



Transmission Grid Development in Texas

An AEP/ETT Perspective

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**AMERICAN
ELECTRIC
POWER®**

BOUNDLESS ENERGY™

**BERKSHIRE HATHAWAY
ENERGY**

ETT  SM
Electric Transmission Texas

- Joint Venture owned in equal shares by subsidiaries of AEP and BHE
- Regulated Utility in ERCOT Region of Texas
- Formed in December 2007 with \$70 million in assets
- Current asset base of approximately \$3.7 billion
- AEP Texas and AEP Transmission provide all services for ETT (No ETT Employees)
- ETT run by AEP Service Corp Employees based in Austin

Transmission Planning Process - ERCOT

➤ **Rapid Renewable Growth**

- AEP system in Texas is Reviewing over 60 Generation Interconnection
 - Wind 92%
 - Solar 8%
- Requires Full Interconnection Study (FIS), Sub-synchronous Oscillation (SSO) Analysis
- Stability Analysis required pre-energization

➤ **Stability Issues North Texas and Rio Grande Valley areas**

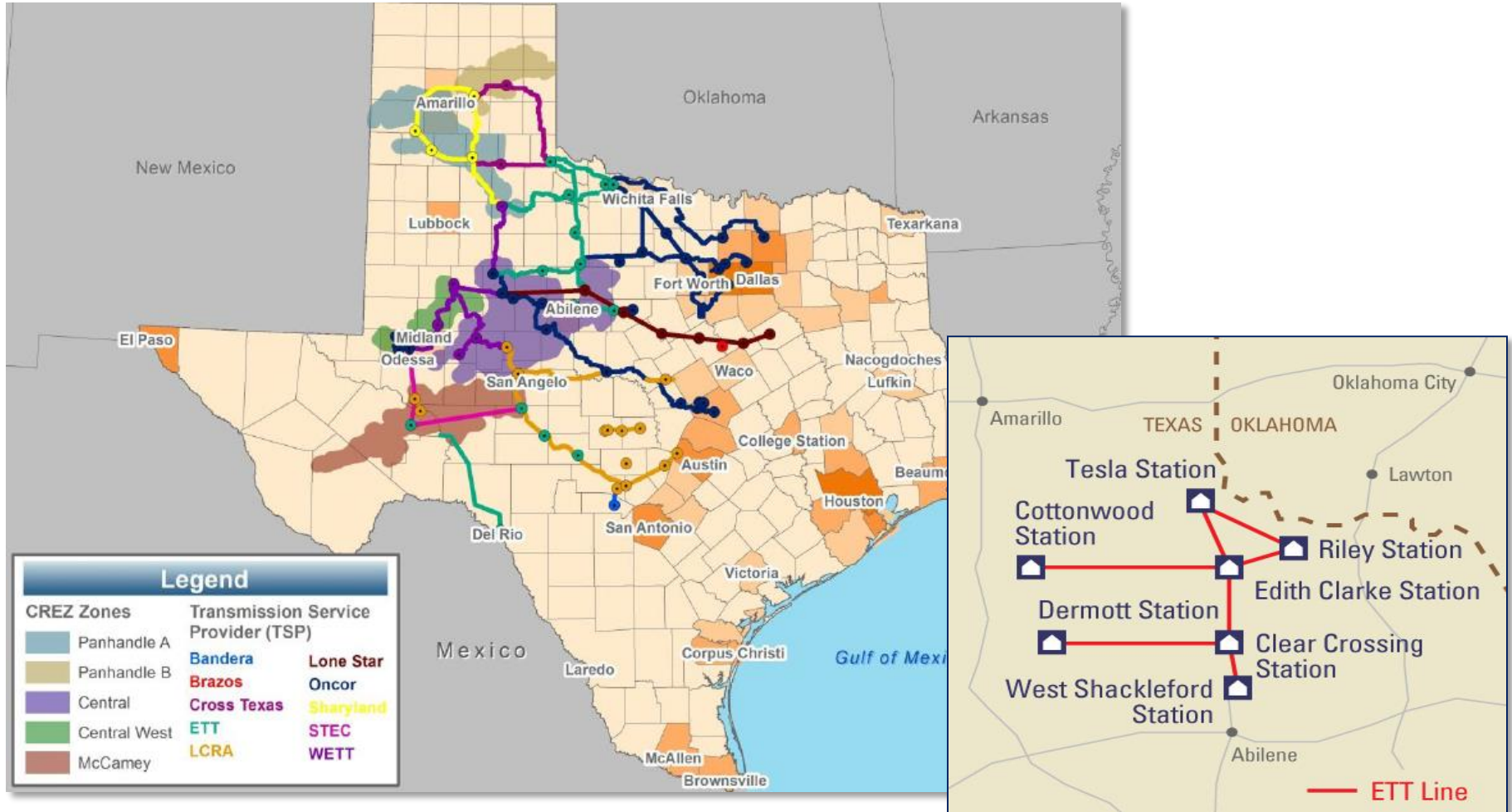
➤ **Transmission Projects in ERCOT are not built based on Economic Analysis but upon Reliability Needs**

- Economic project require a 15% return or 6-7 year payback term for inclusion in the ERCOT Long Term Study.

➤ **Transmission Projects in ERCOT are regionally funded**

- Regional Planning Group Review and Approval
- Technical Advisory Committee Review and Approval
- ERCOT Board Review and Approval (Implied Public Utilities Commission of Texas consent)

Competitive Renewable Energy Zones



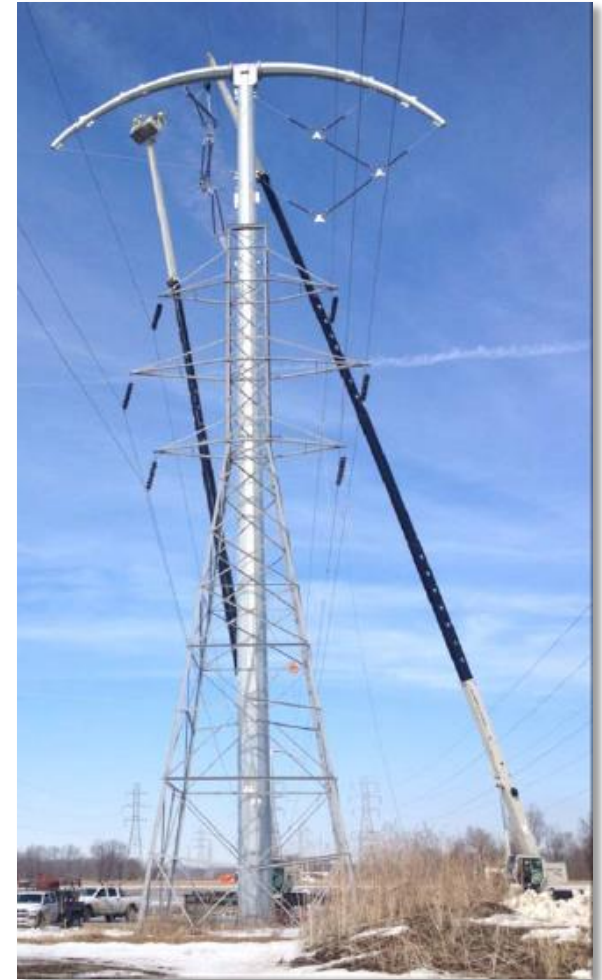
AEP's Breakthrough Overhead Line Design (BOLD)



➤ BOLD Line Advantages

- Lower Impedence
- Eliminates need for Series Compensation
- No added SSR/SSCI risk to area generation
- Mitigates operational and P&C complexities
- Increased capacity
- Comparable cost to traditional Series Compensated 345 kV transmission

***AEP awarded two patents by U.S. Patent & Trademark Office (third patent pending)*



Drop In Control Module



- **Standardizes control room configuration**
- **Reduces installation and construction time**
- **Provides increased versatility; pre-built to accommodate 138 kV, 345 kV and 765 kV**

Skid Station



- **Reduces construction time to 4-6 weeks**
- **Portable and readily deployed**
- **Transferable to other locations as needed**

Laredo VFT

Laredo VFT

Laredo County, TX

138kV Variable Frequency Transformer and Switching station with interconnection to Mexico.

In Service Date:

5/15/2007

Amount:

\$ 48.2M



Presidio Reliability Improvement Project

Presidio Reliability Improvement Project

Presidio County, TX

Installation of NaS batteries and Gonzales substation

In Service Date:

3/31/2010

Amount:

\$ 26.8M



Questions?