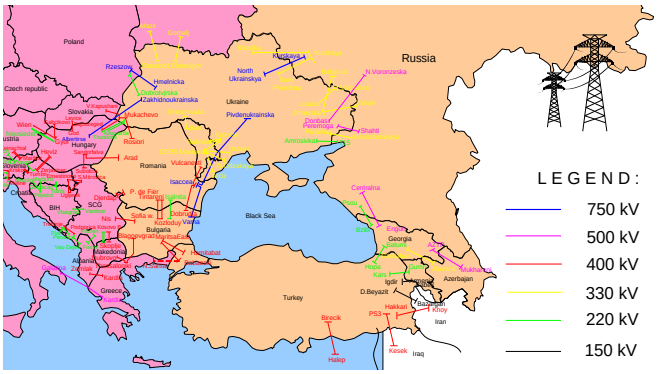
SUCCESS STORY

Black Sea Utilities Integrate Clean Energy Sources and Optimize Regional Generation Fleet

Optimal Power Flow Model enables transmission system operators to site and license clean energy generators



The high voltage transmission lines in the Black Sea region are incorporated in the OPF model used by TSO to integrate clean energy sources

"The addition of the OPF model to the suite of BSTP planning models gives regional planners a platform to couple economic and efficiency parameters to reliability criteria for the first time."

The full report is available online at: www.usea.org

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USAID's Black Sea Regional Transmission Planning (BSTP) project is assisting transmission system operators (TSO) in Armenia, Georgia, Moldova, and Ukraine to integrate clean energy generating resources through the development of a regional Optimal Power Flow (OPF) model. The model simulates the prospective technical operations and economics of the region's high voltage electricity network for 2015 and 2020.

Power plant developers and the international financial community are driving interest in new, clean energy wind, photovoltaic and small hydroelectric generation plants in the Black Sea region.

Owing to their intermittent nature, clean energy technologies pose unique technical challenges to their integration in national and regional high voltage electricity networks. Equipped with the OPF model, TSO are working with project developers and financiers to simulate the effects of adding clean energy generators to the regional network generation mix. The model suggests the optimal location for clean generators and identifies potential technical constraints to the transmission of their electricity production. TSO are using the model to license and site new projects, assess network investments needed to remove transmission constraints and calculate back-up reserves required to compensate for the intermittent nature of wind and photovoltaic generators.

TSO are using the production cost modeling element of OPF to calculate the marginal cost of electricity throughout the Black Sea region. In this way, a TSO in one country can assess the impact on its domestic electricity market of a new clean energy generator located in a neighboring country's system. The model also suggests to the TSO the economic effectiveness of building domestic back-up reserves or purchasing excess reserve generation from a neighbor to compensate for intermittent power production. TSO are using this information to analyze the potential benefits of a regional clean energy market.

Established in 2004 by the Black Sea TSO, USAID and the United States Energy Association, BSTP supports the development of regional electric power transmission planning capacity. Since 2010, BSTP has provided over 250 participant training experiences for Black Sea transmission engineers in advanced modeling and analysis.