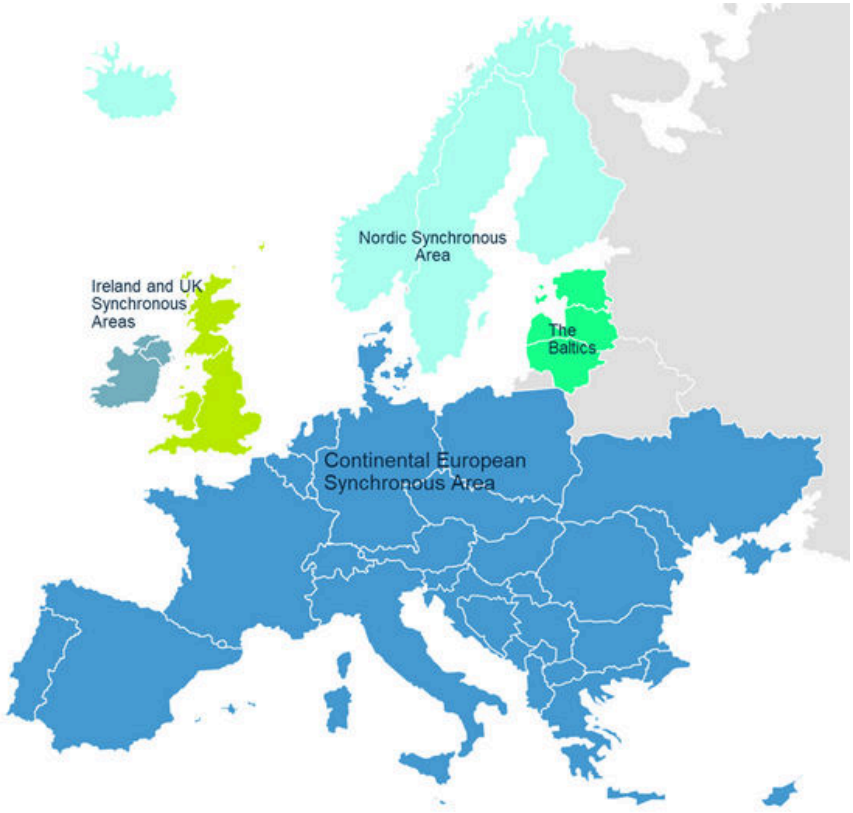
Success of Baltic Synchronization With Continental Europe

Lithuania, Latvia and Estonia have successfully synchronized their electricity systems with the Continental Europe Synchronous Area on February 9, 2025. This is an important milestone for the Baltic states and Europe, strengthening the energy independence and resilience of the whole region.

Synchronization allows the Baltic countries to operate their electricity systems in close cooperation with other continental European countries, ensuring stable and reliable frequency control, thereby enhancing regional energy security. Previously dependent on Russia's IPS/UPS system for frequency control, Lithuania, Latvia and Estonia are now connected to a continental European grid covering more than 400 million customers in 26 countries. All electricity connections to Russia and Belarus are permanently disconnected.

Synchronization enhances the integration of Europe's electricity systems and markets, allowing the Baltic electricity systems to operate under common and clear European rules. In other words, would it be more clear: It also fosters the development of renewable energy in the Baltics and Poland: Due to synchronization, newly built and reconstructed power lines, substations and synchronous condensers increase the ability of transmission networks to integrate a higher share of renewables in the overall electricity production.. This step ensures that from now on, Lithuania together with Latvia and Estonia can build a bright, free, economically strong and secure future.

The synchronization projects implemented by the Baltic and Polish transmission system operators are partly financed by the European Union under the Connecting Europe Facility.



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