

# **ERCOT QUICK FACTS**

### At a glance

- Customers served: 22 million
- Area served: 85% of Texas load, 75% of Texas land
- Generating units: ~550
- High-voltage transmission: 40,327 miles
- Installed capacity: 84,237 megawatts (MW)
- Available capacity: 75,755 MW, (includes 8.7 percent of wind capacity)
- Current reserve margin: 21.4% (minimum required 12.5%)
- Record peak demand: 63,400 MW (July 2009)
- Energy produced: 308 billion kilowatt-hours (2009)
- Market size: \$34 billion, based on 308,277 GWh market volume and average \$0.11/KWh rate
- Market participants: ~800 active entities that generate, move, buy, sell or use wholesale electricity
- Wind capacity: 9,317 MW most in nation
- Demand response: 1,062 MW (equal to three major power plants) in load resource program

#### What do we do?

The Texas Legislature restructured the Texas electric market in 1999 by unbundling the investor-owned utilities and creating retail customer choice in those areas, and assigned ERCOT four primary responsibilities:

- System reliability planning and operations
- Open access to transmission
- Retail switching process for customer choice the only independent system operator with responsibilities as registration agent for retail transactions
- Wholesale market settlement for electricity production and delivery.

#### **Other Organizational Functions**

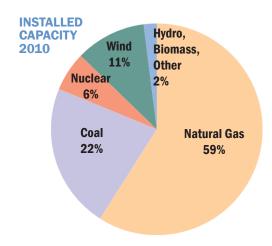
Wholesale market (bilateral): ~95% of market Balancing energy/ancillary services market: ~5% System planning coordination

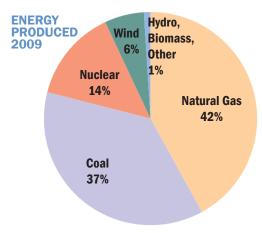
Renewable Energy Credits management (statewide) Market participant/stakeholder activity support

## How are we doing?

#### **Transmission Investment**

- 7,730 circuit miles of transmission improvements since 1999
- 5,729 circuit miles of transmission under study
- \$5.78 billion in transmission added since 1999
- \$8.2 billion under development in five-year plan, including \$5 billion to support 18,000 MW of wind





#### **Generation Development**

- 41,000 MW new generation added since 1996
- 5,000 MW generation committed for the future (with transmission contract and air permit)
- 72,500 MW of new generation requests under review, including 44,300 MW wind; 5,900 MW nuclear; 14,000 MW natural gas; 5,000 MW coal; and 3,300 MW solar, biomass and other (June 2010)

#### **Retail Service Switches to Competitive Retailers**

53% of residential load (May 2010)80% of small commercial load (May 2010)

#### What's ahead?

Comprehensive nodal market implementation, scheduled to "go live" December 1, 2010, including:

- Nodal locational marginal pricing for generation
- Day-ahead energy and ancillary services co-optimized market
- Day-ahead and hourly reliability unit commitment
- Congestion revenue rights.

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ERCOT Governance



The Electric Reliability Council of Texas (ERCOT) manages the flow of electric power to approximately 22 million Texas customers – representing 85 percent of the state's electric load and 75 percent of the Texas land area. The ERCOT Region includes Houston, Dallas, Fort Worth, San Antonio, Austin, Corpus Christi, Abilene and the Rio Grande Valley. ERCOT does not include the El Paso area, the Texas Panhandle, Northeast Texas (Longview, Marshall and Texarkana), and Southeast Texas (Beaumont, Port Arthur, and the Woodlands).

## The ERCOT Vision

To be innovative in providing a world-class, cost-effective, reliable electric grid and efficient electricity markets.

## **The ERCOT Mission**

## **ERCOT** serves the public interest by:

- Ensuring open access to transmission and distribution systems;
- Maintaining system reliability and operations;
- Enabling retail choice;
- Operating fair and competitive wholesale markets;
- Maintaining the renewable energy credits registry;
- Providing leadership and independent expertise to improve system reliability and market efficiency.

# **An Exciting Time for Texas**

This is an exciting time for Texas – we are on the brink of huge changes that will reshape the Texas energy landscape for years to come. The ERCOT of the future will be very different from the ERCOT of today.

The Electric Reliability Council of Texas is evolving from an entity responsible for a reliable electric grid to an entity that also facilitates a market capable of responding to the opportunities of 21st-century innovations and to the pressures of economic demands. For example:

- ERCOT's move from a zonal market to an advanced nodal market will significantly increase market efficiency and contribute to the smarter use of the state's energy resources.
- ERCOT's focus on "smart grid" initiatives such as advanced metering and demand-response technology will benefit Texas consumers by giving them increased control over their electric usage and boosting overall reliability.
- ERCOT's role in expanding energy efficiency and demand response will lead to a more deliberate use of the state's energy resources.
- As ERCOT and Texas continue to be the national leaders in the integration of renewable resources, the state will continue to benefit from the introduction of cleaner energy sources, lower emissions, and improved air quality.

Through the hard work and expertise of ERCOT's dedicated employees, with the critically important input from our stakeholders, and support from government regulators, we are positioned to face the growing complexities of the evolving energy industry.

July 2010 will mark 40 years since ERCOT was created to maintain reliability of the state's electric grid. It should be a time to celebrate the accomplishments achieved by the collaborative spirit among ERCOT, the regulators, and stakeholders and a time to recognize that what we are doing underpins our state's economy and supports our way of life.

As always in the ever-changing energy environment, there are challenges ahead, but there are also many successes to note – indeed there is much to be celebrated.



Trip Doggett President and CEO

# FROM THE CEO **Building a Grid for the Future**

By any measure, 2009 was a pivotal year for the Electric Reliability Council of Texas, its employees, and stakeholders. We successfully launched the first market trials for the 2010 nodal market and completed a major systems change to support wholesale settlement for "smart meters" - all while never losing focus on our primary charge - reliability of the electric grid.

#### Reliability: New demand record set

ERCOT successfully fulfilled its primary responsibility to maintain reliability of the state's bulk electric system in 2009. System operators managed a record-breaking peak demand of 63,400 megawatts (MW) – surpassing the previous 2006 record by more than 1,000 MW – without any major issues. In early 2010, the ERCOT region set a new winter peak record of 55,878 MW – beating the previous 2007 record by 5,474 MW.

#### Renewables: Wind output hits new high

ERCOT continued its lead as the top wind producer in the nation. Wind capacity increased by 911 MW in 2009, bringing the region total to 8,916 MW at year end. System operators successfully maintained reliability as wind output reached new highs. ERCOT recorded a new instantaneous output of 6,223 MW of wind generation in October, representing 17 percent of the total load at the time.

#### Wholesale market: Generation development interest continues

ERCOT's \$34 billion wholesale market has continued to thrive as evidenced by steady generation construction and consistently adequate reserve margins. Generation owners have financed 41,000 MW of new clean and efficient electricity supply since 1996, with another 5,000 MW committed for the future and more than 73,000 MW currently under review. Reserve margins are currently forecast to be above the target minimum through 2013, according to the December 2009 capacity, demand and reserves update.

#### Retail market: Third year to rank number one in North America

ERCOT continues to receive recognition for the most successful competitive retail market in North America with more 5 million retail switches processed since the retail market opened in 2001, and 50 percent of residences switched to a competitive retailer. ERCOT has ranked number one for the past three years in the Annual Baseline Assessment of Choice in Canada and the United States for the most successful residential electricity market design in North America, and number one in commercial/industrial markets for the past

The average consumer in the ERCOT region can choose from more than 130 different plans, offered by 29 different providers.

#### Smart meters: Systems upgraded to support 'smart meter' settlement

In late 2009, ERCOT implemented a new system of wholesale settlement for advancedmetered customers to accommodate 15-minute electricity usage data. This will allow both customers and retailers to benefit financially from lowering energy usage during high-price periods. It also opens the door for new retail products that take advantage of smart-meter technology, such as time-of-use price options, and load-control devices that allow customers to reduce energy consumption remotely or automatically based on price signals.

#### Transmission: \$8.2 billion under development

Future reliability means ensuring not only an adequate supply of power, but also focusing on regional planning to ensure adequacy of the transmission grid. An ERCOT-led industry process has enabled the construction of thousands of miles of transmission over the past ten years and is guiding future development including:

- 1,137 circuit miles of transmission improvements completed in 2009 at an estimated cost of \$538.6 million
- 7,730 circuit miles of transmission added since 1999
- \$5.78 billion in transmission added since 1999
- 5,729 miles of transmission currently under study
- \$8.2 billion under development in the five-year transmission plan, including \$5 billion to support 18,000 MW of renewable energy.

#### Nodal: 'All systems go' for December 2010 launch

Perhaps the most important milestone in 2009 was the successful completion of several key steps toward the December 1, 2010 "go-live" date for nodal:

- Completion of all core vendor applications
- On-time launch of the first core nodal system the single-entry network model a key component for connectivity and reliability
- Successful completion of the first operational-day test on schedule
- Successful integrated test of the congestion revenue rights and settlements/billing
- Successful, on-time start of the market connectivity trials.

The team remains focused on end-to-end testing and is working to increase the quality and quantity of the data as we move closer to full-functionality integrated market trials in 2010.

#### **Additional milestones**

Other key milestones for 2009 included:

- An unqualified opinion on the SAS 70 audit for the third consecutive year
- A successful audit from North American Electric Reliability Corporation, based on the preliminary report including favorable comments on ERCOT's "culture of compliance"
- Notification of a \$3.5 million award from the Department of Energy for a long-term transmission planning study, expected to be completed in mid-2013.

#### **Employees: The key ingredient**

Finally, I want to congratulate and thank ERCOT employees for our many successes during 2009. I believe ERCOT's employees have worked diligently toward aggressive performance goals despite the challenges of an ever-changing environment. Because of our employees' dedicated efforts and skills - along with support from regulators and stakeholders - the ERCOT electric market is widely recognized as the best in the country and one that contributes to the continued economic prosperity of Texas.

Trip Doggett President and CEO

Trip Doggett

## **GRID OPERATIONS**

# **Ensuring Reliability Day-to-Day**

# Operators maintain reliability as new demand, wind records set

ERCOT successfully fulfilled its primary responsibility to maintain reliability of the grid in 2009, while setting new records for peak electricity demand, instantaneous wind generation, and wind generation's percent of total load.

ERCOT electricity demand reached 62,786 megawatts (MW), on July 8, surpassing the three-year-standing record of 62,339 MW from Aug. 17, 2006. But the new record was topped again the next week when consumers used an hourly average of 63,400 MW of power between 4 and 5 p.m. on July 13, exceeding the 2006 record by 1,061 MW.

Grid operations also recorded a new all-time high for instantaneous wind generation: 6,223 MW on Oct. 28, recorded at 8:19 p.m., when the total load was 35,713 MW. At 3 a.m. on the same day, ERCOT was serving 25 percent of the total load with wind – load was 22,893 MW, and wind was at 5,667 MW.

In early 2010, the ERCOT region set a new winter peak record of 55,878 MW – beating the previous 2007 record by 5,474 MW.

The system operators managed the grid during the record-setting demand and wind records without any major issues.

## **Multiple factors behind wind increase**

ERCOT continues to lead the nation with the most installed wind capacity – now at nearly 9,000 MW – almost a 500 percent increase in the last five years. In 2009, the total installed wind capacity increased from 8,005 MW in January to 8,916 MW at year's end.

In the first half of the year, more than 8,000 MW – about 92 percent – of ERCOT's wind generation was located in the western congestion management zone where existing transmission lines were limited to about 4,500 MW of wind.

In the latter part of the year, several wind farms began operations along the coast and in the north zone which were not affected by the curtailments related to transmission congestion in and from the western zone. At year end, 83 percent of the wind generation was in the west

zone, 9.6 percent in the north zone, and 7.5 percent in the south zone.

In addition, a 214-mile private transmission line went into service in October which allowed 850 MW of wind generation that was formerly connected in the west zone to be switched to the less congested south zone.

# **ERCOT** leads the way in learning to manage wind integration

As the percentage of the system load served by wind continues to increase, having a good forecast of how wind will generate during the current day and next day becomes more critical. Because the system operators cannot rely on wind units to deliver a scheduled level of energy in real-time, ERCOT is required to maintain adequate dispatchable (controllable) resources to make up for any variance in wind generation. Inaccuracy in the wind forecast can result in under- or over-commitment of generation resources.

ERCOT has continued to work with its wind forecast, which was integrated into the system operators' planning tools in 2008, to make improvements to help the operators manage the risks of the increased wind penetration.

Recent market rule changes require wind generation resources to:

- Limit or regulate their ramp rates when being given or released from instructed curtailments;
- Use the ERCOT wind forecast in their resource plans so ERCOT can better plan for day-ahead unit commitment;
- Provide primary frequency response and low voltage ride-through capability (applies to new wind generation).

Also, the nodal market, scheduled to launch December 1, 2010, will more efficiently handle the variability in wind generation and system load because nodal dispatch will allow more frequent and direct instructions to controllable generation than the portfolio dispatch under the current zonal market.

## 2009 energy down 1.3 percent

Energy consumed in the ERCOT region last year totaled 308,278 gigawatts – a 1.3 percent decrease over 2008.

February marked the greatest decrease from the previous year with a 6.8 percent decrease, followed by May with a 6 percent decrease.

Wind energy marked the largest percentage increase in energy produced, increasing to 6.2 percent in 2009, compared to 4.9 percent in 2008 and 2.9 percent in 2007.

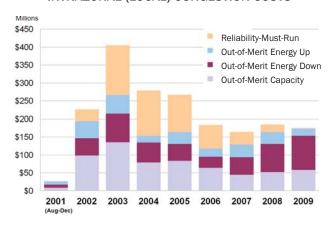
# Zonal congestion costs return to 2007 levels

Zonal congestion costs returned to 2007 levels, recovering from a high of more than \$375 million in 2008, due to a combination of events, including high fuel costs, revised market rules, and increased wind generation.

Intrazonal (local) congestion costs for 2009 were \$175.3 million, about \$10 million less than in 2008.

Moving to the nodal market design in December 2010 will allow more efficient congestion management through improved dispatch efficiencies at the individual resource level every five minutes, rather than by portfolio every 15 minutes.

#### **INTRAZONAL (LOCAL) CONGESTION COSTS**



# Commercial operations procedures developed for Mexico ties

ERCOT coordinated the development of commercial operations procedures over three ties with the Comisión Federal de Electricidad (CFE) in March 12. These ties include:

- Eagle Pass (DC-S), 30 MW
- Sharyland Railroad (DC-R), 150 MW
- Laredo Variable Frequency Transformer (DC-L), 100 MW.

The ERCOT grid is not synchronously connected with any other grids. Connections to other grids are limited to ties which allow the controlled transfer of power between the ERCOT system and another electrical system without the two systems being synchronized. The ERCOT grid also has ties with the Southwest Power Pool region at Oklaunion (220 MW) and at Monticello (600 MW), both in the north Texas area.

The CFE ties have been used for mutual emergency assistance between ERCOT and CFE but were not previously available for commercial transactions. Mexico has provided energy to ERCOT through the ties, and ERCOT has also provided energy to CFE on emergency occasions.

### Other successes reported

Also during 2009, system operations:

- Implemented changes to the methodologies for determining ancillary service requirements allowing ERCOT to begin procuring Non-Spin Reserve Service in four blocks for the operating day instead of two blocks for on-peak and off-peak hours, and allowing Loads Acting as a Resource (loads under contract to be interrupted if needed) to provide up to 50 percent of Responsive Reserve Service;
- Successfully addressed a significant amount of northto-south transmission congestion in the summer, caused by a large amount of generation outages in the south zone, by working with transmission owners to open some limiting transmission lines;
- Received a favorable preliminary report on the reliability standards audit from the North American Electric Reliability Corporation (NERC), including praise for ERCOT's culture of compliance;
- Processed nearly 37,000 planned transmission outage requests.

# **GENERATION, TRANSMISSION PLANNING**

# **Planning Reliability for the Future**

# **ERCOT** forecast shows adequate reserves through 2013

ERCOT reported in December that the region's reserve margins were forecast to remain above the 12.5 percent target minimum through 2013, but drop below the desired reserves beginning in 2014. Reserve margins reflect a snapshot of existing and currently-planned generation resources in excess of forecasted peak demand needed to ensure reliability for extreme temperatures and unexpected major outages.

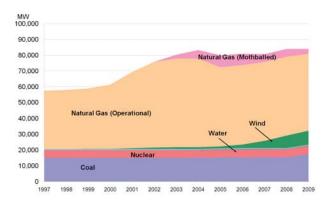
The December update to the annual capacity, demand and reserves report showed more than 3,000 MW had been added to the region's operational generation since May, including 1,689 MW from new coal plants and 1,093 from natural gas plants.

The update showed a net decrease of 1,105 MW in generation in 2014 and 2015, primarily due to the exclusion of the Cobisa Greenville Project, a 1,792 MW natural gas-fired power plant which had been scheduled for completion in 2013. Although the project has an air permit and transmission interconnection agreement, the project developers notified ERCOT in early December that the unit should not be included in the reserve margin calculation, based on their current plans.

Available resources for the 2010 summer peak totaled 76,363 MW, leaving a 21.8 percent reserve margin, up from 20 percent in the May 2009 forecast – well above the 12.5 percent target minimum.

Potential resources that were not included in the report's

#### **GENERATION CAPACITY BY FUEL TYPE 1997-2009**



generation total included more than 3,000 MW of mothballed capacity that could be brought back into service at the owners' decision. Other potential resources not included in the report's total are proposed units with a transmission interconnection study but lacking either an air permit or signed interconnection agreement. The planned units under review total 2,751 MW with a 2010 in-service date, 8,704 MW for 2011 completion, and more than 20,000 MW by 2015.

Major generation units that began commercial operations in 2009 included:

- Barney Davis 2 344 MW, gas, Nueces County
- Bosque 255 MW, gas, Bosque County
- Cedar Bayou 4 535 MW, gas, Chambers County
- Dansby Unit 3 48 MW, gas, Brazos County
- JK Spruce 2 772 MW, coal, Bexar County
- Nueces Bay 701 MW, gas, Nueces County
- Oak Grove 1 917 MW, coal, Robertson County
- Pearsall 100 MW, gas, Frio County
- Sandow 5 560 MW, coal, Milam County.

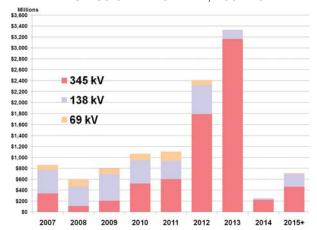
The summer peak demand forecast of 63,491 megawatts (MW) was 1,731 MW lower than the last forecast in December 2008, reflecting the current slowdown in economic conditions. It was 2 percent higher than the 2008 actual peak demand of 62,174 MW due to cooler than normal weather last summer.

ERCOT lowered the peak demand forecast because of the economic downturn in 2009; however, ERCOT forecasts anticipate a recovery in the economy over the next five years as reflected in an increase in the average annual growth rate from 1 percent in the near term to as high as 3 percent around 2012 and 2013.

Installed capacity by fuel type in the December snapshot was 59 percent natural gas, 22 percent coal, 7 percent nuclear, 10 percent wind, and 1 percent water/biomass/solar/other.

For the second year, the summer assessment included demand supplanted by energy efficiency conservation efforts as reported to the Public Utility Commission by ERCOT member utilities, in compliance with Legislative House Bill 3693 (2007). Texas state law mandates that at least 20 percent of all investor-owned-utility growth in

#### TRANSMISSION INVESTMENT, 2001-2015



Numbers are based on projects being completed in the designated year and may not reflect actual investment in that year. Costs may be spread over several years.

electricity demand be met through energy efficiency programs each year. The 2009 estimated load decrease not already accounted for in the load forecast is 110 MW and 242 MW for 2010-2014.

ERCOT's assessment also included 1,115 MW of load resources which are dispatchable, contractually committed demand response resources.

The ERCOT peak use forecast is based on an average weather profile and economic factors including per capita income, population, gross domestic project and various employment measures.

### **CREZ** projects underway

Interest in wind development remains strong as a result of the Competitive Renewable Energy Zones (CREZ) project – a \$5 billion transmission plan approved by the Public Utility Commission in 2008 that will accommodate a total of 18,456 MW of generation capacity in West Texas. The plan overall will move power generated in West Texas – from McCamey in the south to Pampa in the north – to load centers from San Antonio to Dallas, generally a distance of 275 to 350 miles. The CREZ lines are expected to near completion in 2013.

ERCOT's current planning forecasts show a cumulative total of 2,079 MW of wind committed for the next several years, bringing total wind estimates to 11,000 MW by 2012. In addition, almost 46,000 MW of wind generation projects are currently in some phase of screening in the generation interconnection request process, not all of which are expected to be completed.

# **Transmission improvements total** more than half a billion dollars

ERCOT's December 2009 annual transmission planning report included \$8.2 billion in proposed projects for the next five years, expected to improve or add 5,729 circuit miles of transmission and more than 19,000 megavolt ampere (MVA) of autotransformer capacity to the grid.

ERCOT transmission service providers completed more than 1,137 circuit miles of transmission lines and approximately 8,511 MVA of autotransformer capacity, with an estimated capital cost of \$538.6 million.

Transmission projects approved in 2009 totaled \$405.1 million, and the amount for projects completed in 2009 was \$538.6 million.

ERCOT staff completed the analyses and recommendations for 15 transmission projects through the Regional Planning Group review process and processed 135 generation interconnection requests and completed more than 83 interconnection screening studies.

# **ERCOT** selected for \$3.5 million grant for transmission planning

ERCOT received notice in late 2009 that the Department of Energy had selected ERCOT for two transmission planning awards totaling \$3.5 million. Under the grant, ERCOT will develop an efficient, long-term transmission framework for the Texas interconnection that is cost-effective and reliable and that facilitates the development of low cost, environmentally-friendly resources by ERCOT market participants.

The long-term planning study will include:

- Assessment of fundamental drivers of system needs and specifications of potential future scenarios;
- Evaluation of likely resource development by the market under various scenarios;
- Development of technology-neutral ancillary services framework;
- Development of long-term transmission framework for the ERCOT grid.

The study is expected to be completed in mid-2013.

# RENEWABLE ENERGY **Texas Leads the Way**

promotes wind increase

# State's renewable porfolio standard

### Texas retired approximately 14 million Renewable Energy Credits (RECs) in 2009, including a record increase in voluntary participation to support environmental initiatives. The state's 135 competitive retail electricity providers retired 6.79 million RECs to satisfy the

the state renewable portfolio standard's annual mandate.

Voluntary REC retirements continue to increase as the market grows. An additional 8.14 million RECs were retired in the voluntary market to substantiate "green energy" purchases, surpassing 2008's total of 6.77 million.

The program currently includes 103 REC generation accounts with an installed capacity of 10,070 MW, which includes all of Texas, not just ERCOT. The REC program tracked 21.6 million MWh of renewable energy in 2009, an increase of approximately 25 percent over 2008. The breakdown of participating renewable generation by technology type includes: biomass - 73,364 MWh; hydro - 507,507 MWh; landfill gas - 412,926 MWh; solar -4,492 MWh; and wind - 20,595,909 MWh.

RECs are stock-like certificates that correspond to actual megawatts of renewable energy. Each REC represents one megawatt-hour of renewable energy produced. Producers of renewable energy can earn and sell the renewable energy credits to retailers on the open market



as a separate commodity. The range of REC prices is fairly wide since their cost is a function of demand. Prices ranged from \$1 to about \$5 each during the year with some going higher, so the financial impact of the REC trading program in the Texas market could be estimated somewhere between \$22 and \$108 million.

Under the Texas program, retail electric providers must acquire and retire RECs based on their load-ratio share of the renewable portfolio standard annual mandate. Electric providers may also voluntarily retire RECs to substantiate claims of green energy to consumers.

The REC trading program was established as part of the Texas Legislature's restructuring of the state's electricity market in 1999 to increase incentives for renewable energy production through a renewable portfolio standard. The Texas program was the first of its kind in the nation when it began in 2001.

The original statutory goal of the program was to install 2,000 MW of additional, new renewable resource generation in Texas by the year 2009. That goal was surpassed three years ahead of schedule in 2006. The Legislature more than doubled the goal in 2007, making the target 5,000 MW by 2015 and 10,000 MW by 2025, including 500 MW from non-wind renewable resources such as solar, biomass, landfill gas and geothermal. With the current installed renewable capacity of 10,070 MW, Texas has already surpassed the 2025 target of 10,000 MW.

## **MARKET OPERATIONS**

# **Ensuring a Fair and Competitive Market**

## **ERCOT** begins financial settlement process for 'smart meters'

ERCOT and market participants took a major step in implementing system functionality to support the loading of advanced metering 15-minute interval data and the use of the data in ERCOT's settlement processes in November 2009. ERCOT performed the first wholesale

settlements using actual advanced metering data on December 7, 2009 for approximately 11,000 accounts. In early 2010, settlement processes for more than 630,000 accounts had been successfully completed using advanced meter data.

Advanced metering deployments are underway in the service territories of Texas's three largest investor-owned transmission and distribution utilities: Oncor,

CenterPoint and American Electric Power. A fourth utility Texas-New Mexico Power is developing its deployment strategy. Forecasts show nearly 7 million retail customers in Texas will have advanced meters installed by 2014 that will record their energy usage every 15 minutes around the clock.

### **Retail transactions top 93 million**

ERCOT is unique among independent system operators with its central role in assuring conveyance of retail customer switch requests, move-ins and move-outs, and meter-read data.

By 2009, ERCOT completed 5.4 million switch transactions above the 98 percent performance target for all four quarters. The total number of retail transactions supporting choice since the market opened June 1, 2001 topped 93 million at the end of 2009.

The Texas retail electricity market continued to set the standard nationally for active customer switching. By year's end, 50 percent of residential customer load was served by a retail electric provider other than the incumbent utility, compared with 46 percent in 2008. Also, 79 percent of the small commercial load and 75 percent of industrial load was served by a non-incumbent provider.

Twenty-six new retail electric providers joined the ERCOT market in 2009, compared with 19 in 2008.

## Settlements, billing staff process data for \$34 billion market

Managing the data and the wholesale settlements and billings processes that support the estimated \$34 billion market is a critical function of market operations. ERCOT staff processed 164,683 wholesale statements with over 99 percent timeliness and 9,545 invoices with 100 percent timeliness. ERCOT billed over \$1.6 billion of settlement activity in 2009.

Other accomplishments in the markets division included:

- 99.97 percent accuracy on ERCOT polled-settlement meter data provided for settlements;
- 99.94 percent of interval data recorder metering data captured by true-up settlements.

## **ERCOT** staff supports market, stakeholder process

ERCOT staff played a critical role in the stakeholder process by providing meeting management and technical support for numerous stakeholder meetings in 2009. The market rules staff managed all activities for 144 new revision requests and completed 634 revision request reports. Market rules responded to more than 1,400 meeting requests, and provided support to the Technical Advisory Committee and its subcommittees for more than 140 days of meetings.

Retail client services provided business support for 134 market participant entities, drafted and distributed 301 retail market notices, and delivered instructor-led structured education sessions for 495 individuals and computer-based training to 311 individuals. Client services also coordinated flight test activities for 29 new market participants and 27 existing market participants and facilitated 92 working group/task force meetings for the market.

Wholesale client services maintained a 98.53 percent rate for timely resolution of settlement disputes with a dispute volume averaging 109 disputes per month. Client services staff provided registration, qualification, and settlement business support for 1,920 market participant entities, delivered 1,632 man-hours of training, and facilitated the start-up and commissioning of 19 new generation sites. Wholesale Client Services drafted and distributed 305 wholesale market notices and 165 nodal market notices.

The market operations support staff captured approximately 22,000 interval data recorder usage reads per month in 2008. The data integrity department completed an upgrade of the Lodestar application which added new functionality required for the nodal project and also improved batch processing times.

The testing department completed successful testing of ten capital projects, including execution of 4,919 test scripts, in addition to 3,122 test scripts for testing maintenance releases. The testing staff administered three market-wide test flights required for retail market certification. In addition, the department participated in ongoing nodal testing activities, executing more than 19,000 tests scripts and resolving over 1,700 defects.

## NODAL MARKET IMPLEMENTATION

# Market 'Go-Live' on Track for December 2010

#### Nodal readies for 2010 launch

For the Texas Nodal Market Implementation, 2009 was a year of planning and development, including the restructuring of the nodal program leading to a \$658.7 million budget, an expanded schedule, and a go-live date of December 1, 2010. Two critical milestones were completed in 2009: the single-entry network model launch and market connectivity trials.

During the spring and early summer, the nodal team replanned testing and implementation schedules, developed internal plans, and updated the project schedule and budgets for go-live. By the middle of the summer, all core vendor applications had been delivered.

In July, the first integrated test of the congestion revenue rights and settlements and billing was completed. Also, the traceability project was started to match nodal protocols to the nodal system applications to test for inconsistencies.

## First core nodal system activated

The single-entry network model, a key system component for both connectivity and reliability, was successfully activated in August.

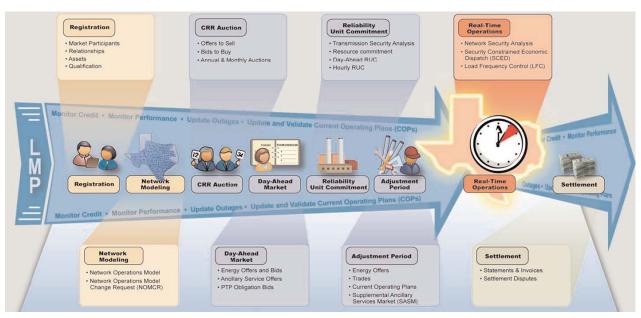
The single-entry model is an electric-transmission management system in which utilities owning equipment on the grid can interactively view and update the ERCOT transmission model with changes to the grid such as new transmission lines, substations, and other equipment.

### **Market connectivity testing begins**

In October, ERCOT opened its nodal production environment to the market for connectivity, allowing market participants to test data transfers between their software systems and ERCOT's market management systems. The market management system interfaces represent several key applications in the integrated suite of applications that make up the nodal market.

The Public Utility Commission authorized ERCOT in September to continue assessing the current nodal surcharge of \$0.169 per MWh through December 31, 2009 and begin collection of the requested nodal surcharge amount of \$0.375 per megawatt-hour on January 1, 2010. The fee is to be discontinued when costs for the nodal market are recovered – anticipated by 2013.

Strict change controls over scope, schedule, and budget allows the program management office to closely monitor and report on the schedule and project progress accurately and efficiently. Independent oversight by the Public Utility Commission, the board of directors, and market participants allows for interaction and transparency into the schedule and budget for go-live.



## **TEXAS NODAL**

## At a Glance

#### **Zonal Market**



In today's zonal market, the grid is divided into Congestion Management Zones (CMZs), which are defined by the **Commercially Significant** Constraints (CSCs). Several limitations have been identified with the current zonal model:

- Insufficient price transparency This results in less efficient power dispatch, less efficient congestion management tools and muted or distorted signals for investment.
- Resources grouped by portfolio Qualified scheduling entities submit schedules for a group of resources (portfolio) in a specific zone, and ERCOT operators have limited options to efficiently resolve congestion.
- Indirect assignment of local congestion Participants who contribute to local congestion are not appropriately assigned the associated costs.

#### **Nodal Market**

Moving to a nodal design will satisfy the PUC order to directly assign local congestion.

In the nodal market, the grid will consist of more than 5,000 nodes, replacing today's CMZs.

The Texas Nodal design is expected to achieve lower overall costs through:



- Improved price signals More granular pricing will encourage additional generation and/or transmission investment in the proper locations.
- Improved dispatch efficiencies Dispatching at the resource level will yield a lower overall cost of power supply and more efficient congestion management.
- More direct assignment of local congestion -Settlement prices are based on locational marginal costs.

#### **SUMMARY OF CHANGES**

#### **Today's Zonal Market**

#### **Tomorrow's Nodal Market**

Transmission congestion rights	Congestion revenue rights
No day-ahead energy market  Day-ahead market for ancillary services procured for capacity	Day-ahead energy and ancillary services co-optimized market
Replacement reserve service and out-of-merit capacity	Day-ahead reliability unit commitment
Hour-ahead studies	Hourly reliability unit commitment
Portfolio-based offers by zone	Resource-specific for local congestion
Balancing energy service (BES) every 15 minutes Zonal congestion management by portfolio for CSCs Resource-specific for local congestion	Security constrained economic dispatch generally every five minutes (still 15-minute settlement)  All congestion management will be resource-specific Enhanced load frequency control
Zonal average shift factors for resources	Actual shift factors for resources
Zonal market clearing prices for BES for generation and loads	Nodal locational marginal pricing (LMP) for generation Zonal weighted LMP for loads

## **ERCOT MEMBERS: 2009**

#### **CONSUMERS**

#### **RESIDENTIAL**

Office of Public Utility Counsel

#### **SMALL COMMERCIAL**

Aransas County Municipal Utility

City of Alice

City of Bedford

City of Bellmead

City of Belton

City of Benbrook

City of Caddo Mills

City of Canton

City of Carrizo Springs

City of Cedar Hill

City of Celina

City of Charlotte

City of Cisco

City of Cleburne

City of Clyde

City of Colleyville

City of Colorado City

City of Commerce

City of Copperas Cove

City of Corinth

City of Crockett

City of Decatur

City of Dilley

City of Early

City of Eastland

City of Forest Hill

City of Frisco

City of Gainesville

City of George West

City of Harlingen

City of Ingleside

City of Justin

City of Keller

City of Kennedale City of Lorena

City of Los Fresnos

City of Mercedes

City of Murphy

City of Ovilla

City of Paris

City of Pleasonton

City of Point Comfort

City of Pottsboro

City of Richland Hills

City of River Oaks

City of Roanoke

City of Robinson

City of Rowlett

City of Snyder

City of Springtown

City of Sulphur Springs

City of University Park

City of Watauga

City of Wharton

City of White Settlement

City of Whitney

City of Woodway

J. C. Penney Corporation Inc.

Town of Argyle

Town of Highland Park

Town of Laguna Vista

Town of Little Elm

Twon of Prosper

Town of South Padre Island

Town of Woodsboro

#### **LARGE COMMERCIAL**

Aquilla Water Supply District

City of Abilene

City of Allen

City of Arlington

City of Big Spring

City of Brownwood

City of Carrollton

City of Corpus Christi

City of Dallas

City of Duncanville

City of Euless

City of Farmers Branch

City of Grand Prairie

City of Grapevine

City of Hamilton

City of Harker Heights

City of Irving

City of Killeen

City of Kingsville

City of La Feria

City of Lewisville

City of Mansfield

City of McAllen

City of McKinney City of Mesquite

City of Midland

City of Midlothian

City of Mission

City of Missouri City

City of North Richland Hills

City of Odessa

City of Plano City of Port Aransas

City of Port Lavaca

City of Portland

City of Rio Grande

City of Rockport

City of San Angelo

City of Sherman

City of Sugar Land

City of Sweetwater

City of Texas City

City of Tyler

City of Victoria

City of Waco

City of Waxahachie

City of Wichita Falls

City of Wylie

HEB Grocery Company LP

Johnson County Special Utility District

The Colony

Town of Addison

Town of Flower Mound

Wal-Mart Stores Inc.

West Central Texas Municip. Water Dist.

### **INDUSTRIAL**

Air Liquide Large Industries US

Air Products and Chemicals

Austin White Lime

Chaparral Steel Midlothian

CMC Steel Texas

Dow Chemical Company

EPCO Holdings

ExxonMobil Power & Gas Svcs

Halliburton Energy Services

Linde Inc.

LyondellBasell Industries

Marathon Petroleum Company

Occidental Chemical Corp.

Pioneer Natural Resources USA

Praxair Inc. Shell Oil Products

Texas Industries

Texas Instruments

Valero Services Associate Member

NuStar Logistics LP

## **COOPERATIVES**

Bandera Electric Cooperative Inc.

Bartlett Electric Cooperative Inc.

Big Country Electric Cooperative Inc.

Brazos Electric Power Cooperative Inc.

Coleman County Electric Cooperative Comanche Electric Cooperative Inc.

Cooke County Electric Cooperative Inc.

CoServ Electric

Fort Belknap Electric Cooperative Inc. Golden Spread Electric Cooperative Inc.

Grayson-Collin Electric Cooperative Hamilton County Electric Coop. Assoc.

Heart of Texas Electric Cooperative HILCO Electric Cooperative Inc.

J-A-C Electric Cooperative Inc. Karnes Electric Cooperative Inc. Lower Colorado River Authority Magic Valley Electric Cooperative Inc. Medina Electric Cooperative Inc. Mid-South Electric Cooperative Navarro County Electric Cooperative Inc. Navasota Valley Electric Cooperative Inc. Nueces Electric Cooperative Inc. Rayburn Country Electric Cooperative Rio Grande Electric Cooperative Inc. San Bernard Electric Cooperative Inc. San Patricio Electric Cooperative Inc. South Plains Electric Cooperative Inc. South Texas Electric Cooperative Inc. Southwest Texas Electric Cooperative Taylor Electric Cooperative Inc. Tri-County Electric Cooperative Inc. Wharton County Electric Cooperative Wise Electric Cooperative Inc. United Electric Cooperative Services Inc. Associate Member

#### INDEPENDENT GENERATORS

Sam Houston Electric Cooperative Inc.

**AES Corporation** AM-PRES Corporation Calpine Corporation Cielo Wind Services Inc. Dynegy Power Corp. E.ON Climate & Renewables NA Inc. Edison Mission Marketing & Trading Inc. Formosa Plastics Corp., Texas GIM Channelview Cogeneration LLC Gregory Power Partners LP Horizon Wind Energy LLC Invenergy Energy Management LLC International Power America Services Kelson Energy Inc. Navasota Energy Management LLC NextEra Energy Resources LLC NRG Texas LLC Power Resources Ltd. PSEG Texas LP RES America Development Inc. Signal Hill Wichita Falls Power LP Suez Energy Marketing NA Inc. Sweetwater Wind 2 LLC Topaz Power Holdings LLC Westar Energy Inc.

#### Wolf Hollow I LP **Associate Members**

BP Alternative Energy North America Cobisa Corporation Guadalupe-Blanco River Authority Hackberry Wind LLC

LS Power Associates LP PSEG Texgen I Inc. ReNu Power Holdings LLC Texas Petrochemicals LP Tenaska Energy Inc. Whirlwind Energy LLC

### **INDEPENDENT POWER MARKETERS**

BP Energy Cargill Power Markets LLC Citigroup Energy Inc. Constellation Energy Commodities . DB Energy Trading LLC DTE Energy Trading Inc. Duke Energy Ohio Inc. Eagle Energy Partners I LP Endure Energy LLC EPIC Merchant Energy LLC Exelon Generation Company LLC Iberdrola Renewables Inc. J. Aron & Company Keystone Energy Partners LP Liberty Power Corp. LLC MAG Energy Solutions Inc. MAMO Enterprises Merrill Lynch Commodities Inc. Morgan Stanley Capital Group Inc. North Amer. Energy Credit & Clearing Rainbow Energy Marketing Corporation Reliant Energy Inc. Sempra Energy Trading LLC

#### Associate Members

Tenaska Power Services Co.

ConocoPhillips Company CPower Inc. Integrys Energy Services Inc. Kansas City Power & Light Comapny KCP&L Greater Missouri Operations Co. PSEG Energy Resources & Trade LLC Reliant Energy Power Supply LLC

Shell Energy North America (US) LP

### INDEPENDENT RETAIL **ELECTRIC PROVIDERS**

Ambit Energy LP Accent Energy Texas LP Champion Energy Services LLC Cirro Group Inc. Cities Aggregation Power Project Inc. Consolidated Edison Solutions Inc. Direct Energy LP dPi Energy LLC Energy Services Providers of Texas Inc. EnerNOC Inc.

Green Mountain Energy Company Hudson Energy Services LLC Integrys Energy Services of Texas LP Just Energy Texas LP Pepco Energy Services Inc. South Texas Aggregation Project Inc. Spark Energy LP Star Electricity LLC dba StarTex Power Stream SPE Ltd. dba Stream Tara Energy Inc. Texas Power LP TriEagle Energy LP Associate Members Andeler Corporation Brubaker & Associates Constellation NewEnergy Inc. Gateway Energy Services Corporation Gexa Energy LP Glacial Enegy of Texas Inc. Himalaya Power Inc. J. Pollock Inc.

#### **INVESTOR-OWNED UTILITIES**

American Electric Power Service Corp. CenterPoint Houston Electric LLC First Choice Power Special Purpose LP Oncor Electric Delivery Company LLC Sharyland Utilities LP

#### Associate Members

Linde Energy Services Inc.

Sitara Energy Inc.

Reliant Energy Retail Services LLC

Sempra Energy Solutions LLC

Suez Energy Resources NA Inc.

AEP Energy Partners Electric Transmission Texas LLC Luminant Generation Company LLC Texas-New Mexico Power Company TXU Energy Retail Company LLC

#### **MUNICIPALS**

City of Bastrop

Austin Energy Brownsville Public Utilities Bryan Texas Utilities City of College Station CPS Energy Denton Municipal Electric Floresville Electric Light & Power System Garland Power & Light Georgetown Power & Light **GEUS** Kerrville Public Utility Board New Braunfels Utilities Texas Municipal Power Agency Associate Member

# **FIVE-YEAR SUMMARY**

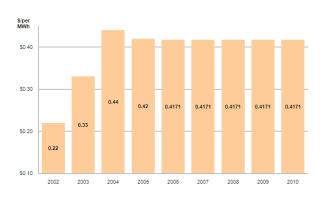
# Financial, Operating, Retail Transactions Data

FINANCIAL DATA (\$/millions) 2005	2006	2007	2008	2009
Revenue*	135.1	165.9	187.0	191.1
Direct Operating Expenses	85.9	115.8	141.1	146.7
Depreciation/Amortization	42.2	33.9	31.9	28.8
Net Interest Expense/(Income)	5.4	4.3	7.0	(0.8)
Total Expenses	133.5	154.0	180.0	174.7
Debt: Long Term	108.0	181.8	280.7	196.2
Debt: Short Term	73.1	77.1	60.2	168.5
Capital Expenditures	68.2	132.7	139.8	118.1
Administration Fee (per MWh)	\$0.4171	\$0.4171	\$0.4171	\$0.4171
NOTE: 2009 Audited Financial Statements are posted on www.ercot.com in News/I	Reports section.			
OPERATING DATA	2006	2007	2008	2009
Peak Demand (MW)	62,339	62,188	62,174	63,400
Energy (GWh)	305,692	307,064	312,401	308,278
Reserve Margin (%)	16.4	14.6	13.8	16.8
Transmission Improvements (\$ millions) \$557.4	\$749.4	\$919.5	\$453.0	538.6
Wind Generation, Cumulative (MW)	2,875	4,785	8,005	8,916
Local Congestion Costs (\$ millions) \$266.6	\$183.6	164.4	184.2	175.3
RETAIL TRANSACTIONS DATA 2005	2006	2007	2008	2009
Competitive Choice Customers (millions)	6.3	6.4	6.5	6.5
Switches Completed (cumulative; millions)	3.1	3.8	4.7	5.5
Switches by Year	846,705	715,239	822,607	839,576
Residential	656,218	578,727	662,566	666,761
Small Non-residential	189,482	135,586	159,216	171,969
Large Non-residential	1,004	926	825	1,119
Migration from Native Affiliate Retail Electric Provider				
Residential (%)	37.9	43.2	46.2	50.4
Small Non-Residential (%)	70.0	72.9	75.5	79.5
Large Non-Residential (%)	72.4	73.0	73.6	74.3
Competitive Retail Total Transactions (000's)	94,857	93,684	95,440	93,086

#### **ERCOT ANNUAL ENERGY, 2001-2015**

## GWn 400.000 ■ Forecast Historical 360,000 320,000 280,000 240,000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

#### **ERCOT SYSTEM ADMINISTRATION FEE, 2002-2010**



<sup>\*</sup> The 2007 revenue includes \$32 million from nodal surcharge, \$2 million from NERC fee; 2008 includes \$47.8 million from nodal surcharge, \$2.1 million from NERC fee; 2009 includes \$52.1 million from nodal surcharge, \$2.1 million from NERC fee.

## **ERCOT GOVERNANCE**

#### **Board of Directors**

#### **Michehl Gent**

Interim Chairman (unaffiliated)

#### **Jorge Bermudez**

(unaffiliated)

#### **Calvin Crowder**

Electric Transmission Texas (investor-owned utility)

#### **Andrew Dalton**

Valero Energy Corporation (industrial consumer)

#### H.B. "Trip" Doggett

President and Chief Executive Officer, ERCOT (ex-officio)

### Laura R. Doll

(unaffiliated)

#### **Mark Dreyfus**

Austin Energy (municipal utility)

#### **Miguel Espinosa**

(unaffiliated)

#### **Nick Fehrenbach**

City of Dallas (commercial consumer)

#### **Sheri Givens**

Office of Public Utility Counsel (residential consumer, ex-officio)

#### **Bob Helton**

International Power America (independent generator)

#### **Clifton Karnei**

Brazos Electric Cooperative (cooperative)

### Alton D. "Dee" Patton

(unaffiliated)

#### **Jean Ryall**

Constellation Energy Commodities (independent power marketer)

#### **Barry T. Smitherman**

Chairman,
Public Utility Commission
(ex-officio, non-voting)

#### **Marcie Zlotnik**

StarTex Power (retail electric provider)

#### **Segment Alternates**

#### **Deryl Brown**

Hudson Energy Services (retail electric provider)

#### **Mike Packard**

South Texas Electric Cooperative (cooperative)

#### Scott Prochazka

CenterPoint Houston (investor-owned utility)

#### **Ray Schwertner**

Garland Power & Light (municipal utility)

#### **Mark Walker**

NRG Texas (independent generator)

#### **Brandon Whittle**

DB Energy Trading (independent power marketer)

#### **ERCOT Officers**

#### **Trip Doggett**

President and Chief Executive Officer

#### **Mike Cleary**

Senior Vice President and Chief Operating Officer

#### **Bill Magness**

Interim Vice President and General Counsel

#### Charles B. Manning, Jr.

Vice President and Chief Compliance Officer

#### **Richard Morgan**

Vice President and Chief Information Officer

#### **Kent Saathoff**

Vice President of System Planning and Operations

#### (position vacant)

Vice President and Chief Financial Officer

#### **Board, Stakeholder Process**

The ERCOT Board of Directors has general overall responsibility for managing the affairs of ERCOT, including approval of the budget and capital spending priorities, approval of revisions to ERCOT protocols and guides, and endorsement of major new transmission recommendations. ERCOT's 16-member "hybrid" board includes five independent (or unaffiliated) members; three consumer segment representatives (industrial, commercial and residential); the ERCOT CEO; the Public Utility Commission (PUC) chairman (non-voting), and six representatives from each of the industry segments — investor-owned utilities (or transmission owners), municipally-owned utilities, cooperatives, generators, power marketers and retail electric providers.

The Board also oversees the affairs of the Texas Regional Entity (Texas RE), the independent division that the Federal Energy Regulatory Commission established in 2006 to serve as the regional entity for the ERCOT region, pursuant to the reliability provisions of the federal Energy Policy Act of 2005. [Note: The Texas RE is in the process of legally separating from ERCOT; FERC approval is anticipated in 2010.]

Under the Board's oversight, ERCOT's stakeholder process is responsible for developing policies, procedures, and guidelines for power grid coordination, reliability, and market operations. Six standing committees and subcommittees supported by numerous working groups and task forces function within the stakeholder process.

#### **PUC, Legislative Oversight**

ERCOT is unique because its electricity grid is not synchronously connected outside of the state. Because of its separateness, ERCOT is primarily regulated by the Public Utility Commission of Texas (PUC) and the Texas Legislature, not federal authorities. The PUC approves the ERCOT system administration fee and has general oversight authority including the ability to order audits.

For most purposes, ERCOT, like the PUC, is accountable to the Texas Legislature and its jurisdictional committees. For federal reliability standards, ERCOT is accountable to the Texas RE, the North American Electric Reliability Corporation, and the Federal Energy Regulatory Commission.

The Electric Reliability Council of Texas (ERCOT) manages the flow of electric power to approximately 22 million Texas customers – representing 85 percent of the state's electric load and 75 percent of the Texas land area. As the Independent System Operator for the region, ERCOT schedules power on an electric grid that connects 40,000 miles of transmission lines and more than 550 generation units. ERCOT also manages financial settlement for the competitive wholesale bulk-power market and administers customer switching for 6.5 million Texans in competitive choice areas. ERCOT is a membership-based 501(c)(4) nonprofit corporation, governed by a board of directors and subject to oversight by the Public Utility Commission of Texas and the Texas Legislature.

