

From Vulnerability to Resilience: How USEA Strengthened Moldova's Energy Security

The United States Energy Association is advancing Moldova's energy security by modernizing its power grid, enhancing resilience, and accelerating integration with Europe's electricity system. Through cutting-edge contingency planning and emergency operations support, USEA has helped transform Moldova's dependence on Russian energy into a pathway toward stability, reliability, and independence.

For over twenty years, the United States Energy Association (USEA) has collaborated with Moldelectrica, Moldova's national transmission system operator, to modernize the power sector, promote regional integration, and improve system resilience. This collaboration was instrumental in achieving milestones such as the historic synchronization of Moldova's and Ukraine's power systems with the European Network of Transmission System Operators for Electricity (ENTSO-E) in 2022 – a critical step toward greater energy independence and security.

Between 2022 and 2024, USEA intensified its support for Moldova during one of the most challenging periods in the country's modern history. Following Russia's invasion of Ukraine in



February 2022, Moldova faced unprecedented risks due to its nearly complete dependence on electricity from the Russian-owned Moldavskaya GRES power plant and on natural gas from Russia. Recognizing the urgent need for strategic preparedness, USEA launched the Moldova Energy Security Contingency Analysis, the country's first comprehensive simulation of operations in crisis conditions.

Through advanced load flow and voltage stability studies, USEA and Moldelectrica devised a plan to partition the national grid into five critical "islanding" zones and connect the 110 kV distribution lines to Romania's distribution network. These measures equipped Moldelectrica with the ability to maintain the electricity

supply under extreme conditions, i.e., loss of Russian gas or electricity supply, bolstering national energy security.

USEA also provided specialized technical assistance to prepare Moldova's grid for winter 2022–2023. The assistance focused on dispatch coordination under emergency conditions, customized emergency control plans for key substations and load pockets, system restoration, and island reconnection protocols. This support provided Moldelectrica with a playbook to manage the worst-case of emergency supply scenarios.

Meanwhile, USEA assessed Moldova's ability to import electricity from Romania during peak winter demand. By evaluating

the capacity of 110 kV corridors and the 400 kV Vulcănești–Isaccea transmission line under peak winter demand scenarios, USEA identified operational strategies, such as voltage control adjustments and reactive power management, that enhance cross-border power flows and reduce Moldova's vulnerability to supply disruptions. These insights supported winter readiness and Moldova's broader integration into the European electricity market.

This targeted technical assistance has helped Moldova transform vulnerability into resilience. By combining cutting-edge analysis with actionable plans, the initiative strengthened operational preparedness.