CCET Smart Grid Demonstration Project

Project Description—Integrating the Texas Wind Resource

Overview

The Center for the Commercialization of Electric Technology (CCET) was awarded $13.5 million from the U.S. Department of Energy (DOE) on November 24 for a demonstration project aimed at better integrating the vast Texas wind energy resources into the state's electric transmission, distribution, and metering system.

The total project size is $27 million and includes a three-pronged effort that includes the use of synchrophasor technology to monitor conditions on the Texas grid; the enhancement of real-time use of direct load control allowed by the advanced metering information collected by the state's major transmission and distribution utilities, and the development for a model for electric distribution system behavior under a model "smart grid community of the future" that includes central system solar, distributed generation of roof top photovoltaic on each home in the community, extraordinary high building envelope efficiencies, battery storage, and demand response programs. The three components address different aspects of wind integration within the ERCOT grid.

Project Team

CCET—Overall

Southwest Research Institute—Project manager and cyber security

Electric Power Group—Principal investigator for synchrophasor component

EcoEdge—Principal investigator for Texas Future Community component

CenterPoint Energy—Host transmission and distribution utility for Texas future community

Oncor—Host transmission and distribution utility for synchrophasor component

American Electric Power—Host transmission and distribution utility for synchrophasor component

Sharyland Utilities—Host transmission and distribution utility for synchrophasor component

Land Tejas Developers—Site host and major in-kind contributor to Texas Future Community

Montgomery County MUD 119—Site host and major in-kind contributor to Tex Future Com.

General Electric—Provide and test demand response equipment at Tex Future Com

GridPoint—Provide and test PHEV management equipment and home energy management equipment

Direct Energy—Retail electric provider to help design and implement demand response program at Tex. Future Community

Drummond Group—Interoperability testing

Frontier Associates—Experimental design, data analysis and economic analysis

Valence—Provide residential level battery storage system

Xtreme Power—Provides large-scale battery system and integration software

Technologies and Programs to be Demonstrated

- Use of synchrophasors to address reliability concerns from adding large quantities of high variable wind generation
- Design development of an enhanced SMT Portal that could eventually provide direct load control capability and potentially an extra ancillary service for ERCOT in using demand response to balance load from highly variable wind generation
- Demand response programs in residences equipped with distributed generation and battery storage and ultra high efficiency appliances and building shells
- Community level battery storage for on-site solar photovoltaic and purchased remote wind generated power
- Individual and community PHEV charging from solar distributed generation and grid purchased power