

REPORT ON EXISTING AND POTENTIAL ELECTRIC SYSTEM CONSTRAINTS AND NEEDS WITHIN THE ERCOT REGION

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DISCLAIMER

This report was prepared by the Electric Reliability Council of Texas (ERCOT) System Planning Transmission Services staff. It is intended to be a report of the status of the transmission system in the ERCOT Region and ERCOT's recommendations to address transmission constraints. Transmission system planning is a continuous process. Conclusions reached in this report can change with the addition (or elimination) of plans for new generation, transmission facilities, equipment, or loads.

Information on congestion management presented herein is based on the most recent settlement calculations at the time of the development of this report. True-up settlement statements had been issued through October 2003. Final settlements had been issued through June 2004. Future settlements and Board and Public Utility Commission of Texas directives may change the figures presented herein.

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EXECUTIVE SUMMARY

High-voltage transmission lines serve as an integral link between power generating plants and consumers of electrical energy. Working together, these transmission lines form a transportation highway for electrical power and are often referred to collectively as the transmission grid. The synergism achieved by all components that make up the transmission grid enables the delivery of power to the consumer with minimum disruptions. Major transmission-related components include conductors, support (tower) structures, rights of way, transformers, relays, breakers, switches, reactive devices and remedial action equipment. Some components are essential to the physical act of transmitting power (e.g. conductors); others ensure that the delivered power is of acceptable quality (e.g. reactive devices), while others are required to protect equipment or affect operations and maintenance (e.g. control systems, SCADA, relays, and breakers). This system must be planned, designed, constructed, and maintained to operate reliably within thermal, voltage, and stability limits while achieving its major purposes. The transmission system must be flexible enough, every second of every day, to accommodate the growing demand for reliable and affordable electricity.

The Electric Reliability Council of Texas (ERCOT), Transmission and Distribution Service Providers (TDSPs), generators, and loads are meeting the challenge to keep the ERCOT system reliable and adequate. Over 26,000 MW of new generation capacity including over 900 MW of wind power has been added to the grid. This represents an increase of over 46% of installed generation capacity since 1995. Reserve margins are projected to remain above the 12.5% minimum requirement through 2009, and transmission construction is proceeding well to meet customer load requirements. About 700 circuit miles of 345-kV lines and hundreds of circuit miles of 138-kV lines along with significant autotransformer additions have been installed since 1996. Additional new generation is being developed within the region. Measures have already been taken that will reduce the chances of wide-scale events like the Northeast blackout of 2003.

A summary of all the transmission projects currently in progress within ERCOT indicates that significant 138-kV construction will be completed over the next three years. Multiple 345-kV/138-kV autotransformers will be installed through 2007 in order to increase the transfer capability from the 345-kV system to the 138-kV load-serving system. 345-kV additions are also continuing to be made at about the same rate as in previous years.

The consumer's electric bill contains rate elements covering the three main components of electrical infrastructure costs – generation, transmission and distribution. Generation costs come from the capital costs of power plant equipment, operation and maintenance expenses and, most significantly, the cost of the fuel used by the plants to produce electricity. Transmission and distribution costs come from the capital costs for transmission and distribution equipment, plus operation and maintenance expenses.

Almost \$2 billion in transmission additions have been made over the past six years with a total transmission plant investment in ERCOT of almost \$6.8 billion. In other words, over 27% of the total transmission plant investment in ERCOT has been added to rate base over the past six years. While these investments require significant capital, transmission costs currently make up less than 10% percent of a retail consumer's electric bill.

Based on the current assessment of existing needs, and in support of ongoing generation and demand growth, ERCOT is tracking a series of projects over several years with an estimated cost of approximately \$2.8 billion. The average level of future transmission estimates in ERCOT is consistent with the past six years. Several large 138-kV, 345-kV, and other transmission projects are expected to be completed in 2006.

Through its planning authority role, all significant projects are independently studied by ERCOT in an open and non-discriminatory manner. ERCOT leads three regional planning groups (RPGs): North, South, and West. ERCOT staff facilitates the consideration and review of proposed projects to address transmission constraints and other system needs. ERCOT has recently adopted computer simulation tools and developed processes to project congestion costs based on wholesale market fundamentals. These new tools and processes are being applied to determining the cost effectiveness of major transmission additions in the RPG process. Where there is a need, ERCOT recommends and the TDSPs build transmission infrastructure that has been fully analyzed vis-à-vis the open RPG process. We emphasize fairness and

openness with stakeholders that may be impacted by these facilities – balancing their concerns with the need to keep the lights on for millions of people. Participation in these regional planning groups is required of all TDSPs and is open to all market participants/stakeholders, consumers, and Public Utility Commission of Texas (PUCT) staff.

Retail competition is strong in Texas. In the ERCOT Region where customer choice is in effect¹, consumers representing about 37% of the peak load have exercised their right to switch to different retail service providers. Over the past 10 years, wholesale competition has been encouraged in electricity markets to lower costs to consumers by spurring needed investments in generation and increasing the efficiency of operations. Today, the transmission system acts as an interstate highway system for wholesale electricity commerce and is the backbone for wholesale and retail competition.

Daily transmission constraints increase electricity costs to consumers and can reduce system reliability and increase the risk of equipment damage if not properly managed. Two types of constraints are defined in the ERCOT market: (a) Commercially significant constraints (CSCs) limit the flow of energy from one of the major zones in the ERCOT Region into another, and (b) local constraints (LCs) limit the flow of energy in areas within a zone in ERCOT.

Reducing transmission constraints when practical and economical is essential to ensuring reliable and affordable electricity now and in the future. Between June 1, 2003, and May 31, 2004, transmission congestion cost ERCOT consumers about \$390 million. Costs may have been even greater due to factors not included in this report, such as self-commitment of higher cost units by Qualified Scheduling Entities. While this figure is significant, it represents only 1.5% of the electric retail market in ERCOT. Figure 1 lists the total cost of congestion by cause and by the type of service procured pursuant to the ERCOT Protocols.

Summary of Congestion Costs		
June 1, 2003, through May 31, 2004		
Cause	Type	Cost
CSC Congestion	Balancing Energy Service	\$22,960,124
	Replacement Reserve Service	\$0
Local Congestion	Local Balancing Energy Service	\$17,140,878
	Out-of-Merit Energy	\$101,539,160
	Out-of-Merit Capacity	\$110,936,573
Reliability Must-Run	Reliability Must-Run	\$137,996,857
Total		\$390,573,592

Figure 1 – Summary of Congestion Costs

The cost of Reliability Must-Run (RMR) services and local congestion mitigation in the ERCOT region has been the focus of significant new analysis by ERCOT Transmission Services over the last year. Since the 2003 report, eight RMR exit strategies have been developed in response to the uneconomic cost of these generation resources. Annual savings to end-use consumers in excess of \$50 million are estimated once the recommended transmission improvements are completed.

In addition, a protocol revision approved this year requires ERCOT and the associated TDSP to identify and implement feasible alternatives to local congestion once certain dollar thresholds are met. ERCOT Transmission Services staff is

¹ Refer to ERCOT's Retail Transaction Report at http://www.ercot.com/Participants/PublicMarketInfo/RetailTransaction_reports/Number_Premises_Switched.ppt

actively identifying areas of chronic transmission congestion and, with the assistance of the regional planning groups, developing plans to alleviate these transmission bottlenecks.

Electricity use is continuing to grow. This reflects the transformation of the economy to a high-technology information base that relies on electricity. Electricity, though, is not a commodity that can be easily stored, and the transmission infrastructure is at the heart of economic well-being. An open, aggressive, and coordinated transmission planning process that incorporates transmission upgrades to relieve constraints, reliability must-run requirements, and the interconnection of new supply (including environmentally friendly units) will be of paramount importance to the future of Texas.

INTRODUCTION

There is a common element running through homes, offices, manufacturing plants, farms, hospitals, schools and public services. It is electricity. Electricity enables us to live our lives comfortably and conduct our business efficiently.

As our quality of life improves, the need for electricity grows. So does the need for a safe, reliable, and growing electric generation and transmission system to supply our growing need for electricity. Transmission provides the highway for power between those who create it (generators) and local distribution companies that distribute it for use in homes and businesses (load).

Under the Public Utility Regulatory Act (PURA), the Electric Reliability Council of Texas (ERCOT) is charged with network reliability, system-wide transmission planning, nondiscriminatory coordination of market transactions, and ensuring the reliability and adequacy of the regional electric network. In addition, ERCOT ensures access to the transmission and distribution systems for all buyers and sellers of electricity on nondiscriminatory terms. ERCOT along with the Transmission and Distribution Service Providers (TDSPs) has a duty and responsibility to operate, maintain, plan, and expand the transmission system to meet the needs of all users dependent upon it.

ERCOT's priorities are to:

- Serve the needs of customers and communities reliably and efficiently,
- Conduct work openly, fairly, and honestly, and
- Solicit a diversity of opinions and ideas to achieve better results.

Customers depend on ERCOT and the TDSPs to deliver power where and when it is needed. Communities count on ERCOT to have the infrastructure in place to meet the electric needs of their residents and businesses and to support economic growth initiatives. ERCOT system operators expertly monitor and manage the electric system around the clock, while ERCOT's transmission planners continually evaluate future electric needs and make recommendations for improving the reliability and adequacy of the system for customers and communities. Because of years of careful planning and operation of the grid, ERCOT enjoys one of the most reliable systems in North America.

Transmission planning in the current environment is a complex undertaking that requires significant work by, and coordination among, ERCOT and the TDSPs, as well as with other market participants. ERCOT works directly with the TDSPs, with stakeholders/market participants, and through the regional planning groups (RPGs). Each of these entities has responsibilities to ensure the appropriate planning and construction occurs.

The ERCOT power system consists of those generation, transmission, and distribution facilities that are controlled by individual entities, such as municipal utilities, electric cooperatives, TDSPs, and generation resources. Together these entities function as an integrated and coordinated power supply network. On July 31, 2001, the ERCOT Region began operations as a single control area under the direction of ERCOT.

The transmission system is the principal means for achieving a reliable electric supply. It ties together the major electric system facilities, generation resources, and customer demand centers. This system must be planned, designed, constructed and maintained to operate reliably within thermal, voltage, and stability limits while achieving its major purposes. Its purposes are to:

Deliver Electric Power to Areas of Customer Demand — The transmission system provides for the integration of electric generation resources and electric system facilities to ensure the reliable delivery of electric power to meet continuously changing customer demands under a wide variety of system operating conditions.

Allow Economic and Competitive Exchange of Electric Power Among Systems — The transmission system allows for the economic and competitive exchange of electric power among all systems and industry participants. Such transfers help to reduce the cost of electric supply to customers and provide a liquid market.

Provide Flexibility for Changing System Conditions — Transmission capacity must be available on the interconnected transmission systems to provide the flexibility needed to handle a shift in facility loadings caused by

the maintenance of generation and transmission equipment, the forced outages of such equipment, and a wide range of other system variable conditions, such as construction delays, higher than expected customer demands, and generating unit fuel shortages.

Electric power transfers have a significant effect on the reliability of the interconnected transmission systems and must be evaluated in the context of the other functions performed by these interconnected systems. In some areas, portions of the transmission system are operated at their reliability limits as the uses of the transmission system increase with new generation and demand. New transmission facilities are identified whenever reliability is compromised or when it is economic to expand the transmission system. Efforts by all industry participants to minimize costs will continue to require maximum utilization, within safety and reliability limits, of the existing transmission systems.

The competitive electricity environment is fostering an increasing demand for transmission services. With this focus on transmission and its ability to support competitive electric power transfers as opposed to traditional integrated utility operation, all users of the interconnected transmission system should understand the electrical limitations of the transmission system and the capability of the system to support a wider variety of energy transfers. The challenge is to plan, operate, and maintain the transmission system in order to provide the requested electric power transfers while sustaining overall system reliability.

Recent announcements of construction of new generation capacity and retirement of older, less efficient units demonstrate the ERCOT market is working effectively. However, competition also changes the landscape:

- New participants enter the market, exit the market, or consolidate their operations, thus changing the players and their contractual supply arrangements.
- Changes in the generation patterns, including the introduction of large, remote wind development, place new challenges on the existing transmission grid.
- Retirement of older plants near metropolitan areas due to economics or environmental restrictions requires a careful assessment of the reliability needs and the transmission alternatives to must-run contracts.

Electric systems must also be planned to withstand probable forced and maintenance outages at projected customer demand and anticipated electricity transfer levels. Extreme but less probable contingencies measure the robustness of the electric systems, and they are evaluated for risks and consequences. The ability of the interconnected transmission systems to withstand probable and extreme contingencies is evaluated by simulated testing of the systems.

Maintaining Reliability

ERCOT, TDSPs, generators, and loads are meeting the challenge to keep the ERCOT system reliable and adequate. Over 26,000 MW of new generation capacity including wind power has been added to the grid since 1995. This represents over 46% increase. Reserve margins are projected to remain above the 12.5% minimum requirement through 2009, and transmission construction is proceeding well to meet customer load requirements. About 700 circuit miles of 345-kV lines and hundreds of circuit miles of 138-kV lines along with significant autotransformer additions have been installed since 1996. Additional new generation is being developed within the region. Measures have already been taken that will reduce the chances of wide-scale events like the Northeast blackout of 2003. Figure 2 presents the projected demand (load) and capacity (generation) through 2009.

Load Forecast:		2004	2005	2006	2007	2008	2009
	Total Summer Peak Demand, MW	61,432	62,906	64,416	65,962	67,545	69,166
	less Load Acting As Resource (LAAR), MW	1478	1478	1478	1478	1478	1478
	less Balancing Up Load (BUL), MW	0	3	3	3	3	3
	Firm Load Forecast, MW	59,954	61,425	62,935	64,481	66,064	67,685
Resources:		2004	2005	2006	2007	2008	2009
	Installed Capacity, MW	77,336	77,336	77,336	77,336	77,336	77,336
	plus 100% DC Ties, MW	856	856	856	856	856	856
	plus 100% Switchable Capacity, MW	2,988	2,988	2,988	2,988	2,988	2,988
	plus 10% Existing Wind Generation, MW	120	120	120	120	120	120
	plus Planned Units with Signed Interconnection Agreement (IA), MW	0	351	943	943	943	943
	plus 10% Planned Wind Generation, MW	0	23	31	49	49	49
	less Mothballed Units, MW	6,244	0	0	0	0	0
	less Retiring Units, MW	0	278	278	278	669	734
	Resources, MW	75,056	81,395	81,996	82,014	81,623	81,558
	Reserve Margin (Resources – Firm Load Forecast)/Firm Load Forecast)	25.2%	32.5%	30.3%	27.2%	23.6%	20.5%

Figure 2 – Capacity, Demand, and Reserves

PURPOSE

This report is prepared annually in compliance with PURA section 39.155(b) Public Utility Commission of Texas (PUCT) Substantive Rules Section 25.200(c) (4). ERCOT System Planning Transmission Services prepares it with the cooperation and assistance of ERCOT staff, transmission service providers, distribution operation companies, load-serving entities, and generation entities. It contains information that describes currently known ERCOT system constraints, major transmission projects under study to relieve those constraints, and existing transmission projects recommended by ERCOT that address some of those constraints. The new transmission projects discussed in the report are intended to ensure conformance to ERCOT Planning Criteria and North American Electric Reliability Council (NERC) System Reliability Standards. Projects will be recommended if they provide adequate service to load, interconnect new generation, and provide capacity for energy transactions, and are economically feasible.

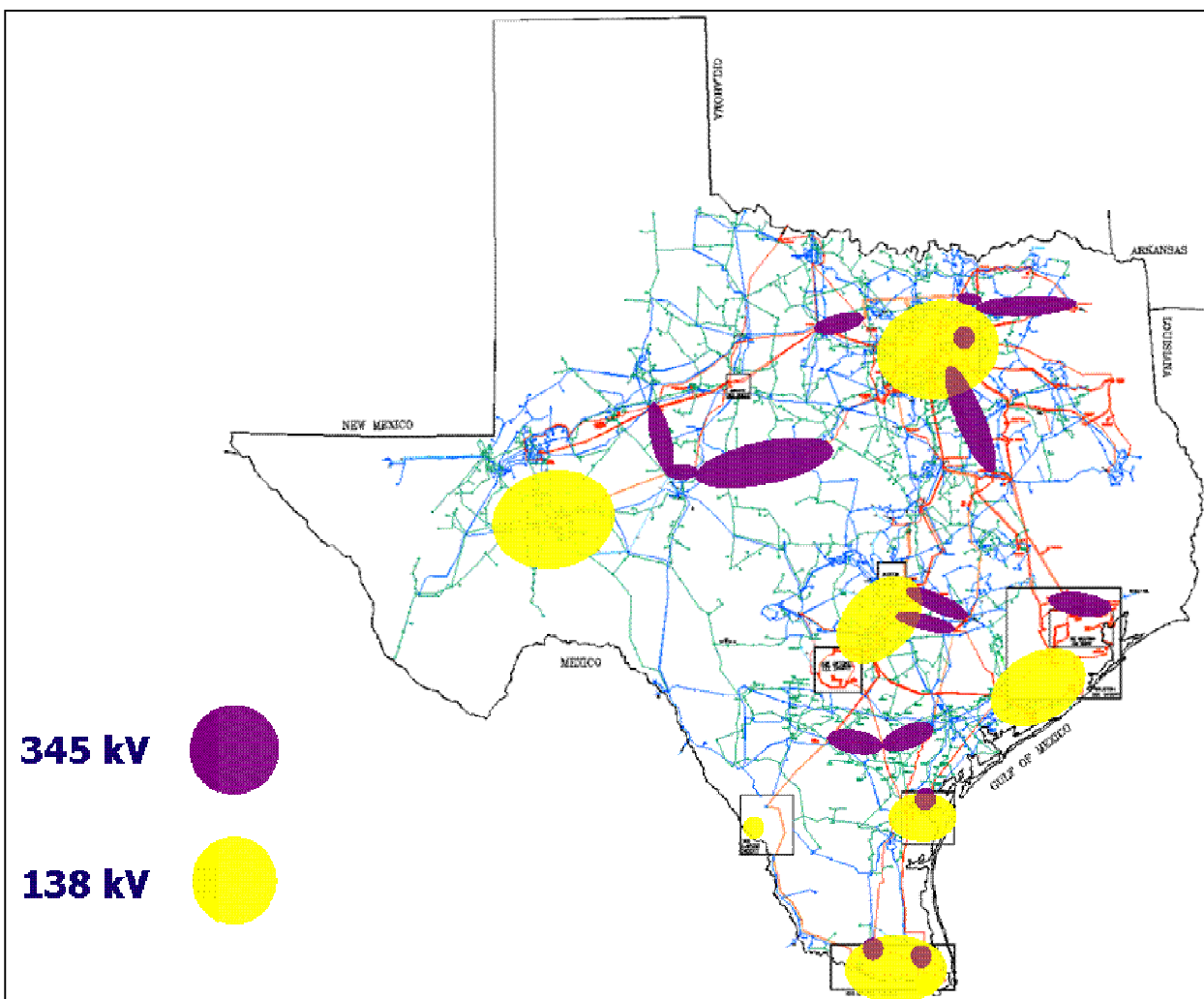
This report documents the process of major changes and additions to the ERCOT transmission grid, helping to ensure continuity in the development of the transmission grid and consistency in the evaluation of grid adequacy. It also helps document the need for new facilities and helps identify the benefits of each project planned, as well as the consequences of project delays.

In addition, this report communicates to generation entities, load-serving entities, other market groups, the public, and the PUCT the nature of transmission constraints and the projects being considered by ERCOT to relieve those constraints. It serves as a starting point for developing proposed projects for approval via the transmission planning process, and it may be useful in the preparation of regulatory and other reports that require transmission grid planning information.

SECTION 1 – TRANSMISSION AND CONGESTION

MAJOR TRANSMISSION ADDITIONS COMPLETED OR UNDERWAY

Significant additions to the transmission system have been completed over the past six years (Figure 3). Additional needed facilities are in progress (Figure 4) within the ERCOT region. This is a far greater expansion of the transmission infrastructure than any other region of North America. There are multiple transmission system upgrade projects too numerous to exhaustively list in this report. However, selected major projects include the following:



Projects Completed:

Limestone-Watermill double-circuit 345-kV line

Graham-Jacksboro 345-kV line

San Miguel-Pawnee 345-kV line

Monticello-Valley Junction-Anna Sw 345-kV line

Morgan Creek-Twin Buttes-Red Creek-Comanche Sw 345-kV line

Pawnee-Coleta Creek 345-kV line

Holman-Lytton 345-kV second circuit

Fayette-Austrop 345-kV second circuit

Establish White Point 345-kV station

Cedar Bayou-King-North Belt-TH Wharton 345-kV line upgrades

Centerville Sw-McCree Sw 345-kV lines

Miles

90

33

35

100

216

54

63

55

49

2

Lon Hill-Rio Hondo And Lon Hill-Edinburg 345-kV lines series capacitor compensation

Laredo 138-kV STATCOM dynamic reactive resource

Military Highway 138-kV STATCOM dynamic reactive resource

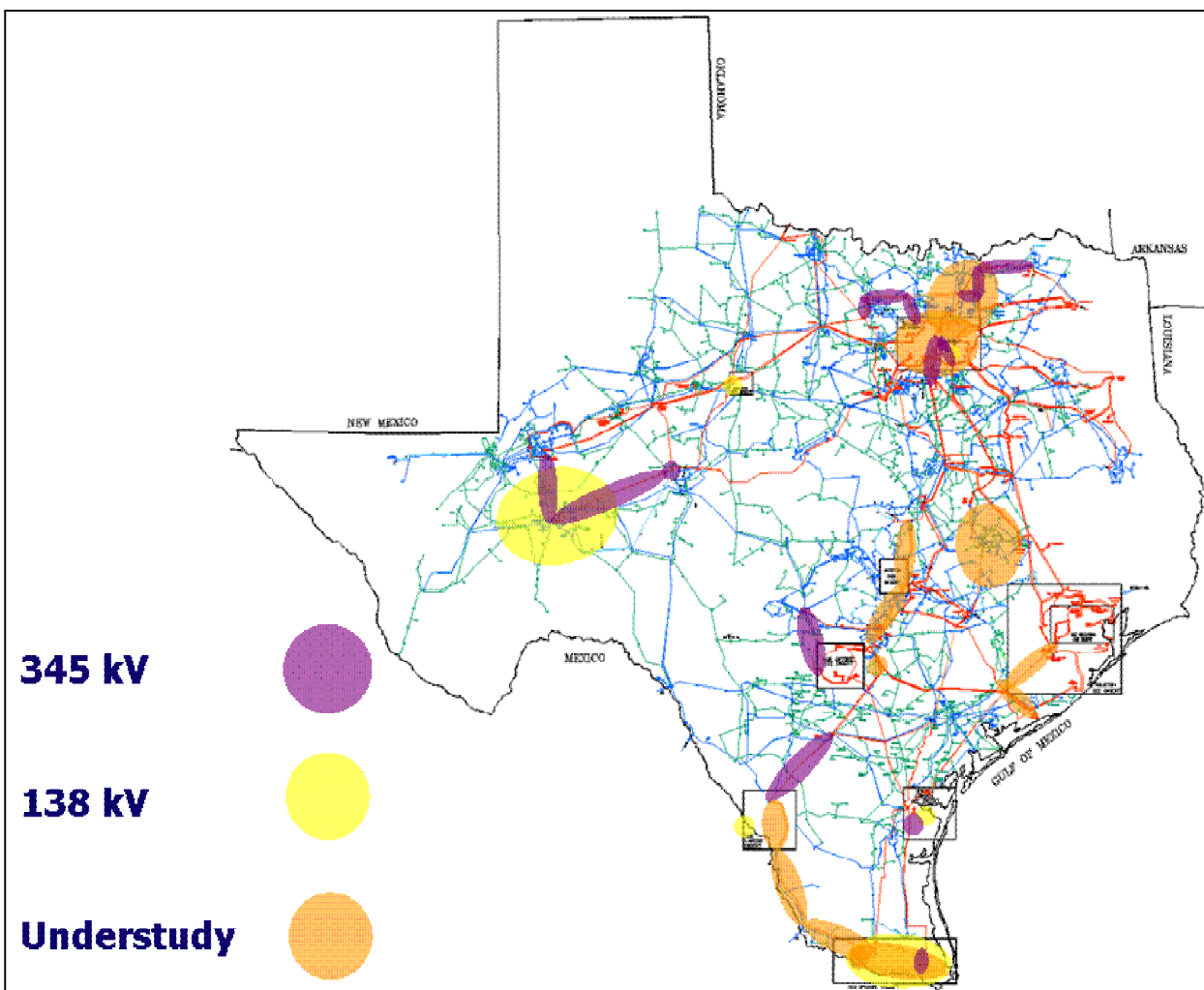
Several hundred miles of new and upgraded 138-kV transmission lines

Numerous substation additions and upgrades

Additional 345/138-kV and 138/69-kV autotransformers installed

Dynamic and static voltage control devices

Figure 3 – Completed Transmission Projects

**Projects in progress or under review:**

Venus-Liggett 345-kV line and circuit
 Jacksboro-West Denton 345-kV line
 West Levee-Norwood 345-kV line
 Cagnon-Kendall 345-kV line
 Paris-Anna 345-kV circuit
 San Miguel to Highway 59 345-kV line
 Clear Springs-Salado 345-kV line
 Hillje-WA Parish 345-kV line
 STP – Hillje 345-kV line
 North McCamey-Twin Buttes 345-kV line
 North McCamey-Odessa 345-kV line

Miles

31 Twin Buttes 345/138-kV autotransformer
 66 Mulberry Creek and Red Creek 345-kV shunt and series reactors
 7 Nelson Sharpe 345/138-kV station and phase shifter
 63 Rio Hondo 345/138-kV autotransformer
 70 Kendall 345/138-kV autotransformer
 110 Salem 345/138-kV autotransformer
 100 Laredo 150-MW CFE tie
 50 Clear Springs 345/138-kV autotransformer
 20 Hillje 345-kV station
 120 Elm Creek 345-kV station
 50 Additional autotransformers

Figure 4 – Transmission Projects in Progress or under Review

Figures 5a and 5b provide a summary of all the transmission projects currently in progress within ERCOT. The figures indicate that significant 138-kV construction will be completed over the next three years. This is directly due to the needed infrastructure improvements (reliability requirements) and the number of RMR exit strategies being implemented. Multiple 345-kV/138-kV autotransformers will be installed through 2007 in order to increase the transfer capability from the 345-kV system to the 138-kV load-serving system. 345-kV additions are also continuing to be made at about the same rate as in previous years. This includes several 345-kV projects in/around Dallas/Ft. Worth (DFW), Central Texas, South Texas, and southwest of Houston. A significant number of voltage support/control devices (capacitors) along with system protection equipment (circuit breakers) are also being added to the grid.

However, total transmission plant investment in the next years might be expected to exceed this level because ERCOT only tracks transmission system upgrade projects and does not track all types of transmission investment, such as replacement of failed or obsolete facilities, transmission line relocations, relay system upgrades or additions, control center investment. Furthermore, many transmission upgrade projects have not yet been identified and therefore are not yet being tracked by ERCOT. Transmission investment is usually not booked to transmission plant until projects are completed, and much of the additional transmission plant investment would likely be offset by revenue growth and depreciation. For all these reasons, it is difficult to ascertain the transmission rate impact of these additions.

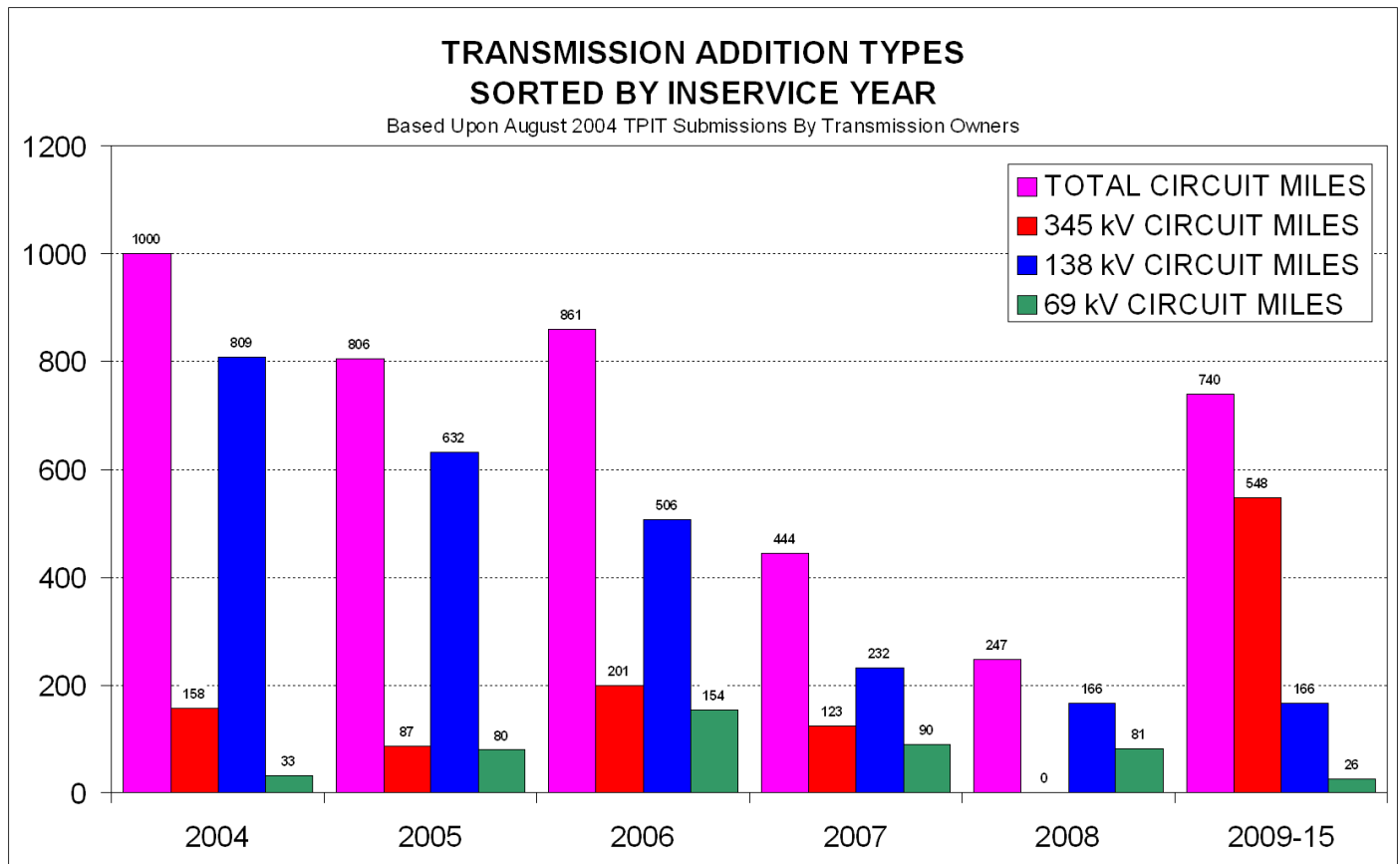


Figure 5a – Types of Transmission Additions

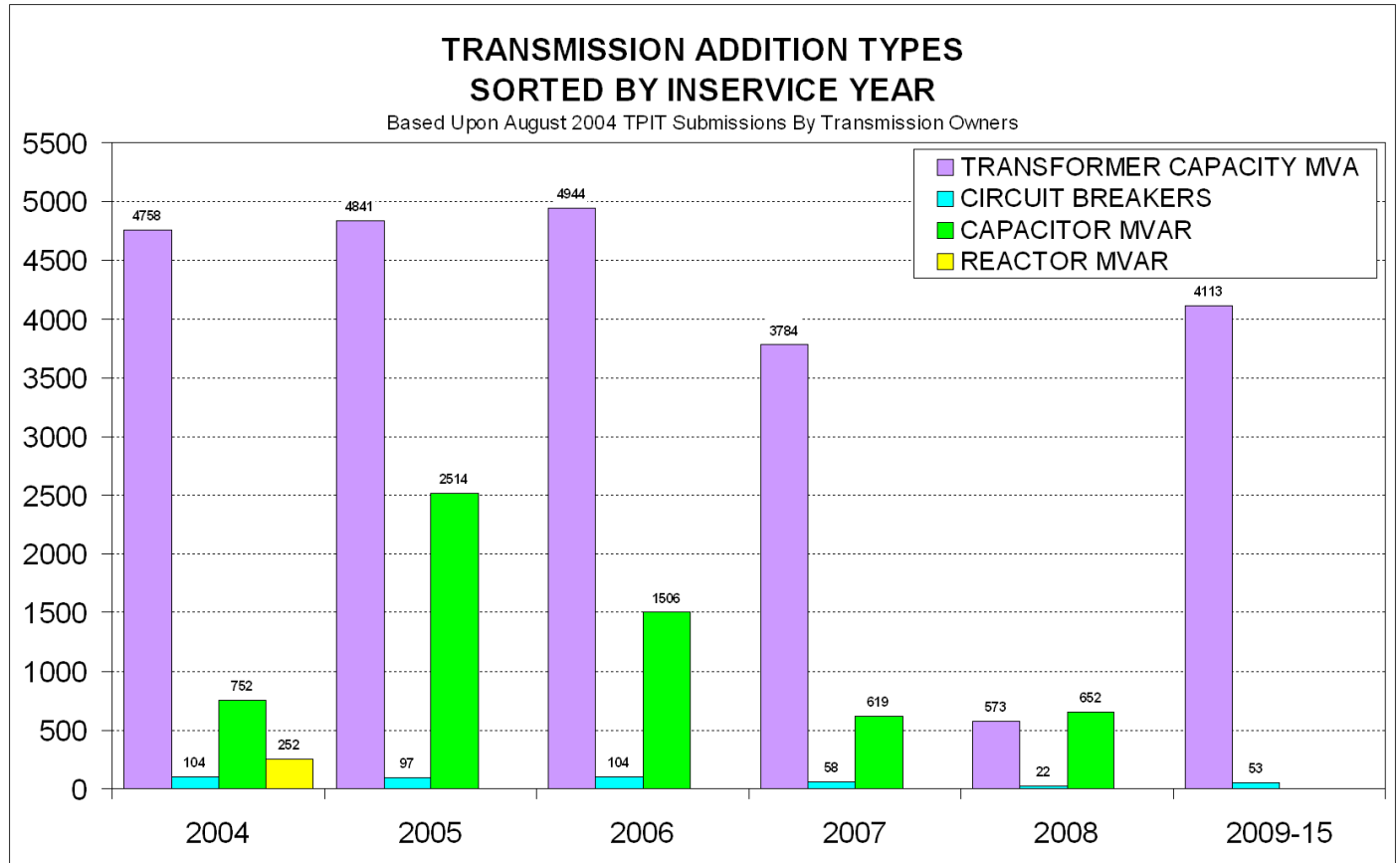


Figure 5b – Types of Transmission Additions

SUMMARY OF TRANSMISSION INVESTMENTS

The consumer's electric bill contains rate elements covering the three main components of electrical infrastructure costs – generation, transmission, and distribution. Generation costs come from the capital costs of power plant equipment, operation and maintenance expenses and, most significantly, the cost of the fuel used by the plants to produce electricity. Transmission and distribution costs come from the capital costs for transmission and distribution equipment, plus operation and maintenance expenses. Transmission costs currently make up less than 10% percent of a retail consumer's electric bill. Figure 6 provides the 2004 annual Transmission Cost of Service (TCOS) for each transmission owner within ERCOT as provided by the PUCT.

TRANSMISSION OWNER	2004 TCOS	TRANSMISSION OWNER	2004 TCOS
AEP Texas Central (Formerly CPL)	\$103,022,000	GEUS (Formerly Greenville)	\$1,432,604
AEP Texas North (Formerly WTU)	\$33,770,000	Grayson-Collin Electric Coop	\$526,745
Austin Energy	\$31,402,928	Houston County Electric Coop	\$173,378
Big Country Electric Coop	\$140,467	Lamar County Electric Coop	\$79,417
Brazos Electric Coop	\$46,135,808	LCRA TSC **	\$155,312,736
Brownsville Public Utilities Board	\$962,807	Magic Valley Electric Coop	\$3,323,987
Bryan Texas Utilities	\$5,029,365	Medina Electric Coop	\$1,428,893
Centerpoint (Formerly Reliant)	\$221,303,967	Rayburn Country	\$1,111,482
Cherokee County Electric Coop	\$75,080	Rio Grande Electric Coop	\$129,826
Coleman County Electric Coop	\$56,015	San Antonio City Public Service	\$57,868,700
College Station, City of	\$495,211	San Miguel Electric Coop	\$2,209,756
Concho Valley Electric Coop	\$115,520	Sharyland Utilities	\$1,119,945
Deep East Texas Electric Coop	\$56,064	South Texas Electric Coop	\$18,606,800
Denton Municipal Electric	\$995,000	Southwest Texas Electric Coop	\$21,471
East Texas Electric Coop	\$73,207	Taylor Electric Coop	\$83,635
Fannin Electric Coop	\$78,542	Texas Municipal Power Agency	\$28,600,840
Farmers Electric Coop	\$521,237	Texas-New Mexico Power	\$17,100,000
Floresville Electric Power System	\$260,322	Trinity Valley Electric Coop	\$536,263
Garland Power and Light	\$7,784,831	TXU Electric Delivery	\$317,166,980
TOTAL ERCOT	\$1,059,111,829	** Includes wholesale customer facilities	

Figure 6 – Transmission Cost of Service

Examining the five investor-owned utilities and Lower Colorado River Authority Transmission Services Corporation (LCRA TSC), Figure 7 indicates that almost \$2 billion in transmission additions have been made over the past six years with a total transmission plant investment of almost \$6.8 billion (Source: FERC Form 1 and PUCT). In other words, over 27% of the total transmission plant investment in ERCOT has been added to rate base over the past six years.

TRANSMISSION PLANT ADDITIONS
Investor-Owned Utilities and LCRA TSC Only

Year	Additions
1998	\$94,956,000
1999	\$181,586,000
2000	\$172,126,000
2001	\$457,165,000
2002	\$457,407,000
2003	\$558,239,312
Total Additions	\$1,921,479,312

Figure 7 - Transmission Plant Additions

Based on the current assessment of existing needs and in support of ongoing generation and demand growth and other issues discussed in this report, ERCOT is tracking a series of projects over several years with an estimated cost of approximately \$2.8 billion (Figure 8). The average level of future transmission estimates in ERCOT is consistent with the past six years illustrated in Figure 7. Several large 138-kV, 345-kV, and other transmission projects are expected to be completed in 2006 as shown in Figure 8. While all of these estimates are tentative, the costs shown for the years 2008 and beyond are more likely to change due to the various steps of project planning, review, and approval to be completed and due to the continuous changes in generation and demand forecasts.

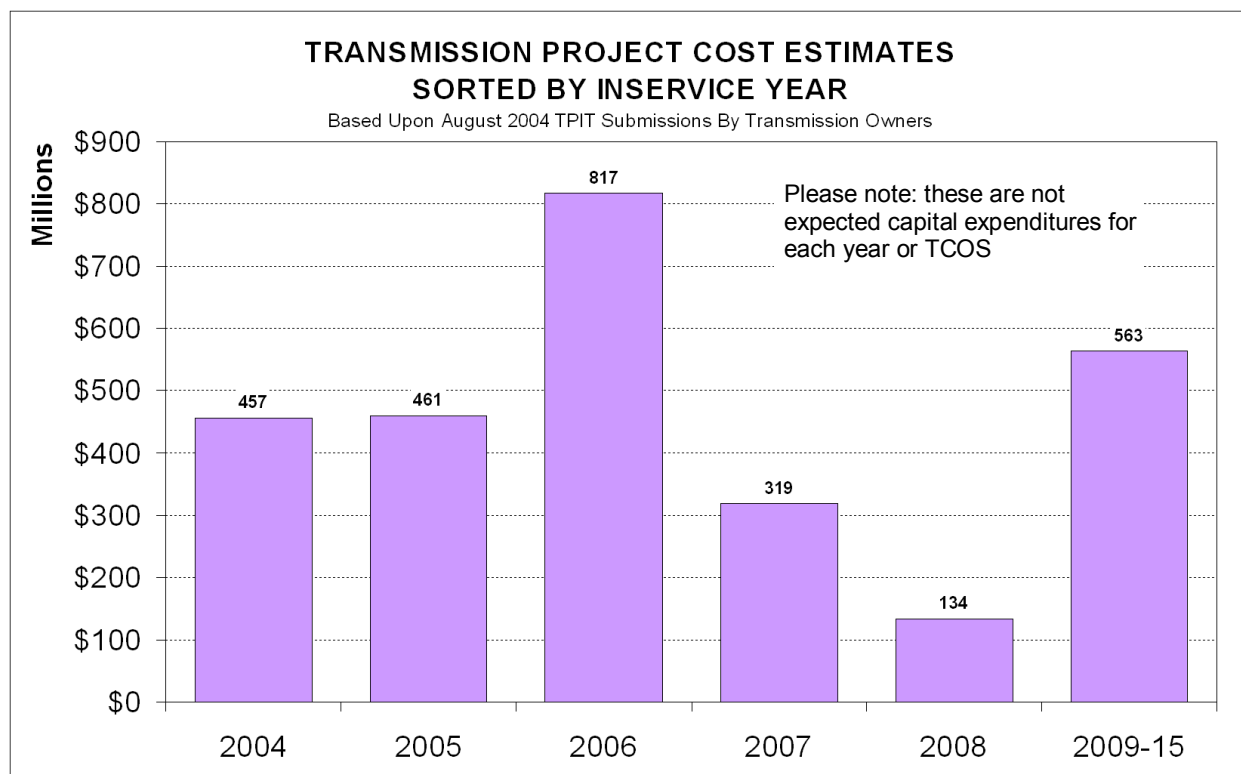


Figure 8 – Transmission Project Cost Estimates

TRANSMISSION PLANNING AND ERCOT PLANNING REGIONS

Through its planning authority role, all significant projects are independently studied by ERCOT in an open and non-discriminatory manner. ERCOT leads three regional planning groups (RPGs): North, South, and West. ERCOT staff facilitates the consideration and review of proposed projects to address transmission constraints and other system needs. Where there is a need, ERCOT along with the TDSPs builds transmission infrastructure that has been fully analyzed vis-à-vis the open RPG process. We emphasize fairness and openness with stakeholders that may be impacted by these facilities – balancing their concerns with the need to keep the lights on for millions of people. Participation in these regional planning groups is required of all TDSPs and is open to all market participants/stakeholders, consumers, and PUCT staff. For a detailed discussion of the responsibilities of the planning regions, refer to the Power System Planning Charter and Processes. This document and significant other planning information is posted on the Internet in the Operations and System Planning Data area at the following address: <http://www.ercot.com/tmaps/Login.cfm>

Throughout the RPG effort, we are committed to be inclusive – to share proposals openly and invite a broad spectrum of interested individuals in their review. This report illustrates ERCOT's commitment. In it, we share proposals for strengthening the transmission system to meet anticipated energy delivery needs. ERCOT recognizes these proposals potentially affect many communities, and appropriately, ERCOT and TDSPs welcome input so that the ultimate solutions are mutually beneficial and cost effective.

The development of this report reflects the feedback received in past years. As a result, we have organized findings and project proposals so readers can easily find information related to specific areas – as well as information about ERCOT and how the planning process works.

The public planning process evaluates and analyzes system performance, identifies needs and problems, develops possible solutions, informs stakeholders of findings, seeks input, discusses options, tailors projects to mitigate identified impacts, and supports regulatory certification and TDSP construction of needed projects.

Accordingly, this report presents transmission system issues as ERCOT continues to improve the transmission system infrastructure. We want to work with people to plan and implement transmission improvements in a reasonable way so ERCOT and the TDSPs can continue to provide the reliable energy delivery service that benefits everyone.

The transmission planning process has a series of detailed technical analyses as its core. ERCOT along with the TDSPs assesses the needs of its existing and potential system users on an individual and collective basis, according to accepted industry system performance criteria and practices, in order to determine the best transmission projects responsive to those needs. We look at individual issues or customer requests on a case-by-case basis, seek input from all market participants/stakeholders, discuss options, develop possible solutions, and then incorporate those into overall system analyses

ERCOT's transmission assessment process complies with regional and national standards and guidelines for reliable operation of the transmission system, development of transmission system models for future years and seasons, and exchange of information related to these issues.

Participation and coordination extends importantly to the public as well. In addition to working closely with TDSPs and others in the industry, ERCOT shares and receives information at various public and stakeholder meetings throughout the year, and regularly communicates with governmental agencies and community organizations. ERCOT believes the more information that is available for mutual planning efforts, the better the ultimate plans. Information from interactions with customers and stakeholders is given full consideration. This report reflects input received from these audiences.

Transmission Benefits to Society

As part of the electric infrastructure, transmission supports two key benefits to society – reliability and economy of electric supply. These two benefits are tightly intertwined. Fundamentally, transmission connects power producers to power consumers. Without transmission, every consumer would have to generate their own electricity on site and exactly match their production to their usage at all times. This is not economically or logistically feasible or socially desirable,

and in fact is the reason transmission system evolved in the first place. Transmission allows for the development of efficient generating plants and for the movement of power to many consumers.

Transmission is a network of wires with many power plants and distribution substations interconnected at various locations. This network provides multiple paths to get power from producers to consumers. Having multiple paths to move power lessens the chance that consumers will be negatively affected by outages of various network elements. Transmission provides the ability for an area to access more distant sources of electricity when local sources are unavailable or are more expensive to run. Transmission provides the means to balance constantly varying electricity production and usage over broad areas, allowing uninterrupted electricity supply on demand for consumers. Because of transmission's network configuration and ability to provide access to more distant sources of power, not as many local sources are required to provide the same level of electrical service reliability to consumers.

Transmission also provides the ability to transport emerging "green" sources of power, like wind energy from large wind farms developing in remote areas, to the consumers. Transmission infrastructure in a community also provides the opportunity for area economic development and growth; without local transmission it is difficult to provide the necessary electrical services to support growth in a timely or economic fashion.

ERCOT Endorsement

Initial inclusion and analysis of proposed transmission projects in this report do not constitute endorsement to begin construction, nor do they indicate a final decision on proposed need or project requirements. The ERCOT Board of Directors will endorse proposed major projects in accordance with the following process:

- ✓ ERCOT staff recommends needed major transmission facility additions based on identified constraints and evaluates proposals from transmission service providers and the requirements for integrating new generating facilities into the ERCOT system.
- ✓ ERCOT conducts an open process of review and comment on proposed major facility additions through committees and subcommittees.
- ✓ ERCOT staff submits final recommended transmission facility additions to the ERCOT Board of Directors for review and concurrence.
- ✓ ERCOT staff determines the designated providers of the additions.
- ✓ ERCOT notifies the PUCT of all Board-endorsed transmission facility additions and their designated providers.

Projects proposed by individual transmission service providers or other stakeholders may also be submitted directly to ERCOT for review.

Figure 9 illustrates the geographic area covered by each regional planning group. Figure 10 illustrates the local areas used in congestion analysis. A detailed discussion of the local areas begins on page 39.

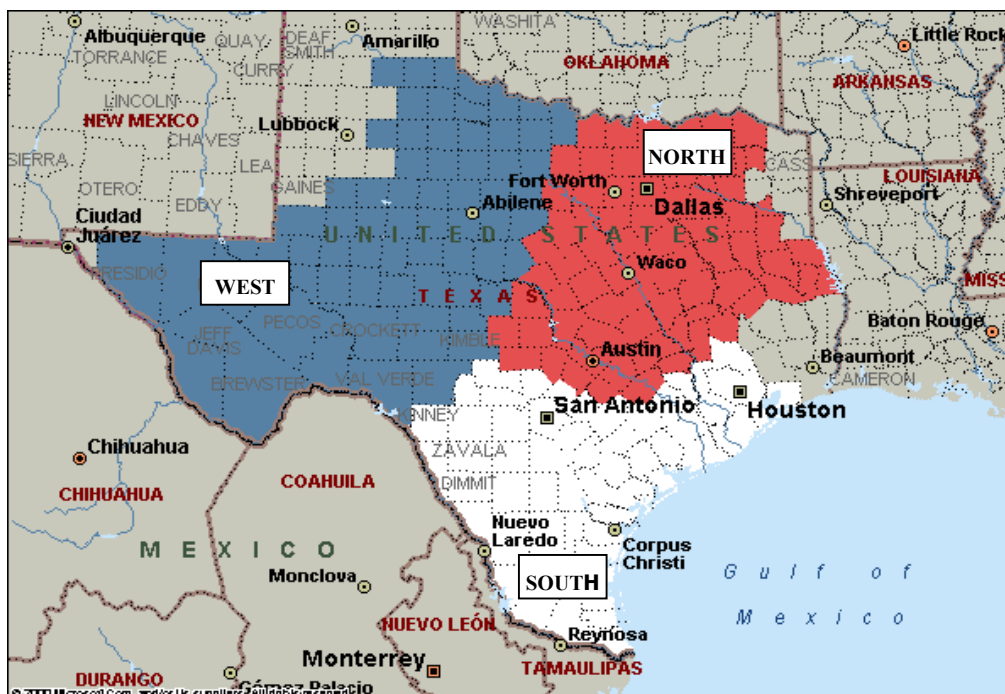


Figure 9 – ERCOT Planning Regions

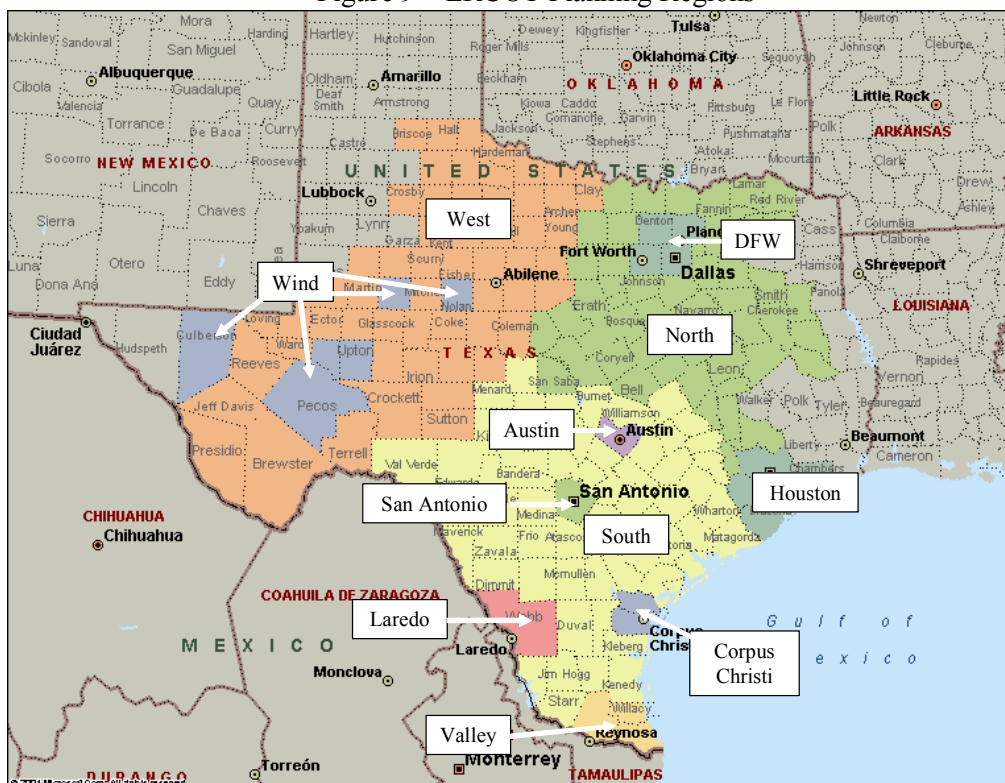


Figure 10 –Local Areas used in Congestion Analysis

South Region Discussion

The ERCOT South Region consists of 55 counties and has 35,539 MW of generation. It had 25,448 MW of coincident peak load in 2003. These numbers represent approximately 43% of the total ERCOT generation capacity and 45% of total ERCOT coincident peak load. Geographically, the region encompasses the San Antonio and Houston metropolitan areas as well as the Rio Grande Valley and smaller centers of load in Laredo, Del Rio, Corpus Christi, and Victoria.

Non-coincident load growth between 1999 and 2003 for the South Region was approximately 2.5% per year compared to the average growth rate of 2.1% for all of ERCOT. The largest increases in load occurred in counties near the San Antonio and Houston metropolitan areas. Based upon percentage, counties located in the Rio Grande Valley and Corpus Christi also ranked near the top in growth. About 1,600 MW of new generation were put into service in the South Region in 2003.

Local Constraints and Congestion

Several services are used in ERCOT for the resolution of local congestion. These are Local Balancing Energy (LBE), Out-of-Merit Energy (OOME), Out-Of-Merit Capacity (OOMC), and Reliability Must-Run (RMR). A detailed discussion of these services can be found starting on page 41. All LBE has been paid as OOME since August 2003 due to a protocol change that determined the LBE was not working as designed and would be discontinued in the ERCOT market.

As shown in Figure 11, a significant portion of local congestion cost continues to be found in the South Region. Between June 1, 2003, and May 31, 2004, approximately 40% of all LBE, OOME, OOMC, and RMR payments were for local congestion mitigation in this region. RMR costs were a disproportionately large percentage, 76%, of the ERCOT total RMR costs. ERCOT continues to have RMR contracts with 10 units in the South Region. South Region RMR units are found in the Lower Rio Grande Valley (Bates units 1 and 2 and La Palma units 4, 5, 6, and 7), Corpus Christi (Barney Davis Unit 2) and Laredo (Laredo units 1, 2, and 3).

Congestion Costs for the South Region					
June 1, 2003, through May 31, 2004					
Local Area	OOMC	OOME	LBE	RMR	Total
Corpus Christi	\$1,511,385	\$1,707,011	\$264,228	\$31,267,763	\$34,750,386
Houston	\$4,819,413	\$6,975,851	\$0	\$0	\$11,795,264
Laredo	\$0	\$0	\$0	\$24,489,968	\$24,489,968
San Antonio	\$1,731,077	\$2,822,640	\$130,302	\$0	\$4,684,019
South	\$152,880	\$9,992,880	\$387,224	\$0	\$10,532,984
Valley	\$3,922,642	\$5,769,699	\$27,516	\$49,304,858	\$59,024,715
South Total	\$12,137,397	\$27,268,081	\$809,270	\$105,062,589	\$145,277,336
ERCOT Total	\$110,936,573	\$101,539,160	\$17,140,878	\$137,848,654	\$367,465,263
Percent of Total in South	11%	27%	5%	76%	40%

Figure 11 – Congestion Costs for the South Region

The Transmission and Project Information Tracking (TPIT) spreadsheet tracks in detail all planned transmission construction projects. Figure 12 is an excerpt from TPIT that highlights future transmission projects that will relieve loading on congested elements found in the South Region. In some cases, Figure 12 condenses several TPIT projects into a single line item. Figure 12 is not an inclusive list of all future transmission projects nor does it attempt to relate individual projects to specific congested items.

Projects for the South Region				
Congestion Area	Congestion Mitigating Project	Voltage, kV	Expected in-service date	RPG Review
Corpus Christi	Rebuild the line section from City of Robstown to Robstown tap*	69	2005	
	Cut-in the Nueces Bay to Morris Street line into Highway 9 substation*	138	2005	Yes
	Install series reactors on both Nueces Bay to Whitepoint circuits*	138	2005	Yes
	Reconfigure Airline to Holly and Barney Davis to Westside lines*	138	2005	Yes
	Cut-in Citgo North Oak Park line into Weil Tract substation*	138	2005	Yes
	Construct Nelson Sharpe substation with phase-shifting transformer in Alazan line*	345	2006	Yes
	Rebuild Naval - Airline - Laguna transmission line*	69	2006	
Houston	Construction of Oasis switching station (SS) and upgrade circuit to WA Parish	345	2004	Yes
	Raise conductors, upgrade substation equipment WA Parish - OBrien	345	2004	
	Reconductor PH Robinson to ISP to Greenbelt	138	2004	Yes
	Add third autotransformer at OBrien	345	2004	
	Add 800MVA autotransformer at TH Wharton	345	2004	
	Add 800MVA autotransformer at Cedar Bayou	345	2005	
	Houston import projects	345	2007	
Laredo	North Laredo Switch phase-shifting transformer*	138	2006	Yes
	Rebuild Asherton to Eagle Pass line*	138	2006	Yes
	Rebuild Laredo plant to Highway 59 corridor*	138	2009	Yes
	Laredo Highway 59, add switching station (SS) with autotransformer*	345	2010	Yes
	Rebuild Laredo inner loop*	138	2005	Yes
	Laredo BtB tie with CFE*	138	2006	Yes
	San Miguel - Laredo line construction*	345	2010	Yes
San Antonio	Cagnon - Kendall line	345	2007	Yes
	Upgrade existing autotransformers at Skyline	345	2009	
	Elm Creek substation	345	2007	Yes
	Harmony Hills to Castle Hills to Med. Center 138kV reconductor	138	2005	
South	Rebuild Leon to Pleasanton line	138	2005	Yes
	Reconductor Victoria to McGruder and add autotransformer at McGruder	138	2006	Yes
	Rebuilds in Amistad/Del Rio areas	138	2006	Yes
	Build Castroville to Uvalde line	138	2008	Yes
	Lytle, add 138kV line and autotransformer	138	2007	Yes
	Rebuild El Campo to Sierra Verde line	138	2007	Yes
	Rebuild Uvalde to Hamilton Road corridor	138	2009	Yes
Valley	Convert Bates - South Mission - South McAllen, reconnected to Frontera*	138	2004	Yes
	Rebuild MVEC Pharr to Hall Acres line*	138	2004	Yes
	Rebuild North Edinburg to North McAllen double-circuit line*	138	2004	Yes
	Rebuild line from N. Edinburg to W. Edinburg*	138	2005	Yes
	Construct Key switching station in N. McAllen to Frontera line*	138	2005	Yes
	Construct Alton to Key SS*	138	2005	Yes
	Convert Moore Field and Palmhurst move to N Edinburg to Bates line*	138	2005	Yes
	Convert Roma to Rio Grande City to Bates line*	138	2006	Yes
	Rebuild La Palma to Rio Hondo line, add Rio Hondo autotransformer*	138	2006	Yes
	Upgrade Raymondville autotransformer*	138	2006	Yes
	Convert Los Fresnos and cut-in La Palma - Loma Alta line*	138	2006	Yes
	Convert Pharr to Weslaco SS to Harlingen SS, convert N Pharr to SS*	138	2007	Yes
	* Indicates that the project is directly related to an RMR exit strategy			

Figure 12 – Transmission Projects for the South Region

The following summaries highlight some of transmission related concerns found within the South Region.

Corpus Christi

ERCOT currently contracts with the Barney Davis unit 2 for RMR services in order to protect against thermal overloads caused by power flow from the north to the south within Corpus Christi. In December of 2003, the ERCOT Board endorsed a plan that provides for several 138-kV and 345-kV transmission system projects to be completed by AEP. AEP's most recent report indicates the 138-kV additions will be completed by year-end 2005 and a new 345/138-kV substation serving the Corpus Christi area to be completed by summer peak of 2007. The intermediate 138-kV projects eliminate the need for an RMR contract with the Barney Davis unit. The new 345/138-kV station will be located approximately 10 miles south of the existing 345-kV Lon Hill substation on the Rio Hondo line and will alleviate long-term 138-kV constraints.

Houston

Houston is one of ERCOT's two largest load centers. It has also been a prime area for independent power producers (IPP) and cogeneration development in recent years. The Deer Park Energy Center (DPEC) generating plant was interconnected in 2002, and the generating units were brought online in stages through 2004. The South Houston Green Power (SHGP) generating plant was interconnected in 2003 and is now in commercial operation. No interconnections of new generating units are expected in 2005.

The large influx of new generation in the Houston area from 1999 to 2004, combined with load growth, Texas Genco mothballing, and other changes within ERCOT, significantly changed transmission system conditions in Houston. However, the timely interconnection of new generating plants and upgrades relating to these plants have resulted in minimal internal congestion costs and no RMR units in the Houston zone. Because both the DPEC and SHGP interconnection substations connect through transmission lines to the existing P. H. Robinson substation (PHR), various transmission upgrades were built in the general vicinity of PHR in 2003 and 2004, including a new autotransformer at PHR and a new 345-kV Oasis substation. Also, 345/138-kV autotransformer loading in the area has been high. In addition to the new PHR 345/138-kV autotransformer, 345/138-kV autotransformers were added or upgraded at Obrien and T. H. Wharton substations in 2004 along with various other transmission system improvements. Even so, autotransformers and circuits at several locations have been highly loaded on several occasions and have occasionally caused OOM generation dispatch. Planning studies indicate the need for additional transmission upgrades over the next several years. A new 345/138-kV autotransformer is planned at Cedar Bayou substation in 2005, along with numerous upgrades in various areas of Houston, particularly the northwest. Generally, high 345/138-kV autotransformer loading is due to a combination of (1) load growth on the 138-kV system, (2) increased imports and 345-kV generator connections, and (3) decreased use of older generation typically connected at 69 kV and 138 kV. These same changes have also caused voltage stability concerns in the Houston area.

Even with the influx of new generation over the past five years, Houston has become a major import area within ERCOT. While Houston load was historically served by generating units located in and around the city, Houston's load is now increasingly served by generation located in other parts of ERCOT. As Houston's load has continued to grow, this generation shift has resulted in increasing import constraints. In 2002, South to Houston flows became a commercially significant constraint in ERCOT. This was followed by North to Houston flows also becoming a commercially significant constraint. Various low-cost, short-lead-time upgrades have been completed to help mitigate these constraints, including upgrades of the South Texas Project - W. A. Parish (STP-WAP) and Gibbons Creek - Obrien 345-kV circuits, autotransformer upgrades at Dow and other locations, the new Oasis substation, and various capacitor banks, and other upgrades. An undervoltage load-shedding scheme has also been installed for the Houston area. It will serve as a safety net in the event of contingencies exceeding the normal planning and operating criteria.

While these upgrades have helped reduce congestion and improve reliability, imports into Houston are still constrained due to thermal and voltage stability limitations. Relatively low-cost, short-lead-time upgrades have largely been exhausted, and import limitations continue to pose significant economic and reliability concerns. CenterPoint Energy has submitted a proposal with various upgrades to address these import limitations for ERCOT regional review. The major

components of the proposed projects include a new 345-kV Hillje substation looped into the existing STP-Holman 345-kV circuit, a new 345-kV double circuit from the new Hillje substation to WAP, a new 345-kV circuit from the new Hillje substation to STP, upgrade of the Tomball-Jewett 345-kV circuit, and an upgrade of the T. H. Wharton-Jewett 345-kV circuit. Upgrades of several underlying facilities in various parts of ERCOT will also be necessary, along with the new static and dynamic reactive resources in the Houston area.

Rio Grande Valley

The lower Rio Grande Valley, located in the south Texas counties of Cameron, Willacy, and Hidalgo, borders Mexico and, because of increased trade and commercial activity, has experienced electric load growth of about 5%. This rate exceeds the average growth for the rest of ERCOT. Major population centers include McAllen, Harlingen, and Brownsville. Local transmission constraints in the Valley continue to result in congestion costs and the need to operate RMR generation at La Palma and Bates plants. Transmission upgrades of the underlying 138-kV system that are underway on both the east and west sides of the Valley will relieve local contingency overloads and eliminate the need for RMR generation by the summer peak of 2006.

Current plans to retire RMR generation will be adequate in the short term; however, long-term requirements are still under consideration. Constraints due to aggressive load growth will impact not only the local need to transport power within the Valley, but also the need to import bulk power to the Valley. Because of the availability of generation in the San Antonio area, the ERCOT Board endorsed extension of the 345-kV system south from the San Antonio area (San Miguel plant) to Laredo. This extension can serve as the first part of a 345-kV line that could ultimately terminate on the west side of the Valley providing a third 345-kV path into the Valley. In order to transport power delivered by this third 345-kV line, a 345-kV loop from North Edinburg to Frontera and then to La Palma will be necessary. This loop would effectively tie the South McAllen and the Brownsville areas together and provide a 345-kV line paralleling the U.S. and Mexico border and providing long-term transmission capacity to serve continued load growth. The 345-kV extension would also open opportunities for transactions with Mexico that could reduce energy costs in both countries.

Laredo

Laredo, located entirely within Webb County, continues to grow at a 5% rate. ERCOT has entered into an RMR contract with the Laredo plant owner in order to protect against voltage collapse and thermal overloads. In March of 2004, the ERCOT Board endorsed a plan that provides for a back-to-back (BtB) tie with the Mexican transmission system at Nuevo Laredo. This tie would allow the area to meet ERCOT Planning Criteria until a new 345-kV line can be constructed between the San Miguel and Laredo plants. The BtB tie is to be in service by summer peak of 2007 when the Laredo plant is not sufficient to meet the reliability criteria. The 345-kV line is to be in service by summer peak of 2010 when the combined benefit of the Laredo plant and the BtB tie is not sufficient to meet the criteria. In addition to these transmission upgrades, many underlying improvements are necessary including phase shifting transformers at the North Laredo and Del Rio Hamilton Road substations. Once the 345-kV line is complete, the Laredo plant can be released from RMR status.

Uvalde and Del Rio Areas

Due to the availability of generation in the San Antonio area and the shortage of generation along the border with Mexico, the prevailing flow of power to Laredo and the Valley passes across the Uvalde and Del Rio areas south of San Antonio. While the new 345-kV line from San Miguel plant to Laredo will eventually cause this flow to bypass these areas, its loss will still adversely impact this area. Several 138-kV line upgrades are underway including Leon to Pleasanton, Pearsall to Dilley, Uvalde to Del Rio Hamilton Road, and Eagle Pass to Asherton. A new 138-kV line is proposed from Kendall to Castroville to Lytle, and another later project will extend this line from Castroville to Uvalde.

San Antonio

City Public Service (CPS) is a municipally owned electric and gas utility company that primarily serves the San Antonio / Bexar County area. CPS serves approximately 600,000 electric customers within its 1,566-square-mile area. The peak

system load reached 4,117 MW in August 2003. The highest load growth is occurring in the northern part of the city. Load growth in this area has been from 9% to 20% compared to 3% system average growth. The area surrounding the future Toyota plant in the southern part of the city will also grow at a rapid rate with predictions of about 20% annual increase for the next few years. CPS will construct a new substation to serve this load for Toyota. Current load forecasts for this substation indicate approximately 49 MVA of load by May 2006. This load could possibly double within several years if Toyota decides to expand plant operations.

In general, most CPS load is served by local CPS-owned generation plants and nuclear power imported from the South Texas Project. In July 2004, approximately 190 MW of new CPS-owned generation was placed into service at the existing Leon Creek plant. This generation consists of four modern combustion turbine peaking units. This new generation replaces the recently retired Mission Road plant, rated at 100 MW. CPS has elected not to opt-in to retail market competition. However, CPS does import and export bulk power from the ERCOT system.

The CPS-owned portion of the existing 138-kV tie line from the Leon Creek plant to Pleasanton was rebuilt and placed into service in June 2003. This transmission line has been and continues to be a limiting element for exporting power from the CPS system. The remainder of the line (15 miles) has not been completed and retains the old rating of 101 MVA. The CPS portion of the line is rated at 215 MVA. The additional 190 MW of generation at Leon Creek mentioned above further increases the loading problems on this line.

The CPS and LCRA systems are experiencing load growth especially in northwest Bexar County and in the Kendall County area, respectively. This growth has created thermal and voltage problems in the Kendall area. Several new projects will resolve these problems by 2007. The most significant project is the addition of a new 345-kV transmission tie line between the CPS Cagnon substation and the Kendall substation. CPS and LCRA are working to determine the best route for this major transmission line. Other related projects include the addition of a second 345/138-kV autotransformer at the Kendall substation and the addition of a 138-kV, 31.2-MVAR capacitor bank at the Boerne substation.

The ERCOT market has been experiencing significant transmission congestion in the area northeast of San Antonio, especially along the corridor between CPS's Skyline substation and LCRA's Marion substation. A proposed 345-kV switching station (Elm Creek) located at the intersection of the 345-kV transmission lines from Skyline to STP, Hill County substation to STP, and both lines from Marion to San Miguel is currently being reviewed by the South Regional Planning Group. A second 345-kV project that will have a positive effect on the area northeast of San Antonio is a new 100-mile 345-kV transmission line between Hays and Bell Counties. This project (Clear Springs-Salado 345-kV line) is also under review by both the South and North Regional Planning Groups.

Figure 13 shows the South Region transmission system.

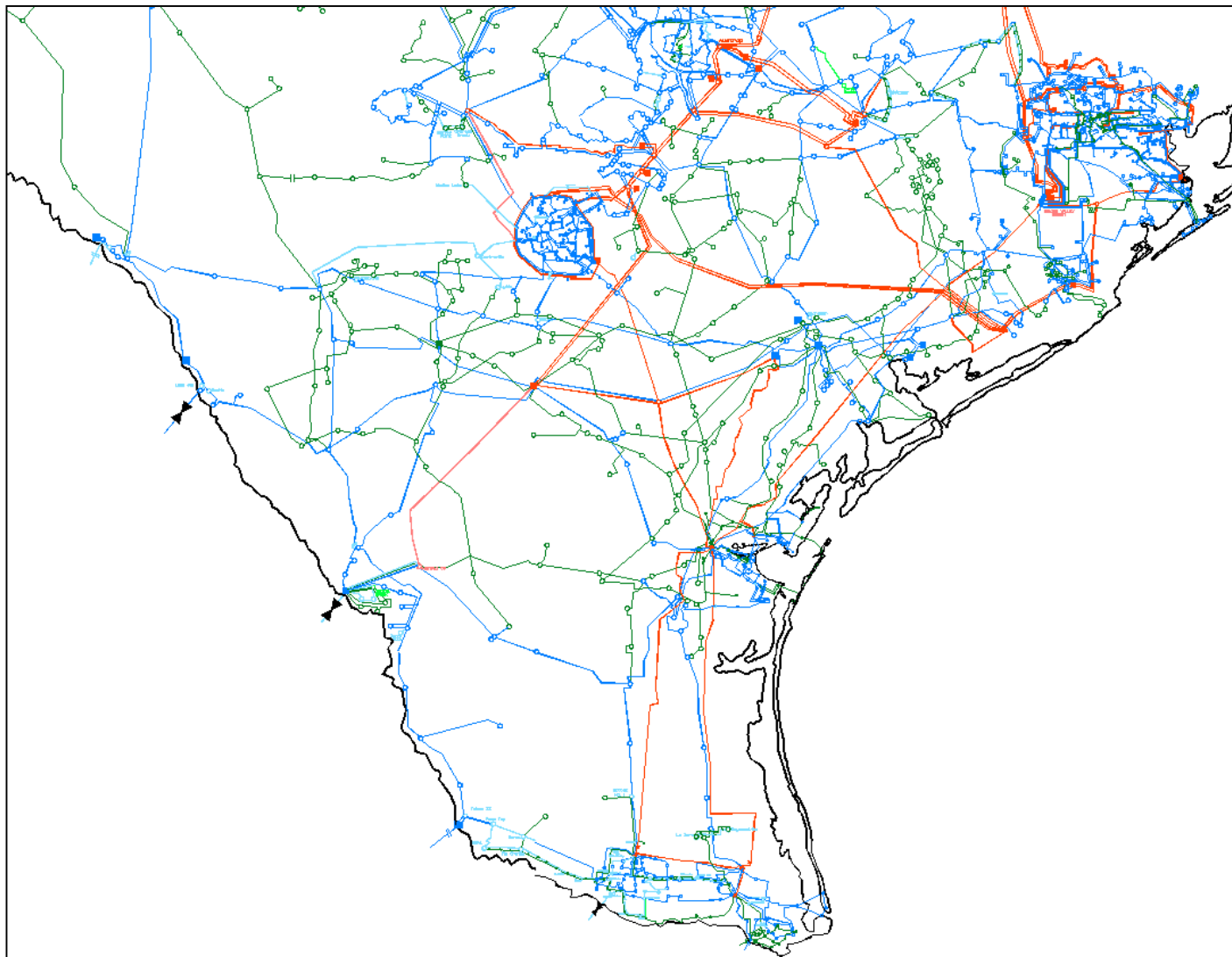


Figure 13 – ERCOT South Region Transmission System

North Region Discussion

The ERCOT North Region consists of 78 counties and has 39,539 MW of generation. It had 27,841 MW of coincident peak load in 2003. These numbers represent approximately 48% of the total ERCOT generation capacity and 49% of total ERCOT coincident peak load. Geographically, the region encompasses the metropolitan areas of Dallas, Fort Worth, and Austin. Non-coincident load growth for 1999 to 2003 in the North Region was approximately 2.5% per year compared to the average load growth of 2.1% for all of ERCOT. The largest increases in load occurred in counties in the Dallas-Fort Worth (DFW) metropolitan area.

There have been 665 MW of new generation put into service in the North Region since August 2003. There are 592 MW of new generation expected to go in service in 2006. This is the only announced future generation in the region.

Local Constraints and Congestion

As shown in Figure 14, the North Region had the highest local congestion costs of any region between June 1, 2003, and May 31, 2004, with approximately \$167 million, or 45% of all local congestion costs. Several improvements have already been made to the transmission system since 2003 to reduce congestion. A very significant improvement was the installation of several Special Protection Systems (SPSs) that allow the generation in northeast Texas and the Kiamichi plant in Oklahoma to operate at full output without compromising reliability. In addition, several remedial action plans (RAPs) were developed to reduce the need to run generation out of economic order to prepare for contingencies. No generation units had entered into an RMR contract during this timeframe; however, Eagle Mountain unit 3 has been under an RMR contract since July 1, 2004. More information will be given in the North Region RMR section below. The DFW and northeast (NE) ERCOT area congestion relief study is currently being performed with the North Regional Planning Group (NRPG) to determine if there are any projects that are justified economically by the reduction in congestion costs.

Congestion Costs for the North Region					
June 1, 2003, through May 31, 2004					
Local Area	OOMC	OOME	LBE	RMR	Total
DFW	\$82,872,707	\$15,796,259	\$5,332,828	\$0	\$104,001,794
Austin	\$182,195	\$3,977,467	\$88,994	\$0	\$4,248,655
North	\$2,132,757	\$45,702,314	\$10,675,551	\$0	\$58,510,623
North Total	\$85,187,659	\$65,476,040	\$16,097,373	\$0	\$166,761,072
ERCOT Total	\$110,936,573	\$101,539,160	\$17,140,878	\$137,848,654	\$367,465,263
Percent of Total in North	77%	64%	94%	0%	45%

Figure 14 - Congestion Costs for the North Region

Figure 15 is an excerpt from TPIT that highlights future transmission projects that will relieve loading on congested elements found in the North Region. In some cases, Figure 15 condenses several TPIT projects into a single line item. Figure 15 is not an inclusive list of all future transmission projects nor does it attempt to relate individual projects to specific congested items.

Projects for the North Region				
Congestion Area	Congestion Mitigating Project	Voltage, kV	Expected in-service date	RPG Review
Austin	Clear Springs to Salado double-circuit line	345	2008	Yes
	Decker to Techridge circuit	138	2006	
DFW	Roanoke second 345/138kV autotransformer*	345	2005	Yes
	Hackberry to DFW NW to Grapevine Ball upgrade circuits*	138	2005	Yes
	Forney to East Mesquite double-circuit rebuild	138	2006	Underway
	Royse to Terrell Switch line rebuild	138	2006	
	Benbrook to Mistletoe circuit rebuild*	138	2005	Underway
	Collin to Renner rebuild for double circuit	138	2005	
	Benbrook to Calmont double-circuit line rebuild*	138	2005	
	Rockwall to East Richardson circuit rebuild	138	2005	
	Collin to Colony circuit upgrade	138	2005	Yes
	Roanoke to McPherson to Keller upgrade circuits*	138	2005	
	Watermill to Tricorner upgrade circuit	345	2005	Yes
	Forest Hill 138/69kV autotransformer replace with larger unit*	138	2005	Yes
	Anna second 345/138kV autotransformer	345	2005	
	Handley 138/69kV new autotransformer*	138	2005	
	938 MVAR of capacitors*	138	2005	
	Watermill to Cedar Hill second circuit	345	2005	Yes
	Venus to Sherry new circuit	345	2006	
	DeSoto 345/138kV new autotransformer	345	2006	Yes
	West Levee to Norwood circuit on new double-circuit structures	345	2006	
	Jacksboro to West Denton on double-circuit structures*	345	2006	Yes
	Venus to Liggett circuit	345	2006	Yes
North	Plano Tennyson 345/138kV autotransformer	345	2007	Yes
	Liggett to Trinity new line and 345/138kV autotransformer	345	2007	
	Lewisville second 345/138kV autotransformer	345	TBD	Currently
	Lake Creek second 345/138kV autotransformer	345	2005	Yes
	133 MVAR of capacitors in Waco	138	2005	
	Paris to Anna Switch circuit	345	2006	Yes
	Hutto 345/138kV autotransformer	345	2008	
	Trinidad to Richland double-circuit line upgrade	345	2006	Underway
	Hood to Spunky uprate or rebuild	138	2007	
	Sandow to Minerva to Robertson circuit rebuild	138	2005	Yes
	Jewett to Watson Chapel rebuild	138	tbd	
	Gibbons Creek to College Station switch	138	2006	Yes
	Salem 345/138kV autotransformer upgrade	345	2005	
	Pecan Creek 345/138kV autotransformer	345	2006	
* Indicates that the project is directly related to an RMR exit strategy				

Figure 15 – Projects for the North Region

The following summaries highlight some of the transmission-related concerns within the North Region.

Reliability Must-Run

RMR status was requested by TXU Energy for nine generating units at five plants in the North Region in late March 2004 and by the City of Garland for five generating units at two plants in mid-April 2004. Studies were performed to ensure that the reliability of the system would not be reduced if these plants were not contracted for RMR service. The studies showed that only Eagle Mountain unit 3 would be necessary to maintain reliable service to load. Several new RAPs were

developed by TXU Electric Delivery to augment scheduled improvements to the transmission system to prevent damage to transmission facilities while maintaining reliability. Without these RAPs and system improvements more units would have been necessary to serve load reliably, and subsequently more units would have been contracted for RMR service.

Thirteen of the fourteen generating plants that requested RMR status are located within the four counties: Tarrant, Dallas, Collin, and Denton that are the center of the DFW area. The total generation capacity in the four counties was 5,486 MW, without these units there are 4,524 MW, a reduction of 1,322 MW or 22.6 % of the available generation within these four counties.

Major Constraints

Reliably moving power into, out of, and through the North Region and delivering power to the large load centers such as the DFW area are the greatest challenges in the region. A number of transmission line upgrade projects were completed in 2004 to relieve line constraints.

Around 400 MVAR of transmission capacitors were installed in 2004 to support the voltage in the region. Large installations of additional capacitors in later years are being studied.

345/138-kV autotransformers are necessary to get power to the load, which is primarily served from the 138-kV transmission network. Four autotransformers were installed in the DFW area by peak 2004, two are scheduled by peak 2005, and one is already scheduled for the 2006 peak while four are being studied for installation between 2006 and 2008. Studies are continually being performed to determine the location and number of 345/138-kV autotransformers that are necessary to reliably serve the load in DFW. Many 345/138-kV autotransformers are scheduled for installation in other North Region load centers between 2005 and 2008. A major concern in determining how many autotransformers to install and where to locate them is the lack of knowledge about the operation/dispatch of existing generation and the installation of future generation in the North Region.

Major Projects Scheduled Before 2006 Summer Peak

A project to convert several 69-kV facilities to 138-kV, construct a new switching station, and construct two miles of new 138-kV circuit in the Bryan – College Station area has been approved by the North Regional Planning Group (NRPG). This project is planned to improve facilities owned by Brazos Electric Cooperative (BEC), the City of College Station (COCS), and Texas Municipal Power Agency (TMPA). This project is considered a short-term improvement for the reliability needs of the Bryan – College Station area.

During the last year the NRPG and the ERCOT Board approved two major projects. West Denton to Jacksboro 345-kV and West Levee to Norwood 345-kV circuits are scheduled to be constructed by TXU Electric Delivery. The West Denton to Jacksboro circuit is important to support the rapid load growth that is occurring in the northern part of the DFW area. The West Levee to Norwood circuit provides a second electrical path to three large autotransformers that serve Dallas County. A much higher level of reliability is achieved when these autotransformers are connected to more than one 345-kV source. The Venus to Liggett 345-kV circuit and the Paris Switch to Anna 345-kV circuit, which were previously approved by the ERCOT Board, provide additional electrical paths into the DFW area. These projects will also help reduce congestion costs in the DFW area.

Numerous projects have been approved by the NRPG and were justified by the planning criteria. However, four projects in the DFW area that had been identified and justified using the reliability criteria have been accelerated to be completed by the summer peak 2005 based upon an economic study that was approved by the NRPG. These four projects (second 345 /138-kV Roanoke auto, reconductor Hackberry – DFW NW – Grapevine Ball 138-kV line, uprate Watermill – Tricorner 345-kV line by 20%, reconductor Roanoke – McPherson – Keller 138-kV line) were initially scheduled to be completed in 2006 and 2007.

Major Projects Scheduled After 2006

There are several projects that are being evaluated for construction after the 2006 summer peak. The largest project is the Clear Springs to Salado double-circuit 345-kV line, which spans between the north and south planning regions. This study has been ongoing for several months, and the report is expected to be presented to all stakeholders late in 2004.

A study of the Bryan-College Station area has recently been started, and several options for a long-term reliability solution are currently being developed for study.

Figure 16 shows the North Region transmission system.

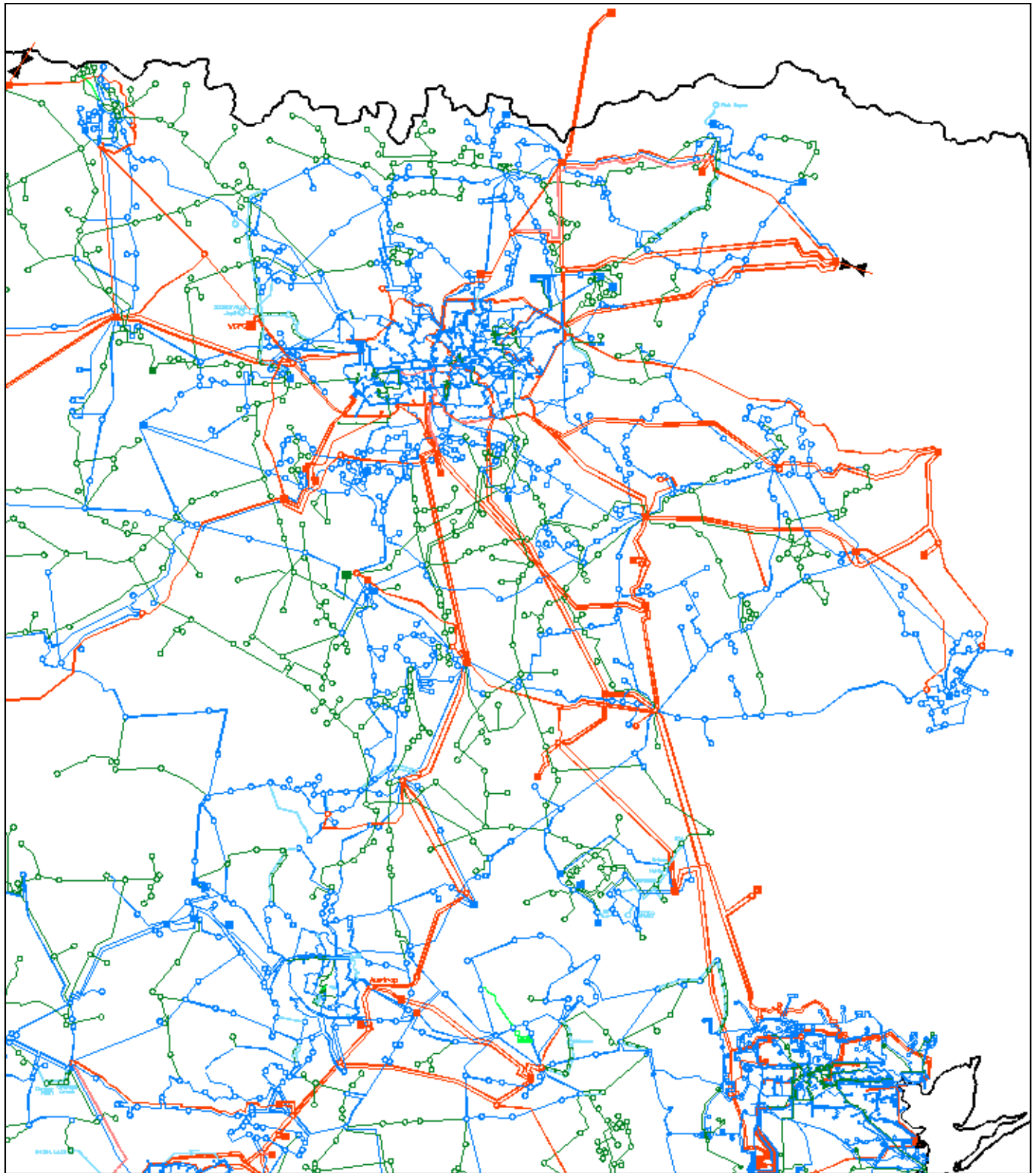


Figure 16 – ERCOT North Region Transmission System

West Region Discussion

The ERCOT West Region consists of 68 counties and has 7,589 MW of generation. It had 3,875 MW of coincident peak load in 2003. These numbers represent approximately 9% of the total ERCOT generation capacity and 7% of total ERCOT coincident peak load. The West Region showed no load growth between 1999 and 2003, compared to the average load growth of 2.1% for all of ERCOT. The West Region includes Wichita Falls and all of the ERCOT system west of Fort Worth, Waco, and Austin, and northwest of San Antonio and Del Rio. This area is characterized generally by low to no load growth. There are some areas where oil field development is resulting in significant load increases, but these occurrences are infrequent. Most of the transmission construction activity is currently being driven by the development of wind generation and changes in dispatch of existing area gas generation.

There have been 198 MW of new generation put into service in the West Region since August 2003. Depending on the status of the federal Production Tax Credit, there could be from 0 to 1,729 MW of new generation put into service by the end of 2005.

Local Constraints and Congestion

As shown in Figure 17, the smallest portion of the ERCOT local congestion costs are found in the West Region, about \$55 million. Between June 1, 2003, and May 31, 2004, approximately 15% of all local congestion mitigation costs were spent for problems in the West Region. This includes LBE, OOME, OOMC, and RMR payments. RMR costs were a significant share of these payments, nearly \$33 million.

In 2003 ERCOT had RMR contracts with three generating units in the West Region: Fort Phantom unit 2, Rio Pecos unit 6, and San Angelo Power Station unit 2. Rio Pecos was released from RMR status November 13, 2003. San Angelo Power Station has been served notice that its contract will be terminated in October 2004. The short-term alternative exit strategy for Fort Phantom RMR is expected to be complete by April 2005.

Congestion Costs for the West Region					
June 1, 2003, through May 31, 2004					
Local Area	OOMC	OOME	LBE	RMR	Total
West	\$13,611,517	\$7,721,457	\$193,902	\$32,786,065	\$54,312,941
Wind	\$0	\$1,073,582	\$40,332	\$0	\$1,113,914
West Total	\$13,611,517	\$8,795,039	\$234,234	\$32,786,065	\$55,426,855
ERCOT Total	\$110,936,573	\$101,539,160	\$17,140,878	\$137,848,654	\$367,465,263
Percent of Total in West	12%	9%	1%	24%	15%

Figure 17 - Congestion Costs for the West Region

Figure 18 is an excerpt from TPIT that highlights future transmission projects that will relieve loading on congested elements found in the West Region. In some cases, Figure 18 condenses several TPIT projects into a single line item. Figure 18 is not an inclusive list of all future transmission projects nor does it attempt to relate individual projects to specific congested items.

Projects for the West Region				
Congestion Area	Congestion Mitigating Project	Voltage, kV	Expected in-service date	RPG Review
Wind	West Yates SS to Mesa View, convert 69kV line	138	2003	Yes
	Crane to Rio Pecos, convert 69kV line	138	2004	Yes
	Mesa View to Mesa View SS, convert 69kV line	138	2004	Yes
	Rio Pecos to Crane, convert 69kV line	138	2004	Yes
	Rio Pecos to North McCamey, rebuild and upgrade	138	2004	Yes
	Fort Lancaster to Friend Ranch line	138	2005	Yes
	Re-configure Big Lake Station to five breaker ring bus	138	2005	Yes
	Twin Buttes to North McCamey line and North McCamey 345/138kV auto	345	Unknown	Yes
	Odessa to North McCamey line and second North McCamey 345/138kV auto	345	Unknown	Yes

Figure 18 – Projects for the West Region

McCamey

Since the beginning of 2003 more than 110 circuit miles of transmission lines have been built or upgraded in the McCamey area. An additional 50 circuit miles of transmission lines will be completed by June 2005. These have all been 138-kV and 69-kV projects approved by the West Regional Planning Group in December 2002.

The ERCOT Board of Directors has approved a 345-kV circuit to be built from McCamey to Twin Buttes when the sum of generation interconnection agreements in the McCamey area reaches 1,500 MW. The 345-kV McCamey – Odessa line is approved to be built when the sum of generation interconnection agreements in the McCamey area reaches 2,000 MW. No additional generation interconnection agreements have been signed in the McCamey area in the past year. These projects are identified in the posted McCamey Wind Generation Transmission Improvement Plan.

Voltage Control Issues

Recent generation dispatch has seen very little gas-fired generation on line in West Texas. Consequently, West to North transfer levels have often been very low or negative. This has a two-fold impact in that as a result there are very few dynamic reactive resources available in West Texas to help control voltages, and very small reactive losses (due to low power flows) to offset the line charging. Consequently, high voltage has been a concern on the 345-kV system. Tertiary reactor installations at Odessa, Morgan Creek, Abilene, Red Creek, and Twin Buttes were made in 2004 to address these concerns. To date the wind generation installations have had no significant reactive capability. Since these machines are induction generators, low voltages can be experienced where these machines are located as they ramp up their output. With additional wind generation anticipated in West Texas on the ERCOT system, voltage control/stability is destined to be a more significant issue in West Texas than thermal loading.

Figure 19 shows the West Region transmission system.

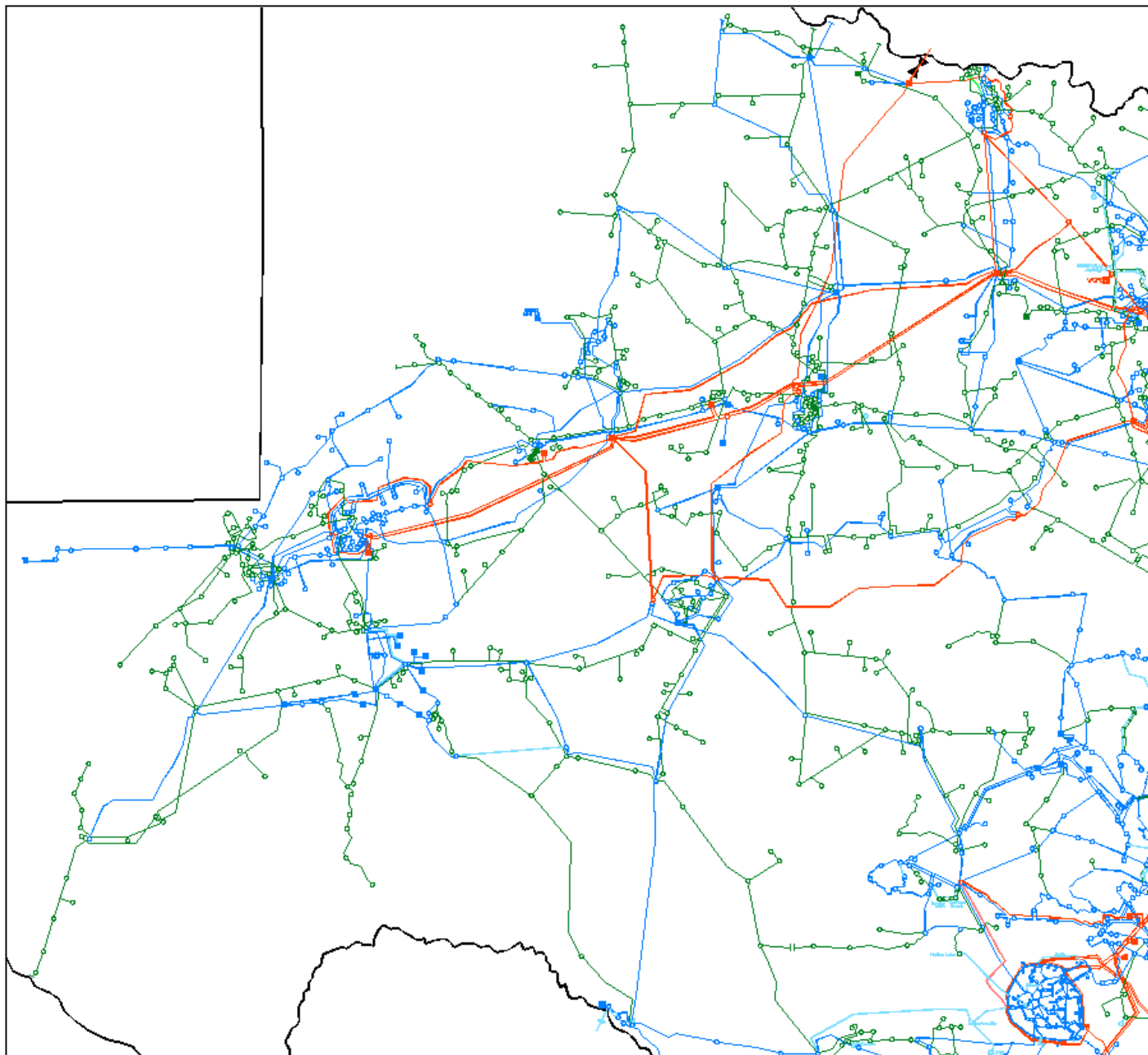


Figure 19 – ERCOT West Region Transmission System

Regulatory Authorization

Most new transmission line construction and some line reconstruction require the approval of the PUCT. It is the responsibility of the transmission service provider building the facility to apply for and obtain the Certificate of Convenience and Necessity (CCN) and all other required regulatory approvals. The present PUCT rules allow the PUCT up to 12 months for consideration of a contested CCN, with some provisions for expedited approval of uncontested applications and critical projects. The need to perform a routing study and for the transmission service provider to hold public meetings typically adds 12 months or more to the time required to certify and build a new transmission line. In most new transmission projects, the acquisition of right of way and construction can take up to 12 months after a CCN is granted by the PUCT. As a result, firm commitments should be made at least three years ahead of required in-service dates for most transmission line projects, and some projects may require commitments four to eight years in advance of system needs.

Transmission Line Routing

ERCOT's primary responsibility and concern is the reliability of the supply of electricity in an area that covers about 75% of the state. In carrying out that responsibility, ERCOT performs hundreds of short-range and long-range technical studies to determine where potential problem areas may be and decide which solutions to the technical issues are appropriate. When the studies indicate that new electric transmission facilities are required, ERCOT initiates a review of the technical merits of such facilities before the projects are formally recommended by ERCOT.

In the case of new transmission lines, ERCOT performs no specific routing evaluation or proposal at this stage other than generally trying to favor existing rights of way and avoiding known congested or environmentally sensitive areas. Indeed, it is impossible for ERCOT to do detailed routing evaluations given the number of potential projects to consider and the thousands of potentially affected properties.

Specific routing evaluations and proposals are the responsibility of the particular transmission service provider that develops and constructs each project. ERCOT encourages them to address landowner concerns and reach a mutually acceptable resolution. If that cannot be done, the specific routing issues can be raised and addressed at the PUCT in CCN proceedings related to the particular project.

Routes shown in the drawings in this document are for illustration only. Actual routes are the responsibility of the transmission service providers and the PUCT certification process.

Conservation, Efficiency, and Distributed Generation Programs

Additional conservation, energy efficiency, and distributed generation programs may help mitigate transmission constraints and the need for additional transmission. However, in a deregulated retail market, it will be much more difficult to quantify such factors. These factors will be included in future studies to the extent to which tangible data can be quantified and locations identified. Candidate areas for development of such projects that could mitigate the need for additional transmission include Dallas/Ft. Worth, Houston, Austin, San Antonio, Laredo, McAllen, Harlingen, and Brownsville, although the value of such projects will vary depending on the exact location and size of the projects within these general areas.

Projected Congestion Discussion

Modeling

ERCOT has recently adopted computer simulation tools and developed processes to project congestion costs based on wholesale market fundamentals. These tools simulate the security-constrained unit commitment and economic dispatch of all generators in ERCOT to meet the projected ERCOT demand in each hour of the forecasted period. The relative dispatch merit of the generating units is determined by each unit's fundamental variable cost drivers (heat rate, start-up cost, fuel price, etc.) and its operational constraints (minimum up and down times, ramp rates, etc.).

The ERCOT transmission network is fully represented utilizing the approved power flow models, and the system load in each hour is distributed across the appropriate transmission buses. The computer simulation results in a dispatch for each hour that is secure for potential contingencies of individual line segments, as well as the double circuits that are considered under the ERCOT criteria to be single elements. However, contingencies on elements with a nominal voltage of 69 kV and below, and overloads on those elements, are ignored. All currently approved SPSs and RAPs are modeled; RAPs may be added or modified for 2005. Due to model limitations, the ratings of transmission lines with dynamic ratings are modeled as changing monthly, based on the peak temperature for the month.

The study is intended to identify likely transmission security violations that will require ERCOT operations to issue generation redispatch instructions resulting in congestion uplifts to market participants. Several limitations in the data and market assumptions exist. The analysis does **not** take into consideration the following:

- Transmission construction and maintenance outages
- Simulation of bidding behavior other than cost-based bids,
- Any special fuel, fuel delivery, or power purchase agreements.

However, the results provide a valid starting point to develop more detailed analyses by the regional planning groups. It is also worth noting that congestion on several of these elements is well known and projects are under review to correct them, while congestion may be experienced on other elements not identified in the analysis due to actual conditions outside the assumptions of this analysis.

Results

Using this approach, the ERCOT system was simulated for the year 2005, using the topology of the transmission network (including new planned facilities) that is included in the ERCOT Steady-State Working Group peak case. The congestion cost for a line segment is defined as the shadow price of the constraint multiplied by the line rating, summed across all hours of the year. The lines with the highest annual congestion costs were identified. Figure 20 shows the transmission circuits which are projected to have congestion costs greater than \$500,000 for the year, based on this simulation.

Congested Line	Planning Region	Solution (Planned or Under Study)
STP-Parish 345-kV line	South	CSC/CRE; STP-Hillje-WA Parish 345-kV project
Austrop 345/138-kV auto	North	Clear Springs-Salado 345-kV line
Allen #2 345/138-kV auto	North	Plano Tennyson 345/138-kV auto
Taylor-Taylor West 138-kV	North	Clear Springs-Salado 345-kV line
Collin 345/138-kV auto	North	Second 345/138-kV auto
Austin-Tuttle	South	Under study
La Palma-Rio Hondo 138-kV line	South	Upgrade line and LaPalma-Rio Hondo 345-kV line
Marion-Skyline 345-kV lines	South to North	Elm Creek 345-kV switch station; Clear Springs-Salado 345-kV line
Laredo import limit	South	San Miguel – Laredo 345-kV line
Everman-Decordova 345-kV line	North	Upgrade line
Big Brown-Jewett 345-kV line	North	Under study
Fayette 345/138-kV auto	North	Under study
Gibbons Creek-Obrien 345-kV line	North to South	CSC/CRE; STP-Hillje-WA Parish 345-kV project
Ballpark-Deely 138-kV line	South	Under study
Zorn-Clear Springs 345-kV line	South to North	Clear Springs-Salado and Cagnon-Kendall 345-kV lines
Terrell NT-Terrell N 138-kV line	North	Upgrade line
Tomball-Jewett 345-kV line	North to South	CSC/CRE; upgrade & STP-Hillje-WA Parish 345-kV project
Techridge-Howard Ln 138-kV line	North	Clear Springs-Salado 345-kV line
Greenville 138/69-kV autos	North	Under study; upgrade autos
Sadow-Salty 138-kV line	North	Clear Springs-Salado 345-kV line
Decordova-Decordova SB	North	Second Concord 345/138-kV autotransformer
Nueces Bay-White Point 138-kV line	South	Under study; RMR exit strategy projects
Asherton-N Laredo 138-kV line	South	RMR exit strategy project
Zorn 345/138-kV autos	North	Zorn 345-kV bus switching; Clear Springs-Salado 345-kV line

Figure 20 - Projected Congestion

Transmission upgrades are currently planned or under consideration to alleviate congestion on several of these congested elements are shown in the figure. The remaining congested elements will be the focus of further study over the next year in order to determine whether economic projects should be planned to reduce the congestion on those elements.

CONSTRAINTS AND CONGESTION ZONES

A sound and reliable electricity infrastructure is a fundamental underpinning of a region's economy and the daily life of its citizens. Consider how many electricity-powered devices are in homes or workplaces now or how many new homes, office buildings, and other developments exist now compared to 25 years ago.

A reliable supply of electricity is so basic to life today that we only tend to think about it when it is not there. The excellent past performance of the nation's electrical system and its operators have created the sense that we can continue to progress indefinitely with what we have now. However, the existing transmission system was not built to accommodate the vastly expanded amounts and types of energy flows that have developed in recent years.

Distribution Constraints

ERCOT can identify the transmission constraints but is dependent on the distribution service providers for information on distribution constraints. Distribution constraints do not affect the ability of specific generation to serve load but may affect the reliability of service. The configuration of a distribution system (i.e., predominantly a radial system) is such that there are no constraints that are comparable to those on a transmission system. Distribution entities usually monitor and perform a comprehensive analysis of their distribution system during peak load periods. During this analysis of the distribution system, the following areas are analyzed: substation transformer and breaker loading, conductor and line device loading, load balance, steady-state voltage level, short-circuit protection and coordination, service reliability, and system configuration. This analysis is the basis for distribution system improvements that are performed to ensure the continued safe and reliable provision of electric service to customers.

Because of the low cost impact of congestion in distribution systems, no distribution constraints that merit consideration have been identified.

Transmission Constraints

A transmission constraint is a physical limitation in the transmission system that prevents the reliable delivery of electricity. It also prevents the full potential of economic and competitive exchange of electric power among all market participants.

Transmission constraints complicate ERCOT system security management, lead to economic inefficiencies, and can create captive markets. They reduce liquidity of the market and can create must-run generation, resulting in increased utilization of inefficient units and reduced utilization of more efficient units.

New transmission capacity provided by system improvements maintains reliable service to load, allows new generation to be fully integrated into the grid, provides for additional competition, and promotes lower energy prices. A robust transmission network is required to support a liquid competitive electricity market. Despite their operating importance, the direct cost of transmission facilities is a small fraction of the total cost of electricity, typically much less than 10% of a customer's bill.

Commercially Significant Constraints

A commercially significant constraint (CSC) is a constraint in the transmission grid that limits the free flow of energy within the ERCOT market to a commercially significant degree. This report does not address the establishment of CSCs as described in ERCOT Protocols Section 7. CSCs are established annually in a stakeholder process for supporting congestion management operations and allocating zonal congestion management costs.

ERCOT has implemented a zonal balancing energy market design for the resolution of transmission congestion across CSCs based on power-flow calculations. In this market design, the ERCOT transmission grid, including generation resources and load, is divided into a predetermined number of congestion zones. Figures 21 and 22 show the approximate congestion zones for 2003 and 2004, respectively.

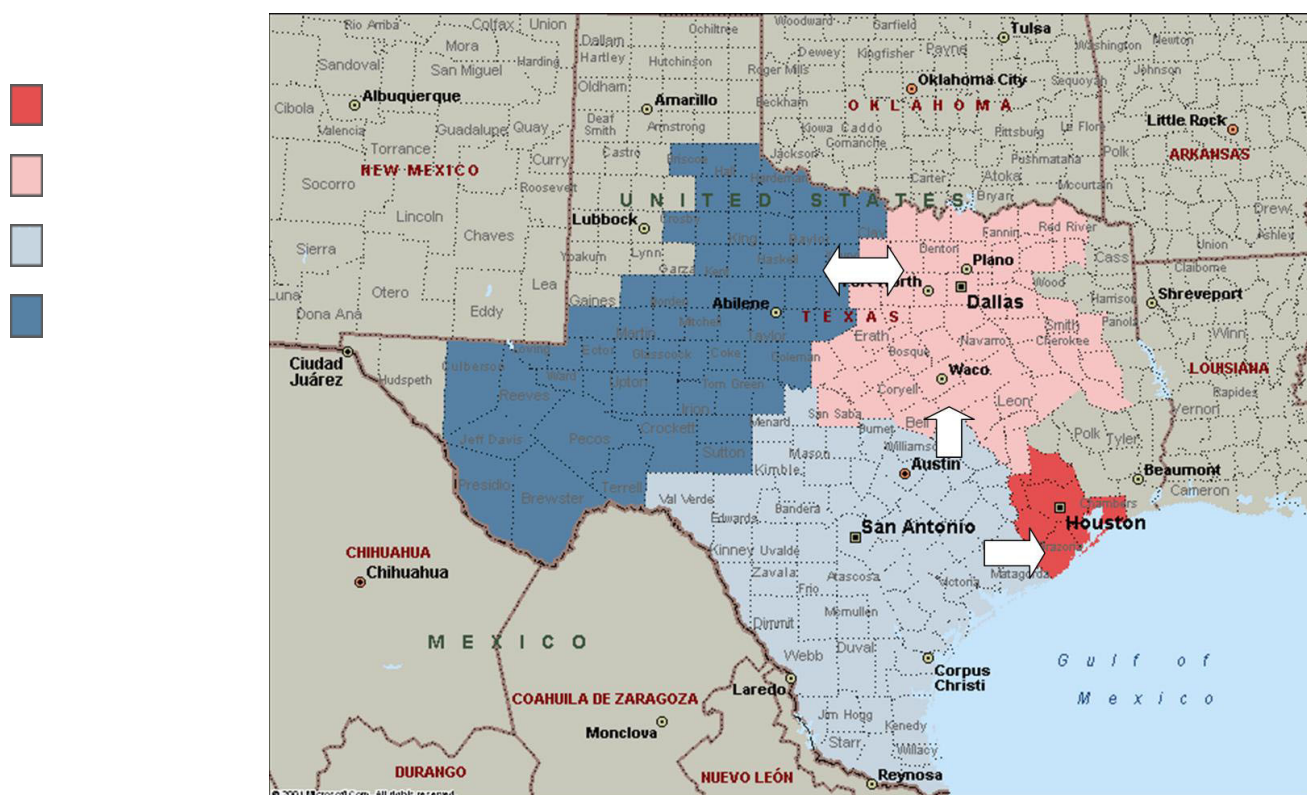


Figure 21 – Congestion Zones for 2003

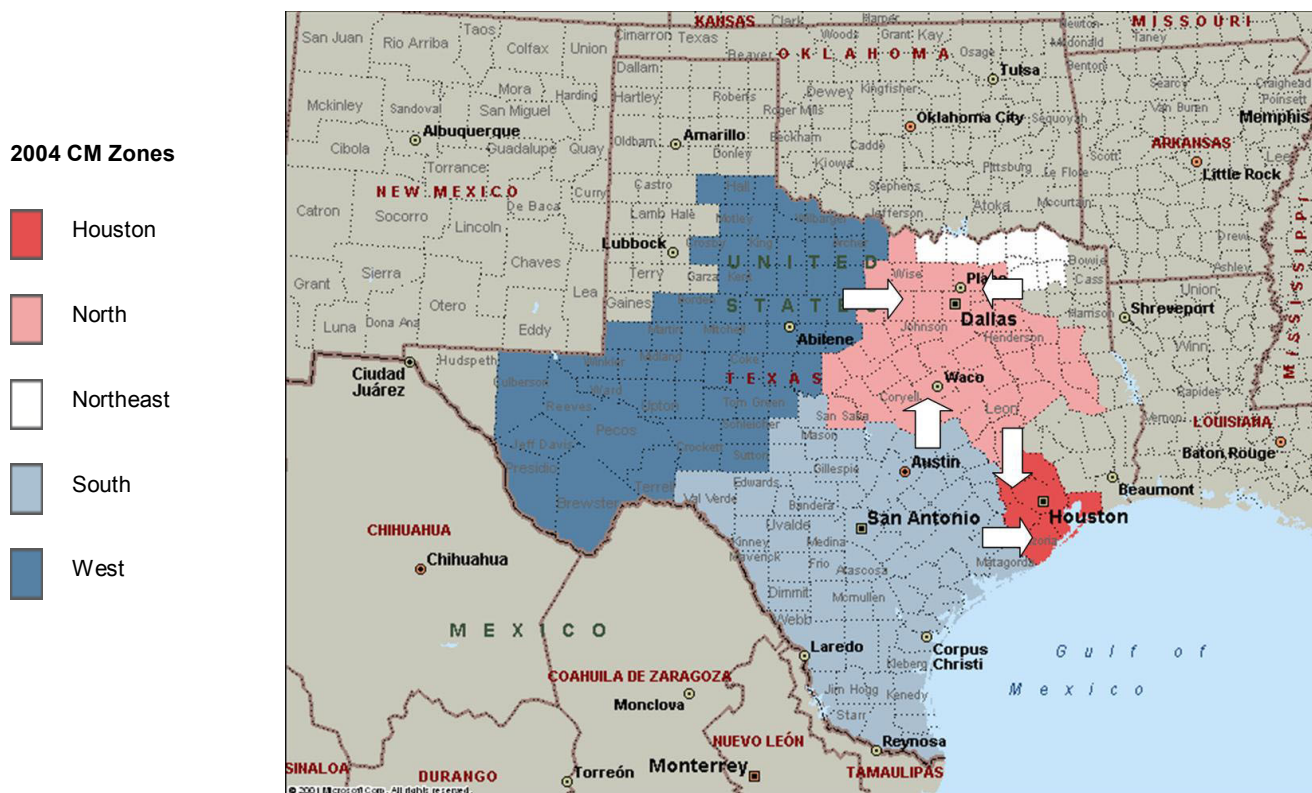


Figure 22 – Congestion Zones for 2004

There were four zones for 2003 and three CSCs: West-North, South-North, and South-Houston. For 2004, a fifth zone, the Northeast zone, was developed from the North Zone. There are five CSCs for 2004: West-North, South-North, South-Houston, North-Houston, and Northeast-North. CSCs are shown as white arrows in Figures 21 and 22. Zonal congestion is resolved on every 15-minute interval by a linear programming algorithm solving simultaneously for power balance and the CSCs between zones.

Congestion Management Costs For CSCs

The two ERCOT market services utilized for the resolution of CSC congestion are Balancing Energy Service and Zonal Replacement Reserve Service. The costs presented herein include the amounts settled for these two services consistent with the ERCOT Protocols and were based on data as of mid-August 2004. Final congestion costs reflected in true-up settlement statements and other re-settlements may vary based on subsequent metering information received at ERCOT.

Balancing Energy Service for Congestion Management

Balancing Energy Service (BES) makes up the difference between total electricity requirements and the sum of the energy schedules on a zonal basis. ERCOT deploys up BES on the load side of the CSC at a marginal incremental price and down BES on the generation side of the CSC at a marginal decremental price based on submitted BES bids. Interzonal congestion management charges are directly assigned to scheduled power flows that impact congested CSCs. Figures 23 and 24 show the balancing energy costs by constraint for 2003 and 2004, respectively.

Balancing Energy Costs for 2003	
June 1, 2003, through December 31, 2003	
Constraint	Cost
South-North	\$4,959,668
West-North	\$14,453
South-Houston	\$4,288,174
Total	\$9,262,295

Figure 23– Balancing Energy Costs 2003

In 2003, the South-North constraint accounted for 54% of the balancing energy costs for congestion management, the South-Houston constraint accounted for 46% of the costs, and the West-North constraint accounted for less than 1%.

Balancing Energy Costs for 2004	
January 1, 2004, through May 31, 2004	
Constraint	Cost
South-North	\$2,223,684
West-North	\$0
South-Houston	\$1,948,814
North-Houston	\$2,609,835
Northeast-North	\$6,915,497
Total	\$13,697,829

Figure 24– Balancing Energy Costs for 2004

In 2004, the Northeast-North constraint accounted for 51% of the costs and the North-Houston constraint for 19%. The total balancing energy costs for congestion management between June 1, 2003, and May 31, 2004, were **\$22,960,124**.

The average cost of each CSC constraint is shown in Figures 25 and 26. The average is calculated by dividing the cost for each constraint by the total number of 15-minute intervals or the number of days.

Average Balancing Energy Costs for 2003		
June 1, 2003, through December 31, 2003		
Constraint	Per-Interval Costs	Per-Day Costs
South-North	\$241	\$23,176
West-North	\$1	\$68
South-Houston	\$209	\$20,038
Total	\$451	\$43,282

Figure 25 – Average Balancing Energy Costs 2003

Average Balancing Energy Costs for 2004		
January 1, 2004, through May 31, 2004		
Constraint	Per-Interval Costs	Per-Day Costs
South-North	\$152	\$14,629
West-North	\$0	\$0
South-Houston	\$134	\$12,821
North-Houston	\$179	\$17,170
Northeast-North	\$474	\$45,497
Total	\$939	\$90,117

Figure 26 – Average Balancing Energy Costs for 2004

Zonal Replacement Reserve Service

Replacement Reserve Service (RPRS) is procured from generation units planned to be off line and loads acting as resources that are available for interruption during the requirement period. When deployed, units providing RPRS are capable of providing additional balancing energy service to ERCOT. Replacement Reserve Service was not required between June 1, 2003, and May 31, 2004.

Local Constraints

A local constraint (LC) is a bottleneck that limits the flow of energy in areas generally within one congestion zone. ERCOT has identified eleven general areas with local constraints. These areas are Austin, Corpus Christi, Dallas/Fort Worth (DFW), Houston, Laredo, North, Rio Grande Valley, San Antonio, South, West, and Wind. The most significant of these areas (based on costs) are Dallas/Fort Worth, North, West (McCamey, San Angelo, Morgan East), Houston and South. These five areas account for 90% of the total local balancing and out-of-merit costs.

Congestion Management Costs For LCs

Three ERCOT market services are utilized for the resolution of local congestion: Local Balancing Energy Service, Out-of-Merit Energy, and Out-of-Merit Capacity. While these services may be procured for other reliability needs, the costs included in this report are those incurred in the resolution of local congestion in the ERCOT LCs.

Local Balancing Energy (LBE) Service

Local Balancing Energy Service is used to manage local congestion when the market solution test is met in accordance to Section 7 of the ERCOT Protocols. Figure 27 shows the local balancing costs by local area for June and July 2003. Since August 2003 all Local Balancing Energy has been paid as OOME due to a protocol change that determined the LBE was not working as designed and would be discontinued in the ERCOT market. The North area accounts for most of the costs, with 62%, and DFW is second with 31%.

Local Balancing Energy Costs			
June 1, 2003, through July 31, 2003			
Area	Up	Down	Total
Austin	\$53,888	\$35,106	\$88,994
Corpus Christi	\$123,312	\$140,916	\$264,228
DFW	\$5,242,414	\$90,414	\$5,332,828
Houston	\$0	\$0	\$0
Laredo	\$0	\$0	\$0
North	\$2,563,076	\$8,112,475	\$10,675,551
San Antonio	\$76,852	\$53,451	\$130,302
South	\$65,571	\$321,653	\$387,224
Valley	\$8,117	\$19,400	\$27,516
West	\$108,615	\$85,287	\$193,902
Wind	\$11,392	\$28,940	\$40,332
Total	\$8,253,236	\$8,887,641	\$17,140,878

Figure 27 – Local Balancing Energy Costs (Totals may not match because of rounding.)

Out-of-Merit Energy (OOME) Service

OOME services are provided by resources selected by ERCOT outside the bidding process in order to resolve local congestion when no market solution exists. Resources include generators or loads acting as resources listed as “on line and available” in the resource plan. OOME is captured in system-generated and logged instructions as well as verbal dispatch instructions. Figure 28 shows the OOME costs by local area for June 1, 2003, through May 31, 2004. The North area accounts for most of the costs, with 45%.

OOME Costs			
June 1, 2003, through May 31, 2004			
Area	Up	Down	Total
Austin	\$3,953,036	\$24,431	\$3,977,467
Corpus Christi	\$874,098	\$832,913	\$1,707,011
DFW	\$15,423,750	\$372,509	\$15,796,259
Houston	\$5,227,545	\$1,748,307	\$6,975,851
Laredo	\$0	\$0	\$0
North	\$3,263,786	\$42,438,528	\$45,702,314
San Antonio	\$1,283,227	\$1,539,413	\$2,822,640
South	\$4,041,802	\$5,951,078	\$9,992,880
Valley	\$198,120	\$5,571,579	\$5,769,699
West	\$4,973,257	\$2,748,200	\$7,721,457
Wind	\$183,098	\$890,484	\$1,073,582
Total	\$39,421,718	\$62,117,441	\$101,539,160

Figure 28 – Total OOME Costs (Totals may not match because of rounding.)

Out-of-Merit Capacity (OOMC) Service

OOMC is used to provide for generation capacity needed such that balancing energy is available to solve local congestion or other reliability needs when a market solution does not exist. OOMC can be provided from any resource or load acting as a resource that is listed as available in the resource plan.

OOMC Costs	
June 1, 2003, through May 31, 2004	
Area	Total
Austin	\$182,195
Corpus Christi	\$1,511,385
DFW	\$82,872,707
Houston	\$4,819,413
Laredo	\$0
North	\$2,132,757
San Antonio	\$1,731,077
South	\$152,880
Valley	\$3,922,642
West	\$13,611,517
Wind	\$0
Total	\$110,936,573

Figure 29 – Total OOMC Costs by Local Area

Figure 29 shows the total OOMC costs for June 1, 2003, through May 31, 2004. The DFW area accounted for 75% of the total OOMC costs and the West area for 12%.

Figure 30 shows the total OOM costs. OOMC accounted for 52% of the total OOM costs and OOME for 48%.

Total OOM Costs	
June 1, 2003, through May 31, 2004	
OOME	\$101,539,160
OOMC	\$110,936,573
Total	\$212,475,732

Figure 30 – Total OOM Costs

Figures 31 and 32 show the total OOME and OOMC costs by local area.

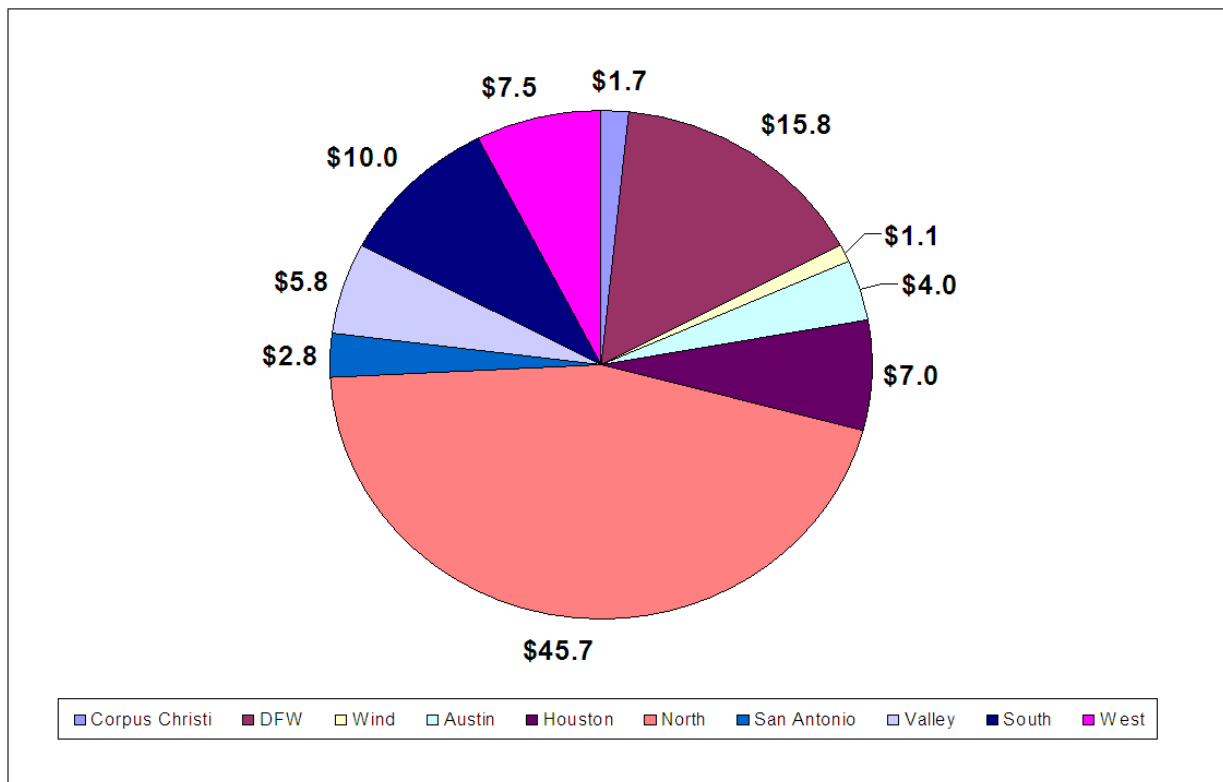


Figure 31 – Total OOME Costs by Local Area (Millions)

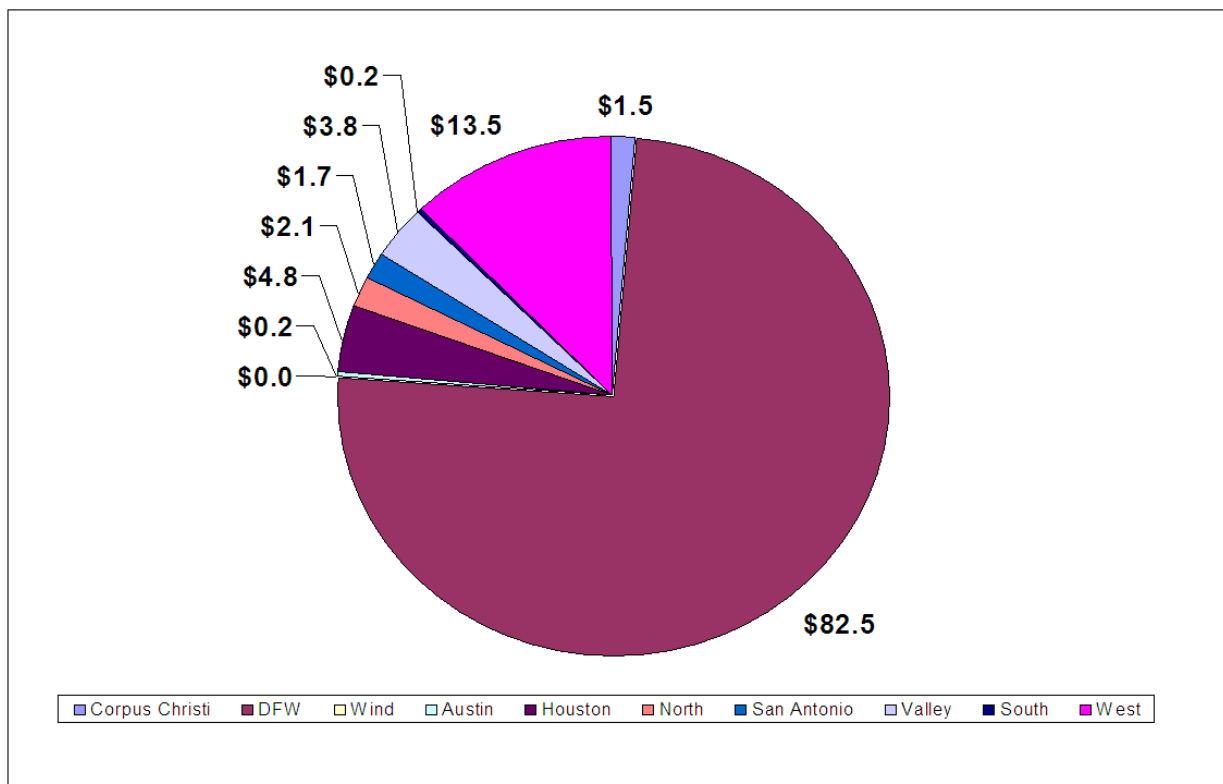


Figure 32 – OOMC Costs by Local Area (Millions)

Reliability Must-Run Service

Units defined as RMR units are those operated under the terms of an annual agreement with ERCOT. These units would not otherwise be operative except that they are necessary to provide voltage support, stability, or management of localized transmission constraints under first contingency criteria where market solutions do not exist. RMR service is the provision of generation capacity or energy resources from an RMR unit or a synchronous condenser unit.

RMR service was first paid in October 2002. Figure 33 shows the net costs for RMR service between June 1, 2003, and May 31, 2004. The net costs are RMR payments including Balancing Energy Neutrality Account (BENA) credits for the market value of the energy. RMR costs include standby, startup, energy to provider, and energy imbalance. BENA credits reflect the positive effect of the RMR generation (effectively reducing other generation and creating a payment back to the market).

Reliability Must-Run Costs			
Month	RMR Payments	BENA Credit	RMR Net Costs
Jun-03	\$30,663,868	(\$14,827,432)	\$15,836,436
Jul-03	\$30,380,117	(\$16,219,948)	\$14,160,169
Aug-03	\$28,843,484	(\$20,274,902)	\$8,568,582
Sep-03	\$24,406,815	(\$12,297,584)	\$12,109,231
Oct-03	\$21,069,839	(\$10,447,399)	\$10,622,440
Nov-03	\$20,380,676	(\$9,037,065)	\$11,343,611
Dec-03	\$25,654,944	(\$10,143,527)	\$15,511,417
Jan-04	\$23,339,321	(\$12,044,830)	\$11,294,490
Feb-04	\$19,990,413	(\$9,538,322)	\$10,452,091
Mar-04	\$15,052,579	(\$6,931,945)	\$8,120,633
Apr-04	\$15,797,499	(\$7,550,850)	\$8,246,649
May-04	\$28,274,777	(\$16,543,670)	\$11,731,107
Total	\$283,854,329	(\$145,857,473)	\$137,996,857

Figure 33 – RMR Net Costs

The units under RMR contracts with ERCOT during this time are Barney M. Davis unit 2, J.L. Bates units 1 and 2, Fort Phantom unit 2, La Palma units 4, 5, 6, and 7, Laredo units 1, 2, and 3, Rio Pecos unit 6, and San Angelo unit 2.

The cost of RMR services and local congestion mitigation in the ERCOT region has been the focus of significant new analysis by ERCOT Transmission Services over the last year. Since the 2003 report, eight RMR exit strategies have been developed in response to the uneconomic cost of these generation resources. Annual savings to end-use consumers in excess of \$50 million are estimated once the recommended transmission improvements are completed. Figure 34 summarizes the transmission project completion dates of each RMR exit strategy for all contracted plants. The dates provided reflect worst-case scenarios based upon the August TPIT report. Efforts to improve on the project schedules are continuing, and upgrades within each exit strategy are prioritized to mitigate run-time on the RMR generation.

Summary of RMR Exit Strategies			
Units	Contract MW	Est. Exit Timeline	Average Monthly Cost
Rio Pecos 6	98	November 2003	\$367,526
San Angelo 2	102	October 2004	\$1,007,774
Fort Phantom 2	202	March 2005	\$1,492, 327
Eagle Mountain 3	375	April 2005	\$2,082,449
B. M. Davis 1	347	December 2005	\$2,580,341
La Palma 4-7	249	June 2006	\$2,054,621
J. L. Bates 1-2	181	June 2006	\$2,182,632
Laredo 1-3	172	June 2010	\$2,157,917
Total	1,726		\$13,925,587

Figure 34 – RMR Exit Strategies

Frequency of Congestion

For the purposes of this document “frequency” will be defined as either

- the number of 15-minute intervals that balancing energy service was used to manage congestion, or
- the number of intervals for which generating units were paid to increase or decrease their level of generation in order to manage congestion. For LBE, OOME, and RMR the frequency is based on 15-minute intervals, for OOMC on hourly intervals.

Balancing Energy Service for Congestion Management

The number of 15-minute intervals where balancing energy was needed to manage congestion is shown in Figures 35 and 36 for 2003 and 2004, respectively.

Intervals of Balancing Energy for Congestion Management	
June 1, 2003, through December 31, 2003 (20,544 intervals)	
Constraint	Intervals
South-North	800
West-North	12
South-Houston	499
North-West	13
Total	1,324

Figure 35 – Intervals of Balancing Energy for Congestion Management for 2003

Of the 20,544 intervals between June 1 and December 31, balancing energy was needed in 4% of the intervals for the South-North constraint and in 2% of the intervals for the South-Houston constraint. In 2003, the South-North constraint accounted for 60% of the times that balancing energy was used for congestion management.

Intervals of Balancing Energy for Congestion Management	
January 1, 2004, through May 31, 2004 (14,592 intervals)	
Constraint	Intervals
South-North	415
West-North	1
South-Houston	131
North-Houston	60
Northeast-North	341
Total	948

Figure 36 – Intervals of Balancing Energy for Congestion Management for 2004

Of the 14,592 intervals between January 1 and May 31, balancing energy was needed in 3% of the intervals for the South-North constraint and 2% of the intervals for the Northeast-North constraint. In 2004 for the intervals in which balancing energy was needed, the South-North constraint accounted for 44% and the Northeast-North constraint for 36%.

Local Balancing Energy Service

Figure 37 shows the number of times by area that generating units were instructed to change the operating level for local balancing energy service. It is possible to have more instructions than the number of intervals in the period. For example, if two units were needed to clear one constraint, then that is considered as two times even when it is the same interval.

Total LBE Instructions	
June 1, 2003, through July 31, 2003	
Area	Instructions
Austin	78
Corpus Christi	234
DFW	1,702
Houston	0
Laredo	0
North	6,868
San Antonio	1,046
South	1,514
Valley	210
West	409
Wind	283
Total	12,344

Figure 37 – Total LBE Instructions (Based on 15-minute intervals)

For this period the North area accounted for 56% of the local balancing energy instructions and the DFW area for 14%.

Out-of-Merit Service

Figure 38 shows the number of intervals by local area for which generating units were instructed to change the operating level for OOME and OOMC.

Total OOM Instructions		
June 1, 2003, through July 31, 2003		
Area	OOME (based on 15-minute intervals)	OOMC (based on hourly intervals)
Austin	14,922	103
Corpus Christi	19,473	618
DFW	36,727	28,420
Houston	22,513	1,852
Laredo	8	9
North	120,165	1,852
San Antonio	13,438	658
South	64,945	150
Valley	43,923	3,242
West	27,029	8,056
Wind	397,792	0
Total	760,935	44,960

Figure 38 – Total OOM Instructions

Between June 1, 2003, and May 31, 2004, the Wind area accounted for 52% of the OOME instructions. The Laredo area had the least number of OOME instructions during the period.

Between June 1, 2003, and May 31, 2004, the DFW area accounted for 63% of the OOMC instructions and the West area for 18%.

Reliability Must-Run

Between June 1, 2003, and May 31, 2004, RMR units were instructed to run 259,407 intervals for a total of 3,793,603 MWh.

Congestion Cost Summary

In accordance with Section 7 of the Protocols, ERCOT has established congestion zones and commercially significant constraints. There were four zones in 2003 and five in 2004. CSC congestion is congestion between the zones; local congestion is congestion generally within one zone. Figure 39 presents a summary of the congestion costs by cause and by the type of service procured under the ERCOT Protocols. Between June 1, 2003, and May 31, 2004, transmission congestion cost ERCOT consumers about \$390 million. Costs may have been even greater due to factors not included in this report, such as self-commitment of higher cost units by Qualified Scheduling Entities. While this figure is significant, it represents only 1.5% of the electric retail market in ERCOT.

Summary of Congestion Costs		
June 1, 2003, through May 31, 2004		
Cause	Type	Cost
CSC Congestion	Balancing Energy Service	\$22,960,124
	Replacement Reserve Service	\$0
Local Congestion	Local Balancing Energy Service	\$17,140,878
	OOME	\$101,539,160
	OOMC	\$110,936,573
RMR	RMR	\$137,996,857
	Total	\$390,573,592

Figure 39 – Summary of Congestion Costs

Reliability must-run (RMR) accounts for the largest category of the congestion costs, approximately 35%. Out-of-merit service for capacity (OOMC) accounts for about 29% and out-of-merit service for energy (OOME) about 26%. Balancing energy service for constraint management accounts for about 6%. The average cost of congestion per 15-minute interval is about \$11,040 and per day is about \$1 million.

The frequency of congestion in this document is defined as the number of intervals that balancing energy service was used for congestion management or the number of times generating units were instructed to increase or decrease output for out-of-merit service or reliability must-run. Figure 40 shows a summary of the frequencies of the different types of congestion. OOME is the most frequent type of congestion solution used, with about 71%.

Summary of Frequency of Congestion		
June 1, 2003, through May 31, 2004		
Cause	Type	Instructions
CSC Congestion	Zonal Congestion	2,272
Local Congestion	Local Balancing Energy Service	12,344
	OOME	760,935
	OOMC	44,960
RMR	RMR	259,407
	Total	1,079,918

Figure 40 – Frequency of Congestion

SECTION 2 – OVERVIEW OF ERCOT

POPULATION

The ERCOT region includes about 200,000 square miles. It is a very diverse area – topographically, climatologically, and demographically. Texas population since 1999 has grown 12.5% (2.4% per year). Figure 41 shows a map of Texas with the population projections by county for 2004 (from the Texas Health and Human Services Commission). Approximate ERCOT boundaries are shown on the map.

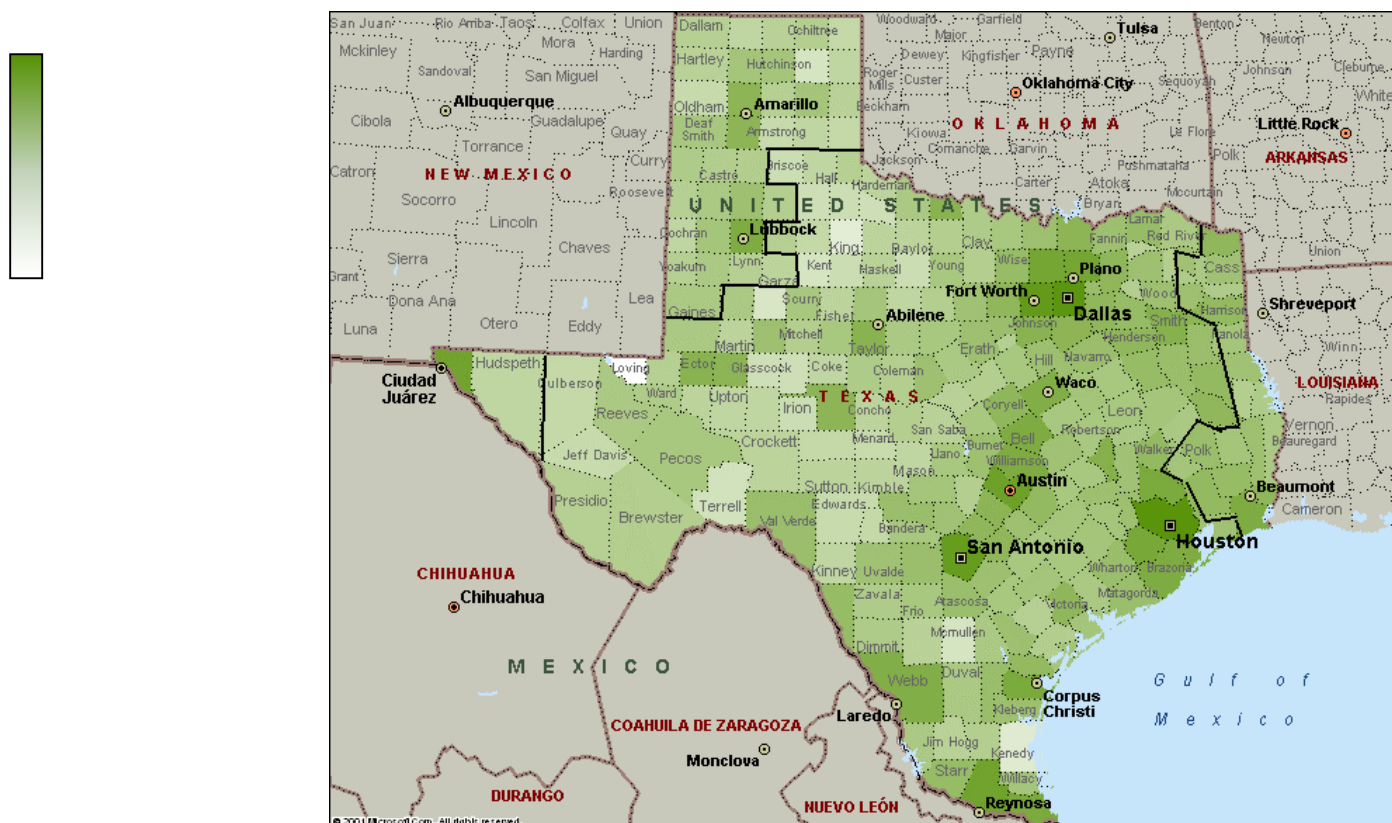


Figure 41 – 2004 Population by County

The counties range in population from Loving County in West Texas with a population of 67 to Harris County in Southeast Texas with a population over 3.6 million. The ten most populous counties in ERCOT are Harris, Dallas, Tarrant, Bexar, Travis, Hidalgo, Collin, Denton, Fort Bend, and Cameron. These counties correspond to the population centers of Houston, the Dallas/Fort Worth metroplex, San Antonio, Austin, and the Valley. The ten least populous counties in ERCOT are Loving, King, Kenedy, Borden, Kent, McMullen, Roberts, Terrell, Motley, and Sterling. These counties are in the Panhandle, West Texas, and South Texas.

LOADS

ERCOT represents a bulk electric system located totally within the State of Texas and serves about 85% of the electrical load in the state. ERCOT is a summer-peaking system, due to hot weather combined with a high saturation of air conditioning, and usually has the lowest peaks in the spring and fall.

Historical Loads

Load duration curves are a good way to get a “big picture” of the system. A load duration curve is the hourly data for a period arranged in decreasing order and plotted against the percent of time in the reference period. Figure 42 shows the load duration curves for the ERCOT system for 1993, 1998, and 2003.

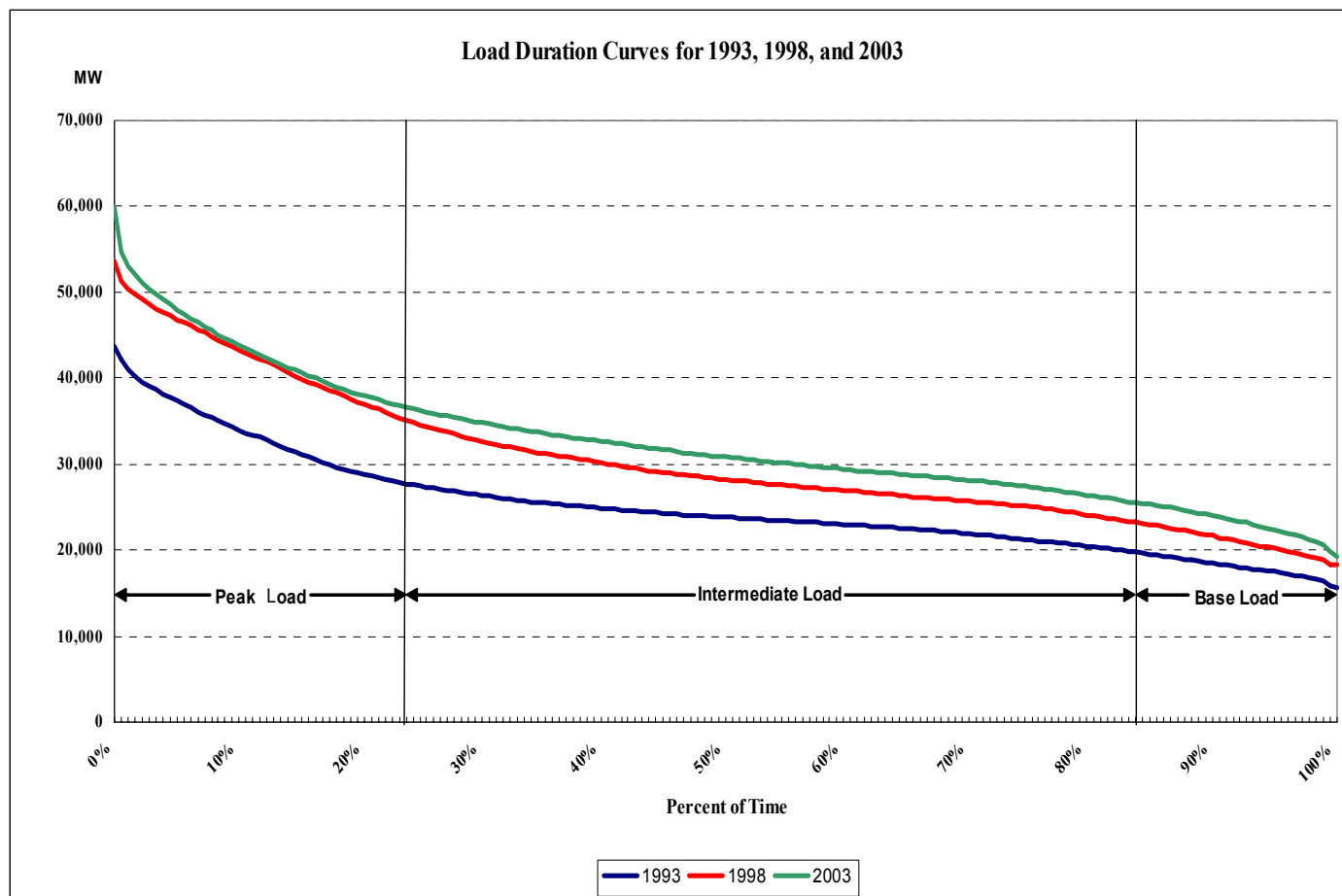


Figure 42 – Load Duration Curves for 1993, 1998, and 2003

This graph shows that the shape of the load duration curve has not changed significantly in the last ten years. The minimum demand has increased from 15,576 MW in 1993 to 19,344 MW in 2003, a compound growth rate of 2.2%. The maximum demand has increased by a compound growth rate of 3.2%. The energy usage has increased by a compound growth rate of 2.6%.

Load factor is the ratio of the average demand to the peak demand and indicates the variability in electricity demand (the higher the load factor, the less variability of demand in the system). The load factor for the ERCOT area has decreased from 57.8% in 1993 to 54.3% in 2003. This decrease indicates that there is presently more variability in the ERCOT system than previously.

Peak load can be defined as the load that occurs only 25% of the time. Base load is the minimum constant level of demand that is met at least 85% of the time. Intermediate load is the load that is met between 25% and 85% of the time. The peak, intermediate, and base loads are shown in the load duration curves. The bottom of peak load range increased from 27,471 MW in 1993 to 36,329 MW in 2003, a compound growth rate of 2.8%. The top of the base load range increased from 19,510 MW in 1993 to 25,297 MW in 2003, a compound growth rate of 2.6%. These load growth rates emphasize the importance of maintaining current generating capability and of adding new generation and transmission to the ERCOT system.

Figure 43 shows the ERCOT annual system peak values since 1994 and the annual growth rates. The peak demand for 2004 is based on initial settlement data and may change with future settlements. All other values for 2004 presented herein are forecasted.

YEAR	ERCOT COINCIDENT PEAK DEMAND, MW	ANNUAL GROWTH
1994	43,588	-
1995	46,668	7.07%
1996	47,683	2.17%
1997	50,150	5.17%
1998	53,689	7.06%
1999 (1)	54,849	2.16%
2000	57,606	5.03%
2001	55,201	-4.17%
2002	56,248	1.90%
2003	60,095	6.84%
2004	58,528	-2.61%
	Average Ten-Year Compound Growth Rate	2.99%

(1) 1999 value would have been greater if there had been no interruptible load curtailments at the time of the peak.

Figure 43 – ERCOT Coincident Peak Demand

Between 1994 and 2004 ERCOT peak demand has grown 34.3% (14,940 MW).

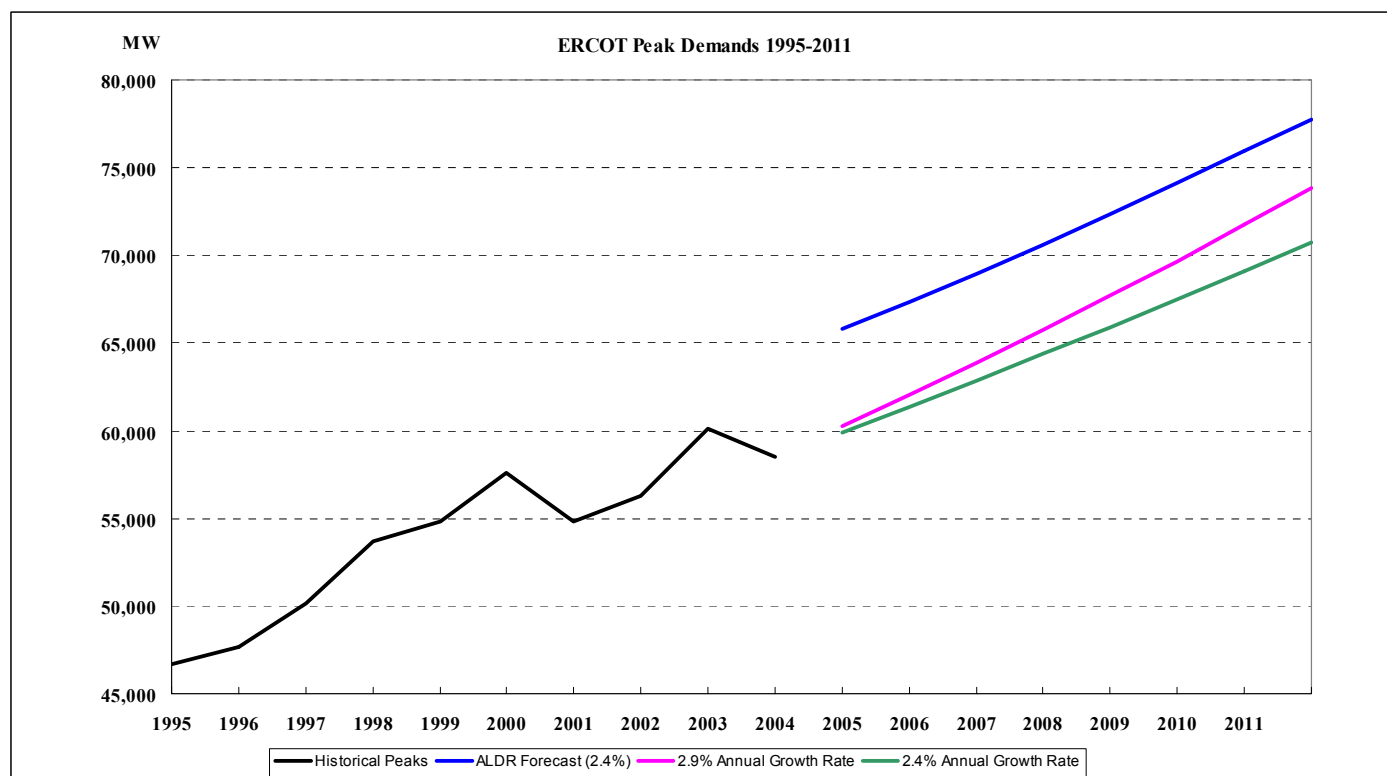


Figure 44 – ERCOT Peak Demands 1995-2012

Figure 44 shows the historical coincident peak demands from 1995 through 2004 and three forecasted peak demands for 2005 through 2012. The data for 2004 is based on initial settlement data. The Annual Load Data Request (ALDR) forecast has a 2.4% growth rate and a large increase between 2004 and 2005. The 2.9% annual growth rate is the actual annual growth rate between 1994 and 2004. The 2.4% growth rate was developed by applying the growth rate to the actual demand. The peak demand has grown considerably since 1996 and is likely to continue to grow.

Location of Demand (Load)

Figure 45 is a map of the ERCOT Region that shows the load by county for the summer of 2004. Note that the loads used in this map are non-coincident peak demand forecasts provided in the 2003 ALDR by the TDSPs.

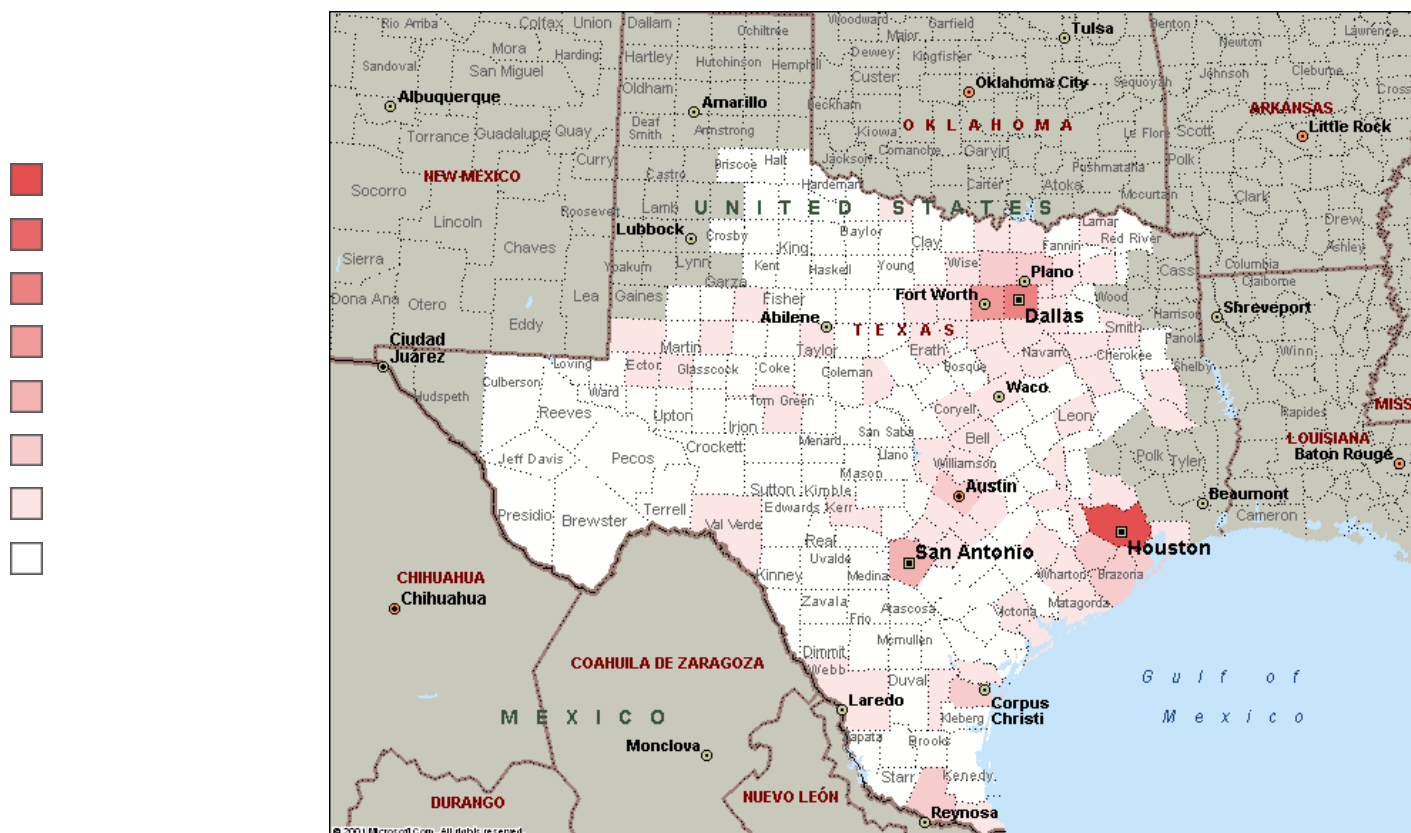


Figure 45 – Peak Load by County for Year 2004

This figure shows that the greatest load is in Harris County (12,841 MW). The rest of the ten counties with the greatest load are Dallas (8,702 MW), Tarrant (5,341 MW), Bexar (4,590 MW), Travis (2,635 MW), Collin (2,271 MW), Denton (1,643 MW), Nueces (1,392 MW), Galveston (1,391 MW), and Brazoria (1,214 MW). These high-load areas, not surprisingly, correspond to the high-population areas (Figure 41). The ten counties with the least ERCOT load are Kenedy, Borden, Terrell, Briscoe, Hall, Crosby, Franklin, Foard, Madison, and Cottle; most of these counties are in West and South Texas, where population is lower than in other parts of the state. Franklin and Madison Counties are in East Texas, where the population is greater, but the ERCOT system serves only one or two delivery points in those counties.

Figure 46 shows the expected load growth by county. These values were derived from the 2004 ALDRs.

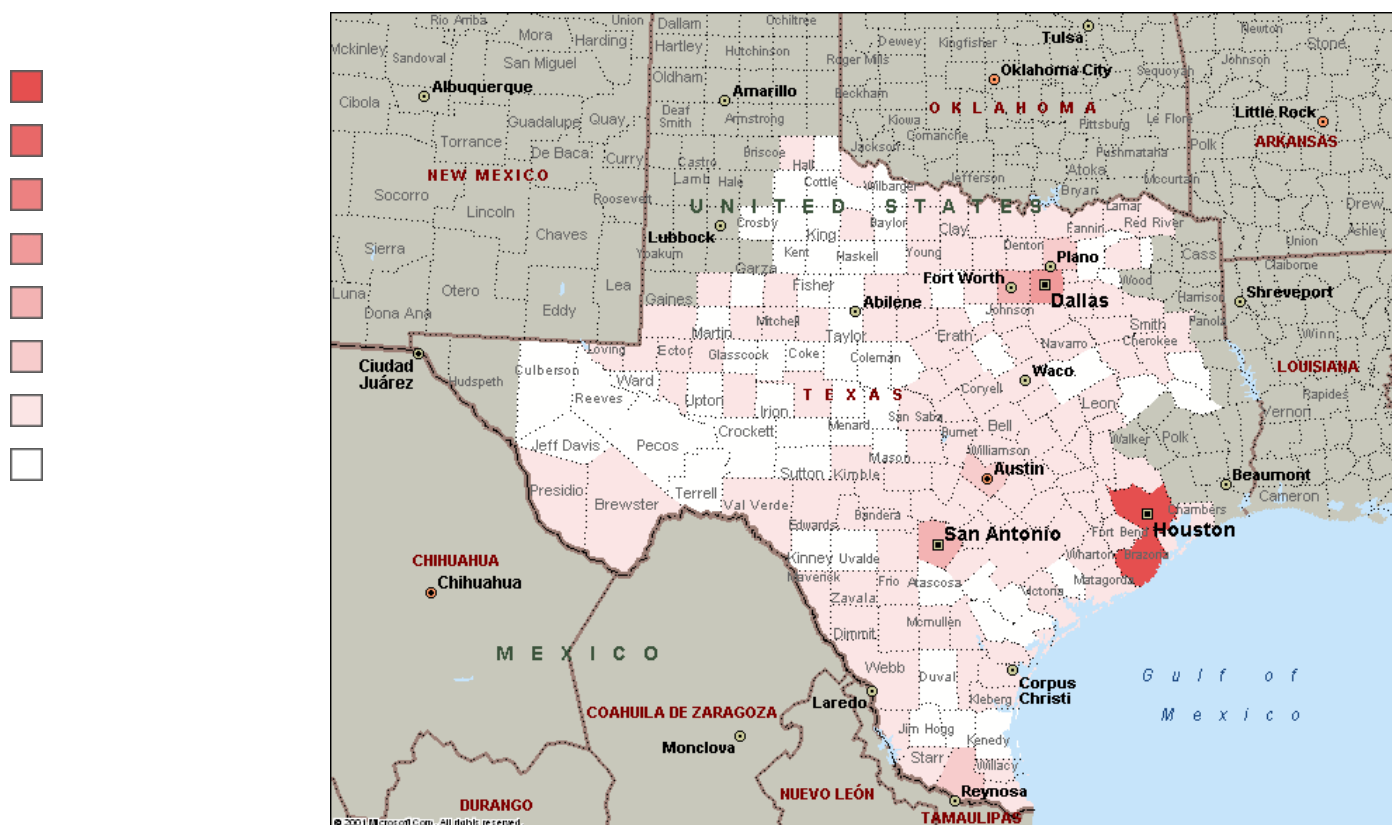


Figure 46 – Load Growth by County between 2004 and 2009

The counties with the largest expected load growth are Harris, Brazoria, Dallas, Tarrant, Bexar, Collin, Travis, Hidalgo, Denton, and Chambers. Again, these counties closely correspond to the largest population centers.

ENERGY

Figure 47 shows the historical and forecasted annual energy usage in the ERCOT Region. The historical data was derived from the ERCOT Demand and Energy Report. The annual energy for 2003 may change with the recalculation of the settlements.

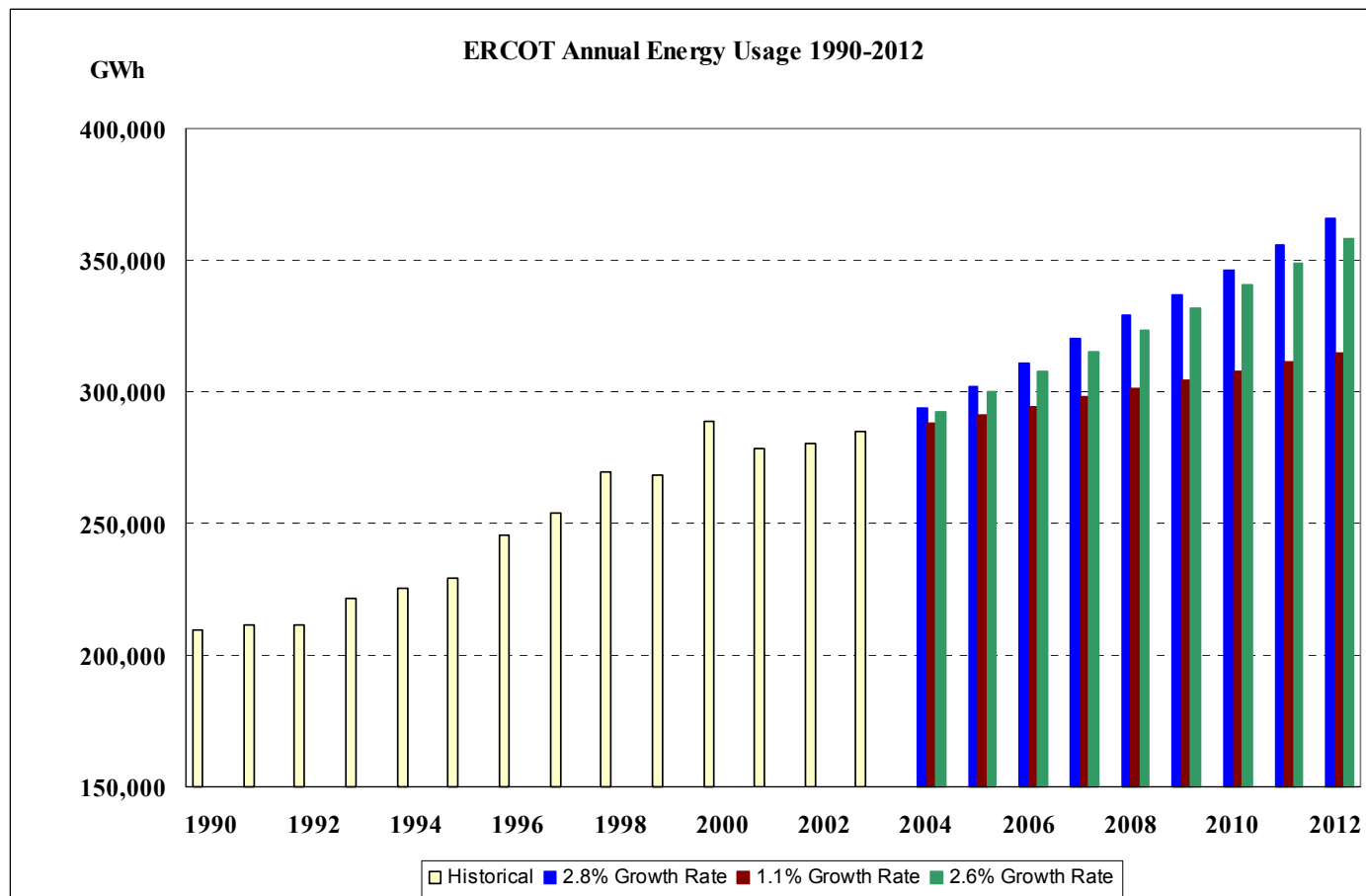


Figure 47 - ERCOT Annual Energy Usage

The 2.6% annual growth rate is the actual growth rate between 1993 and 2003. The 1.1% growth rate is the actual growth rate between 1998 and 2003. The 2.8% annual growth rate was developed from the 2004 ALDR data. The energy usage has increased steadily since 1992 except for 1999 and 2001. These decreases were due to weather that was more normal in 1999 and in 2001 after extremely hot weather in 1998 and 2000.

GENERATION

Location of Generation Capacity

Figure 48 shows a map of the ERCOT Region with the location of the existing generation capacity by county. These values are based on information from the generating companies and include switchable capacity (capacity capable of serving both ERCOT and another regional council), DC ties, self-serve generation available for the grid, and distributed generation. The capacities of mothballed units are included in these values.

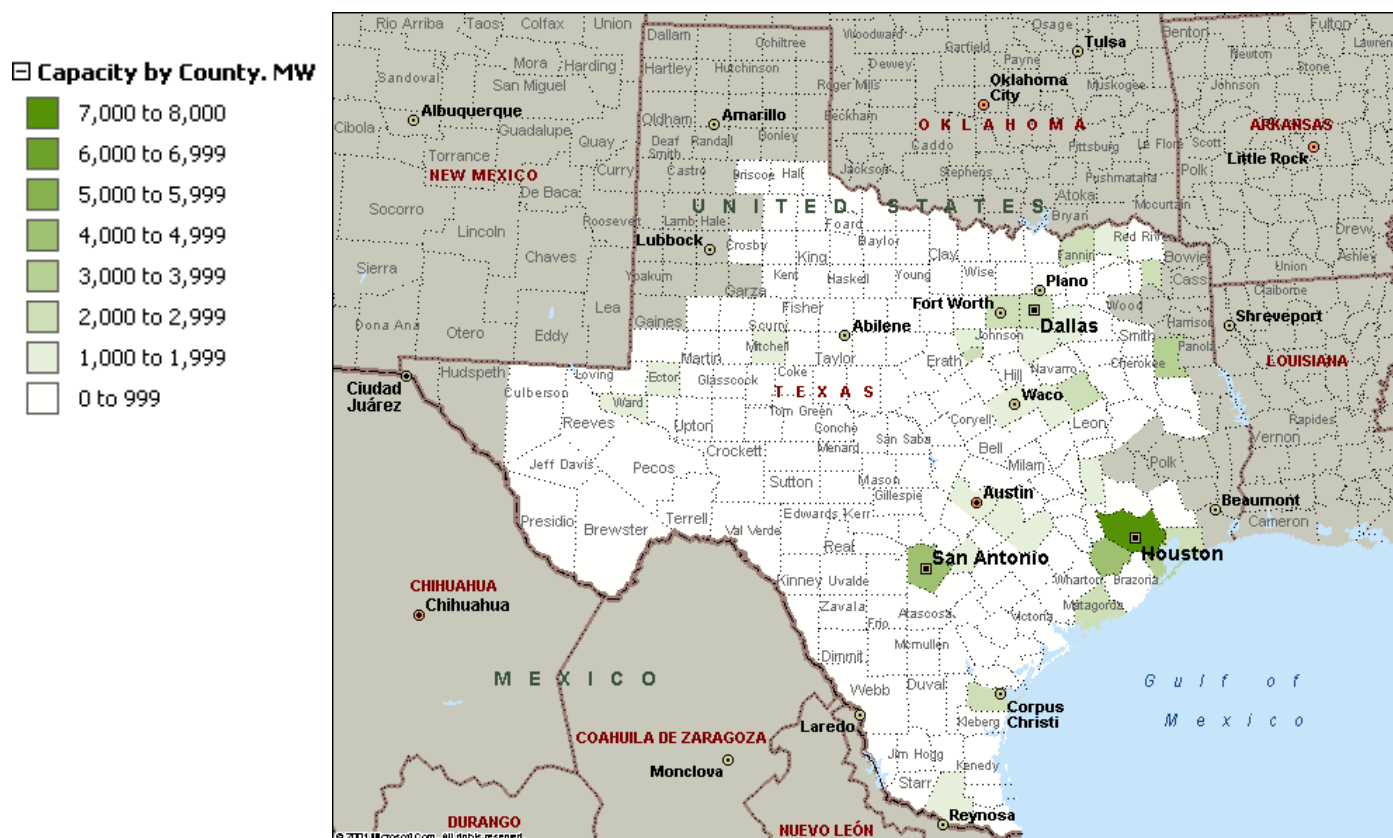


Figure 48 – Generation Capacity by County for the Year 2004

The counties with the greatest amount of capacity are Harris (7,723 MW), Bexar (4,464 MW), Fort Bend (4,326 MW), Galveston (3,367 MW), Rusk (3,115 MW), Chambers (2,739 MW), Dallas (2,586 MW), Matagorda (2,529 MW), Titus (2,475 MW), and Fannin (2,379 MW).

Import/Export

Figure 49 consolidates peak load by county (Figure 45) and generation by county (Figure 48) to show generation import/export by county in the ERCOT system for the year 2004. If a county has more generation than peak load (blue on the map), then it will “export” generation to other counties. If a county has more peak load than generation (red on the map), then it must “import” generation. Because this is a calculation, it is presented for example only. The true values will depend on actual load levels and actual generation dispatch.

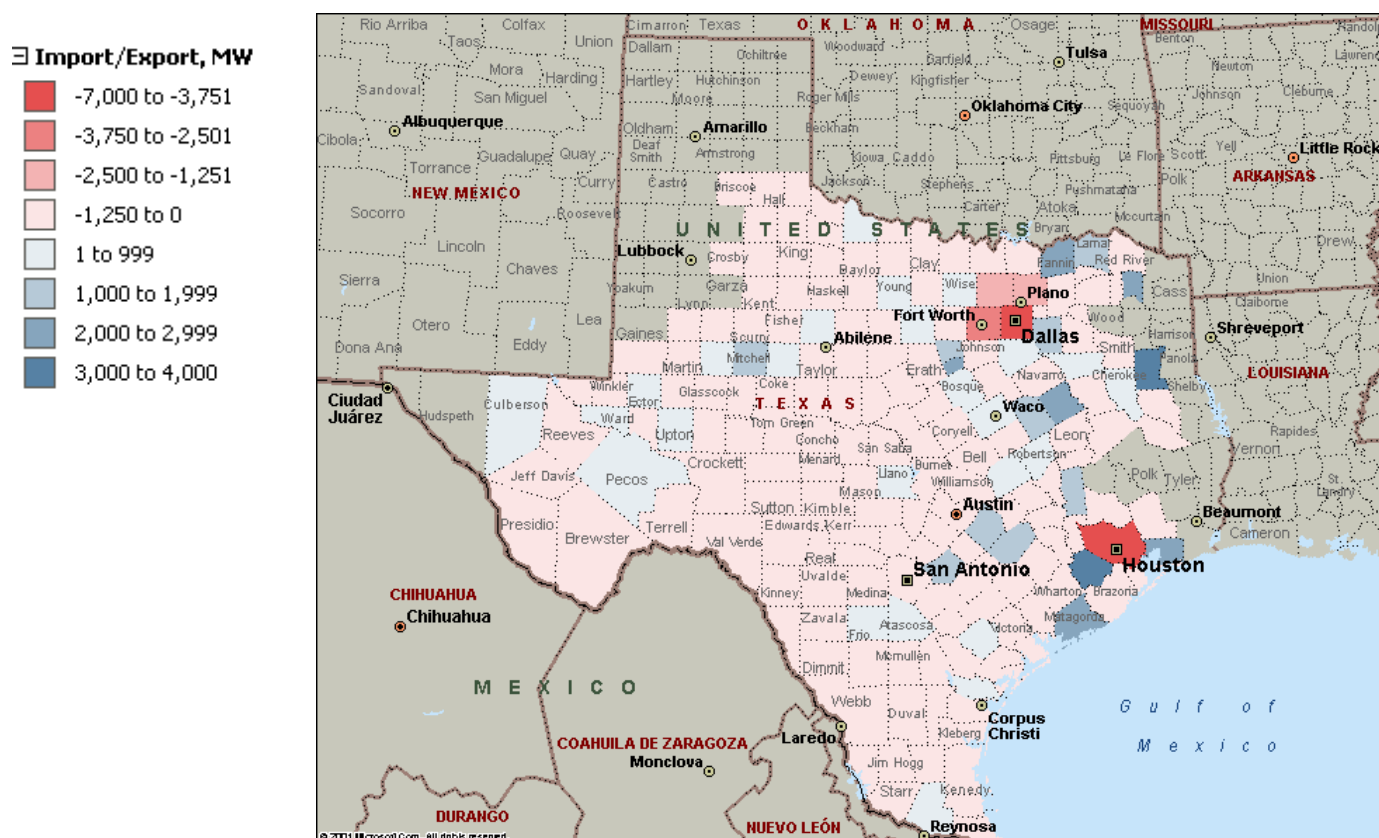


Figure 49 – Generation Import/Export by County for the Year 2004

For the year 2004 for non-coincident peak load, the counties that import the most generation are Dallas, Harris, Tarrant, Collin, Denton, Williamson, Bell, Travis, Brazoria, and Smith. These counties are the most dependent on transmission to meet customers’ energy needs. The counties that are able to export the most generation are Fort Bend, Rusk, Chambers, Titus, Matagorda, Fannin, Somervell, Freestone, Hood, and Fayette.

New Generation Capacity

Since 1997, ERCOT has received more than 209 requests from across the state for generation interconnection. Load growth in the state, the revisions to the PUCT transmission rules, and market deregulation appear to be attracting merchant plant developers to the Texas market. There is still some uncertainty associated with the proposed plants because many are in competition with one another and some may not be built. Figures 50 and 51 show the new generation capacity proposed and the generation interconnection request activity for the ERCOT system.

In-Service Year	New Generation Capacity with Interconnection Agreements
2004 (Sep-Dec)	48 MW
2005	314 MW
2006	767 MW

Figure 50– New Generation Capacity

Generation Currently Under Development as of 10/01/04				
Active Generation Interconnection Requests	North	South	West	Total ERCOT
Security Screening Study (SSS)	1	0	1	2
SSS Completed	1	1	5	7
Full Interconnection Study (FIS)	3	3	10	16
FIS Completed	1	3	2	6
Capacity, MW	4,979	1,656	3,798	10,433
Wind, MW	0	720	3,798	4,518

Figure 51– Generation under Development

Proposed new generation may help relieve the current transmission constraints in ERCOT, but, in turn, new generation might worsen the constraints because the existing transmission system cannot fully accommodate the proposed new plants. New generation projects, as well as load growth patterns, direct the need and placement of new transmission additions. The uncertainty of proposed plants and the generation they will displace may result in some imprecise transmission planning at any given time. Therefore, planning for any new transmission additions should provide the capacity above that required for currently identified contingencies.

In this discussion, counties with the greatest population, peak load, peak load growth, generation capacity, and generation capacity growth have been ranked by magnitude. Figure 52 summarizes this information, showing load growth through 2009 but capacity growth only through 2006 because this is the only data available. It is expected that other generation will be built between 2006 and 2009.

ERCOT Top Ten Counties by -						
Population (2004)	Peak Load (2004)	Peak Load Growth (2004- 2009)	Generation Capacity (2004)	Generation Capacity Growth (2005- 2006)	IMPORT (2004)	EXPORT (2004)
Harris	Harris	Harris	Harris	Jack	Dallas	Fort Bend
Dallas	Dallas	Brazoria	Fort Bend	Nolan	Harris	Rusk
Tarrant	Tarrant	Dallas	Bexar	Eastland	Tarrant	Chambers
Bexar	Bexar	Tarrant	Galveston	Culberson	Collin	Titus
Travis	Travis	Bexar	Rusk		Denton	Matagorda
Hidalgo	Collin	Collin	Chambers		Williamson	Fannin
Collin	Denton	Travis	Dallas		Bell	Somervell
Denton	Nueces	Hidalgo	Matagorda		Travis	Freestone
Fort Bend	Galveston	Denton	Titus		Brazoria	Hood
Cameron	Brazoria	Chambers	Fannin		Smith	Fayette

Figure 52 – Top Ten Counties Ranked in Order

Although Harris County has both the highest load and capacity in 2004, its capacity is considerably less (about 6,000 MW) than its load. Several counties (Fort Bend, Galveston, Chambers) near Harris County have capacity available to supply the load in Harris County. In addition, much of the generation from Matagorda County is used in the Houston area. The transmission system is essential for moving the generation from surrounding counties to Harris County.

It is significant that the county that has the second largest load in 2004 and ranks high in load growth is only seventh in capacity and has no planned new capacity. The counties in the central Dallas/Fort Worth area (Dallas, Tarrant, Collin, Denton) in year 2004 have a combined load of about 18,000 MW but a combined capacity of only about 5,400 MW. Other counties near the DFW area (Hood, Ellis, Grayson, and Somervell) have about 5,800 MW of capacity available for export. Dallas, Tarrant, Collin, and Denton Counties all are in the top ten for load and load growth, but only Dallas County appears in the top ten for capacity. There will be new capacity in Jack County to help serve the DFW area. The transmission system will be critically important for delivering power to the Dallas/Fort Worth area.

Age of Generating Capacity

One aspect that should be considered in determining available capacity is the age of existing units and whether there will be enough new capacity to compensate for load growth requirements and possible retirement of older units. To reflect the possibility of unit retirements, the ages of the units were analyzed by using the in-service dates. The areas used in this analysis are the ERCOT weather zones (Figure 53), and the ages of the plants in those areas were investigated. The results are illustrated in Figure 54.

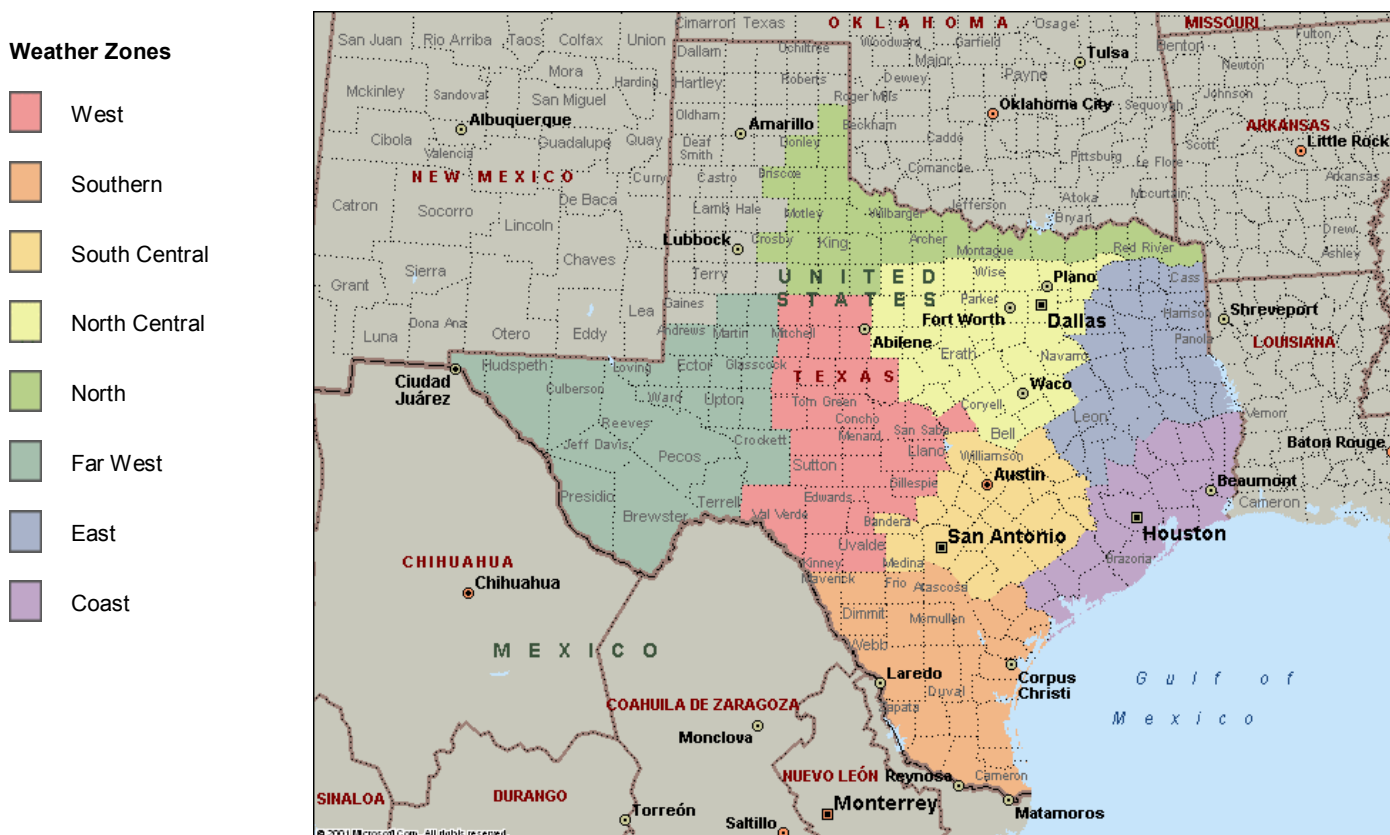


Figure 53 – Areas (ERCOT Weather Zones) Used in Age-of-Plant Analysis

Generation Capacity by Weather Zone and Ages of Plants in 2004						
Weather Zone	Age of Plants					
	> 50	49-40	39-30	29-20	19-10	<10
	MW	MW	MW	MW	MW	MW
Coast	161	2,100	7,159	3,876	3,852	5,234
East	0	210	2,533	4,158	305	2,748
Far West	2	256	545	0	580	1,910
North	106	257	1,054	40	998	2,244
North Central	468	2,326	4,214	2,106	4,324	5,642
South Central	362	655	3,159	2,591	1,280	4,613
Southern	247	558	1,268	1,533	0	2,981
West	84	268	1,226	276	724	327
Total	1,430	6,630	21,157	14,580	12,064	25,699

Figure 54 – Generation Capacity by Area and Age of Plants

Most of the capacity greater than 50 years old is in the North Central area, followed by the South Central area. Most of the capacity greater than 30 years old is Coast area. Most of the newer capacity (less than 10 years old) is in the North Central and Coast areas. Older units usually require more maintenance and are generally more expensive to run than newer units.

About 900 MW of generation retired between October 2003 and September 2004. Of this retired generation 400 MW was older than 50 years, another 400 MW was 40 to 50 years old, and the remaining retirements were less than 30 years old. Most of this generation was in the North Central area. Another 278 MW of generation will retire by summer 2005 and is 40 to 50 years old. Most of this generation is in the South Central area.

Figure 55 shows the total generation capacity for summer peaks (including proposed generation projects with interconnection agreements), plots of the capacity with the older units retired, and the forecasted peak demand. The fact that a unit is over 30 years old does not necessarily mean that the unit will retire.

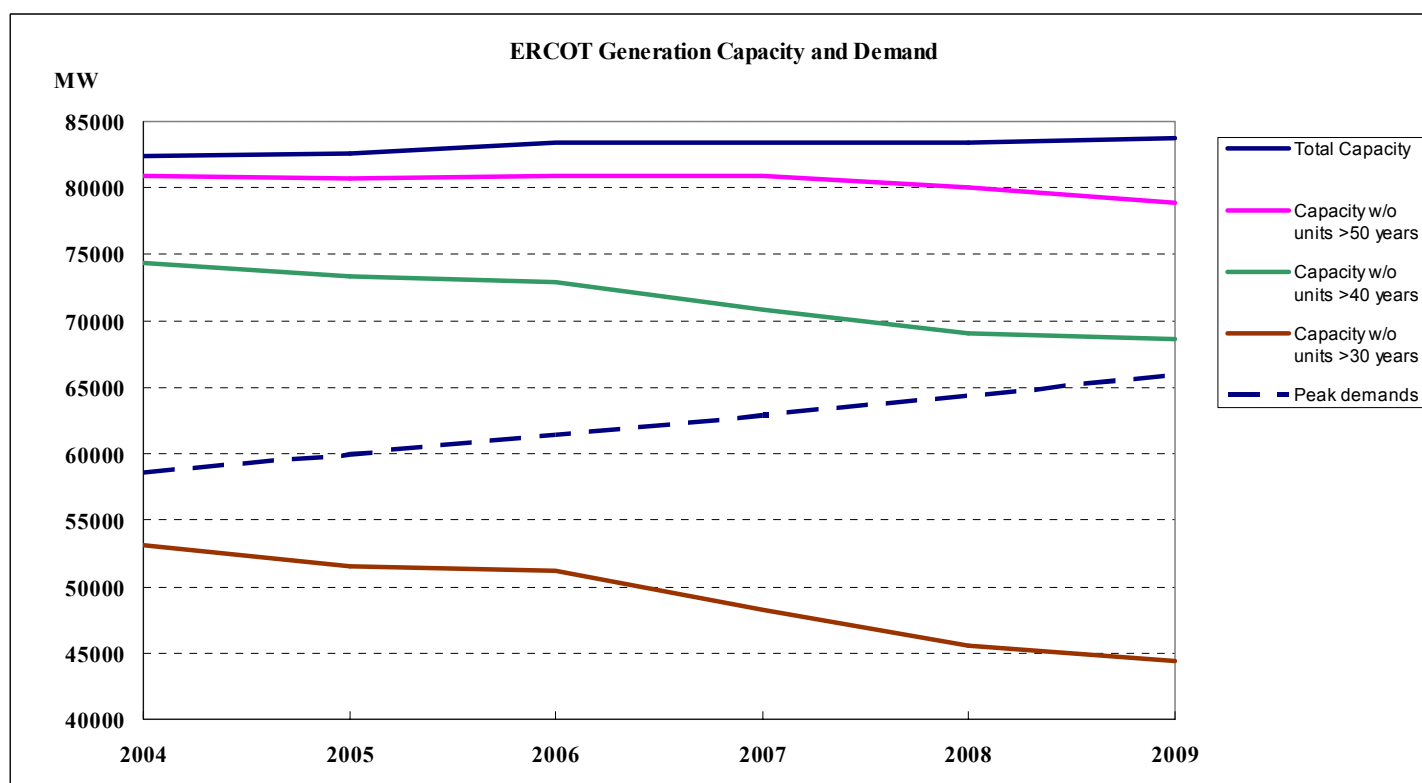


Figure 55 – ERCOT Capacity and Demand (2.4% Annual Growth Rate)

APPENDIX A – TRANSMISSION PROJECT INFORMATION TRACKING (TPIT)

Transmission project listing as of August, 2004, Submitted by Transmission Owners

In-Service Year	Project Title	TDSP	Primary Planning Region	Location County Start	Location County End	Level kV
2004	Zorn Auto	LCRA	SOUTH	GUADALUPE		345
2004	Cedar Bayou - North Belt ckt.99	CNP	SOUTH	CHAMBERS	HARRIS	345
2004	Chambers - King ckt. 97	CNP	SOUTH	CHAMBERS	HARRIS	345
2004	Royse 345 138-kV autotransformer	TXU ED	NORTH	ROCKWALL		345
2004	Sargent Rd. 345 138-kV autotransformer	TXU ED	NORTH	DALLAS		345
2004	Everman 345 138-kV autotransformer	TXU ED	NORTH	TARRANT		345
2004	Valley - Anna 345-kV line upgrade	TXU ED	NORTH	FANNIN	COLLIN	345
2004	Jeanetta 345 138-kV autotransformer	CNP	SOUTH	HARRIS	HARRIS	345
2004	W.A. Parish - Dow ckt.99	CNP	SOUTH	FORT BEND	BRAZORIA	345
2004	W.A. Parish - Obrien ckt.99	CNP	SOUTH	FORT BEND	FORT BEND	345
2004	T.H. Wharton 345 138-kV autotransformer	CNP	SOUTH	HARRIS	HARRIS	345
2004	Twin Buttes, add SS with 345 138-kV autotransformer	LCRA AEP	WEST	TOM GREEN		345
2004	W.A. Parish - Obrien ckt.98	CNP	SOUTH	FORT BEND	FORT BEND	345
2004	W.A. Parish - Oasis ckt.99	CNP	SOUTH	FORT BEND	BRAZORIA	345
2004	Oasis Switching Station	CNP	SOUTH	BRAZORIA	BRAZORIA	345
2004	Red Creek, add 100 MVar shunt reactor	AEP TNC	WEST	TOM GREEN		345
2004	Mulberry Creek, add 36 MVar shunt reactor	AEP TNC	WEST	TAYLOR		345
2004	Watermill - W. Levee (2nd) 345-kV circuit	TXU ED	NORTH	DALLAS	DALLAS	345
2004	Obrien 345 138-kV autotransformer	CNP	SOUTH	FORT BEND	FORT BEND	345
2004	Watermill - Tricorner 345-kV line	TXU ED	NORTH	DALLAS	DALLAS	345
2004	West Yates SS to Mesa View, upgrade 69-kV line	LCRA AEP	WEST	PECOS	PECOS	138
2004	Industrial - E Levee 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Tomball - Pinehurst ckt.81	CNP	SOUTH	HARRIS	MONTGOMERY	138
2004	Atascosita - Kingwood ckt.66	CNP	SOUTH	HARRIS	HARRIS	138
2004	Brownwood - Bangs 138-kV and 69-kV line	TXU ED, AEP, LCRA	WEST	BROWN	COLEMAN	138
2004	Hill Country to Stonegate 138-kV line	CPS	SOUTH	BEXAR	BEXAR	138
2004	Mesa View to Mesa View SS, rebuild 138-kV line	LCRA AEP	WEST	PECOS	PECOS	138
2004	Rio Pecos to Crane, upgrade 69-kV to 138-kV line	LCRA AEP	WEST	PECOS	CRANE	138
2004	Inteq - Intercontinental ckt.67	CNP	SOUTH	HARRIS	HARRIS	138
2004	North Belt - Inteq ckt.67	CNP	SOUTH	HARRIS	HARRIS	138
2004	T.H. Wharton - Kluge ckt.21	CNP	SOUTH	HARRIS	HARRIS	138
2004	Burleson to Sand Hill 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2004	Burleson to Sand Hill 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2004	P.H. Robinson - Webster Tap ckt.92	CNP	SOUTH	GALVESTON	HARRIS	138
2004	Addicks - Satsuma Tap ckt.21	CNP	SOUTH	HARRIS	HARRIS	138
2004	Bellaire - Garrot ckt.37	CNP	SOUTH	HARRIS	HARRIS	138
2004	Sargent - Parkdale 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Barton to Patton Lane project	AEN	NORTH	TRAVIS	TRAVIS	138
2004	Palo Alto 138-kV 13-kV Substation	BPUB	SOUTH	CAMERON		138
2004	Barton to Patton Lane project	AEN	NORTH	TRAVIS	TRAVIS	138

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2004	Denton Dr - Morrison 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Allen Substation 138-kV capacitors	TXU ED	NORTH	COLLIN		138
2004	Blackland 138-kV capacitors	TXU ED	NORTH	ROCKWALL		138
2004	Allen North Substation 138-kV capacitors	TXU ED	NORTH	COLLIN		138
2004	Terrell Switch 138-kV capacitors	TXU ED	NORTH	KAUFMAN		138
2004	Rio Pecos to N McCamey, rebuild 138-kV line	LCRA AEP	WEST	UPTON	PECOS	138
2004	P.H. Robinson -Telephone Tap ckt.06	CNP	SOUTH	GALVESTON	BRAZORIA	138
2004	P.H. Robinson - Telephone Tap ckt.91	CNP	SOUTH	GALVESTON	BRAZORIA	138
2004	Hockley - Macedonia ckt.1	LCRA, CNP	SOUTH	HARRIS	WALLER	138
2004	North Belt	CNP	SOUTH	HARRIS	HARRIS	138
2004	Greens BayouC - Lychem ckt.08 & Greens BayouE - Explor ckt 03	CNP	SOUTH	HARRIS	HARRIS	138
2004	Polaris - Genoa Tap ckt.95	CNP	SOUTH	HARRIS	HARRIS	138
2004	Greens Bayou - Humble ckt.94	CNP	SOUTH	HARRIS	HARRIS	138
2004	Veterans - Willow ckt.81	CNP	SOUTH	HARRIS	HARRIS	138
2004	Garden Villas	CNP	SOUTH	HARRIS	HARRIS	138
2004	Wynn Joyce-Rosehill 138-kV line	GARLAND	NORTH	DALLAS		138
2004	Rosehill 138-kV new substation	GARLAND	NORTH	DALLAS		138
2004	Rosehill-Lyons 138-kV line	GARLAND	NORTH	DALLAS		138
2004	Hillsboro - Whitney 138-kV line	TXU ED	NORTH	HILL	BOSQUE	138
2004	Mansfield Substation 138-kV capacitors	TXU ED	NORTH	TARRANT		138
2004	Copperas Cove - Copperas Cove LCRA 138-kV line	TXU ED	NORTH	CORYELL	CORYELL	138
2004	Temple - N Temple 138-kV line	TXU ED	NORTH	BELL	BELL	138
2004	Killeen Fort Hood Tap - Killeen W 138-kV line	TXU ED	NORTH	BELL	BELL	138
2004	Round Rock - Round Rock Westinghouse 138-kV line	TXU ED	NORTH	TRAVIS	WILLIAMSON	138
2004	Hackberry - N Lake 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Allen Switch 345 138-kV autotransformer series reactor	TXU ED	NORTH	COLLIN		138
2004	Benbrook - Wedgwood 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2004	Shamburger - SE Tyler 138-kV line	TXU ED	NORTH	SMITH	SMITH	138
2004	Odessa EHV - Glenhaven 138-kV line	TXU ED	WEST	ECTOR	ECTOR	138
2004	Kirkland Park - TI 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Hardy	CNP	SOUTH	HARRIS	HARRIS	138
2004	Northaven - Alpha Rd 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Temple Switch 345 138-kV autotransformer series reactors	TXU ED	NORTH	BELL		138
2004	Allen Switch - Ben Davis 138-kV line series reactor	TXU ED	NORTH	COLLIN		138
2004	Comfort-Verde Creek	LCRA	SOUTH	KENDALL	KERR	138
2004	Hockley-Macedonia	LCRA	NORTH	WALLER	HARRIS	138
2004	Bellville South-Peters	LCRA	SOUTH	AUSTIN		138
2004	Kendall-Kerville Stadium	LCRA	SOUTH	KENDALL	KERR	138
2004	Salem-Bellville South	LCRA	NORTH	WASHINGTON	AUSTIN	138
2004	P.H. Robinson - Webster ckt.93	CNP	SOUTH	GALVESTON	HARRIS	138
2004	Frontera to South Mission	SU	SOUTH	HIDALGO		138

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2004	Fair Oaks Ranch 138-kV Substation	CPS	SOUTH	KENDALL	KENDALL	138
2004	Veterans - Gears ckt.67	CNP	SOUTH	HARRIS	HARRIS	138
2004	Cedar Bayou W - Chevron ckt.86	CNP	SOUTH	HARRIS	HARRIS	138
2004	Mont Belvieu - Warvue ckt.84	CNP	SOUTH	HARRIS	CHAMBERS	138
2004	Cedar Bayou D - Warvue ckt.84	CNP	SOUTH	HARRIS	CHAMBERS	138
2004	SAPS to Big Lake, cut-in Twin Buttes with dble crct 138-kV line	LCRA AEP	WEST	IRION	TOM GREEN	138
2004	Twin Buttes cut-in to SAPS, rebuild 138-kV line	LCRA AEP	WEST	IRION	TOM GREEN	138
2004	Pedernales STATCOM	AEN	NORTH	TRAVIS	TRAVIS	138
2004	Mountain Creek - Westmoreland 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	North McCamey to Crane, add second 138-kV circuit	LCRA AEP	WEST	CRANE	UPTON	138
2004	Rio Pecos to North McCamey, add second 138-kV circuit	LCRA AEP	WEST	UPTON	PECOS	138
2004	Rio Pecos to Mesa View SS, rebuild 138-kV Line	LCRA AEP	WEST	PECOS	PECOS	138
2004	P.H. Robinson - ISP ckt.1	CNP, TNMP	SOUTH	GALVESTON	GALVESTON	138
2004	Stonegate to Green Mountain 138-kV line	CPS	SOUTH	BEXAR	BEXAR	138
2004	Ben Hur to Perry and Ben Hur to Prairie Hill Rebuild	BEC	NORTH	FALLS	LIMESTONE	138
2004	North Pharr, add 138-kV SS	AEP TCC	SOUTH	HIDALGO		138
2004	South Mission, upgrade two 68-kV distributioin banks	AEP TCC	SOUTH	HIDALGO		138
2004	Dunvale - Sharps ckt.05	CNP	SOUTH	HARRIS	HARRIS	138
2004	Jeanetta - Dunvale ckt.05	CNP	SOUTH	HARRIS	HARRIS	138
2004	Westwood - Jeanetta ckt.25	CNP	SOUTH	HARRIS	HARRIS	138
2004	Spring to Jordan Conversion	BEC	NORTH	COOKE	COOKE	138
2004	Tintop to Brock Reconductor	BEC	NORTH	PARKER	PARKER	138
2004	Paris - Commerce 69-kV line	TXU ED	NORTH	LAMAR	HUNT	138
2004	South Mission to Bentsen	SU	SOUTH	HIDALGO		138
2004	Bentsen to South McAllen	SU	SOUTH	HIDALGO		138
2004	Santa Anna, add 138-kV SS	AEP TNC	WEST	COLEMAN		138
2004	Santa Anna to Bangs, build 138-kV line	LCRA AEP	WEST	COLEMAN	BROWN	138
2004	Bellaire - Brays ckt.09	CNP	SOUTH	HARRIS	HARRIS	138
2004	T.H. Wharton - Gears ckt.95	CNP	SOUTH	HARRIS	HARRIS	138
2004	Klein - Willow ckt.81	CNP	SOUTH	HARRIS	HARRIS	138
2004	Jefferson - College ckt.06	CNP	SOUTH	HARRIS	HARRIS	138
2004	North McCamey 138-kV Substation, add two breakers to split breaker and half busses	LCRA AEP	WEST	UPTON		138
2004	Loma Alta 138-kV Substation	BPUB	SOUTH	CAMERON		138
2004	Sandow - Minerva - Robertson 138-kV line	TXU ED	NORTH	MILAM	ROBERTSON	138
2004	Selden (BEC) - Walnut Springs 138-kV line	TXU ED	NORTH	ERATH	BOSQUE	138
2004	Everman - Forest Hill 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2004	Rockwall - E Richardson 138-kV line	TXU ED	NORTH	ROCKWALL	DALLAS	138
2004	McColl to N McAllen, reconductor upgrade double circuit 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2004	Benbrook - Calmont 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2004	Midessa - Midland W 138-kV line	TXU ED	NORTH	MIDLAND	MIDLAND	138
2004	Odessa EHV - TI Tap 138-kV line	TXU ED	WEST	ECTOR	ECTOR	138

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2004	Watermill - Lancaster 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Midtown 138-kV Substation	BPUB	SOUTH	CAMERON		138
2004	Roma, add 138-kV SS	AEP TCC	SOUTH	STARR		138
2004	Forest Hill 138 69-kV autotransformer	TXU ED	NORTH	TARRANT		138
2004	Hamilton Wolfe 138-kV Substation	CPS	SOUTH	BEXAR	BEXAR	138
2004	Rincon to Rockport, rebuild 138-kV line	LCRA AEP	SOUTH	SAN PATRICIO	ARANSAS	138
2004	Bates to Frontera, reconductor 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2004	Dallas 800 900 - Greenville 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	South Lane - Wharton ckt.60	CNP	SOUTH	WHARTON	WHARTON	138
2004	Roanoke - Keller 138-kV line	TXU ED	NORTH	DENTON	TARRANT	138
2004	NW Carrollton - Carrollton Frankford 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2004	Killeen Switch - Killeen Taft 138-kV line	TXU ED	NORTH	BELL	BELL	138
2004	Collin - Colony 138-kV line	TXU ED	NORTH	COLLIN	DENTON	138
2004	Crane to McElroy, build 69kV line	AEP TNC	WEST	CRANE	CRANE	69
2004	Retrieve - West Columbia ckt.47	CNP	SOUTH	BRAZORIA	BRAZORIA	69
2004	Velasco - Retrieve ckt.47	CNP	SOUTH	BRAZORIA	BRAZORIA	69
2004	Reconnect Foster 69-kV Substation	CNP	SOUTH	FORT BEND	FORT BEND	69
2004	Newman-Miller 69-kV line	GARLAND	NORTH	DALLAS		69
2004	Forest Hill - Bryan Tap 69-kV line	TXU ED	NORTH	TARRANT	TARRANT	69
2004	Whitney to Powell Rebuild	BEC	NORTH	BOSQUE	BOSQUE	69
2004	Texas City, Amoco-Terminal 69kV line rebuild	TNMP	SOUTH	GALVESTON	GALVESTON	69
2004	Santa Anna to Bangs, rebuild 69-kV circuit	AEP TNC	WEST	COLEMAN	COLEMAN	69
2004	Walnut-Fairdale 69-kV line	GARLAND	NORTH	DALLAS		69
2004	Dallas North Network Substation 13.2-kV capacitors	TXU ED	NORTH	DALLAS		
2004	Dallas West Network Substation 13.2-kV capacitors	TXU ED	NORTH	DALLAS		
2004	Marshall Substation	RCEC	NORTH	KAUFMAN		
2004	Forney West Substation	RCEC	NORTH	KAUFMAN		
2005	Anna 345 138-kV autotransformer	TXU ED	NORTH	COLLIN		345
2005	Eagle Mountain 345-kV breakers	TXU ED	NORTH	TARRANT		345
2005	Lake Creek second 345 138-kV autotransformer	TXU ED	NORTH	MCLENNAN		345
2005	Martin Lake 345-kV breakers	TXU ED	NORTH	RUSK		345
2005	Monticello 345-kV breaker	TXU ED	NORTH	TITUS		345
2005	Watermill - Cedar Hill (2nd) 345-kV circuit	TXU ED	NORTH	DALLAS	DALLAS	345
2005	Roanoke Switch 345 138-kV autotransformer	TXU ED	NORTH	DENTON		345
2005	Zorn Auto	LCRA	SOUTH	GUADALUPE		345
2005	Salem 345 138-kV autotransformer upgrade	LCRA	SOUTH	WASHINGTON		345
2005	Kendall 345 138-kV autotransformer # 2	LCRA	SOUTH	KENDALL		345
2005	Paris Switch - Anna 345-kV line	TXU ED	NORTH	LAMAR	COLLIN	345
2005	Mesa View SS to Ft Lancaster, rebuild 138-kV Line	LCRA AEP	WEST	PECOS	PECOS	138
2005	Roma, convert 2 distribution banks to 138-kV	AEP TCC	SOUTH	STARR		138
2005	Texas City, PH Robinson-ISP-Greenbelt 138kV Line Reconductor	TNMP	SOUTH	GALVESTON	GALVESTON	138
2005	Harmony Hills to Castle Hills to Med. Center 138kV Reconductor	CPS	SOUTH	BEXAR	BEXAR	138

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2005	TAMU to South Switch	BTU	NORTH	BRAZOS	BRAZOS	138
2005	Alton to AEP N. McAllen 138kV Tie Line & Palmhurst Switching Station	MVEC	SOUTH	HIDALGO		138
2005	Toyota 138-kV Substation	CPS	SOUTH	BEXAR	BEXAR	138
2005	Polk to Halls Acres, reconductor 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2005	Grandview to Happy Hill Switch Rebuild	BEC	NORTH	JOHNSON	JOHNSON	138
2005	Mulberry Creek, add 2-138-kV 10 Ohm series reactors	AEP TNC	WEST	TAYLOR		138
2005	Reno to Cottondale Switch	BEC	NORTH	WISE	PARKER	138
2005	Falcon SS, add 138-kV SS	AEP TCC	SOUTH	STARR		138
2005	Construct Goodyear 138KV Substation	CNP	SOUTH	HARRIS	HARRIS	138
2005	Laredo to Anna Street, upgrade 69-kV line	AEP TCC	SOUTH	WEBB	WEBB	138
2005	MVEC Pharr to North Pharr, reconductor 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2005	Garceno to Roma, upgrade 69-kV to 138-kV line	LCRA AEP	SOUTH	STARR	STARR	138
2005	N. Edinburg to W. Edinburg, rebuild 138-kV line	MVEC	SOUTH	HIDALGO		138
2005	Big Springs - Cosden 138-kV line	TXU ED	NORTH	HOWARD	HOWARD	138
2005	Liggett - Euless 138-kV line	TXU ED	NORTH	DALLAS	TARRANT	138
2005	Benbrook - Mistletoe 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2005	Iron Bridge 138 69-kV autotransformer	TXU ED	NORTH	HUNT		138
2005	East Munday, add 28.8 MVAR cap	AEP TNC	WEST	CALLAHAN		138
2005	Carrollton East system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	Cedar Bayou - Strang ckt.87	CNP	SOUTH	CHAMBERS	HARRIS	138
2005	Cedar Hill Switch system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	East Abilene, add 28.8 MVAR cap	AEP TNC	WEST	TAYLOR		138
2005	Eastside	CNP	SOUTH	HARRIS	HARRIS	138
2005	EXXON - Bertron, S R Plant ckt.03	CNP	SOUTH	HARRIS	HARRIS	138
2005	Flewellen - Katy Tap ckt.66	CNP	SOUTH	FORT BEND	WALLER	138
2005	Greens Bayou - Fidelity ckt.21	CNP	SOUTH	HARRIS	HARRIS	138
2005	Hackberry system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	Liggett system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	Magnolia Park	CNP	SOUTH	HARRIS	HARRIS	138
2005	Newport - Lockwood ckt.86	CNP	SOUTH	HARRIS	HARRIS	138
2005	North Belt - Greens Road Tap ckt.90	CNP	SOUTH	HARRIS	HARRIS	138
2005	North Lake system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	Northwest Abilene, add 28.8 MVAR cap	AEP TNC	WEST	TAYLOR		138
2005	Norwood system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	Plano Tennyson system reactive capacitors	TXU ED	NORTH	COLLIN		138
2005	Putnam, add 28.8 MVAR cap	AEP TNC	WEST	KNOX		138
2005	Roanoke Switch system reactive capacitors	TXU ED	NORTH	DENTON		138
2005	South Abilene, add 2-28.8 MVAR cap	AEP TNC	WEST	TAYLOR		138
2005	W Levee system reactive capacitors	TXU ED	NORTH	DALLAS		138
2005	Waco E system reactive capacitors	TXU ED	NORTH	MCLENNAN		138
2005	Waco W system reactive capacitors	TXU ED	NORTH	MCLENNAN		138
2005	Handley 138 69-kV autotransformer	TXU ED	NORTH	TARRANT		138

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2005	Morrison 138-kV breakers	TXU ED	NORTH	DALLAS		138
2005	Sun 138-kV capacitors	TXU ED	NORTH	SCURRY		138
2005	Atkins Capacitor Addition	BTU	NORTH	BRAZOS		138
2005	Greens Bayou	CNP	SOUTH	HARRIS	HARRIS	138
2005	Humble to Treaschwig ckt.66	CNP	SOUTH	HARRIS	HARRIS	138
2005	Treaschwig to Westfield ckt.66	CNP	SOUTH	HARRIS	HARRIS	138
2005	Westfield	CNP	SOUTH	HARRIS	HARRIS	138
2005	Braunig to Kennedy 138-kV Reconnector	CPS	SOUTH	BEXAR	WILSON	138
2005	Whitney - Walnut Springs 138-kV line	TXU ED	NORTH	BOSQUE	BOSQUE	138
2005	Allen Switch system reactive capacitors	TXU ED	NORTH	COLLIN		138
2005	Hackberry - Grapevine Ball St 138-kV line	TXU ED	NORTH	DALLAS	TARRANT	138
2005	Pinn Rd. to Southwest Research (SWRI) 138-kV line	CPS	SOUTH	BEXAR	BEXAR	138
2005	Santa Rosa Distribution, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2005	Fairdale Kraft-Marquis 138-kV line	GARLAND	NORTH	DALLAS		138
2005	Marquis 138-kV new substation	GARLAND	NORTH	DALLAS		138
2005	Marquis-Shiloh 138-kV line	GARLAND	NORTH	DALLAS		138
2005	White Point, add 2 series 10 Ohm reactors on Nueces Bay 138-kV lines	AEP TCC	SOUTH	NUECES		138
2005	Weil Tract, bypass cut-in Citgo NOP to Lon Hill 138kV line	LCRA AEP	SOUTH	NUECES		138
2005	Frontera to N McAllen, tap Palmhurst sub at 138-kV	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2005	Collin - Renner 138-kV line	TXU ED	NORTH	COLLIN	COLLIN	138
2005	Jack County Plant to Cottondale Sw	BEC	NORTH	JACK	WISE	138
2005	Ft. Lancaster to Friend Ranch, build 138-kV line	LCRA AEP	WEST	PECOS	CROCKETT	138
2005	Bowie to Cottondale Sw.	BEC	NORTH	MONTAGUE	WISE	138
2005	Falfurrias Station, add 2-28.8 MVAR caps	AEP TCC	SOUTH	FRIO		138
2005	Bell County to Taylors Valley Rebuild	BEC	NORTH	BELL	BELL	138
2005	North Denton Conversion and Rebuild North Denton to Spring	BEC	NORTH	DENTON	COOKE	138
2005	Asherton, add 4-14.4 MVar caps	AEP TCC	SOUTH	DIMIT		138
2005	Dilley Sw. Station, add 2-28.8 MVAR caps	AEP TCC	SOUTH	BROOKS		138
2005	Moore, add 4-14.4 MVar caps	AEP TCC	SOUTH	UVALDE		138
2005	Midtown - Military Hwy 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2005	FM 802 - Midtown 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2005	Price Rd - FM 802 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2005	Filter Plant - Airport 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2005	Price Rd - Filter Plant 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2005	Silber Dip to White Oak ckt.81	CNP	SOUTH	HARRIS	HARRIS	138
2005	Ft. Lancaster, expand 138-kV to three position ring bus	LCRA AEP	WEST	PECOS		138
2005	Palmhurst, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	HIDALGO		138
2005	North Texas to Cottondale Sw.	BEC	NORTH	PARKER	WISE	138
2005	Bowie to St Jo	BEC	NORTH	MONTAGUE	MONTAGUE	138
2005	Price Rd 138-kV Substation	BPUB	SOUTH	CAMERON		138
2005	FM 802 138-kV Substation	BPUB	SOUTH	CAMERON		138

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2005	Hickory Forest-New Berlin	LCRA	SOUTH	GUADALUPE		138
2005	Military Hwy 138-kV Substation	BPUB	SOUTH	CAMERON		138
2005	Filter Plant 138-kV Substation	BPUB	SOUTH	CAMERON		138
2005	Airport 138-kV Substation	BPUB	SOUTH	CAMERON		138
2005	Coffee Port, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	CAMERON		138
2005	Santa Rosa, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	CAMERON		138
2005	Weslaco SS, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	CAMERON		138
2005	Southwest Research (SWRI) to Westside 138-kV line	CPS	SOUTH	BEXAR	BEXAR	138
2005	Jones to Atkins Annex 138, New line construction	BTU	NORTH	BRAZOS	BRAZOS	138
2005	Jones to Snook 138, New line construction	BTU	NORTH	BRAZOS	BRAZOS	138
2005	Marion-Comal	LCRA	SOUTH	GUADALUPE	COMAL	138
2005	HiCross-Marshall Ford	LCRA	NORTH	TRAVIS		138
2005	Highway 32-Wimberley	LCRA	NORTH	HAYS		138
2005	Buchanan-Graphite Mine-Lampasas	LCRA	NORTH	BURNET	LAMPASAS	138
2005	Marshall Ford-Buttercup	LCRA	NORTH	TRAVIS	WILLIAMSON	138
2005	Waller-Prairie View-Seaway-Macedonia	LCRA	SOUTH	HARRIS	WALLER	138
2005	Kendall-Miller Creek	LCRA	SOUTH	KENDALL	BLANCO	138
2005	Mountain Top-Blanco-Devil's Hill	LCRA	NORTH	BLANCO	COMAL	138
2005	Annex to Steel Store 138	BTU	NORTH	BRAZOS	BRAZOS	138
2005	Comfort-Cico	LCRA	SOUTH	KENDALL	KENDALL	138
2005	Oak Hill 31.2 Mvar Capacitor bank	AEN	NORTH	TRAVIS	TRAVIS	138
2005	Moore Field area, Construct 138-kV hairpin	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2005	Moore Field, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	HIDALGO		138
2005	East Capacitor Addition	BTU	NORTH	BRAZOS		138
2005	Rio Grande City to Garceno, upgrade 69-kV to 138-kV line	LCRA AEP	SOUTH	STARR	STARR	138
2005	Rio Grande City, add SS with 138 69-kV auto	AEP TCC	SOUTH	STARR		138
2005	LaGrulla to Rio Grande City, upgrade 69-kV to 138-kV line	LCRA AEP	SOUTH	STARR	STARR	138
2005	Big Lake Substation, reconfigure to five position ring bus	AEP TNC	WEST	REAGAN		138
2005	North Pharr to Polk, reconductor 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2005	Falcon, add 2-28.8 MVar caps	AEP TCC	SOUTH	STARR		138
2005	Texas City, Comanche-Loop 197 138kV line	TNMP	SOUTH	GALVESTON	GALVESTON	138
2005	Texas City, Amoco-Loop 197 138kV line	TNMP	SOUTH	GALVESTON	GALVESTON	138
2005	Raymondville, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	CAMERON		138
2005	La Grulla, convert 2 distribution banks to 138-kV	AEP TCC	SOUTH	STARR		138
2005	Airline, re-terminate Holly 138-kV line	AEP TCC	SOUTH	NUECES	NUECES	138
2005	Airline, re-terminate Davis 138-kV line	AEP TCC	SOUTH	NUECES	NUECES	138
2005	Highway 9, cut-in Nueces Bay to Morris 138-kV line	AEP TCC	SOUTH	NUECES	NUECES	138
2005	Leon to Pleasanton, rebuild 138-kV line	AEP TCC	SOUTH	ATASCOSA	BEXAR	138
2005	Bates, add 2-28.8 MVar caps	AEP TCC	SOUTH	STARR		138
2005	Rio Grande City, add 2-14.4 MVar caps	AEP TCC	SOUTH	STARR		138
2005	Laredo to Zacate Creek, upgrade 69-kV line	AEP TCC	SOUTH	WEBB	WEBB	138
2005	Highway 9, replace 138-kV autotransformer	AEP TCC	SOUTH	NUECES		138

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2005	Zacate Creek, upgrade 69-kV distribution bank	AEP TCC	SOUTH	WEBB		138
2005	Powell to Meridian	BEC	NORTH	BOSQUE	BOSQUE	138
2005	Raymondville, upgrade 138 69-kV auto	AEP TCC	SOUTH	CAMERON		138
2005	Military Highway, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	CAMERON		138
2005	LCP - Pleasanton 138kV Reroute	CPS	SOUTH	BEXAR	BEXAR	138
2005	Ben Davis-Crist Road 138-kV line	GARLAND	NORTH	DALLAS		138
2005	Crist Road-McCree 138-kV line	GARLAND	NORTH	DALLAS		138
2005	Crist Road 138-kV new substation	GARLAND	NORTH	DALLAS		138
2005	Rockport to Fulton #2, rebuild 69-kV Line	LCRA AEP	SOUTH	ARANSAS	ARANSAS	69
2005	Robstown tap to City of Robstown, rebuild 69-kV line	AEP TCC	SOUTH	NUECES	NUECES	69
2005	Pleasant Valley - Iowa Park Tap 69-kV line	TXU ED	WEST	WICHITA	WICHITA	69
2005	Wynn Joyce-Miller 69-kV line	GARLAND	NORTH	DALLAS		69
2005	Presidio, add 3-2.4 MVAR caps	AEP TNC	WEST	PRESIDIO		69
2005	North Padre, add 10 MVAR cap	AEP TCC	SOUTH	NUECES		69
2005	Alamito Creek, add 10 MVAR capacitor	AEP TNC	WEST	PRESIDIO		69
2005	Hearne to Hearne Southwest Rebuild	BEC	NORTH	ROBERTSON	ROBERTSON	69
2005	Nall Capacitor Addition	BTU	NORTH	BRAZOS		69
2005	North Padre to Mustang Island, rebuild 69-kV line	LCRA AEP	SOUTH	NUECES	NUECES	69
2005	Mustang Island to Port Aransas, rebuild 69-kV line	LCRA AEP	SOUTH	NUECES	ARANSAS	69
2005	Port Aransas, add SS with 10 MVAR cap	AEP TCC	SOUTH	ARANSAS		69
2005	Garza, add 10 MVar 69-kV cap	AEP TCC	SOUTH	STARR		69
2005	Rio Rico, add 10 Mvar cap	AEP TCC	SOUTH	HIDALGO		69
2005	Port O'Connor 69-kV line	STEC	SOUTH	CALHOUN		69
2005	Verdi 69-kV Substation	STEC	SOUTH	ATASCOSA	WILSON	69
2005	Walnut-Fairdale 69-kV line	GARLAND	NORTH	DALLAS		69
2005	Loma Alta - Price Rd 138-kV Circuit	BPUB	SOUTH	CAMERON		
2005	Verdi 138-kV Substation	STEC	SOUTH	ATASCOSA	WILSON	
2006	Rio Hondo, add 345 138-kV auto	AEP TCC	SOUTH	CAMERON		345
2006	Skyline -Replace 345kV AutoTrans #2 & #4	CPS	SOUTH	BEXAR	BEXAR	345
2006	Pecan Creek 345 138-kV autotransformer	TXU ED	NORTH	BELL		345
2006	Venus - Sherry 345-kV line	TXU ED	NORTH	ELLIS	TARRANT	345
2006	Sandow - Temple Switch 345-kV line	TXU ED	NORTH	MILAM	BELL	345
2006	W. Levee - Norwood 345-kV line	TXU ED	NORTH	DALLAS	DALLAS	345
2006	Jacksboro Switch - W. Denton 345-kV line	TXU ED	NORTH	JACK	DENTON	345
2006	Venus - Liggett 345-kV line	TXU ED	NORTH	ELLIS	DALLAS	345
2006	DeSoto 345 138-kV autotransformer	TXU ED	NORTH	DALLAS		345
2006	Spruce to Skyline 345kV 2nd Circuit	CPS	SOUTH	BEXAR	BEXAR	345
2006	Kendall-CPS Cagnon 345-kV line	LCRA CPS	SOUTH	BEXAR	KENDALL	345
2006	Clear Springs	LCRA	SOUTH	GUADALUPE		345
2006	Nelson Sharpe, add 345 138-kV auto with 2-28.8 Mvar	AEP TCC	SOUTH	KLEBERG		345
2006	Uvalde, add 4-14.4 138-kV MVar caps	AEP TCC	SOUTH	UVALDE		138
2006	Rhome to Rhome Switch	BEC	NORTH	WISE	WISE	138

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2006	Jack County to Wise County Switch	BEC	NORTH	JACK	WISE	138
2006	Decker to Techridge 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2006	North McAllen to West McAllen, reconductor 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	Weil Tract SS, add 138-kV SS	AEP TCC	SOUTH	NUECES		138
2006	Weil Tract SS, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	NUECES		138
2006	Anna Street, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	WEBB		138
2006	Zacate Creek to Anna Street, upgrade 69-kV line	AEP TCC	SOUTH	WEBB	WEBB	138
2006	Goodwin to LaGrulla, upgrade 69-kV to 138-kV line	LCRA AEP	SOUTH	STARR	STARR	138
2006	Goodwin, convert 2 distribution banks to 138-kV	AEP TCC	SOUTH	HIDALGO		138
2006	Westside, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	NUECES		138
2006	Airline, add 2-28.8 MVAR caps	AEP TCC	SOUTH	NUECES		138
2006	Barney Davis, add 2-28.8 MVAR capacitors	AEP TCC	SOUTH	NUECES		138
2006	Laredo BtB to Laredo Power Plant, Falfurrias 138-kV cut-in	AEP TCC	SOUTH	WEBB	WEBB	138
2006	Laredo BtB to Laredo Power Plant, Milo 138-kV cut-in	AEP TCC	SOUTH	WEBB	WEBB	138
2006	Laredo BtB, add 2-57.6 MVar caps	AEP TCC	SOUTH	WEBB		138
2006	N Pharr to N Alamo, upgrade 69-kV line	LCRA AEP	SOUTH	HIDALGO	HIDALGO	138
2006	Santa Rosa to N Mercedes, upgrade 69-kV line	LCRA AEP	SOUTH	CAMERON	HIDALGO	138
2006	Santa Rosa to Harlingen SS, upgrade 69-kV line	LCRA AEP	SOUTH	CAMERON	CAMERON	138
2006	Frontera to Palmview, tap Palmhurst and upgrade 69-kV to 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	W McAllen to S McAllen, reconductor 138-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	North Alamo Distribution, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	North Mercedes Distribution, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	Frontera to Goodwin, upgrade 69-kV to 138-kV line	LCRA AEP	SOUTH	HIDALGO	STARR	138
2006	Copperas Cove - Ding Dong (BEC) 138-kV line	TXU ED	NORTH	CORYELL	BELL	138
2006	N Laredo SS, add 2-28.8 MVar caps on load side of PST	AEP TCC	SOUTH	WEBB		138
2006	North Laredo SS, add 150 MVA PST on Asherton 138-kV line	AEP TCC	SOUTH	WEBB		138
2006	Cedar Hill Substation - DeSoto 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2006	LaPalma to Loma Alta, cut-in Los Fresnos at 138-kV	AEP TCC	SOUTH	CAMERON	CAMERON	138
2006	Sauer Dip to Silber Dip ckt.73	CNP	SOUTH	HARRIS	HARRIS	138
2006	Sauer Dip to Silber Dip ckt.81	CNP	SOUTH	HARRIS	HARRIS	138
2006	Steward Rd to Hidalgo, upgrade 69-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	Hidalgo, upgrade two 69-kV distribution banks	AEP TCC	SOUTH	HIDALGO		138
2006	Los Fresnos, Convert 69-kV distribution sub to 138-kV	AEP TCC	SOUTH	CAMERON		138
2006	North Laredo SS, add 2-28.8 MVAR caps on source side of PST	AEP TCC	SOUTH	WEBB		138
2006	Tomball	CNP	SOUTH	HARRIS	HARRIS	138
2006	System reactive capacitors	TXU ED	NORTH			138
2006	Venus Switch - Cedar Hill Substation 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2006	LaPalma to Rio Hondo, rebuild 138-kV line	AEP TCC	SOUTH	CAMERON	CAMERON	138
2006	North Temple - Temple NW - Belton 138-kV line	TXU ED	NORTH	BELL	BELL	138
2006	Sterrett - Waxahachie Pump 138-kV line	TXU ED	NORTH	ELLIS	ELLIS	138

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2006	Stryker Creek - Jacksonville 138-kV line	TXU ED	NORTH	CHEROKEE	CHEROKEE	138
2006	Belton - Nolanville 138-kV line	TXU ED	NORTH	BELL	BELL	138
2006	Benbrook 138-kV series reactor	TXU ED	NORTH	TARRANT		138
2006	Forest Grove - Mabank 138-kV line	TXU ED	NORTH	HENDERSON	HENDERSON	138
2006	Big Spring Switch - Big Spring West 138-kV line	TXU ED	NORTH	HOWARD	HOWARD	138
2006	Lamesa 138-kV capacitor	TXU ED	WEST	DAWSON		138
2006	Midessa - Midland Airport 138-kV line	TXU ED	WEST	MIDLAND	MIDLAND	138
2006	Midland East - Windwood 138-kV line	TXU ED	WEST	MIDLAND	MIDLAND	138
2006	Royse - Ben Davis (TMPA) 138-kV line	TXU ED, TMPA	NORTH	ROCKWALL	COLLIN	138
2006	Anna Switch - Allen Switch 138-kV line	TXU ED	NORTH	COLLIN	COLLIN	138
2006	Great Southwest Substation 138-kV capacitor	TXU ED	NORTH	TARRANT		138
2006	Ennis Switch - Ennis 138-kV line	TXU ED	NORTH	ELLIS	ELLIS	138
2006	Carrollton East - Renner 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2006	Centerville - Crockett 138-kV line	TXU ED	NORTH	LEON	HOUSTON	138
2006	Denison North - Denison Tap 138-kV line	TXU ED	NORTH	GRAYSON	GRAYSON	138
2006	Lake Wichita Switch - Wichita Falls Switch 69-kV line	TXU ED	NORTH	ARCHER	WICHITA	138
2006	Sherry - Great Southwest 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2006	Tennessee Colony 138-kV capacitor	TXU ED	NORTH	ANDERSON		138
2006	Tyler NE - Tyler East 138-kV line	TXU ED	NORTH	SMITH	SMITH	138
2006	Elkton - Tyler West 138-kV line	TXU ED	NORTH	SMITH	SMITH	138
2006	Paris - Paris Kimberly Clark 138-kV line	TXU ED	NORTH	LAMAR	LAMAR	138
2006	Royse - Terrell Switch 138 69-kV line	TXU ED	NORTH	ROCKWALL	KAUFMAN	138
2006	Eules - Keller 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2006	Centerville 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2006	Cagnon to Lytle 138-kV line	CPS	SOUTH	BEXAR	MEDINA	138
2006	Hamilton Road 138-kV, add 150 MVA-PST on Sonora 138-kV line	AEP TCC	SOUTH	VAL VERDE		138
2006	Hamilton Road, add 2-28.8 MVar caps	AEP TCC	SOUTH	VAL VERDE		138
2006	Hidden Valley 31.2 Mvar Capacitor bank	AEN	NORTH	TRAVIS	TRAVIS	138
2006	Gibbons Creek to College Station Switch	BEC, TMPA, CS	NORTH	GRIMES	BRAZOS	138
2006	Magruder, add 139 69-kV auto	AEP TCC	SOUTH	VICTORIA		138
2006	Goodloe Loop	BEC	NORTH	NAVARRO	NAVARRO	138
2006	Weslaco Unit, add 28.8 Mvar cap	AEP TCC	SOUTH	HIDALGO		138
2006	Victoria to Magruder, reconductor 138-kV line	AEP TCC	SOUTH	VICTORIA	VICTORIA	138
2006	Peoria to Forrester Uprating	BEC	NORTH	HILL	ELLIS	138
2006	Ennis Loop	BEC	NORTH	ELLIS	ELLIS	138
2006	Spring to St Jo Rebuild	BEC	NORTH	COOKE	COOKE	138
2006	Hamilton Road to Arroyo, reconductor 138-kV line	AEP TCC	SOUTH	VAL VERDE	VAL VERDE	138
2006	Arroyo, add 138-kV SS with 138-kV cap	AEP TCC	SOUTH	VAL VERDE		138
2006	Whitney to Covington Uprate	BEC	NORTH	BOSQUE	JOHNSON	138
2006	Lakeway second circuit from LCRA tap to the substation.	AEN	NORTH	TRAVIS	TRAVIS	138
2006	Conoco to Pueblo, rebuild 138-kV line	LCRA AEP	SOUTH	MAVERICK	MAVERICK	138

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2006	Snook to Steel Store 138, New line construction	BTU	NORTH	BURLESON	BRAZOS	138
2006	TAMU to Atkins 138 reconductor	BTU	NORTH	BRAZOS	BRAZOS	138
2006	Dansby to Atkins Annex 138	BTU	NORTH	BRAZOS	BRAZOS	138
2006	Buda-San Marcos	LCRA	NORTH	HAYS		138
2006	McQueeney-New Berlin	LCRA	SOUTH	GUADALUPE		138
2006	Kendall-Comfort	LCRA	SOUTH	KENDALL	KENDALL	138
2006	Lampasas-Evant	LCRA	NORTH	LAMPASAS		138
2006	Nelson Sharpe, add 150 MVA PST in Davis 138-kV line	AEP TCC	SOUTH	KLEBERG		138
2006	Andice-Glasscock	LCRA	NORTH	WILLIAMSON		138
2006	N Weslaco to Weslaco SS, upgrade 69-kV line	LCRA AEP	SOUTH	HIDALGO	HIDALGO	138
2006	Weslaco SS to N Alamo, upgrade 69-kV line	LCRA AEP	SOUTH	HIDALGO	HIDALGO	138
2006	Laredo BtB, build 150 MW CFE tie	AEP TCC	SOUTH	WEBB		138
2006	Hidalgo to S McAllen, upgrade 69-kV line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2006	Alvin 345-138 Autotransformer	TNMP	SOUTH	BRAZORIA	BRAZORIA	138
2006	Eules - McKamy Tap 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2006	North Herty - Lufkin East 138-kV line	TXU ED	NORTH	ANGELINA	ANGELINA	138
2006	Odessa EHV - Odessa 2 138-kV line	TXU ED	WEST	ECTOR	ECTOR	138
2006	Forney - East Mesquite 138-kV line	TXU ED	NORTH	KAUFMAN	DALLAS	138
2006	Tyler SE - Tyler GE 138-kV line	TXU ED	NORTH	SMITH	SMITH	138
2006	Stryker Creek - Troup 138-kV line	TXU ED	NORTH	CHEROKEE	CHEROKEE	138
2006	Asherton to Conoco, rebuild 138-kV Line	LCRA AEP	SOUTH	DIMMIT	MAVERICK	138
2006	Walnut-Fairdale line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2006	Wynn Joyce-Ben Davis 138-kV line	GARLAND	NORTH	DALLAS		138
2006	Walnut 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2006	Newman 138-kV new switching substation and new 138-kV 69-kV autotransformer	GARLAND	NORTH	DALLAS		138
2006	Fairdale load 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2006	Newman-Walnut line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2006	Eagle Pass Loop 431, add 138-kV SS	AEP TCC	SOUTH	MAVERICK		138
2006	Pueblo to Eagle Pass Loop 431, rebuild 138-kV line	LCRA AEP	SOUTH	MAVERICK	MAVERICK	138
2006	Uvalde, add 10 MVAR 69-kV cap	AEP TCC	SOUTH	UVALDE		69
2006	Rangerville, add 10 Mvar cap	AEP TCC	SOUTH	CAMERON		69
2006	Camp Wood, add 138-kV SS with 3x5 MVar caps	AEP TCC	SOUTH	REAL		69
2006	Rebuild Olsen-Walnut Springs 69kV line.	TNMP	NORTH	BOSQUE	BOSQUE	69
2006	Airline to Naval Base, rebuild 69-kV line	LCRA AEP	SOUTH	NUECES	NUECES	69
2006	Ackerly - Ackerly Lyntegar 69-kV line	TXU ED	WEST	DAWSON	DAWSON	69
2006	Maypearl 69-kV capacitor	TXU ED	NORTH	ELLIS		69
2006	Seaton - Poage 69-kV line	TXU ED	NORTH	BELL	BELL	69
2006	Ackerly Vealmoor - Ackerly 69-kV line	TXU ED	WEST	DAWSON	HOWARD	69
2006	West Waco - Lorena 69-kV line	TXU ED	NORTH	MCLENNAN	MCLENNAN	69
2006	DeLeon 69-kV capacitors	TXU ED	NORTH	COMANCHE		69
2006	Temple - Troy 69-kV line	TXU ED	NORTH	BELL	BELL	69
2006	Alice, add 10 MVAR cap	AEP TCC	SOUTH	JIM WELLS		69

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2006	Poage to Leon Junction Rebuild	BEC	NORTH	BELL	CORYELL	69
2006	Hilltop Lakes to Hilltop Lakes Switch Upgrade or Rebuild	BEC	NORTH	LEON	ROBERTSON	69
2006	Prairie Hill to Purdon Rebuild	BEC	NORTH	LIMESTONE	NAVARRO	69
2006	Fayetteville-Pisek-Welcome-Salem	LCRA	NORTH	FAYETTE	WASHINGTON	69
2006	Comfort-Raymond Barker	LCRA	SOUTH	KENDALL	KERR	69
2006	Sandy Creek	LCRA	NORTH	LLANO		69
2006	Airline to Laguna, rebuild 69-kV line	LCRA AEP	SOUTH	NUECES	NUECES	69
2006	Palestine - Montalba 69-kV line	TXU ED	NORTH	ANDERSON	ANDERSON	69
2006	Wichita Falls - Wichita Falls Basin 69-kV line	TXU ED	NORTH	ARCHER	WICHITA	69
2007	Liggett - Trinity 345-kV line	TXU ED	NORTH	DALLAS	TARRANT	345
2007	Trinity 345 138-kV autotransformer	TXU ED	NORTH	TARRANT		345
2007	Plano Tennyson 345 138-kV autotransformer	TXU ED	NORTH	COLLIN		345
2007	Trinidad - Richland 345-kV line	TXU ED	NORTH	HENDERSON	FREESTONE	345
2007	North McCamey - Odessa 345-kV Line	LCRA	WEST	UPTON	ECTOR	345
2007	2nd Lewisville Auto	BEC	NORTH	DENTON		345
2007	Reconductor Last Three spans of Circuit between Austrop and Decker	AEN	NORTH	TRAVIS	TRAVIS	138
2007	Bergstrom to Kingsbery Reconductor	AEN	NORTH	TRAVIS	TRAVIS	138
2007	Steward Road, build 138 69-kV SS with 2-28.8 MVar caps	AEP TCC	SOUTH	HIDALGO		138
2007	Steward Rd to Rio Rico cut-in, build 138 69-kV double circuit line	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2007	Liggett - Hackberry 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2007	System reactive capacitors	TXU ED	NORTH			138
2007	Centerville Switch - Parkdale 138-kV line	TXU ED	NORTH	DALLAS	DALLAS	138
2007	Watermill 138-kV series reactors	TXU ED	NORTH	DALLAS		138
2007	Trinity Switch - Richland #2 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2007	Saginaw - American Manufacturing Tap 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2007	Plano West - Richardson Tap 138-kV line	TXU ED	NORTH	COLLIN	DALLAS	138
2007	Lufkin Switch - Crockett 138-kV line	TXU ED	NORTH	ANGELINA	HOUSTON	138
2007	Saginaw - Euleess Roanoke Switch 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2007	Handley - Sherry #3 138-kV line	TXU ED	NORTH	TARRANT	TARRANT	138
2007	Lewisville Switch - TNMP Highland 138-kV line	TXU ED	NORTH	DENTON	DENTON	138
2007	HiCross to Slaughter Lane 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2007	Beltline-Lyons 138-kV line	GARLAND	NORTH	DALLAS		138
2007	Beltline-Oates 138-kV line	GARLAND	NORTH	DALLAS		138
2007	Brand 138-kV substation upgrade	GARLAND	NORTH	DALLAS		138
2007	Beltline 138-kV new substation	GARLAND	NORTH	DALLAS		138
2007	N Mercedes to N Weslaco, upgrade 69-kV line	LCRA AEP	SOUTH	HIDALGO	HIDALGO	138
2007	Fairview to Aledo	BEC	NORTH	HOOD	PARKER	138
2007	Buena Vista to Arroyo, reconductor 138-kV line	AEP TCC	SOUTH	VAL VERDE	VAL VERDE	138
2007	Del Rio to Buena Vista, reconductor 138-kV line	AEP TCC	SOUTH	VAL VERDE	VAL VERDE	138
2007	Hamilton Road to Del Rio reconductor 138-kV line	AEP TCC	SOUTH	VAL VERDE	VAL VERDE	138
2007	Lytle, add 138 69-kV auto	AEP TCC	SOUTH	MEDINA		138
2007	CPS Lytle to TCC Lytle, build 138-kV line	AEP TCC	SOUTH	BEXAR	MEDINA	138

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2007	Military Hwy - Power Plant 138-kV Line	BPUB	SOUTH	CAMERON		138
2007	Decker to Techridge 138kV Partial Reconductor	AEN	NORTH	TRAVIS	TRAVIS	138
2007	Frisco to Kruegerville Rebuild	BEC	NORTH	COLLIN	DENTON	138
2007	Jewett to Watson Chapel Rebuild, Hilltop Lakes - Iola Conversion	BEC	NORTH	LEON	MADISON	138
2007	North Weslaco Distribution, upgrade 69-kV distribution bank	AEP TCC	SOUTH	HIDALGO	HIDALGO	138
2007	Hood - Spunky 138 Uprate or Rebuild	BEC	NORTH	HOOD	HOOD	138
2007	Military Hwy 138-kV Substation	BPUB	SOUTH	CAMERON		138
2007	Power Plant 138-kV Substation	BPUB	SOUTH	CAMERON		138
2007	Dansby to Atkins 138 reconductor	BTU	NORTH	BRAZOS	BRAZOS	138
2007	Rim Rock-Harper Road	LCRA	SOUTH	KERR		138
2007	Medina Lake-CPS Anderson (Part 1)	LCRA	SOUTH	BANDERA	MEDINA	138
2007	New Berlin-Hickory Forest-Capote-Seguin	LCRA	SOUTH	GUADALUPE		138
2007	Techridge to Howard Lane 138kV Reconductor	AEN	NORTH	TRAVIS	TRAVIS	138
2007	Verde Creek-Kerrville Stadium	LCRA	SOUTH	KERR	KERR	138
2007	Convert Bureson to Cardinal Lane & Cardinal Lane to Seaholm from 69kV to 138kV	AEN	NORTH	TRAVIS	TRAVIS	138
2007	McNeil autotransformer replacement	AEN	NORTH	TRAVIS	TRAVIS	138
2007	Wynn Joyce-Miller line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2007	Miller 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2007	Newman-Miller line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2007	McCree-Miller line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2007	Oak Creek 69-kV capacitors	TXU ED	WEST	NOLAN		69
2007	Second Hawkins Auto	BEC	NORTH			69
2007	Second Seaton Autotransformer	BEC	NORTH	BELL		69
2007	Olney to Seymour Rebuild	BEC	NORTH	YOUNG	BAYLOR	69
2007	Booneville to Hearne Southwest Rebuild	BEC	NORTH	ROBERTSON	BRAZOS	69
2007	Hearne to Branchville Rebuild	BEC	NORTH	ROBERTSON	MILAM	69
2007	Hilltop Lakes to Petteway Rebuild	BEC	NORTH	ROBERTSON	ROBERTSON	69
2007	McCree-Miller 69-kV line	GARLAND	NORTH	DALLAS		69
2008	Hutto Switch - Salado Switch 345-kV line	TXU ED	NORTH	WILLIAMSON	BELL	345
2008	Harris Branch 345 138kV autotransformer	AEN	NORTH	TRAVIS	TRAVIS	345
2008	Asphalt Mines to Brackettville, rebuild 138-kV line	LCRA AEP	SOUTH	KINNEY	UVALDE	138
2008	Crosby	CNP	SOUTH	HARRIS	HARRIS	138
2008	Olsen-Jonesboro 138kV conversion	TNMP	NORTH	BOSQUE	HAMILTON	138
2008	System reactive capacitors	TXU ED	NORTH			138
2008	Austin Ranch - Hebron 138-kV line	TXU ED	NORTH	DENTON	DENTON	138
2008	Belton - South Harker Heights 138-kV line	TXU ED	NORTH	BELL	BELL	138
2008	Hutto Switch - Round Rock NE 138-kV line	TXU ED	NORTH	WILLIAMSON	WILLIAMSON	138
2008	Naaman-Apollo line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2008	Walnut-Castle line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2008	Castle-Naaman line 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138

In-Service Year	Project Title	TDSP	Primary Planning Region	Location County Start	Location County End	Level kV
2008	Uvalde to Sabinal, build 138-kV line	AEP TCC	SOUTH	UVALDE	MEDINA	138
2008	Covington to Grandview Upgrade	BEC	NORTH	JOHNSON	JOHNSON	138
2008	Atkins to Annex 138	BTU	NORTH	BRAZOS	BRAZOS	138
2008	Jones to Snook 138, Reconductor	BTU	NORTH	BRAZOS	BRAZOS	138
2008	Medina Lake-CPS Anderson (Part 2)	LCRA	SOUTH	BANDERA		138
2008	Mountain Top-Johnson City-Wirtz	LCRA	NORTH	BLANCO	BURNET	138
2008	Circuit 1013 Double Breaker at Decker Power Plant	AEN	NORTH	TRAVIS	TRAVIS	138
2008	Glen Rose, Spunky to Glen Rose	TNMP	NORTH	HOOD	SOMERVELL	138
2008	Uvalde to Brackettville, rebuild 138-kV Line	LCRA AEP	SOUTH	UVALDE	UVALDE	138
2008	Apollo-Lookout 138-kV line	GARLAND	NORTH	DALLAS		138
2008	Lookout 138-kV new substation	GARLAND	NORTH	DALLAS		138
2008	Naaman 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2008	Firewheel-Lookout 138-kV line	GARLAND	NORTH	DALLAS		138
2008	Castle 69-kV to 138-kV voltage conversion	GARLAND	NORTH	DALLAS		138
2008	Naaman-Apollo 69-kV line	GARLAND	NORTH	DALLAS		69
2008	Castle-Naaman 69-kV line	GARLAND	NORTH	DALLAS		69
2008	Alamito Creek to Cienega, rebuild 69-kV Line	LCRA AEP	WEST	PRESIDIO	PRESIDIO	69
2008	Olney to Shannon Rebuild	BEC	NORTH	YOUNG	CLAY	69
2008	Hasse to Downing Upgrade Rebuild	BEC	NORTH	COMANCHE	COMANCHE	69
2008	Knippa to Sabinal, rebuild as 138 69-kV double circuit line	AEP TCC	SOUTH	UVALDE	UVALDE	69
2008	Leon Junction to Santa Fe Sw. Rebuild	BEC	NORTH	CORYELL	CORYELL	69
2008	Seaton to Barclay Rebuild	BEC	NORTH	BELL	FALLS	69
2008	Uvalde to Knippa, rebuild as 138 69-kV double circuit line	AEP TCC	SOUTH	UVALDE	UVALDE	69
2008	Harris to Fiesta new 69kV circuit	AEN	NORTH	TRAVIS	TRAVIS	69
2009	West Denton - NW Carrollton 345-kV circuit	TXU ED, TMPA	NORTH	DENTON	DALLAS	345
2009	Skyline -Install a 3rd 345kV AutoTrans	CPS	SOUTH	BEXAR	BEXAR	345
2009	Cagnon to Hillcountry 345kV 2nd Circuit	CPS	SOUTH	BEXAR	BEXAR	345
2009	Hill Country to Skyline 345-kV 2nd Circuit	CPS	SOUTH	BEXAR	BEXAR	345
2009	Zorn Clear Springs-Harris Branch-Hutto Switch 345-kV line	LCRA	SOUTH	WILLIAMSON	GUADALUPE	345
2009	Dansby to Twin Oak 345-kV	BTU	NORTH	BRAZOS	ROBERTSON	345
2009	Brackettville to Hamilton Road, rebuild 138-kV line	LCRA AEP	SOUTH	VAL VERDE	KINNEY	138
2009	Kingsbery to Pedernales 69kV to 138kV conversion (new addition)	AEN	NORTH	TRAVIS	TRAVIS	138
2009	Warda-Giddings	LCRA	NORTH	FAYETTE	LEE	138
2009	Lavernia-Sutherland Springs	LCRA	SOUTH	GUADALUPE	WILSON	138
2009	Blossom 138-kV Substation	CPS	SOUTH	BEXAR	BEXAR	138
2009	Mountain Top-Blanco-Devil's Hill	LCRA	NORTH	BLANCO	COMAL	138
2009	Dansby to Tabor 138	BTU	NORTH	BRAZOS	BRAZOS	138
2009	Castroville Area Switching Station	CPS	SOUTH	MEDINA	MEDINA	138
2009	Tabor Capacitor Addition	BTU	NORTH	BRAZOS		138
2009	El Campo to Sierra Verde, upgrade 69-kV line	AEP TCC	SOUTH	WHARTON	COLORADO	138
2009	Sierra Verde, add 138 69-kV auto	AEP TCC	SOUTH	COLORADO		138

In-Service Year	Project Title	TDSP	Primary Planning Region	Location County Start	Location County End	Level kV
2009	St Jo - Capps Corner Uprating	BEC	NORTH	MONTAGUE	MONTAGUE	69
2009	Graham 69KV Tie	BEC	NORTH	YOUNG	YOUNG	69
2009	Pancake to Gatesville Rebuild	BEC	NORTH	CORYELL	CORYELL	69
2009	Rocket Sw. to India Rebuild Upgrade	BEC	NORTH	ELLIS	ELLIS	69
2010	Highway 59, build 345-kV for 675MVA autotransformer	AEP TCC	SOUTH	WEBB		345
2010	Highway 59 to San Miguel, build 345-kV line	AEP TCC	SOUTH	WEBB	ATASCOSA	345
2010	Harris Branch 345 138kV autot & Harris Branch 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	345
2010	Laredo to Highway 59, rebuild 138-kV line	AEP TCC	SOUTH	WEBB	WEBB	138
2010	Laredo to Highway 59, upgrade 69-kV to 138-kV line	AEP TCC	SOUTH	WEBB	WEBB	138
2010	Highway 59, build 138 69-kV substation	AEP TCC	SOUTH	WEBB		138
2010	Bergstrom to Carson Creek 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2010	Bergstrom to Sand Hill 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2010	McNeil to Summit new 2nd 138kV circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2010	Hidden Valley to Lakeway 138kV Circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2010	Lakeway to Trading Post New 138kV Circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2010	Trading Post to Patton Lane New 138kV Circuit	AEN	NORTH	TRAVIS	TRAVIS	138
2010	Trumbo 138-kV Substation	CPS	SOUTH	BEXAR	BEXAR	138
2010	Circuit 941 (Williamson to Summit) Bundle	AEN	NORTH	TRAVIS	TRAVIS	138
2010	Airport - Waterport 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2010	Airport 138-kV Substation	BPUB	SOUTH	CAMERON		138
2010	Loma Alta - Union Carbide 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2010	Union Carbide 138-kV Substation	BPUB	SOUTH	CAMERON		138
2010	Waterport - Union Carbide 138-kV Circuit	BPUB	SOUTH	CAMERON		138
2010	Waterport 138-kV Substation	BPUB	SOUTH	CAMERON		138
2010	Northland Conversion - Ph 2	AEN	NORTH	TRAVIS	TRAVIS	138
2011	Frontera, add SS with 345 138-kV auto	AEP TCC	SOUTH	HIDALGO		345
2011	N Edinburg to Frontera, build 345-kV double circuit line	LCRA AEP	SOUTH	HIDALGO	HIDALGO	345
2011	Hwy 59 to Rio Bravo, new 345-kV line	AEP TCC	SOUTH	WEBB	WEBB	345
2011	Rio Bravo to Frontera, new 345-kV line	AEP TCC	SOUTH	WEBB	HIDALGO	345
2011	Rio Bravo, add SS with 345 138-kV autotransformer	AEP TCC	SOUTH	WEBB		345
2011	Rio Bravo to Wormser, Reconductor 138-kV line	AEP TCC	SOUTH	WEBB	WEBB	138
2012	North McCamey to Twin Buttes 345-kV Line	LCRA AEP	WEST	UPTON	IRION	345
2012	North McCamey 345 138-kV autotransformer	LCRA AEP	WEST	UPTON		345
2015	Frontera to South McAllen 345-kV line	LCRA AEP	SOUTH	HIDALGO	HIDALGO	345
2015	South McAllen, new SS with 345 138-kV autotransformer	AEP TCC	SOUTH	HIDALGO		345