

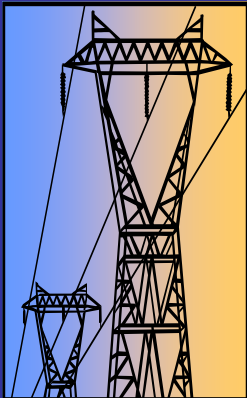


Transmission Expansion in ERCOT

Project No. 28500

***Activities Related to the Implementation of a Nodal Market
For the Electric Reliability Council of Texas***

July 12, 2005



**Bill Bojorquez, Director of Transmission Services
Electric Reliability Council of Texas**

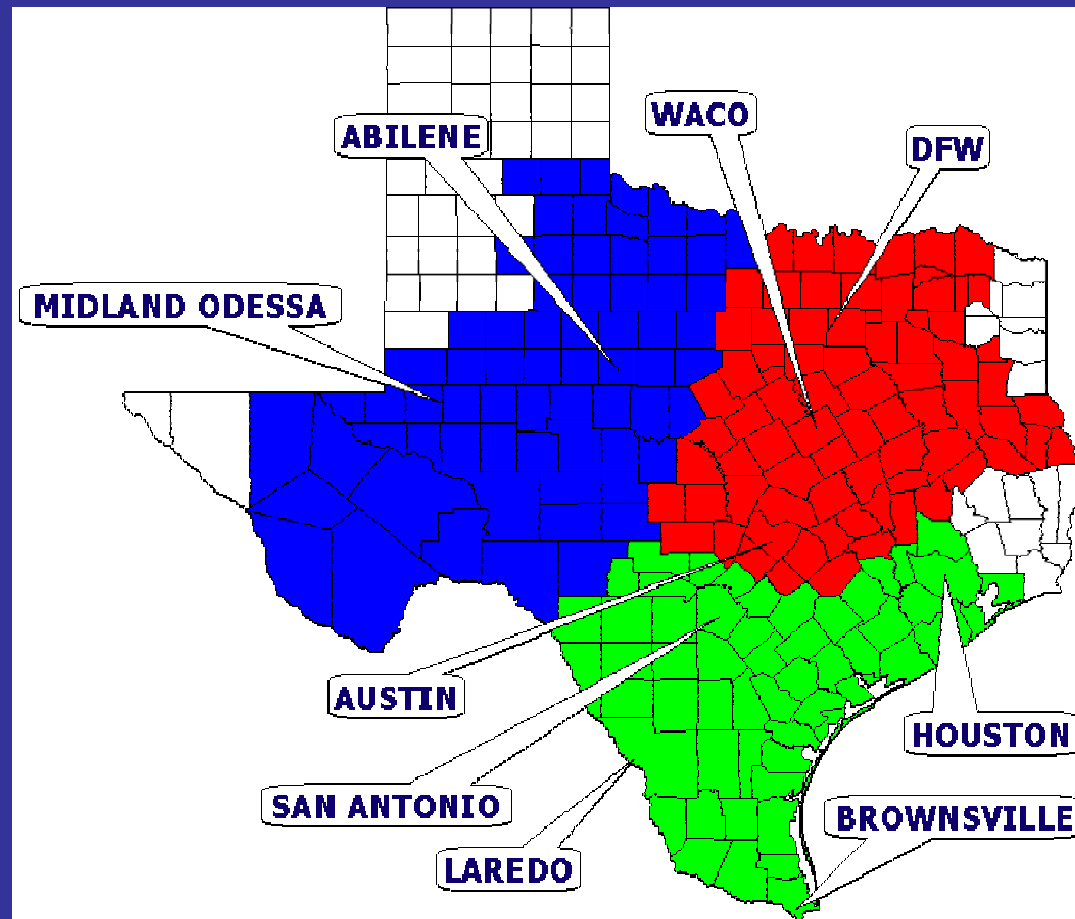


ERCOT Planning Process

- ERCOT supervises an open, non-discriminatory planning process that considers and balances the impact of transmission system additions on stakeholders
- Projects or studies can be proposed by any Market Participant, Transmission Owner or ERCOT Staff
- Stakeholders have opportunity to comment on proposals and offer alternative solutions through the Regional Planning Groups
- ERCOT Staff performs independent review
- ERCOT Staff makes independent recommendation to the Board of Directors for major projects

Regional Planning Groups

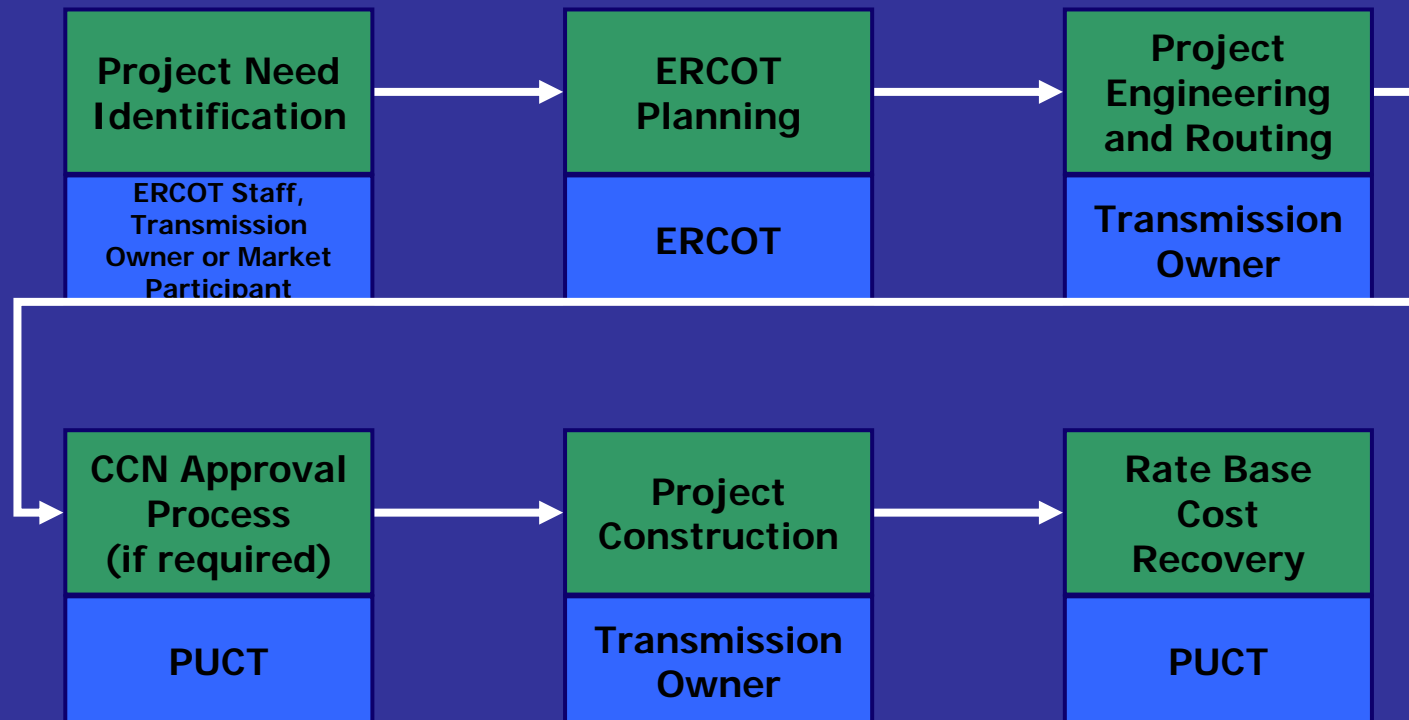
- ERCOT leads and facilitates three Regional Transmission Planning Groups (North, South and West)
- Information about planned transmission projects is distributed to and among members of these groups
- These groups provide the means for stakeholders to participate, express concerns, share alternatives, and provide input to the ERCOT staff independent recommendation





Implementation of New Transmission Projects

The ERCOT Planning Process is only one part of a broader process through which new transmission is implemented





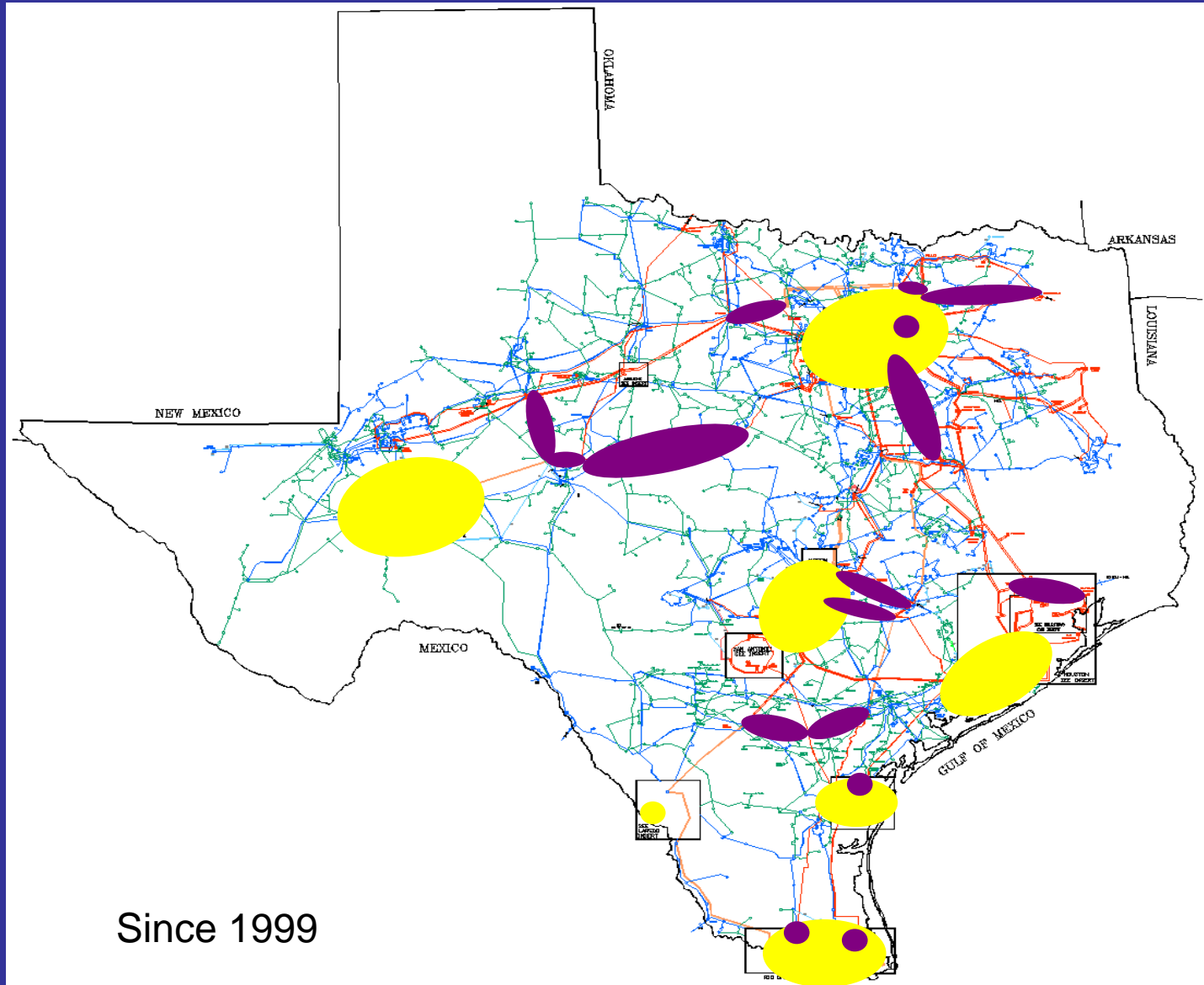
Planning Process Results

Facilities added and currently in service (since 1996)

- 26,500 MW of generation capacity interconnected (45% increase)
- Over 5,200 MW of generation capacity decommissioned
- 12,000 MW increased Peak Demand
- Nearly \$2 billion invested in transmission facilities
- 700 miles of new 345 kV transmission lines
- Several hundred miles of new or rebuilt 138 kV transmission lines
- Many 345/138 kV transformers
- Dynamic and static voltage control devices

ERCOT Region has seen much greater expansion of transmission infrastructure in recent years than any other North American region

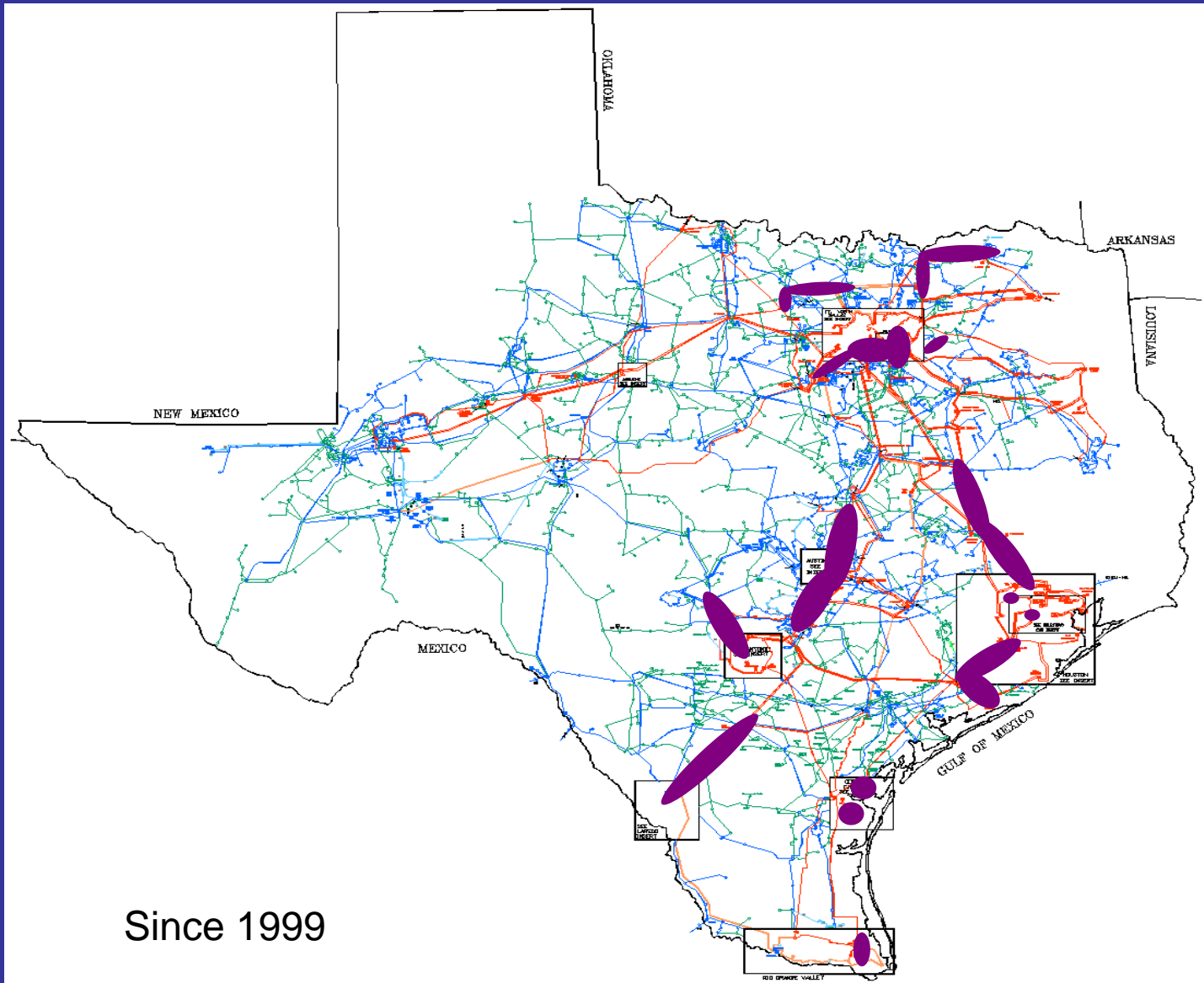
Completed Projects



Since 1999



Additional Planned Major Projects



Since 1999



Cagnon - Kendall

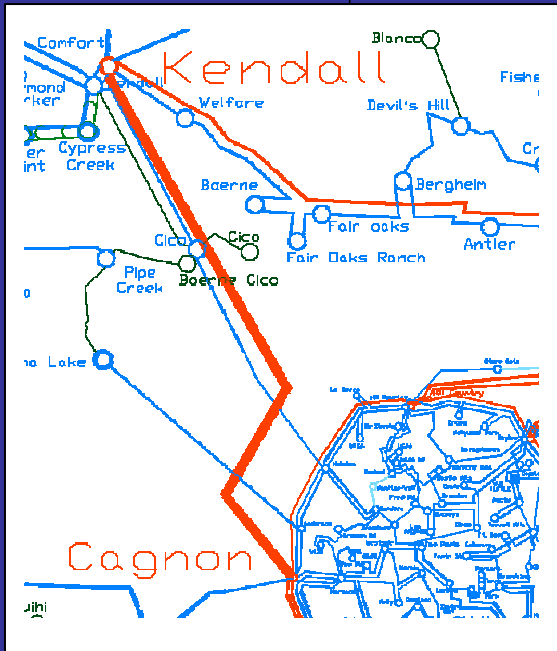
ERCOT BOD
Approved 2/02

CPS/LCRA Project

- 45 miles of 345-kV double circuit (1 circuit in place)
- Second 345/138-kV autotransformer at Kendall
- 31.2 Mvar Capacitor Bank

Cost - \$65.6 million

In Service date 6/06





West Levee - Norwood

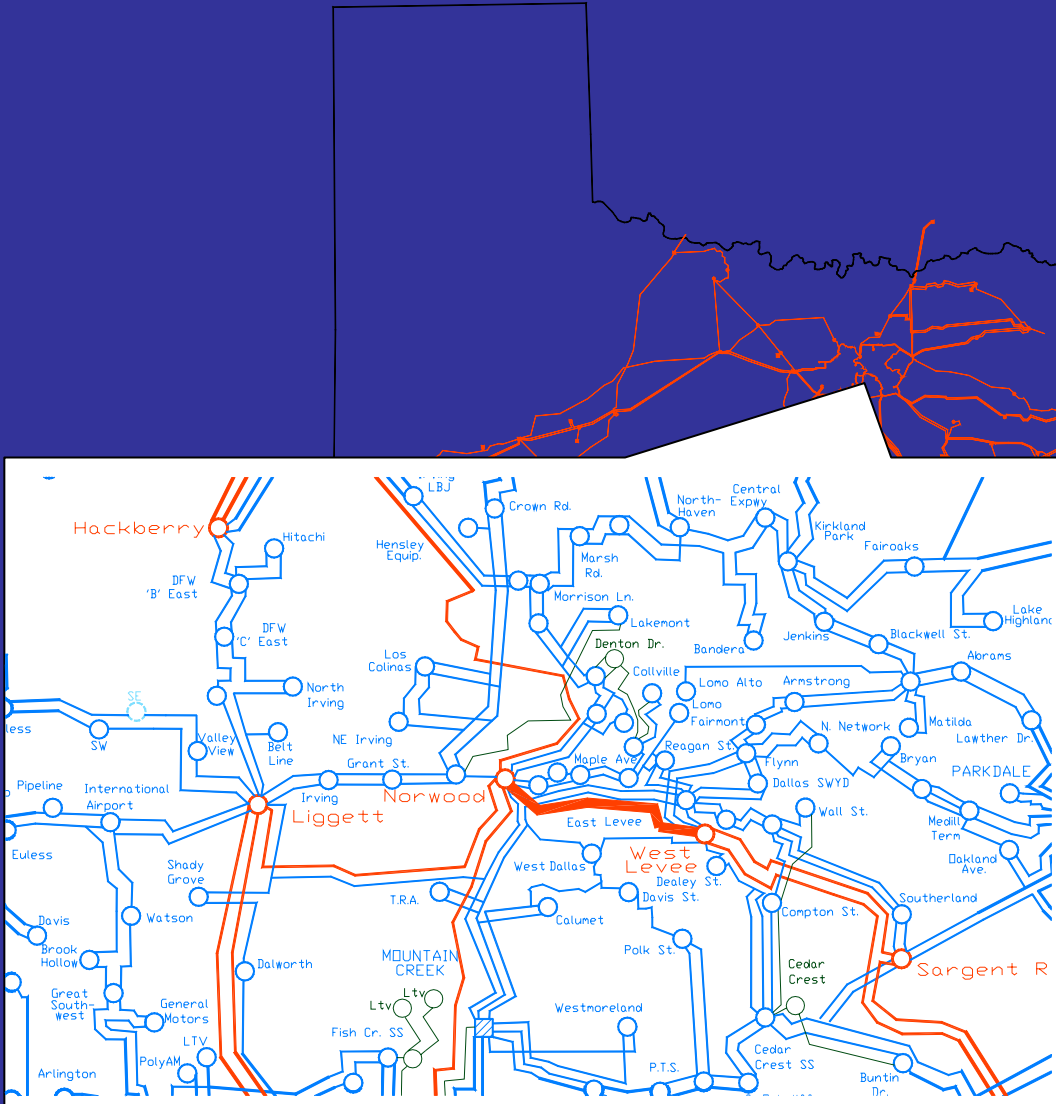
ERCOT BOD
Approved 4/04

TXU Project

7 miles of 345-kV
double circuit
(1 circuit in place)

Cost - \$18.7 million

In Service date
5/06





Jacksboro – West Denton

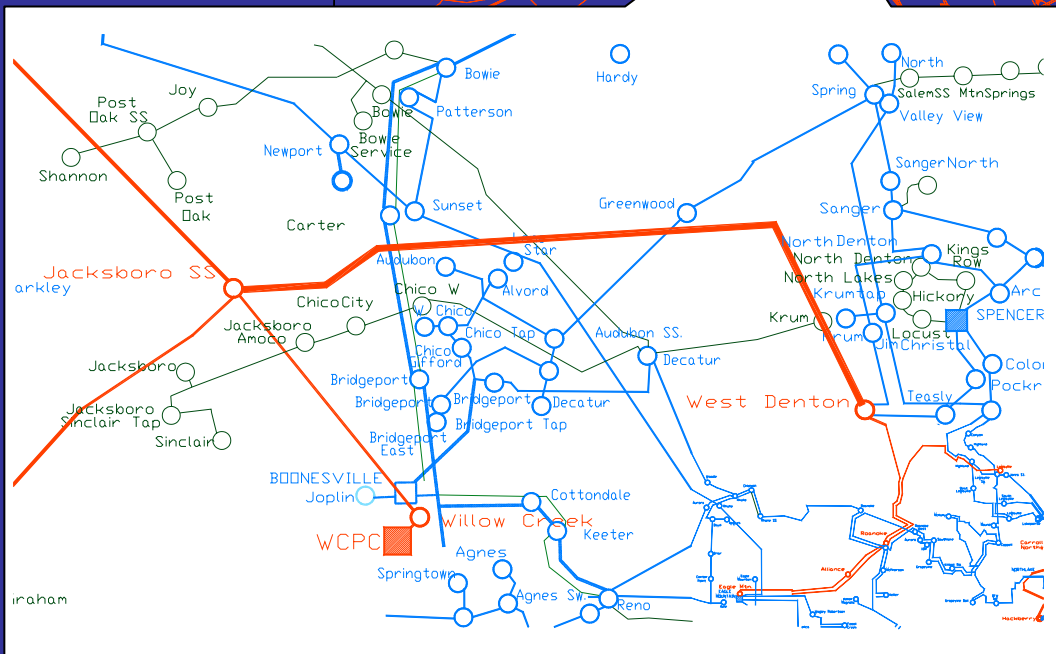
ERCOT BOD
Approved 5/20/04

TXU Project

50 miles of 345-kV
double circuit
(1 circuit in place)

Cost - \$66.4 million

In Service date
12/06





Venus - Liggett

ERCOT BOD
Approved 8/01

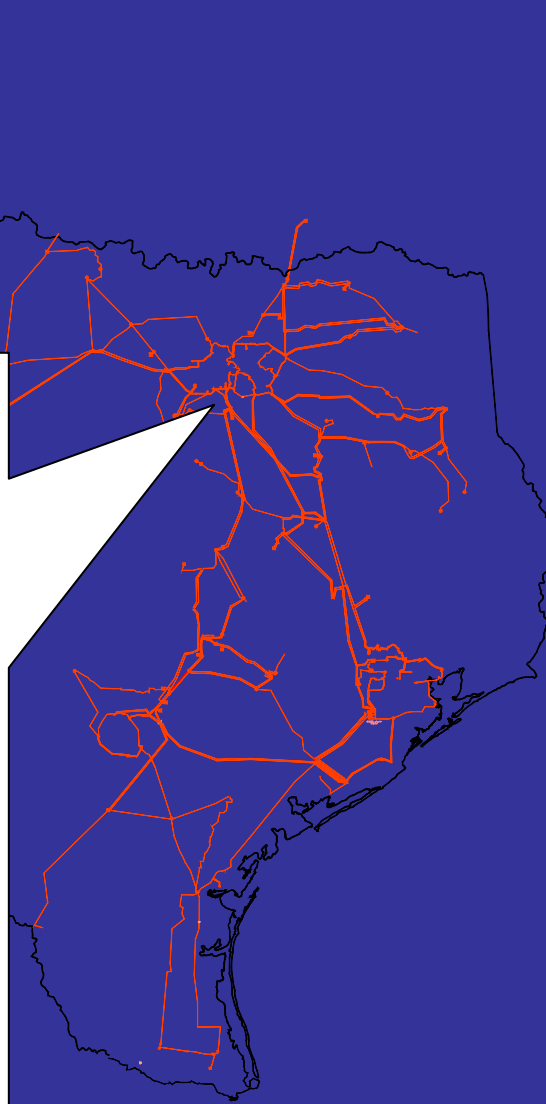
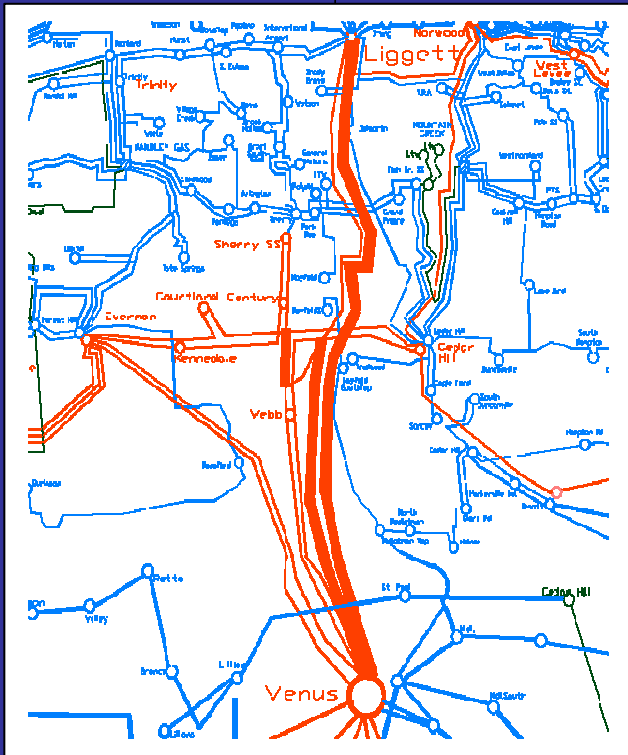
TXU Project

- 15.7 Miles of new 345-kV double circuit
- 11.7 miles of new 345-kV line on existing structures
- New 345/138-kV autotransformer at Liggett

Cost - \$40.8 million

In Service date

5/06





Paris - Anna

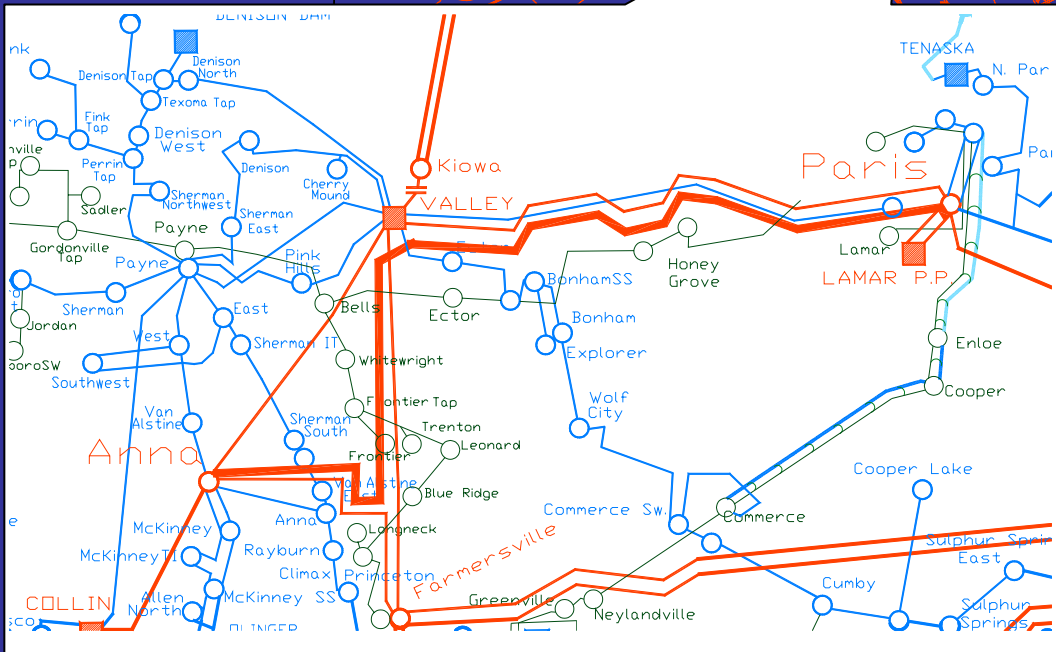
ERCOT BOD
Approved 9/01

TXU Project

88 miles of new 345-
kV line on existing
structures

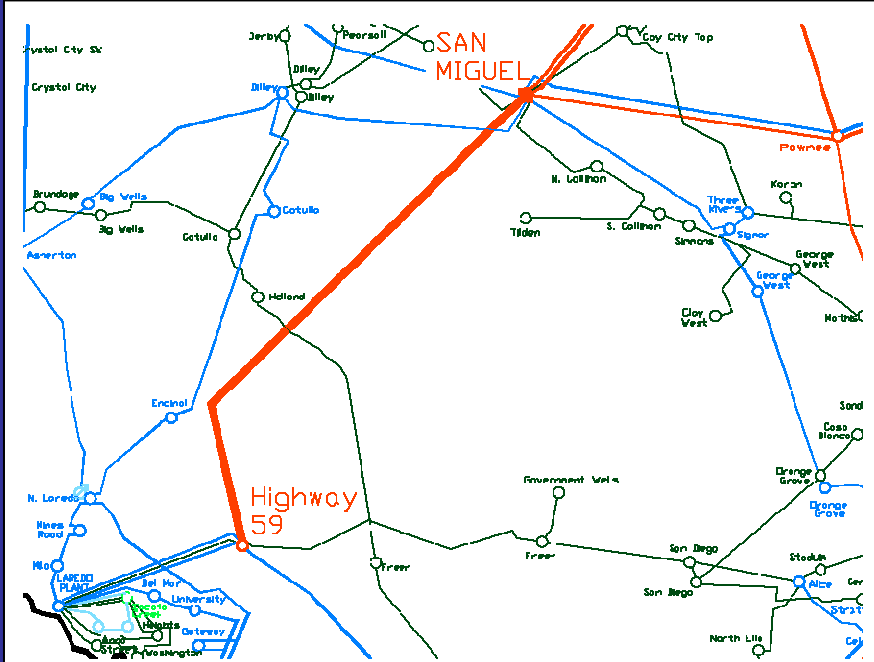
Cost - \$34.5 million

In Service date 12/06





San Miguel - Laredo



ERCOT BOD
Approved 4/04

AEP Project

110 miles of 345-kV
double circuit
(1 circuit in place)

Cost - \$99 million

In Service date 5/10



Economic Planning

- While ERCOT has recommended several major and numerous minor projects since 1996 to reduce the impacts of congestion, there has been an increased emphasis on identifying and evaluating such projects during the last two years
- Economic Projects are defined as system improvements intended to resolve current or projected levels of reliability criteria violations that could instead be solved by the redispatch of existing generation but have been initiated because they are projected to result in a net economic benefit to the market based on ERCOT-wide impacts.



Economic Planning

- ERCOT has obtained staff and tools to enable the identification and evaluation of these economically-driven projects
- One tool that ERCOT has been using over the past two years to evaluate the economics of transmission that will reduce the impacts of congestion is the UPlan market simulation model

- This model calculates the security-constrained, least-cost unit commitment and economic dispatch of all generation to serve forecasted system load assuming cost-based dispatch of generation
- ERCOT primarily uses UPlan to predict which transmission lines are likely to cause congestion and to forecast production costs savings that will result from proposed transmission system improvements
- UPlan also inherently calculates the marginal cost of electricity at each bus in each hour



Economic Projects

- The economic analysis performed by ERCOT using this model has been used to evaluate about \$500 million of transmission projects over the past two years, including:
 - RMR Exit Strategy Projects
 - Clear Springs – Salado Project
 - Houston Import Projects
 - DFW 2006 Congestion Reduction Projects
 - And several smaller projects



La Palma RMR Exit

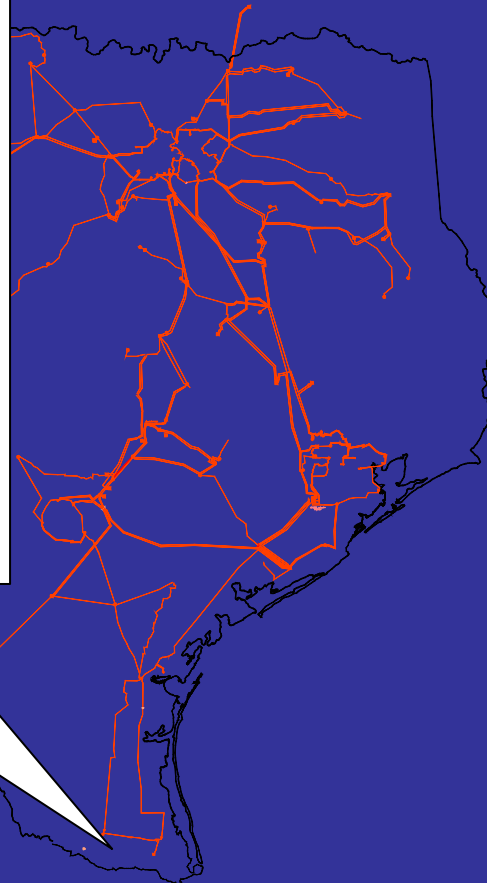
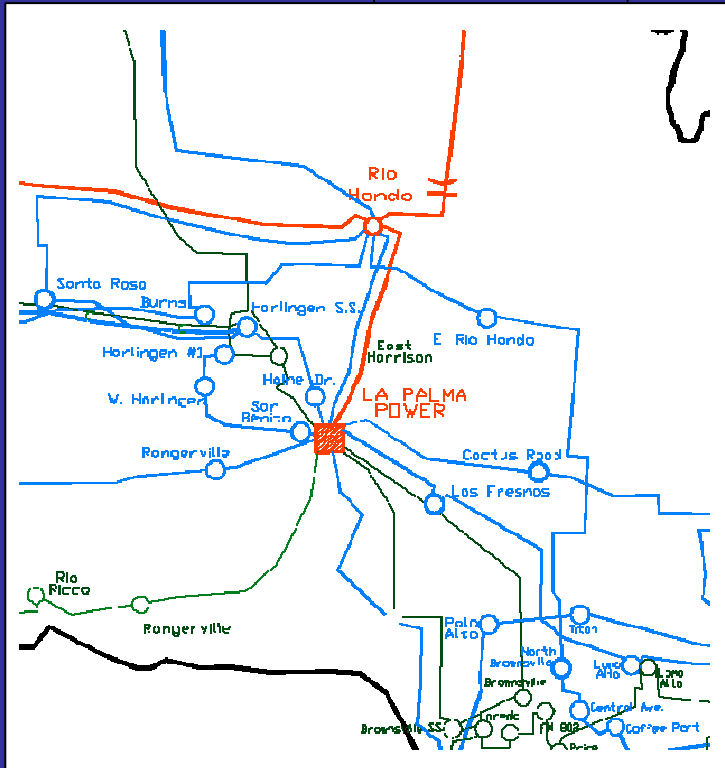
ERCOT BOD
Approved 10/03

AEP Project

- Add second 345/138-kV autotransformer at Rio Hondo
- Rebuild Rio Hondo-La Palma 138-kV line

Cost - \$19.6 million

In Service date
4/06





Barney Davis RMR Exit

ERCOT BOD
Approved 12/03

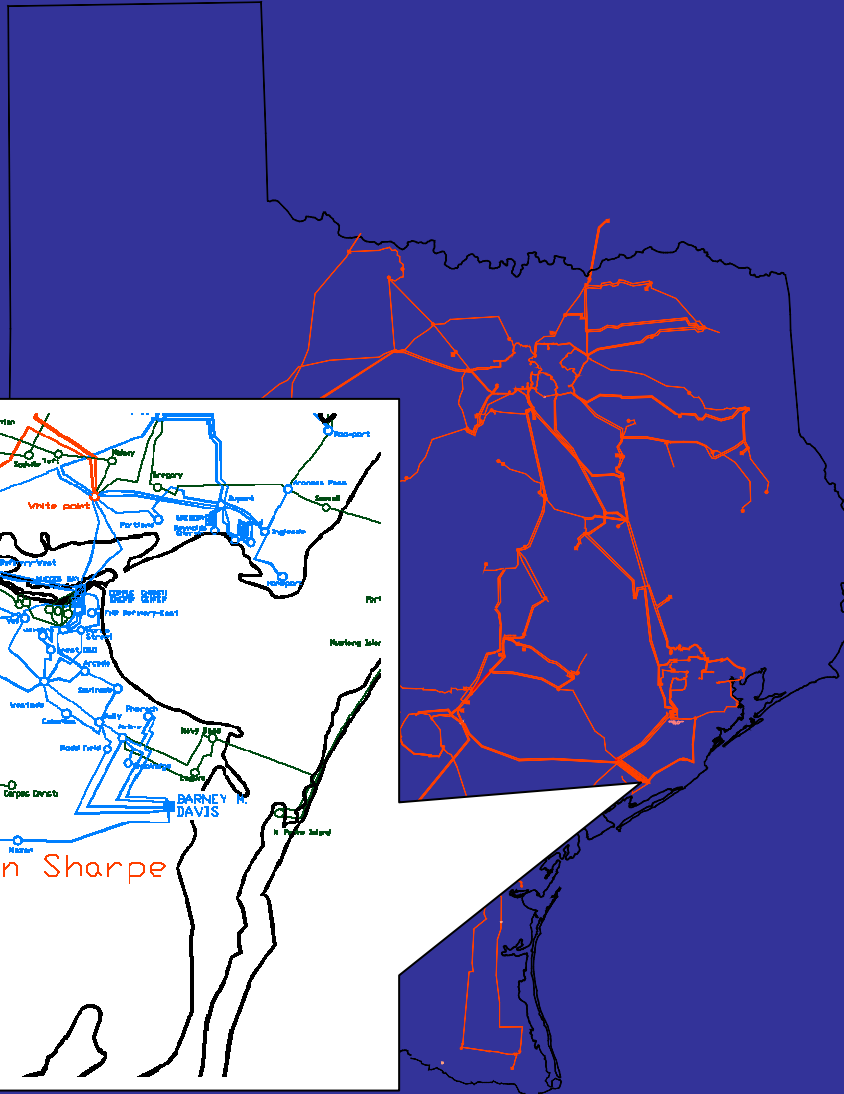
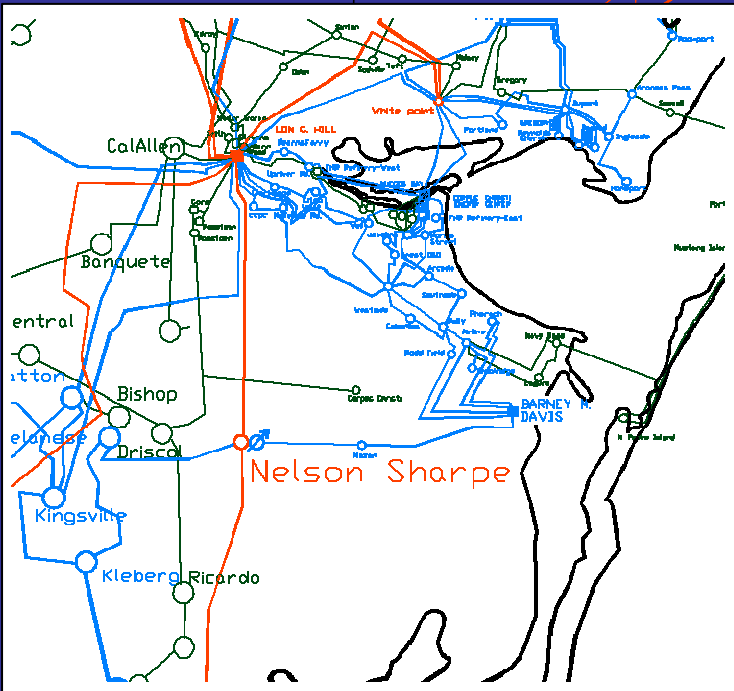
AEP Project

- New Nelson Sharpe Substation with Phase shifting 345/138-kV autotransformer
- Additional Static and Dynamic Reactive Resources
- Reconfigure existing 138-kV lines

Cost - \$33.3 million

In Service date

5/06





Clear Springs – Salado

ERCOT BOD
Approved 12/2004

Joint AE, LCRA, and TXU
project

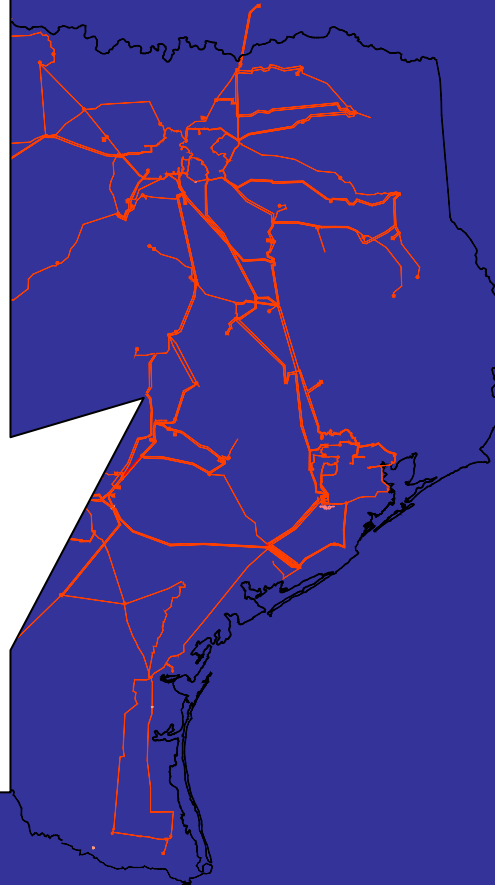
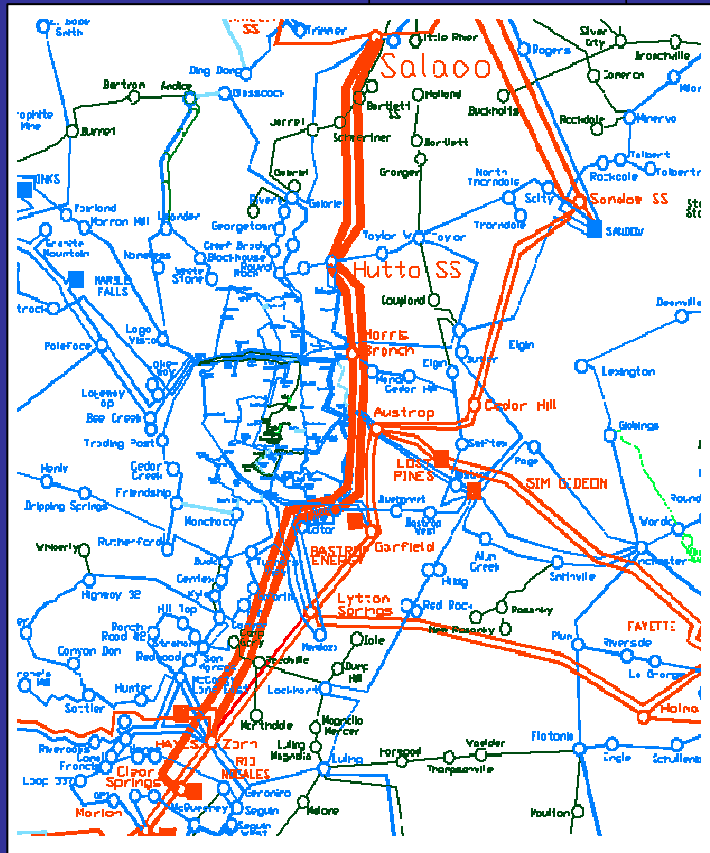
- 200 miles of new 345-kV line
- 3 new 345-kV stations
- 2 new 345/138-kV autotransformers

Cost - \$141 million

In Service date 6/10

\$49M in Annual Production
Cost Savings

Mitigates \$47.5M in reliability
driven transmission Projects



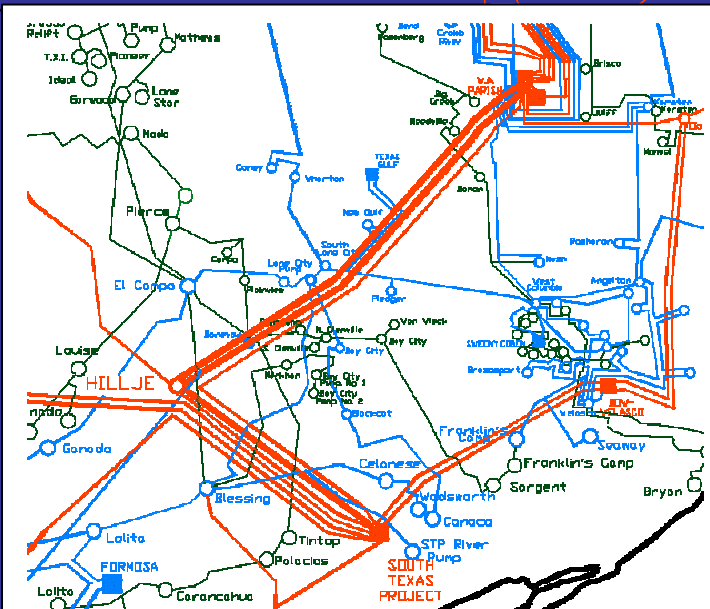
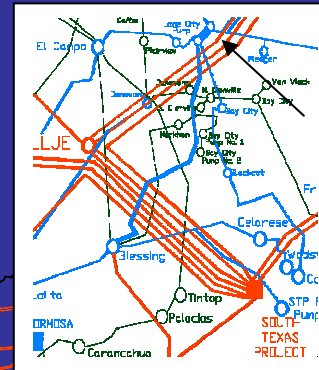
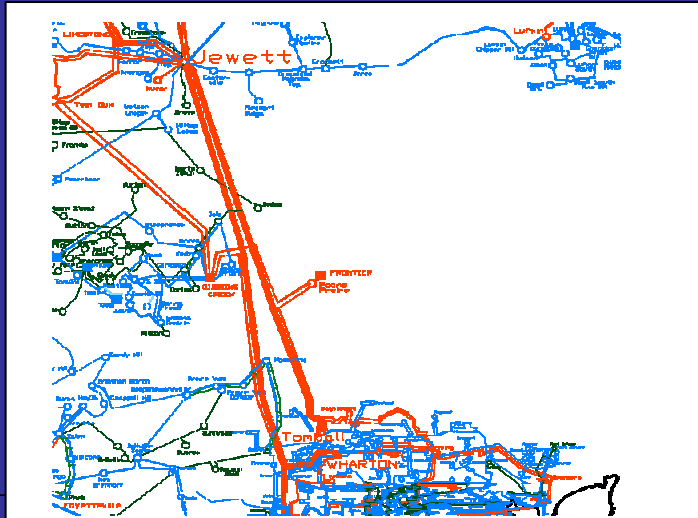


Major Projects Recommended in 2005

- There have been two major projects recommended by ERCOT in 2005



Houston Constraint Mitigation Project



ERCOT BOD
Approved 3/05

Centerpoint/TXU Project

Jewett-Tomball/TH Wharton 345-kV Upgrade (\$9.5M)

- STP-Hillje-Parish 345-kV line and station addition (\$98.5M)
- Blessing-Lane City Reactor -AEP (\$5 M)
- Other Transformer and Equipment upgrades (\$14M)

Cost - \$122.5 million

In Service date 6/08

Projected Production Cost Savings of \$63M Annually

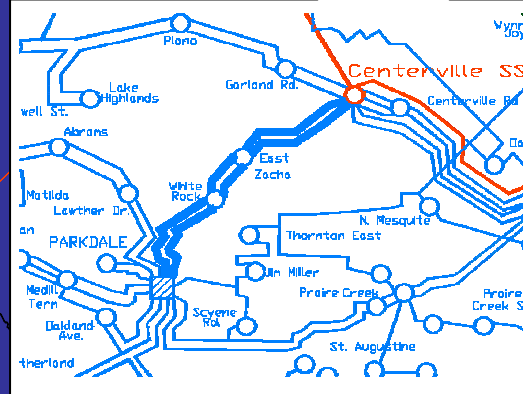
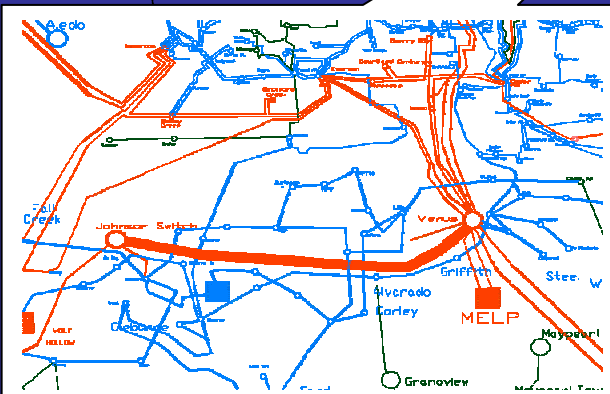
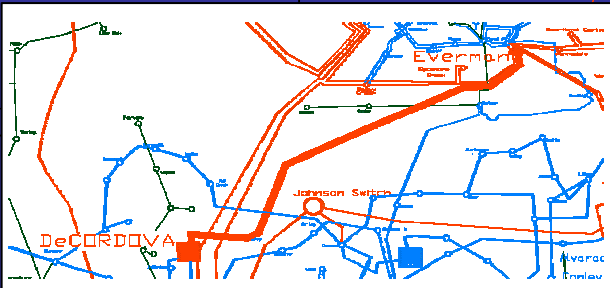
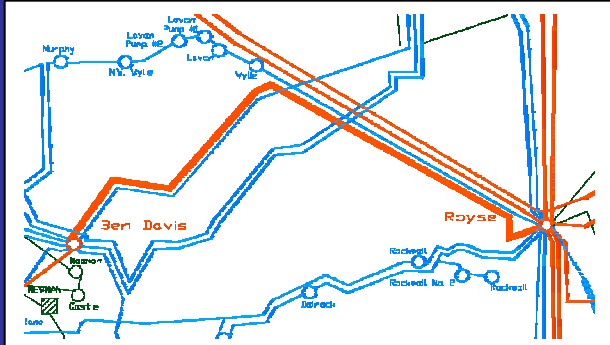


DFW 2006 Congestion Reduction Project

ERCOT Endorsement 6/05

TXU and TMPA projects

- Ben Davis – Royse 345-kV line upgrade
- Everman – DeCordova 345-kV line upgrade
- Johnson Switch – Venus 345-kV line upgrade
- Centerville Switch – Parkdale 138-kV line rebuild



Cost - \$43.7 million
Projected Production Cost
Savings of \$19.3 million
Annually

In Service date
6/06



Part II: Impact of Planned Projects on Marginal Costs in ERCOT