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Energy Security at a Cost: The Ripple Effects of the Baltics' Desynchronization from the BRELL Network

The Baltic States' desynchronization from the BRELL network on February 7, 2025, cut ties with Russia and Belarus, ending electricity trade. Though the transition was smooth with no outages, recent underwater cable disruptions have highlighted vulnerabilities, raising energy security concerns. These events underscore the importance of both diversifying and decentralizing power systems, drawing lessons from Ukraine's electricity market, which has remained operational despite sustained Russian attacks.

The Baltics' power system was part of a large Russian-operated synchronous electricity system known as BRELL, which connected the electricity transmission systems of Belarus, Russia, Estonia, Latvia, and Lithuania (Figure 1). The desynchronization from BRELL and the integration into the European grid have been discussed since 2007, when the Prime Ministers of the Baltic States declared desynchronization as the region's strategic priority. In 2018, a decision was made to join the Continental European Synchronous Area through a connection with Poland, leading to significant investments – financially supported by the European Commission – to ensure adequate infrastructure. Fully committing to their priority, the Baltic's desynchronized completely from BRELL on February 7th, 2025.

Figure 1. The BRELL power ring

Source: Karčiauskas (2023)

A Successful Physical (De)synchronization

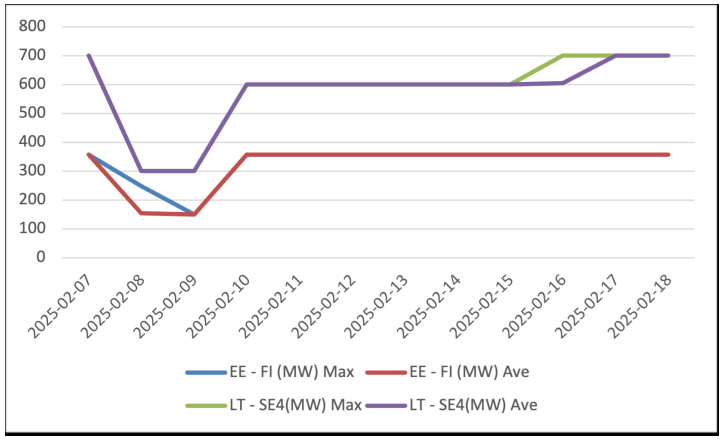
The desynchronization process proceeded smoothly, with no blackouts. This success was anticipated, given the project's meticulous planning over several years. A comparable example is Ukraine, which disconnected from the Russian and Belarusian power systems less than a month after Russia's full-scale invasion in 2022. Ukraine then synchronized with the Continental European power grid ENTSO-E, an event that had been in preparation since 2017.

After the desynchronization, the Baltic states temporarily operated in island mode, relying entirely on domestic generation for all grid operations. To maintain system stability, the commercial capacity of interconnectors with the Nordics (whose regional group is not part of the Continental European Synchronous Area) was reduced, ensuring they could serve as reserves in case of major generator outages. The NordBalt cable is one such connector linking Sweden's SE4 region and Lithuania.

However, conditions are gradually returning to normal. As of February 17, 2025, 700 MW is now available for commercial trading, as shown in Figure 2. Despite this progress, the commercial trading capacity of the interconnector with Poland (the LitPol line) remains heavily restricted and is primarily used to maintain system stability.

The Baltic region's synchronization with the European grid is currently achieved through a 400 kV overhead power line connecting Lithuania and Poland. A second link, the Harmony Link, an underground cable, is planned to become operational by 2030. This makes the existing interconnection an essential part of regional infrastructure and a potential security risk, particularly given the recent sabotage of cables in the Baltic Sea. In response to these threats, Lithuania has increased surveillance of the NordBalt cable. The country's prime minister has estimated the cost of securing the Baltic cables at €32-34 million, seeking EU support for its funding. The government has also strengthened the protection measures. Initially, security was outsourced to a private security company, but plans are in place for the country's Public Security Service (Viešojo saugumo tarnyba) to take over in spring 2025. Further, in preparation for the Baltics' full desynchronization, the Polish Transmission System Operator deployed helicopters to patrol the interconnection, to enhance the security of the infrastructure.

Figure 2. Day-ahead commercial transfer capacities on the Nordic interconnectors around the desynchronization



Source: Nord Pool

From Trade Interruption to Infrastructure Sabotage

The most significant short-term impact of the desynchronization from the BRELL is the limitation of electricity trade for the Baltic states. The desynchronization has affected reserve balancing in the Baltic region, forcing the three states to rely more on their internal generation for system stability. This has resulted in reduced generation capacity for commercial trade, as the states must be prepared to again operate in island mode in case of an outage on the LitPol cable. Until February 19, 2025, the LitPol line remained unused for commercial trading. However, gradual increases are expected to eventually allow for 150 MW commercial trade between the Polish area and the Baltics, a significant reduction from the

500 MW previously available. This limited trading capacity could lead to higher prices in the Baltics, as the region is a net importer of electricity.

This is not the first time the Baltics have faced trade disruptions. In November 2020, after the construction of a Belarusian nuclear power plant near the Lithuanian border, Lithuania, followed by Latvia and Estonia, limited commercial electricity exchanges with Russia and Belarus. Furthermore, on May 15, 2022, electricity trade between Russia and Finland was halted, followed by the closure of the Kaliningrad-Lithuania connection the next day. While this event led to no blackouts, it clearly impacted the region's price volatility (Lazarczyk & Le Coq, 2023).

Recently, the region has experienced sabotage to underwater interconnectors, significantly impacting electricity trade between the Nordics and the Baltics. On December 25, 2024, the Estlink 2 cable, one of two connections between Finland and Estonia, was cut, reducing transmission capacity between the two regions. Repair costs are expected to reach several million Euros. As disclosed via Nord Pool's Urgent Market Message, repairs are expected to last until August 2025 – stressing the system. As Estlink 2 is offline, the Baltic system is not fully operating. If another major component fails, there may be insufficient capacity to maintain grid stability, increasing the risk of outages or the need for emergency interventions.

With the complete disconnection from the Russian and Belarusian power grids, Russia no longer has direct control over the Baltic electricity trade, effectively eliminating the risk of trade disruptions from Russia. However, a new energy threat has emerged: infrastructure sabotage. Although the perpetrators of recent sabotage incidents have not been clearly identified, both Lazarczyk & Le Coq (2023) and Fang et al. (2024) emphasize Russia's strategic incentives to engage in such actions to maintain its geopolitical influence and discourage neighboring countries from reducing their energy dependence. Sabotaging critical infrastructure presents another efficient method of weaponizing electricity, particularly in the current context of limited Nord Pool imports and the Baltic States' insufficient integration with the broader European grid.

From Diversification to Decentralization: Responses to Electricity Infrastructure Threats

The Baltic States have diversified their domestic energy supply sources to address the electricity infrastructure threat. In 2024, Estonia's parliament approved the development of nuclear energy, with Fermi Energia planning to build two 300 MW light-water reactors. Other projects include a hydrogen-ready gas plant in Narva, which is expected to be completed by 2029, as well as an expansion of wind power capacity. While there was some support for extending the use of oil-fired plants in Estonia, their competitiveness has been undermined by high carbon prices and the closure of domestic oil fields. Elering, the Estonian Transmission system operator, has also begun long-term procurement to acquire 500 MW of new generation and storage for frequency management to ensure reserve capacity.

However, diversification alone will not be sufficient to address the challenges currently faced by the Baltic States. Incidents like the cutting of underwater cables underscore the growing need to decentralize the power system. Large, centralized power plants are more vulnerable to targeted attacks compared to decentralized energy systems. As a result, connected microgrids seem to be a viable solution for future energy resilience, as they can maintain functionality even when localized damage occurs. Again, Ukraine's experience demonstrates the benefits of decentralization. Since the onset of the war, Ukraine has faced both physical and cyberattacks but has strengthened its energy resilience by decentralizing its system and expanding wind and solar power (Eurelectric, 2025). This approach has

proven effective: while a single missile could destroy a nearly gigawatt-scale power plant, it would only damage an individual wind turbine or a small section of solar panels, significantly limiting the overall impact.

The desynchronization of the Baltic States from the BRELL network marked a complete break with Russia and Belarus, effectively ending any possibility of electricity trade between these countries and the Baltic region. This transition was successfully completed without any power outages. While the primary goal was to enhance energy security in the Baltics, several challenges remain, as highlighted in this policy brief. Recent disruptions to underwater cables, as well as Russia's attacks on Ukraine's electricity market, underscore the urgent need for both diversification and decentralization to strengthen the region's energy security. While energy supply diversification reduces supply chain dependencies, decentralization enhances resilience against targeted attacks, creating a more robust and flexible energy system.

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