



ERCOT System Operation

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Joint Board on Security Constrained Economic Dispatch

South Region

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ERCOT Region & Quick Facts

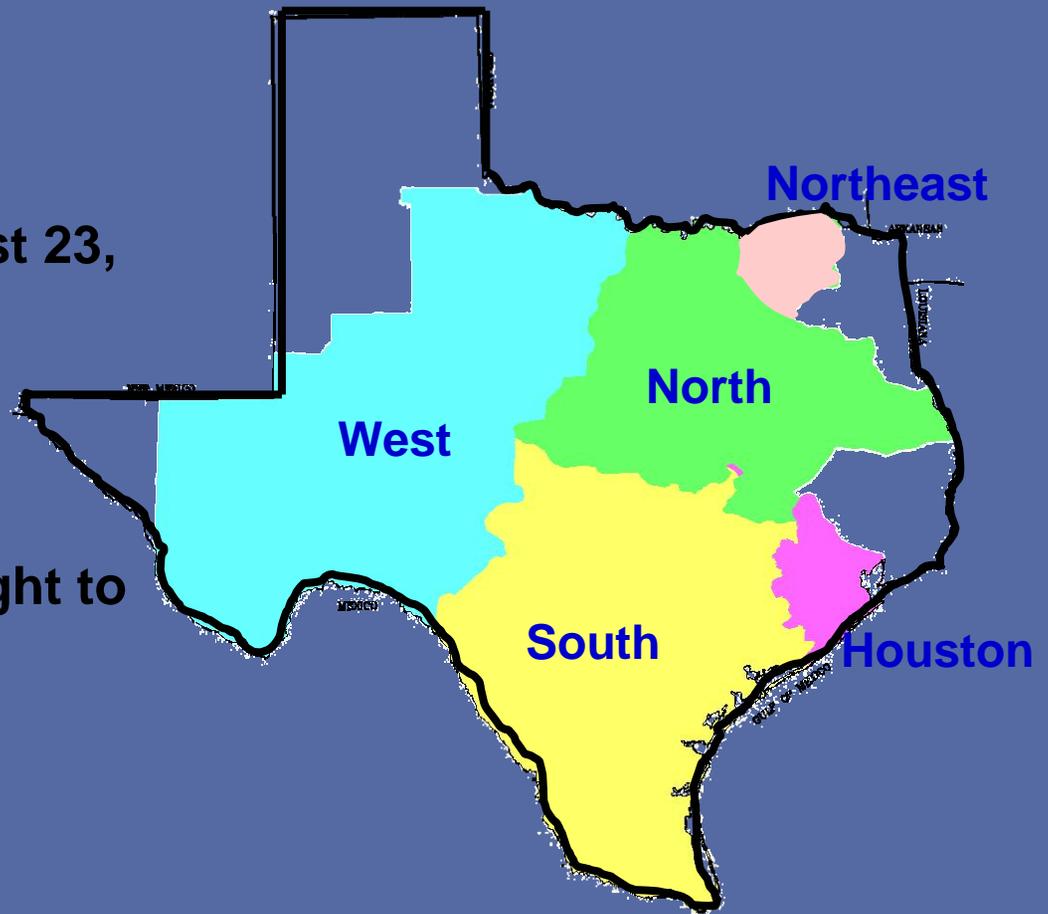
Electric Reliability Council Of Texas



- **Independent, not-for-profit organization since 1941**
- **Intra-state electric interconnection**
 - 1 of 3 North American interconnections
 - Connected only by DC ties
- **Independent System Operator**
 - Administrator of the wholesale & retail markets
 - Neutral registration agent for retail customers
 - Supervisor of the transmission planning process
- **One of 10 NERC Regional Reliability Councils**
- **Public Utility Commission of Texas (PUCT) jurisdictional**

ERCOT System

- 72,000 MW Active Generation
- 60,272 MW Peak Load (August 23, 2005)
- 8,000 Miles of 345kV Lines
- 16,000 Miles of 138 kV Lines
- 5.6 Million Customers with right to choose
- \$ 27 Billion Market



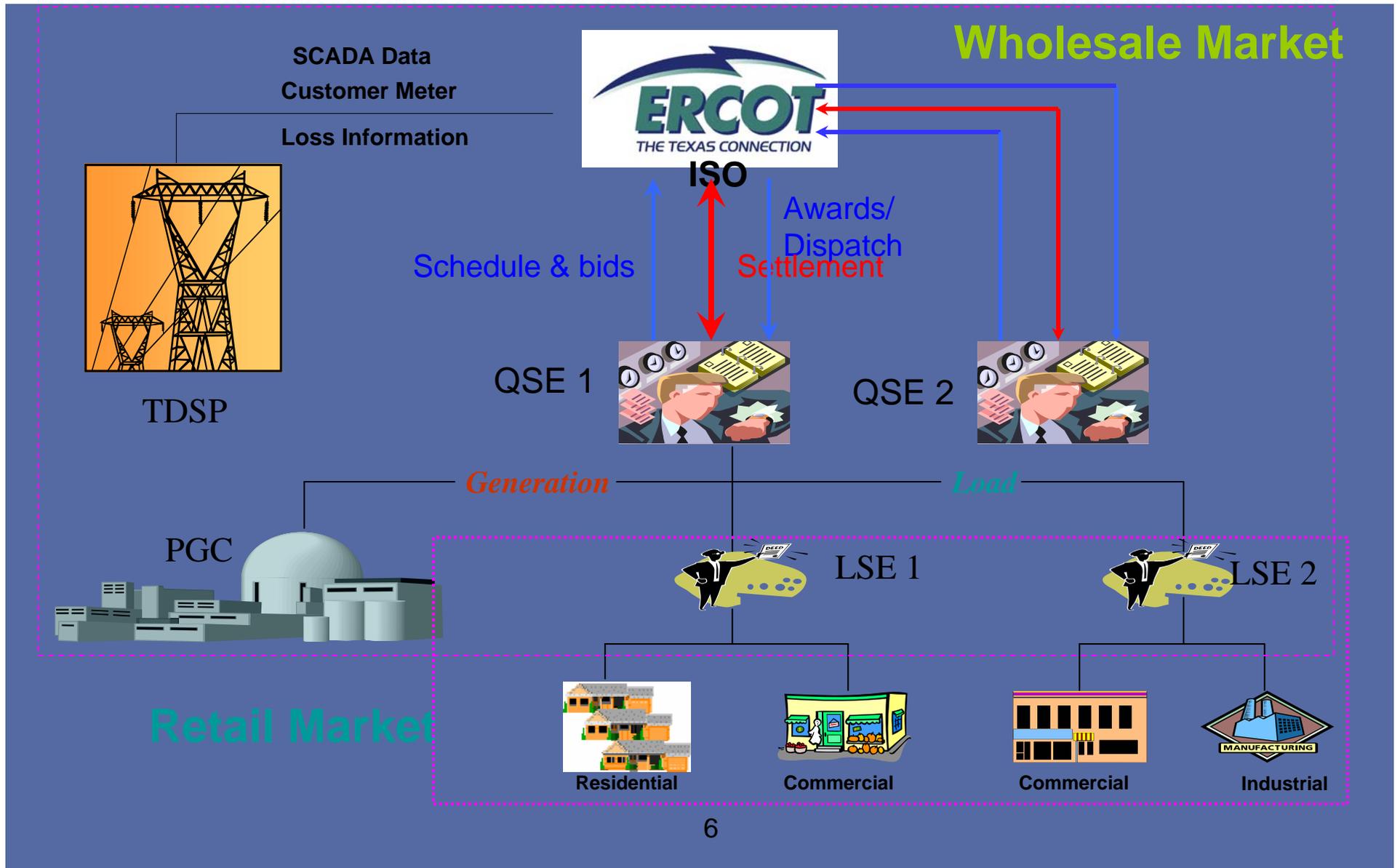
Generating Capacity Fuel Mix

- Renewables -- 2%
- Nuclear -- 6%
- Coal/Lignite -- 15%
- Dual (Natural gas or oil) --14%
- Natural Gas -- 63%

ERCOT Wholesale Market

- Single Control Area
- Bilateral (95% of energy requirement) + Ancillary Service + Balancing Energy Market
- No Centralized Day-ahead Energy Market
- Zonal Locational Model (5 zones)
- QSE Portfolio Schedules
- Balancing Energy = Load Following + Inter-zonal Congestion Management + Intra-zonal Congestion Management

ERCOT Players in the Market



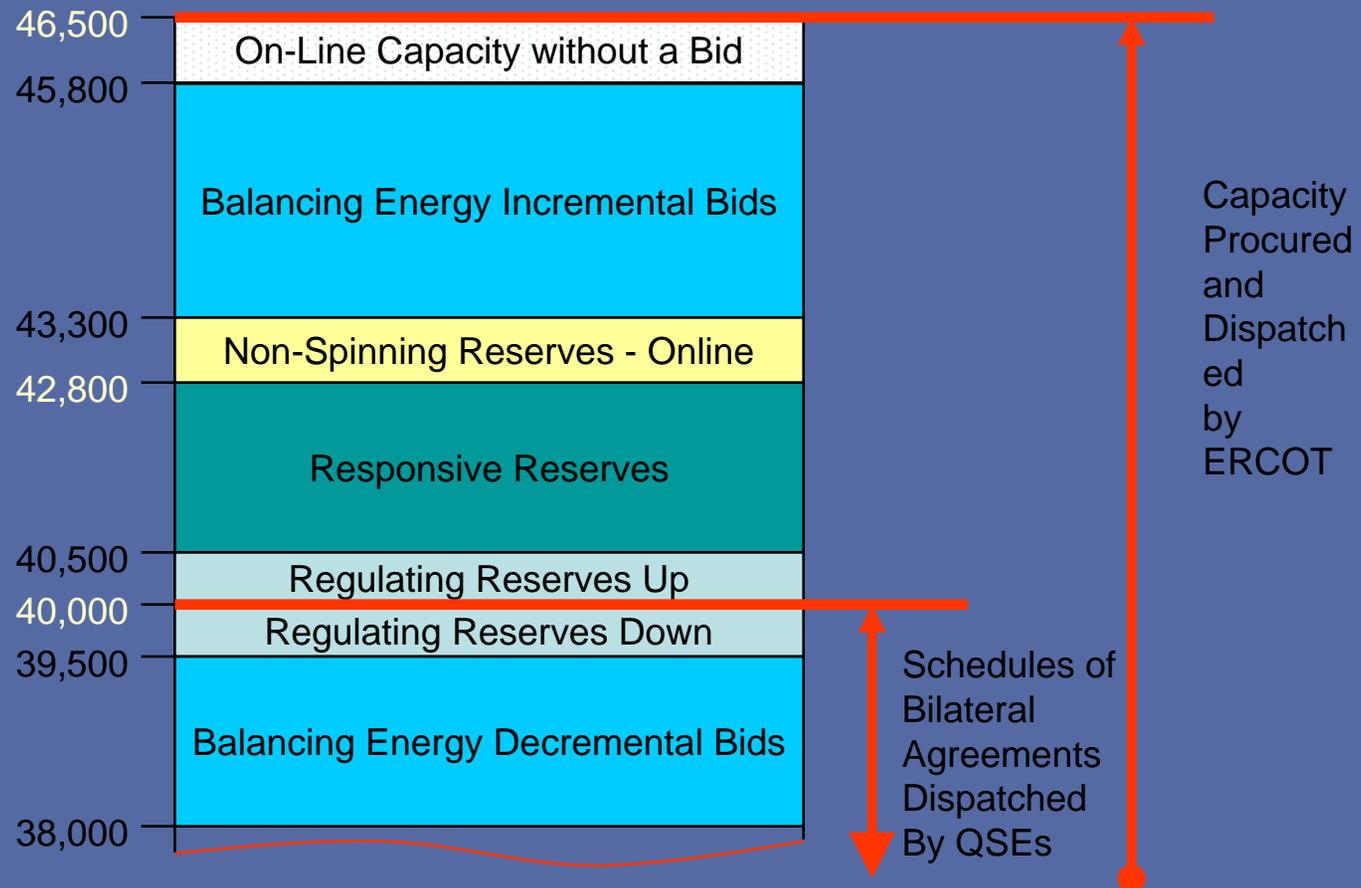
Transmission

- Not reserved for any particular transaction or schedule
- Paid for by Load Serving Entities on a load ratio share basis

Schedules

- All bi-lateral schedules flow according to QSE initial dispatch; no curtailments
- Transmission congestion handled by ERCOT re-dispatch using Ancillary Services, Balancing Energy and Out of Merit (OOM) deployments
- Cost of redispatch:
 - Between Zones – allocated to QSEs scheduling between zones
 - Within Zones – allocated to Load Serving Entities on a load ratio share basis

Capacity Dispatched by ERCOT



Current Application of Economic Dispatch in ERCOT

1. Who performs the dispatch?

- Qualified Scheduling Entities (QSEs) dispatch their portfolios to meet their bilateral obligations
- ERCOT dispatches Ancillary Service (A/S) capacity and Balancing Energy Service (BES) to maintain reliability requirements based on bids from QSEs

2. How is the dispatch determined?

- QSEs make the initial dispatch of their portfolios to meet their bilateral obligations, presumably at lowest cost
- ERCOT dispatches A/S and BES and redispatches QSE portfolios to maintain overall system requirements and manage transmission congestion

Current Application of Economic Dispatch in ERCOT

3. What is the geographic scope of the dispatch?

- The ERCOT Region ~ 75% of Texas

4. Are there resources not included in the dispatch?

- Only resources that are off-line and unavailable

5. Would including them improve the dispatch?

- Probably not. They are probably not available due to maintenance, forced outage, being uneconomical or not determined to be needed by ERCOT for reliability

6. Are there resources that present challenges in incorporating them into the dispatch?

- Combined Cycle Units – Interdependency of GT/Steam units
- Wind – Intermittent and uncontrollable resource
- Hydro – Energy limited

7. How do transmission congestion and the dispatch affect each other? How would improvements in one affect the other?

- Dispatch purely on a economic basis frequently will cause transmission congestion
- Transmission congestion (security constraint) will require changing initial economic dispatch
- Reduction in transmission congestion by transmission system improvements will allow more economic dispatch

Current Application of Economic Dispatch in ERCOT

8. How are individual dispatches in the region coordinated?

- The QSEs coordinate initial dispatch of individual units in their portfolios
- ERCOT coordinates dispatch/redispach of individual units in the entire region to meet reliability requirements

9. How is the dispatch communicated to affected generation operators?

- ERCOT communicates most dispatch instructions to QSEs via private WAN. Some are provided verbally.
- QSEs provide their dispatch instructions, as modified by ERCOT instructions, to generation operators via their own AGC systems

10. Are there technical/infrastructure impediments that interfere with implementing the economic dispatch?

- Zonal portfolio instead of resource specific scheduling and dispatch presents challenges to ERCOT in transmission congestion management and has raised questions about whether it results in most optimal security constrained economic dispatch

11. Possible improvements to current dispatch practices.

- Recently put into production a more market based unit commitment application
- Pending implementation of a Nodal system (2009) will result in more granular resource specific pricing and dispatch
- Along with a Nodal system, there will be a centralized Day-Ahead energy market

12. What are the potential benefits and costs of those improvements?

- Cost/Benefit analysis of Nodal system indicated a net benefit of \$76 million/year average in lower generation costs. See <http://www.ercot.com/TNT/default.cfm?func=documents&intGroupId=83&b=> for complete CBA

13. Are there institutional, regulatory or statutory impediments to the identified improvements?

- No. The Public Utility Commission of Texas has supported a Nodal system and is in process of approving Protocols to implement

14. What are the benefits and costs of the way ERCOT dispatches now compared to the way dispatch was done prior to the ERCOT-wide dispatch?

- ERCOT- wide dispatch facilitated implementation of retail choice
- Frequency Control – Faster recovery after system disturbances, but more frequency variation in normal operation
- Consistent monitoring, analysis and managing of transmission security constraints by a single entity versus the previous 10 control area operation
- Cost and location of system transmission congestion now consistently quantified which aids transmission system planning