

Building Grid Resilience in Kazakhstan through Advanced Transmission Technologies



The United States Energy Association enhanced Kazakhstan's grid resilience by deploying advanced FACTS technologies to address regional instability and cross-border power challenges. The upgrades enable more reliable electricity delivery and support the integration of renewable energy.

The U.S. Energy Association (USEA), in partnership with the Kazakhstan Electricity Grid Operating Company (KEGOC), significantly advanced the resilience of Kazakhstan's national power grid through the deployment of Flexible Alternating Current Transmission System (FACTS) technologies.

Kazakhstan's power system has long struggled with grid instability due to its interconnection with the Russian network and uncoordinated regional power flows across Central Asia. These factors led to frequent voltage fluctuations, overloaded transmission lines, and an increased risk of system separation – particularly in the Northern, Western, and Southern regions. Such conditions placed constant stress on the grid and limited its ability to adapt to real-time disturbances.

By strengthening the grid's capacity to absorb shocks and adapt to unpredictable changes, the project laid a solid

foundation for greater resilience in Kazakhstan's power system. This is especially important as the country integrates more renewable energy sources, which add variability to the grid and require more responsive infrastructure.

USEA's support not only addressed immediate technical risks but also improved the grid's long-term ability to withstand and recover from operational stresses – ensuring more consistent and reliable electricity delivery across the country. The initiative represents a meaningful step forward in Kazakhstan's efforts to build a modern, robust, and future-ready transmission system.