



CHAPTER 32

Appendix 1: The Electricity Market

Electricity customers in Texas are served by three distinct electric networks defined by specific geographic boundaries, each of which have unique rules that govern the operation of electricity markets within their footprint. Texas' westernmost counties (El Paso and portions of Hudspeth and Culberson) are part of the Western electric grid of the United States and southwestern Canada. Substantial land areas in the Texas Panhandle as well as contiguous areas in East Texas from Texarkana to Beaumont are part of the Eastern electric grid of the United States. The remainder of Texas is contained within the Electric Reliability Council of Texas (ERCOT), representing approximately 75 percent of the land area and 85 percent of the electric consumption in the state. This appendix describes key features of the electricity market in ERCOT.

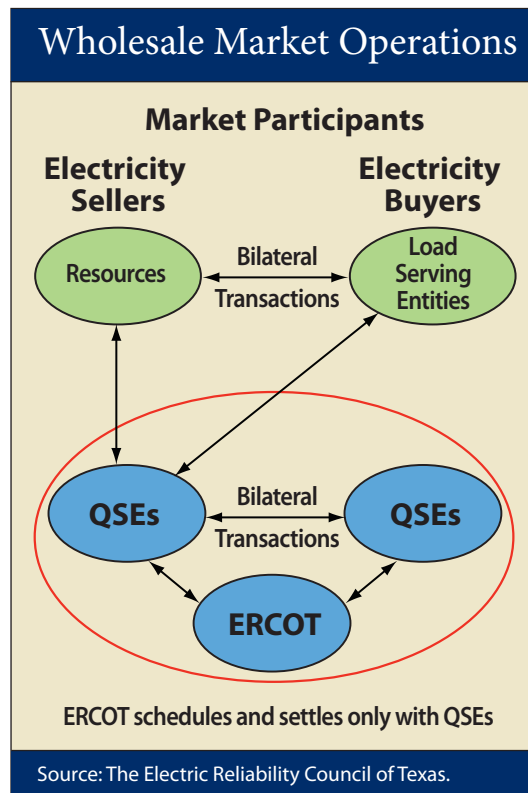
BILATERAL MARKET

Most energy (over 95 percent) consumed within the ERCOT power region is purchased through the bilateral market, so called because it involves contracts between power generating companies and load serving entities (LSEs), which can be retail electric providers, municipally owned utilities and cooperatives. The scheduling of power purchased through these agreements is reported to ERCOT through Qualified Scheduling Entities (QSEs).

ERCOT-certified QSEs provide the schedules of all power loads and generation that they are representing in the ERCOT power region (**Exhibit 32-1**). QSEs may represent generators, power marketers (those who buy and sell energy in the bilateral market) and/or load serving entities; all generators and LSEs must be represented by a QSE.

These QSEs are required to inform ERCOT of the private contractual agreements in the bilateral market for each 15-minute period of the day, so that ERCOT can ensure that the supply and demand for energy are sufficiently balanced.

EXHIBIT 32-1



BALANCING MARKET

Electricity load fluctuates constantly, and any changes in load demand within the ERCOT power region that are not offset by a change in resource schedules (in essence, under- or over-scheduling) require ERCOT to meet the demand by purchasing electricity from QSEs representing generators (in the event of “under-scheduling”) or by compensating those QSEs to reduce generation (in the event of “over-scheduling”). In either case, the expense is recouped from the QSEs representing LSEs. This additional power (or reduction in power) is purchased in the “balancing” market.

ERCOT determines the amount of energy needed by examining the schedules submitted by QSEs



and the anticipated demand. Energy purchased in the balancing market (“balancing energy”) covers any shortfalls in demand the schedules do not meet. This allows owners of undedicated generation to sell power into the balancing market.

ERCOT determines a “market-clearing price” every 15 minutes that it will pay to generators that sell energy in the balancing market. The market-clearing price is the price ERCOT pays for the last megawatt procured in the bid-stack for balancing energy and is paid to all generators providing this service.

As noted above, QSEs also may over-schedule energy, meaning more energy is scheduled to be generated than is demanded. In this scenario, ERCOT pays generators in the balancing market to reduce generation. Again, ERCOT recoups the cost from QSEs representing load.

ANCILLARY SERVICES

Ancillary services include various types of energy and capacity products to meet their reliability requirements. ERCOT has stated that ancillary services resemble insurance that market participants must acquire to do business. The cost of this “insurance” is paid by all LSEs and is based on their “load ratio share,” or the LSE’s share of the overall load.¹

QSEs can either purchase their ancillary services through a bilateral contract, supply it themselves, if able, or ask ERCOT to procure it for them in a competitive market.

Ancillary services can be divided into two categories, *capacity* and *energy*, which are defined below. **Exhibit 32-2** shows the various ancillary services.

EXHIBIT 32-2
Ancillary Services

Capacity

Responsive Reserve	Responsive or “spinning” reserves are daily operating reserves that will respond quickly to restore interconnection frequency in case of a disruption.
Non-Spinning Reserve	This service provides additional electrical generation capacity within 30 minutes.
Replacement Reserve	This service is utilized when additional capacity is called on to provide additional Balancing Energy Bids, to cover system capacity or congestion.
Out of Merit Capacity	Similar to Replacement Reserve, but not acquired through the Replacement Reserve market process due to immediate operational needs.
Black Start	This service, acquired by ERCOT for the benefit of all customers, is power that can be generated without the support of the ERCOT transmission grid in case of a partial or total blackout.
Reliability Must-Run Capacity	This is capacity from a generator that would otherwise be mothballed or retired except that it is necessary to provide “voltage support, stability or management of localized transmission constraints.” ²

Energy

Balancing Energy	Energy that is deployed to resolve congestion or when the actual demand for energy does not equal the scheduled amount of energy.
Reliability Must-Run Energy	This is energy from a generator that would otherwise be mothballed or retired except that it is necessary to provide “voltage support, stability or management of localized transmission constraints.” ³
Out of Merit Energy	This is energy available from resources but not deployed through the market clearing process or scheduled by the QSEs.

Source: The Electricity Reliability Council of Texas.



TRANSMISSION CONGESTION MANAGEMENT

Electricity purchased for use in a particular geographical area is not necessarily generated there. Generators often are located near the fuel source; near bodies of water used for cooling; or in rural areas. And, in a market with varying prices, cheaper power may be purchased from a generator at some distance away from the user. Moving electricity across the grid from generation to end user often results in congestion — that is, the transmission lines cannot carry the amount of power being generated. This endangers the reliability of electricity.

The ERCOT grid is currently divided into congestion management zones (**Exhibit 32-3**). When power flowing between two zones reaches a level that may jeopardize reliability, ERCOT will deploy “balancing energy service,” which in effect decreases the amount of energy coming from the generators in the “sending” zone and increases production in the “receiving” zone. This combination of actions serves to decrease the flow of electricity between zones to a reliable level.

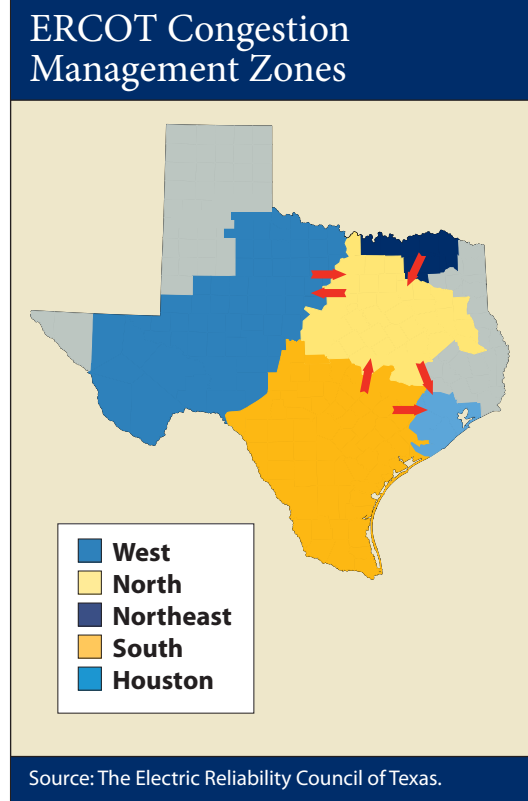
This balancing is accomplished by requiring generators to increase output in the receiving zone, and decrease it in the sending zone. These actions are often more expensive for the end user. Ideally, generation plants with the cheapest energy are called on before more costly generation. When reliability is at risk, however, ERCOT must dispatch more expensive generation to solve the congestion.

ERCOT calculates the cost of congestion relief between the market zones and charges those QSEs scheduling energy between the zones. This system assigns costs for congestion between zones, but does not address congestion *within* a zone. To address this problem, the ERCOT independent system operator (ISO) market is moving to nodal pricing.

NODAL PRICING

Beginning in December 2008, ERCOT is scheduled to move to a nodal market. Unlike the current, zonal market discussed above, the nodal market will calculate the costs of transmission

EXHIBIT 32-3



from generation to more than 4,000 delivery points or nodes across the state.⁴

Nodal pricing is expected to decrease congestion by exposing pockets where electricity is expensive, and encouraging either generation or transmission solutions to lower those costs.

ENDNOTES

- ¹ Interviews with Joel Mickey and Theresa Gage, Electric Reliability Council of Texas, April 19, May 3, and June 5, 2007.
- ² Electric Reliability Council of Texas, *ERCOT Protocols* (Austin, Texas), Section 5, pp. 2-25, available in Word format at <http://www.ercot.com/mktrules/protocols/current.html>. (Last visited April 24, 2008.)
- ³ Electric Reliability Council of Texas, *ERCOT Protocols*, Section 5, pp. 2-25.
- ⁴ Electric Reliability Council of Texas, About Texas Nodal, <http://nodal.ercot.com/about/index.html>. (Last visited April 24, 2008.)

