

Advancing Energy Security in Kazakhstan through Grid Modernization



The U.S. Energy Association (USEA), in collaboration with the Kazakhstan Electricity Grid Operating Company (KEGOC), strengthened Kazakhstan's energy security by enhancing the stability and resilience of its national power grid through the deployment of Flexible Alternating Current Transmission System (FACTS) technologies.

Kazakhstan's energy system has long faced technical vulnerabilities stemming from its dependence on cross-border power flows and regional imbalances. The country's interconnectedness with the Russian grid and the lack of coordinated regional dispatch have exposed it to frequent voltage fluctuations, overload transmission

lines, and heightened risks of system separation – particularly in Northern, Western, and Southern regions. These challenges have posed persistent threats to reliable power delivery and national energy sovereignty.

USEA addressed these risks by delivering tailored engineering solutions and a phased roadmap for deploying advanced grid stabilization technologies. FACTS systems enable KEGOC to better regulate voltage, improve reactive power management, and enhance the flexibility of the transmission network. These capabilities are essential for maintaining uninterrupted electricity supply during fluctuating demand, unforeseen outages, or regional power disturbances.

The United States Energy Association improved Kazakhstan's energy security by deploying FACTS technologies to reduce reliance on the Russian grid and stabilize regional power flows. The project strengthened grid resilience and enabled greater integration of renewable energy.

By reinforcing the core infrastructure of Kazakhstan's electricity transmission system, the project significantly reduced the country's reliance on external grid stability and improved its ability to manage internal supply-demand dynamics. The modernized grid also lays the groundwork for integrating variable renewable energy sources, contributing to long-term sustainability while ensuring system reliability.

This partnership has been a critical step in bolstering Kazakhstan's national energy security – ensuring the country can maintain control over its electricity system, respond effectively to emerging challenges, and pursue its energy transition without compromising reliability or independence.