



United States Energy Association

SUCCESS STORY

USAID's Emergency Technical Support Preserves Electricity Service for Millions in Ukraine

Rapid Mobilization Prevented Widespread Catastrophic Blackouts



The Working Group was established by USAID, the United States Energy Association and Ukrenergo, Ukraine's national electric power company, to develop a remedial action plan to prevent a catastrophic blackout of the Ukrainian power system.

USAID's emergency power assistance support is credited with preserving electric power service for up to four million electricity consumers over the coldest months of the winter of 2014/2015.

This program is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the United States Energy Association and do not necessarily reflect the views of USAID or the United States Government.

Beginning in the autumn of 2014, the Ukrainian power system was confronted by a triple challenge: 1) the loss of Russian natural gas imports dramatically reduced the supply of fuel used to produce electricity, heat and hot water; 2) damage to mines and rail infrastructure reduced the production of domestic coal used to produce electricity; and 3) increased use of electric heaters heightened demand for electricity. As winter arrived and daily temperatures averaged below 32° F (0° C), Ukraine faced the very real possibility of severe electric power network instability that could have resulted in catastrophic blackouts and the loss of electricity, heat and hot water for millions of consumers.

In September 2014, with the support of the United States Energy Association as the implementing partner, USAID mobilized an expert team of electric power transmission specialists to perform an analysis of the Ukrainian high voltage network and developed a remedial action plan that prevented a catastrophic blackout of the Ukrainian power system. Working in tandem with Ukraine's national electric power company, Ukrenergo, USAID and USEA employed sophisticated planning software to develop a near perfect mathematical simulation of Ukraine's high voltage electric power network. The simulation model was used by the joint project team to analyze a combination of events and scenarios that could have significantly impacted the stability of the network. These included the failure of a very large power generator, the unexpected decoupling of the Ukrainian network from its neighbors, and a significantly greater increase in the demand for electricity than previously expected.

Joint network analysis of the scenarios performed by USAID and Ukrenergo revealed vulnerable sections of the power network likely to fail, the worst of which could have resulted in cascading blackouts across the country. Focusing on these most unstable portions of the network throughout the winter of 2014/2015, the project team developed a hierarchy of emergency remedial actions to counter network instability. Implementation of the remedial action hierarchy by Ukrenergo preserved network stability by relaxing frequency and voltage control standards and by temporarily disconnecting the fewest number of consumers possible until the emergency conditions subsided.

USAID's emergency power assistance support is credited with preserving electric power service for up to four million electricity consumers over the coldest months of the winter of 2014/2015. Equipped with an improved mathematical network simulation model, a new methodology for analyzing network instability and an effective remedial action plan, Ukrenergo is now better prepared for the winter of 2015/2016. USAID will continue to provide support to Ukrenergo over the spring and summer of 2015 in preparation for next winter.