SUMMARY/ABSTRACT

Applicant: Algonquin Power Fund (America), Inc.
Project Manager: Mark Phelan
Project Title: Enabling the Clean Energy Transition by Enhancing Grid Stability Using SmartValve Technology

Project Objectives. The main technical objective is to demonstrate how renewable energy sources such as wind power can be integrated into the existing electricity grid and then operated at full output using an advanced power flow control, grid enhancing technology, resolving stability issues without the need to build expensive new transmission lines. The main objective of the Community Benefits Plan is to engage with the community and labor, educate and train a diverse workforce, reduce utility costs to end users, and reduce fossil fuel usage.
Description. The clean energy transition is being severely impacted by stability limits on electric transmission grids in two ways: by preventing the addition of new renewable generators, and by limiting the output of existing renewable generation facilities. This project covers two deployments demonstrating the use of an advanced power flow control, grid enhancing technology, SmartValves, in two regions of the country to address these issues.

In northern Illinois, SmartValves will be deployed to enable the interconnection of a 105MW wind farm to the grid in an area where previously, a new transmission line would have been required to resolve system stability concerns. This project will be the first use of this technology in Illinois and in the PJM electrical interconnection footprint, saving years of time, reducing environmental impacts, and costing only a fraction of what would be required to build a new transmission line.

In the Lower Rio Grande Valley in south Texas, this technology will be deployed to reduce transmission system constraints that are currently preventing the existing renewable generation facilities from producing at their full potential and getting clean energy to customers. This first-of-its-kind deployment in Texas and ERCOT will be installed on existing transmission lines and can be put into operation quickly, providing near term consumer and environmental benefits.
Methods. Following careful evaluation, we will employ SmartValves, produced by US-based Smart Wires Inc., a modular Static Synchronous Series Compensator (m-SSSC) device to improve the stability of the grid in these two locations. We will facilitate twenty undergraduate student scholarships and labor and workforce training; network with community organizations; and promote contract opportunities to diverse companies.
Impact. The project will increase transmission capacity on the existing grids in the two regions by approximately ***300 MW*** (enough to power over 300,000 homes), resolve stability issues, and mitigate risk of electrical failure in extreme weather. By aiding grid stability, SmartValves will allow renewables to interconnect and operate at full output, at a reduced cost and time and with a lower environmental footprint compared to traditional stability solution alternatives.
Participants. Smart Wires; generators Acciona Energy USA Global LLC, Duke Energy Sustainable Solutions, EDF Renewables, Energy USA Global LLC, RWE, Clean Energy LLC, Schroders Greencoat (US) LLC, and others; utilities American Electric Power (Texas) and Commonwealth Edison (an Exelon Company); system operators PJM Interconnection and Electric Reliability Council of Texas (ERCOT); and a number of community and labor organizations.