Technology Solutions for Wind Integration in ERCOT



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CCET

A National Town Meeting on Demand Response and Smart Grid, Washington D.C., June 23-24, 2010

Who is CCET

- **Texas Non-Profit (501 (C) 6)**
- **Formed with 4 Founding Members in Sept 2005**
- **Current Membership: 20 (4 TDUs, AE, BEC, LCRA, 3 REPs, 12 Tech Companies, 5 University cooperators)**
- **Mission: to enhance the safety, reliability, security, and efficiency of the Texas electric transmission and distribution system through research, development and commercialization of emerging technologies**

Who is CCET

Full

- AEP Texas
- Austin Energy
- Bluebonnet Electric Co-op
- CenterPoint Energy
- Direct Energy
- IBM
- Oncor Electric Delivery
- TXU Energy

Affiliate

- ABB
- Comverge
- Energy Xtreme
- Electric Power Group
- General Electric
- GridPoint
- Landis+Gyr
- National Instruments
- Reliant Energy
- Sharyland Utilities
- Southwest Research

CCET's Regional Demonstration Grant

- DE-OE-0000194
- $27 million total; $13.5 million DOE
- Five-year demonstration
- Seventeen companies participating

OVERVIEW

The Project will demonstrate three classes of technologies to help integrate 18,000 MW wind generation…

1. Synchrophasor Technology
2. Smart Meter Texas Portal
3. Smart Grid Community of the Future

Context for CCET Regional Demonstration

- Advanced Meter Deployment
  - Oncor – 3.4 Million
  - CenterPoint Energy – 2.2 Million
  - AEP, Texas – 1.1 M
  - Austin Energy – 250,000
  - BlueBonnet – 80,000 deployment of AMR complete
- Smart Meter Texas Portal is operational
- ERCOT now settles wholesale transactions at a 15-minute level of granularity
- CREZ planning is done; deployment of $5 billion transmission expansion is underway
- 9,000 MW Wind generation in place; 18,000 in five years

SMART TEXAS rethinking energy



ONCOR

CenterPoint Energy

gridSMART From AEP TEXAS

AUSTIN ENERGY

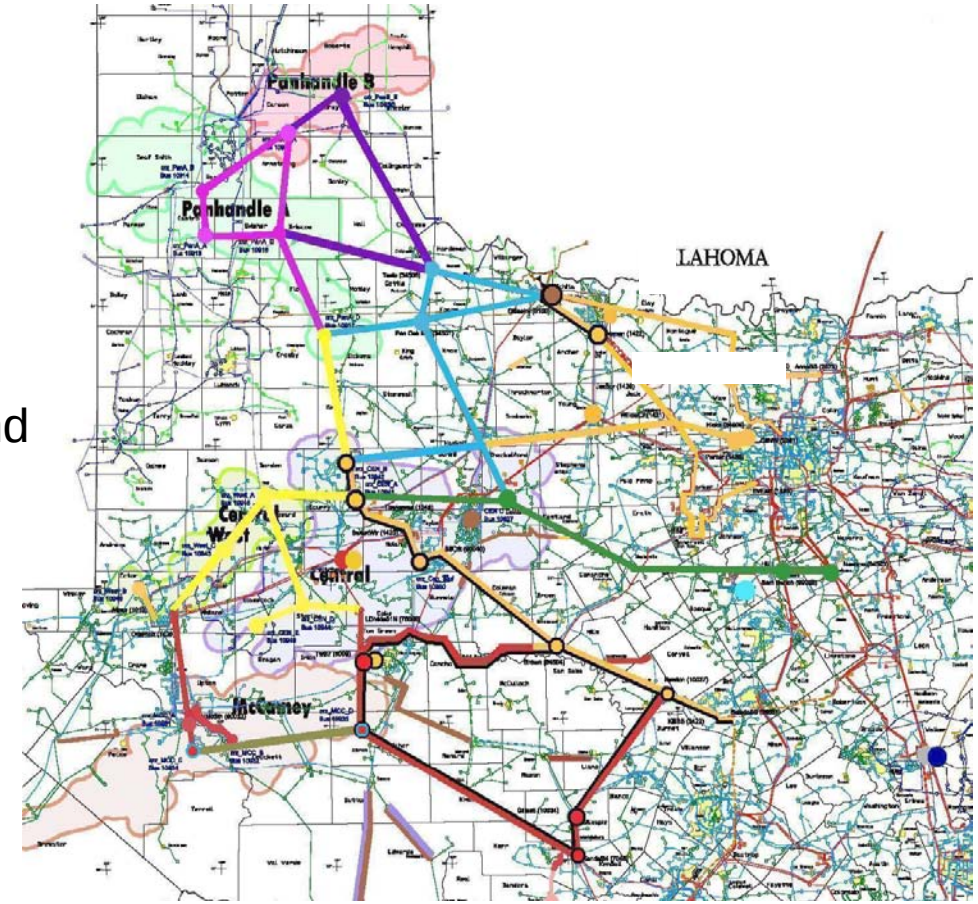
Context (Conti) CREZ Update

o The PUCT and ERCOT identified wind rich zones primarily in the West and Panhandle areas of Texas

o ERCOT led the development of transmission plans to integrate wind production facilities

o The PUCT selected a 18 GW plan, and selected eight companies to build more than 2,200 miles of new transmission lines

o Project will more than double Texas' current wind capacity



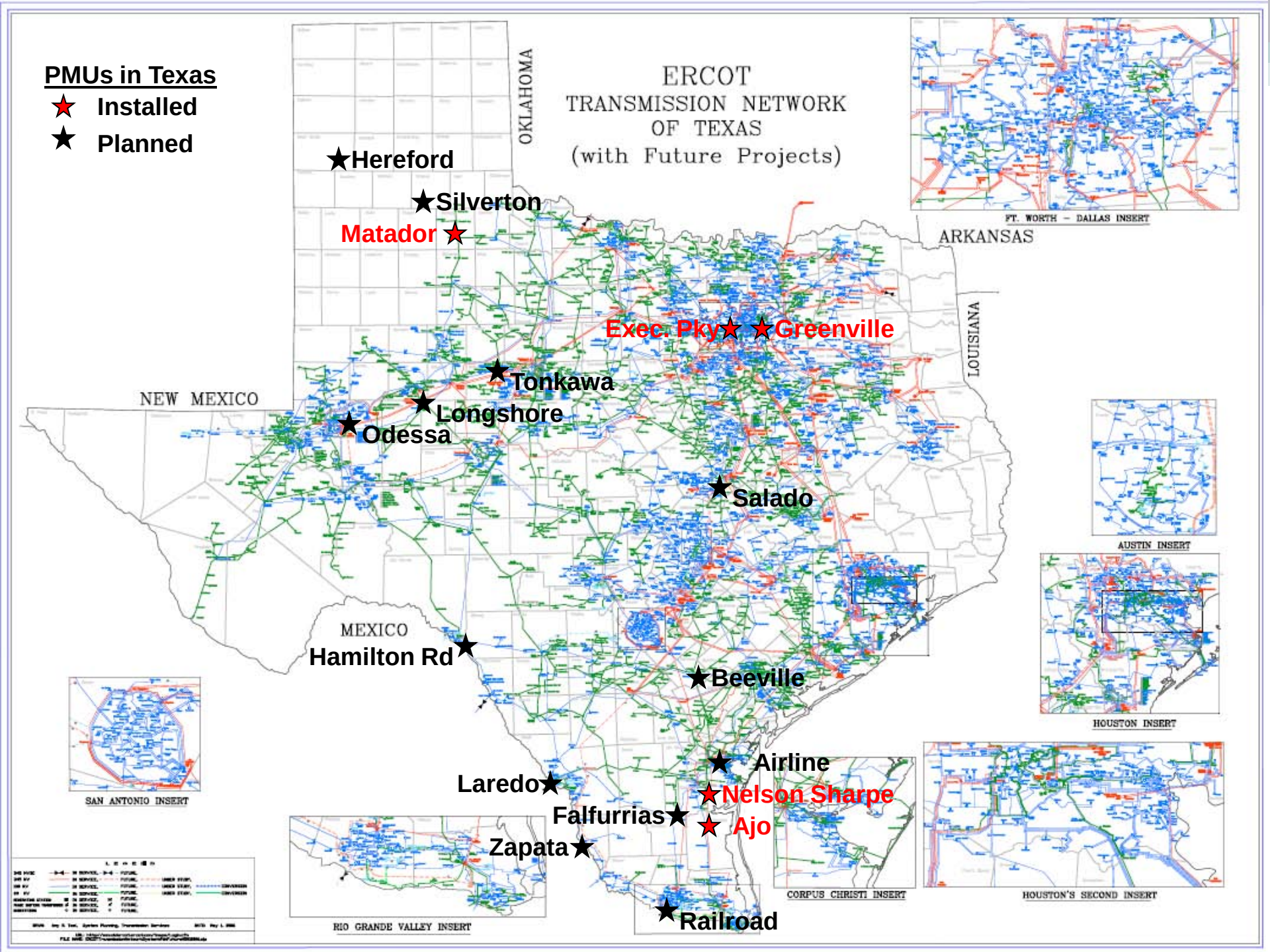
* represents areas of shared projects

1. Synchrophasor Technology –

Although we already know the many benefits of wind power, it is critical that we manage its effect on reliability of the grid before wind can become a viable energy source in the Texas electricity market.

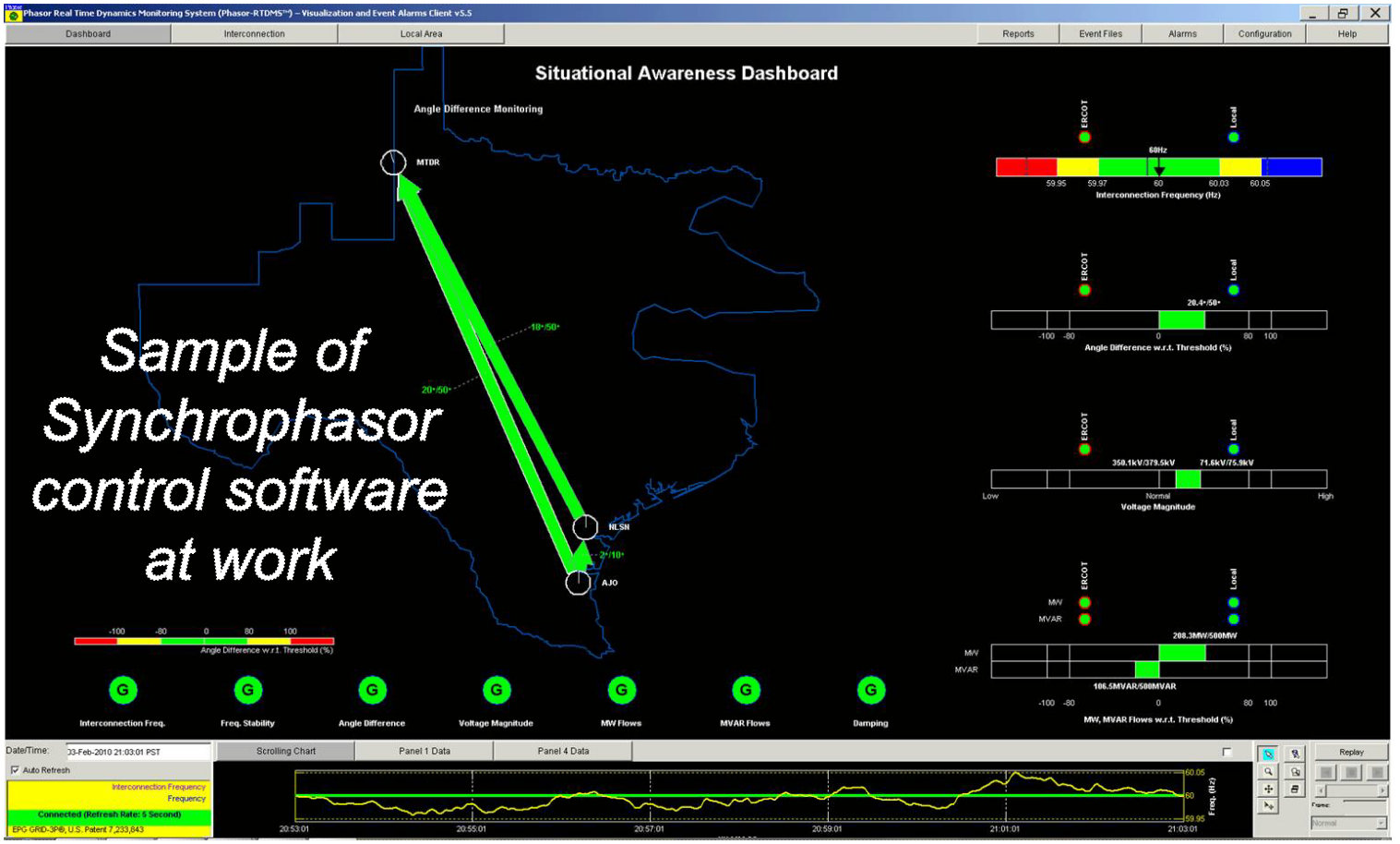
Our first task in this demonstration will be to monitor the ERCOT grid and its large-scale wind resources with **Synchrophasor** technology to detect and identify undesirable conditions on the grid, thereby enabling ERCOT operators to make adjustments to maintain grid reliability, and to expand the level of wind generation from available wind capacity.




PMUs in Texas
Installed
Planned
ERCOT
TRANSMISSION NETWORK
OF TEXAS
(with Future Projects)
OKLAHOMA
ARKANSAS
LOUISIANA
NEW MEXICO
MEXICO
Hereford
Silverton
Matador
Exec. Pky
Greenville
Tonkawa
Longshore
Odessa
Salado
Hamilton Rd
Beeville
Airline
Laredo
Nelson Sharpe
Falfurrias
Ajo
Zapata
Railroad
FT. WORTH – DALLAS INSERT
AUSTIN INSERT
HOUSTON INSERT
SAN ANTONIO INSERT
CORPUS CHRISTI INSERT
HOUSTON'S SECOND INSERT
RIO GRANDE VALLEY INSERT

1. Synchrophasor Technology Cont.

Synchrophasor technology measures variations across a transmission grid in absolute real-time. The measurement includes a time stamp that provides an easy method of correlating values from different locations that take different amounts of time to arrive at a common collection point. This gives us a tool to view the power system as a whole or to compare different points in real time.



2. Smart Meter Texas Portal Extension–

ERCOT and the largest electricity companies in Texas have launched the most aggressive Advanced Metering System (AMS) deployment in the U.S. The *Smart Meter Texas Portal* initiative is a several-year collaboration to properly integrate these meters into the ERCOT market. The grant Project **will plan** the expansion of the Portal capabilities.

This Project and all of its stakeholders will plan an extension of Portal capabilities with the prospect of testing them in the Texas Future Community including:

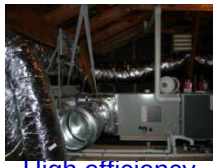
- Direct Load Control (DLC) enabled by the newly-deployed AMS,
- An investigation of the prospects of expanding AS market in ERCOT to include aggregated residential load enabled by SMT Portal



3. Smart Grid Community of the Future

Formal testing of new types of Load Control and DR…

Providing a homeowner solution is the 3rd step and will involve creating a **"Smart Grid Residential Community of the Future"** in Spring, TX. Spring is a growing suburb 25 miles north of Houston and an excellent test bed for this kind of demonstration. This Community will feature homeowner services such as:



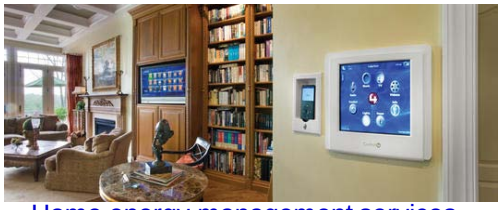
High efficiency HVAC systems with central Indoor Air Quality (IAQ) systems



Electronic Vehicle (EV) charging



Rooftop solar for serving as Distributed Generation (DG) for each home



Home energy management services including an in-home display & software applications to help homeowners manage their electricity more efficiently



2-way metering capabilities to support DG and new-generation demand response programs



Solar farm to supply common areas such as a water treatment plant, community center and swimming pool



Extraordinary high building envelope efficiencies





Home Battery storage



Smart appliances

Project Team

This diverse group of stakeholders arms this project with a deep understanding of all three phases of this Project.







































Questions?

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