



**Center for the Commercialization of Electric Technologies**

# **CCET& ERCOT Collaboration to Develop and Deploy a Synchrophasor Technology System in the ERCOT Market**

**by**

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**President & COO**

**Center for the Commercialization of Electric Technologies (CCET)**

**ERCOT Taskforce Meeting**

**Nov 12, 2013**



## CCET Mission

- CCET facilitates electric industry, technology company and university collaboration for the purpose of enhancing the **safety, reliability, security, and efficiency** of the Texas electric transmission and distribution system **through research, development and commercialization** of emerging technologies.
- Created as a Texas Non-Profit in September, 2005
- Mission & Strategy
  - ✓ Keep **abreast of emerging issues and concerns**
  - ✓ **Project focus 3 to 5 years in front** of the current market
  - ✓ **Technology focus** but include policy recommendations
  - ✓ Keep the **pipeline of project ideas** full
  - ✓ **Relevant** to member interests



# Center for the Commercialization of Electric Technologies

## 2013 Membership (20 not including universities)

### Governing Participants:



### Affiliated Participants:



### University participants as needed via contract:

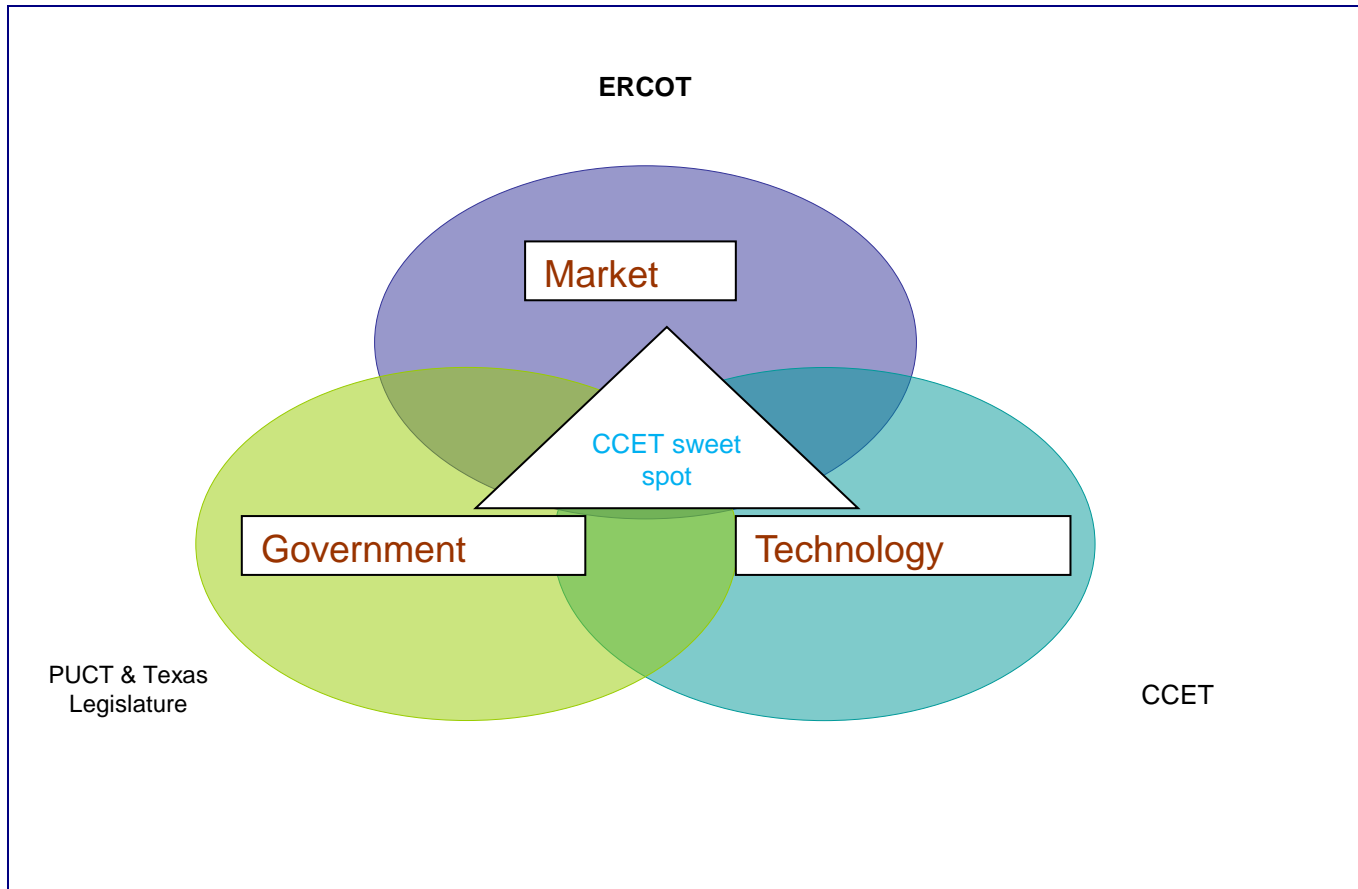
### Advisor Directors:





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**CCET Strategy:** CCET will champion and develop the **Technology Leg** of the Three-Legged Texas Electric Market Stool

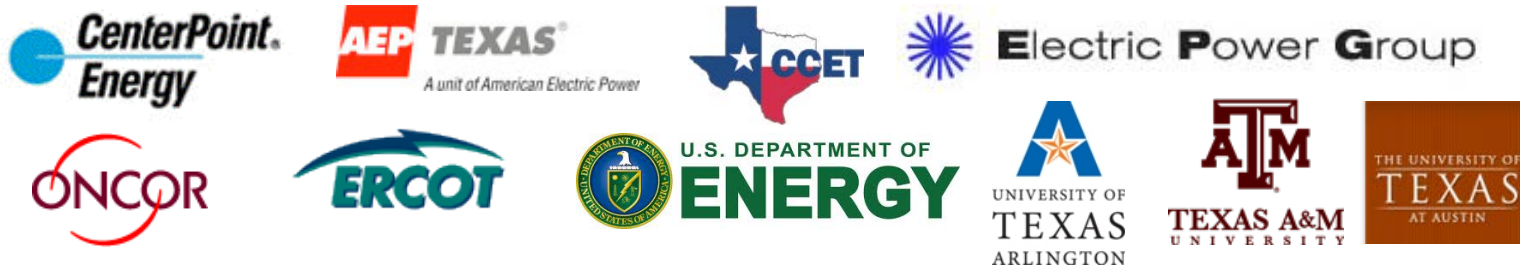




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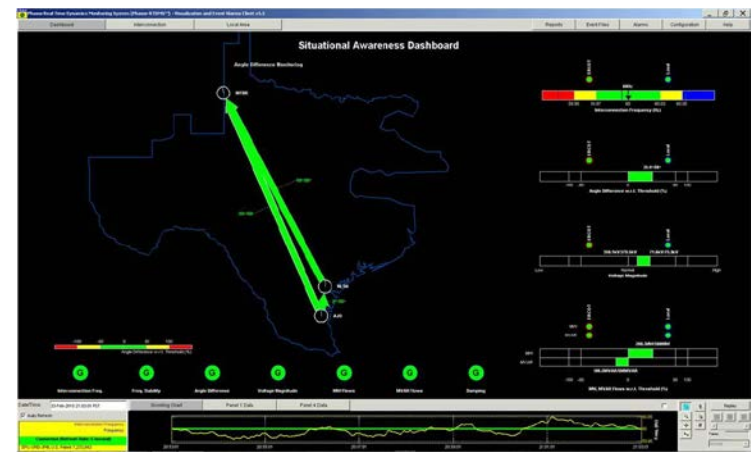
### The Beginning of Synchronphasors System in the ERCOT Market ETF Grant in 2006-2008

#### Project Participants:



#### Project Market Outcomes:

- Fault Location software
- Intelligent Alarm Processor software
- Starter synchronphasor system with roadmap
  - 3 AEP PMUs reporting
  - algorithm for optimum PMU location
  - software development for improving generator parameter estimates
  - RTDMS installation at ERCOT



EPG's RTDMS



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## Major Addition to the Synchrophasor System via ARRA Grant: Discovery Across Texas: Technology Solutions for Wind Integration in ERCOT (\$27M Project) 2010-2014

### Project Participants:



P3E



DOE administers the ARRA funded projects and helps guide the cooperative agreement

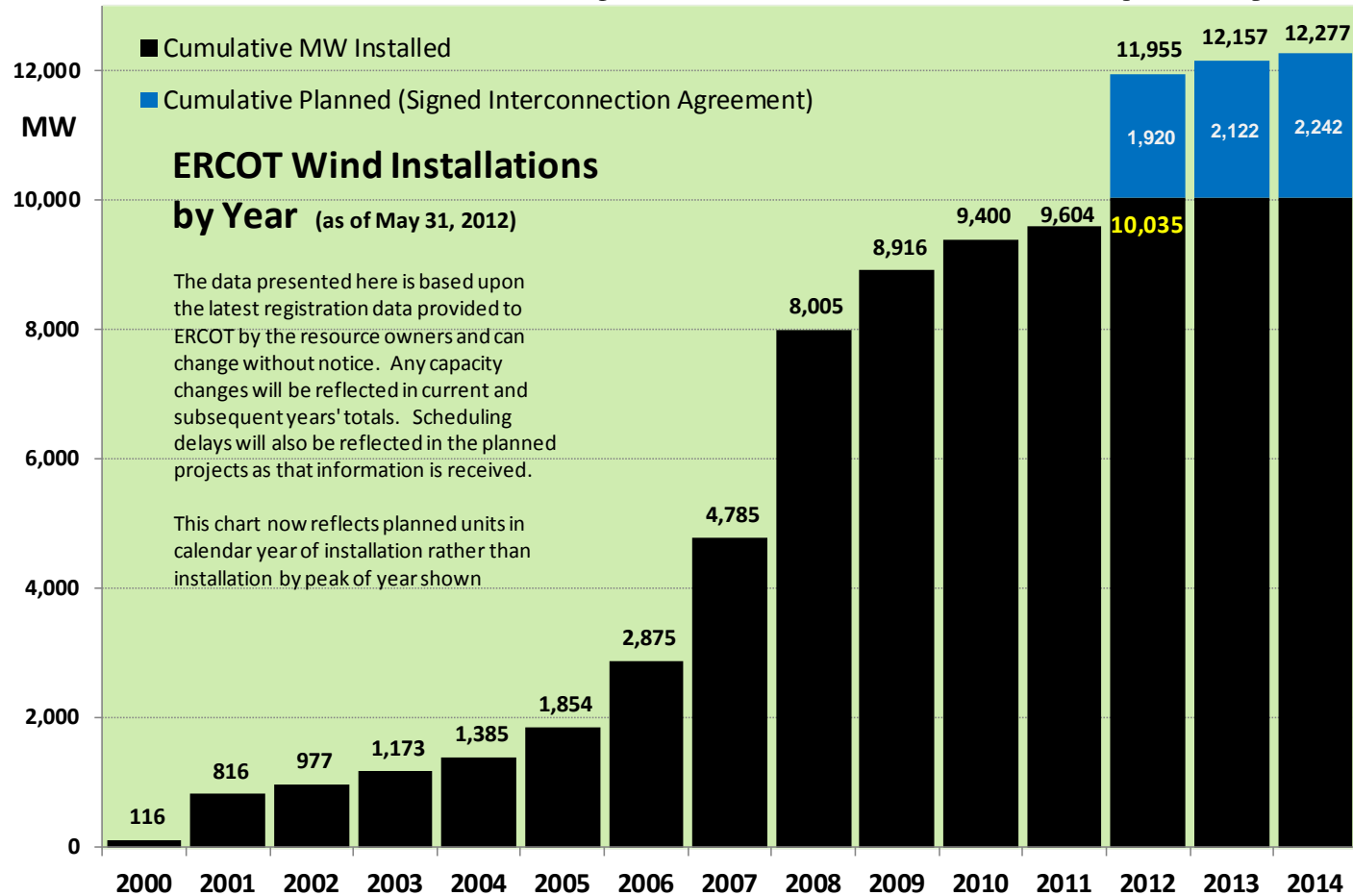
November 12, 2013  
Slide 6

ERCOT Synchrophasor Task Meeting  
Milton Holloway, Ph.D.  
President & COO, CCET

Austin, Texas  
Met Center



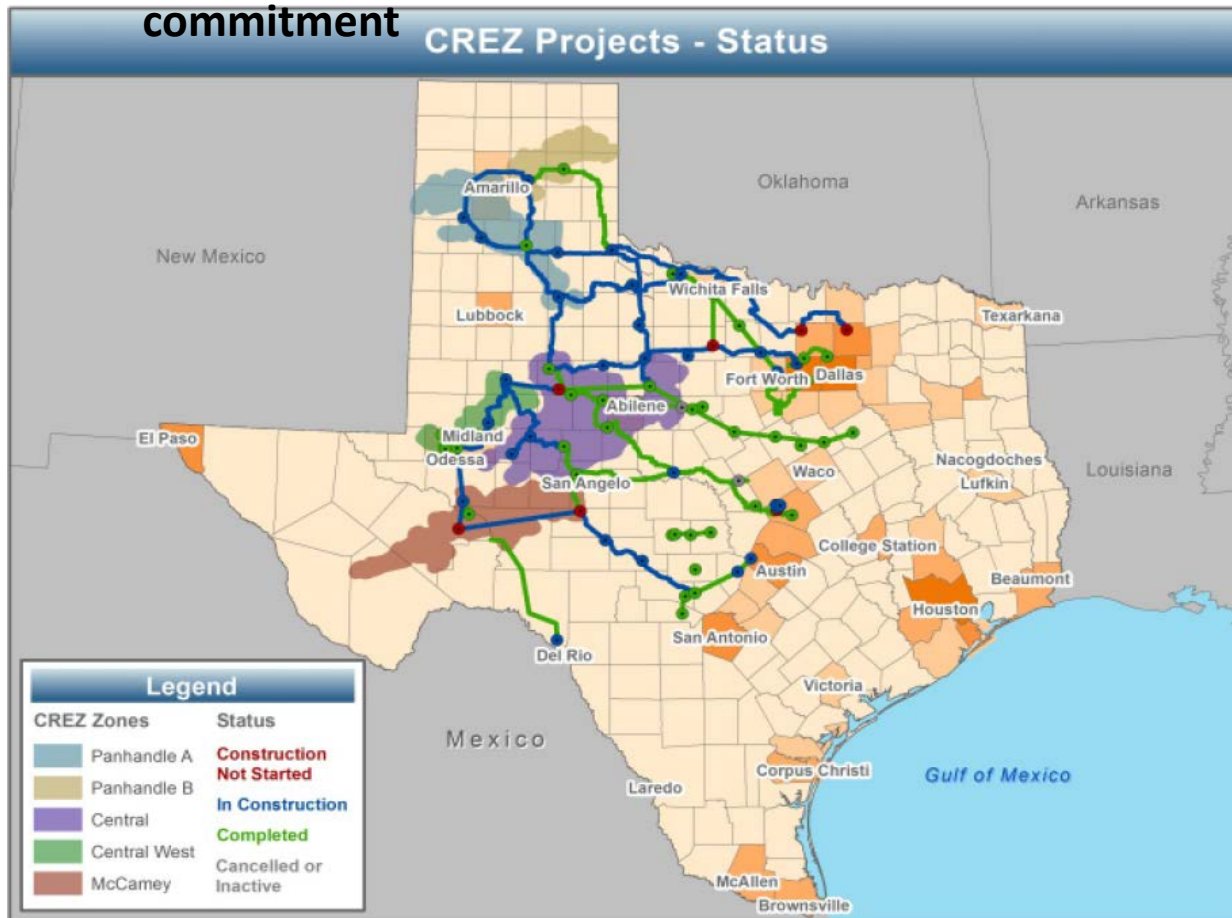
# Context for the ARRA Project: ERCOT Wind Capacity





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### Context for the ARRA Project : CREZ Build-out







## Discovery Across Texas: Technology Solutions for Wind Integration in ERCOT (Conti)

### Project Purpose:

- Demonstrate new and emerging **technologies for wind integration** in ERCOT
- Technology solutions include: **synchrophasor** based grid monitoring and operator tools, security fabric demonstration, consumer **demand response** in a future community, REP sponsored **direct load control** in grid critical times, distribution utility managed **battery** storage, **fleet PEV** and utility battery resources for **Fast Response Regulation Service** capability

### Project Funding:

This project is jointly funded by the American Recovery and Reinvestment Act of 2009 administered by the U.S. Department of Energy (\$13.5M) and CCET project participants by cost share (\$13.7M). The project is entitled **Technology Solutions for Wind Integration in ERCOT (DE-OE0000194)** awarded in November 2009 in response to the CCET application under funding opportunity number DE-FOA-0000036.



## Discovery Across Texas: Technology Solutions for Wind Integration in ERCOT (Conti)

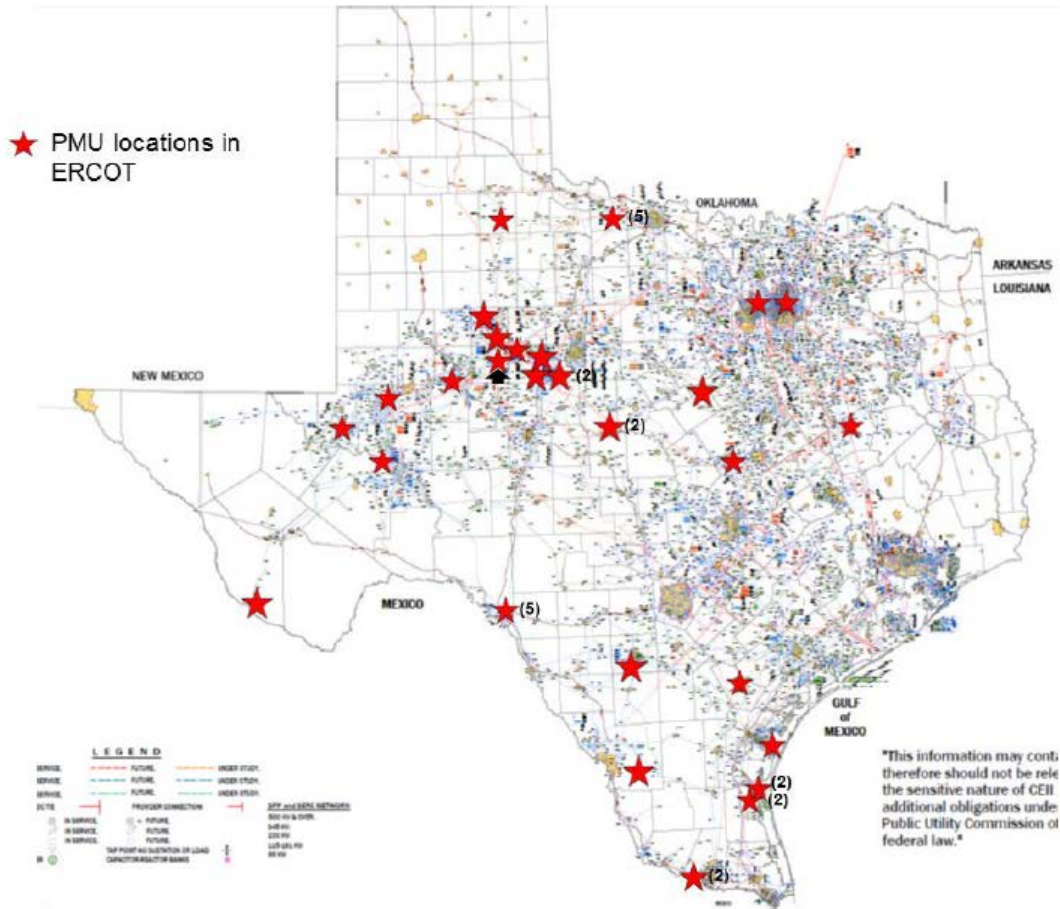
### Project Components:

- I. Synchrophasor system with applications**
- II. Security fabric for synchrophasor system protection**
- III. Utility-scale battery with wind farm**
- IV. Pricing trials at Pecan Street**
- V. DLC demonstration with dual communication paths**
- VI. Solar community monitoring**
- VII. PEV fleet Fast Response Regulation Service demonstration**



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## I. Synchrophasor system with applications: wide area visualization



### Participants





- I. **Synchrophasor system with applications , including security fabric demo : expected commercial market outcomes**
  - A. Expect adequate PMU coverage robust enough for production environment : **52+** PMUs fielded while only 13 were promised
  - B. Definitive event analysis so as to drive new application development for both wind and non-wind events
  - C. Generator model may be expanded and could become a tool for generators
  - D. Established production grade system of PMUs and servers
  - E. Distribution level monitoring at TTU, and different market (SPP)
  - F. Commercial viability of a security fabric product for synchrophasor system protection



# Questions?

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