ERCOT Report

Mark Armentrout, Board Chair

Thomas F. Schrader, President and CEO

Sam Jones, COO

Senate Committee on Business & Commerce

April 25, 2006

Agenda

Emergency Curtailments

- **April 17 chronology**
- **Communications improvements**
- **Other steps**

ERCOT Issues

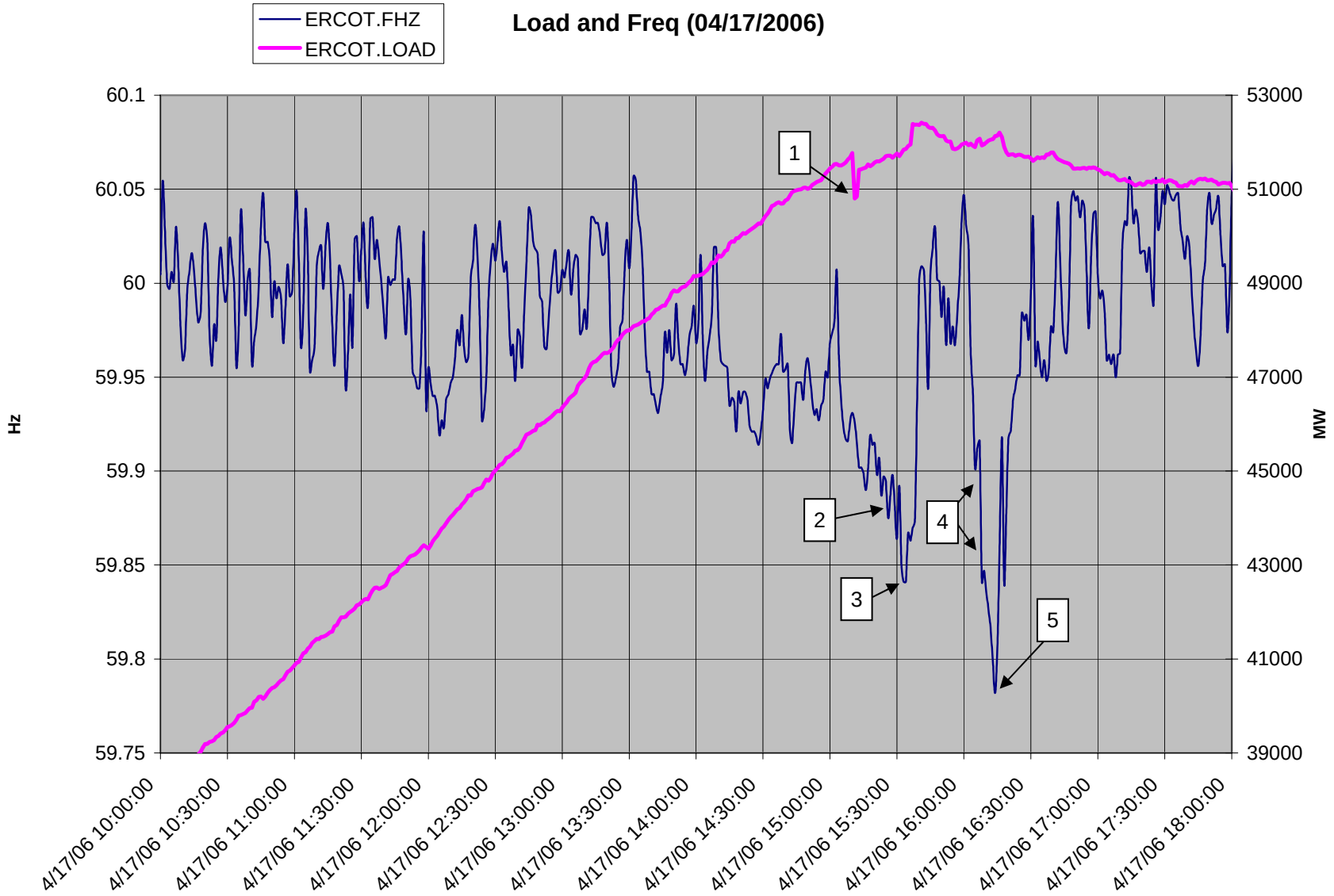
- **Generation capacity**
- **Congestion management**
- **Transmission planning**
- **ERCOT Fee**
- **SB 408 compliance**

April 17 Sequence of Events

- **Sunday, April 16**
  - **Capacity out on planned maintenance – 14,000 MW**
  - **2 pm: ERCOT purchased 1,250 MW of standby generating capacity for the peak period of Monday, April 17 (normal ancillary services market)**
  - **4 pm: Monday peak load forecast -- 49,018 MW**
  - **6 pm: ERCOT purchased 1,540 MW additional capacity for the 17th peak period in the replacement market**
  - **Peak capacity scheduled for Monday – 53,920 MW**

- **Monday, April 17**
  - 1 am: New forecast for the day increased load estimate to 49,600 MW
    - Scheduling system showed more than adequate reserves
  - 5 am: ERCOT manually increased the load estimate by an additional 2,000 MW to 51,600 MW
    - Scheduling system continued to show more than adequate reserves
  - ERCOT ran updated load forecasts every hour as the day progressed
    - All showed adequate capacity.
  - 11:58 am: A 500 MW generating unit tripped out of service
  - 12:23 pm: A 163 MW generating unit tripped out of service
  - 2 pm: ERCOT began to experience slow generation reserve response to control frequency

ERCOT Region Load & Frequency April 17



April 17 Sequence of Events (see chart)

1 **3:10 – 3:35 pm – A generating entity lost telemetry to ERCOT**

2 **3:25 pm – ERCOT experienced a decline in system frequency and declared Step 1 of the Emergency Electric Curtailment Plan (EECP)**

- Requires all generation to operate at maximum capability.
- Provides notice to QSEs and TDUs that a short supply situation is occurring.

3 **3:34 pm – Due to further decline in system frequency, ERCOT declared Step 2 of the EECP**

- Requiring all interruptible loads (loads paid for agreeing to turn off if needed) be curtailed.
- System load at the time was 52,360 MW.
- Returned frequency to normal levels.
- Grid was near peak for the day and operation without reducing firm load would have been possible for the remainder of the day baring further contingencies.

4 **3:51 – 4:17 pm – 5 generators with a total capacity of 1,680 MW tripped off line**

- **Frequency dropped very rapidly toward an unreliable level that could have resulted in a major blackout.**

5 **4:13 pm – Due to low frequency ERCOT bypassed Step 3 of the EECP and went to Step 4, requiring reduction of firm load**

- 1,000 MW of firm load reduction ordered.
- System load at that time was back up to 52,113 MW.
- Load reductions returned frequency to acceptable levels.

April 17 Sequence of Events (continued)

- **4:25 pm: ERCOT declared Step 3 of the EECP**
  - Issued media appeals for voluntary load reduction
- **5:15 pm: An 81 MW generating unit tripped out of service**
- **5:31 pm: ERCOT began restoring firm load as peak load subsided on the system**
- **7:20 pm: ERCOT canceled all alerts**

NOTE

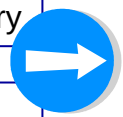
- **The loss of 5 generating units (1,680 MW) in a very short period of time (26 minutes) during peak load conditions is an extremely unlikely event.**
- **Total of 7 generators lost in a little over 4 hours and 8 in one day -- also very unlikely**

Communications during EECP

- **ERCOT will incorporate lessons learned into its Crisis Communications Plan**
- **Communications automated to the extent possible**
- **3 stages of communications:**

Stage 1 ALERT
Conditions indicate Step 1 of EECP may be necessary

Stage 2 ALERT
Step 2 of EECP declared



PUC
--Commissioners
--Exec. Director
--Media relations
--Infra./Security
--Govt. Relations

Governor / SOC hotline
-- City & County officials
-- Public safety
-- State agencies

Legislative Leadership

Market Participants
Load-serving entities

Stage 3: EECP
Step 3 or Step 4 of EECP declared

All of the above PLUS.....
- News media
- All legislators
- All market participants & other interested parties
- Activate ERCOT.com web page for public updates

Evaluation of EECP

- **ERCOT's Compliance Division is investigating incident**
- **Technical Advisory Committee (stakeholders) will analyze all aspects of the April 17 event**
  - Identify market concerns
  - Review communications steps
  - Review the EECP
  - Operational analysis in detail by Reliability & Operations Subcommittee

Incident Command System (ICS)

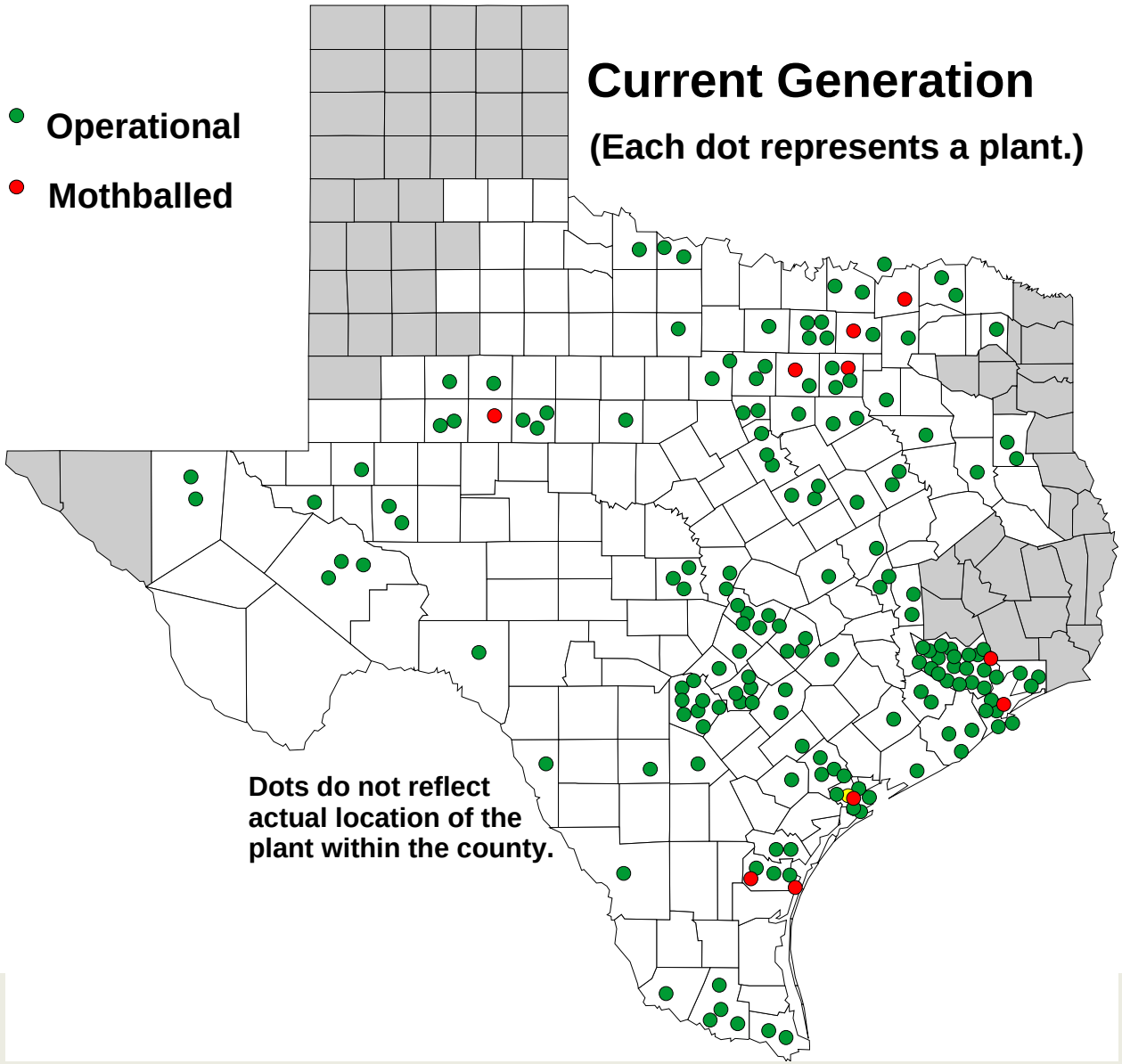
- **ERCOT will devise a response and recovery approach employing Incident Command System (ICS) structure**
- **ICS is widely used by governmental agencies to respond to crises such as fires, natural disasters, disease and pandemics, hazardous materials incidents, terrorist incidents, and other security situations**
- **ICS adopted by Department of Homeland Security for the National Incident Management System (NIMS)**

ERCOT Issues

- **Generation capacity**
- **Congestion management**
- **Transmission planning**
- **ERCOT Fee**
- **SB 408 compliance**

Generation in the ERCOT Region

- **554 total units (77,000 MW) includes:**
  - 30 mothballed units
  - 11 units (729 MW) on RMR status
  - 3 active DC Ties
  - Switchable facilities
- **26,000 MW of new generation capacity added since 1998**

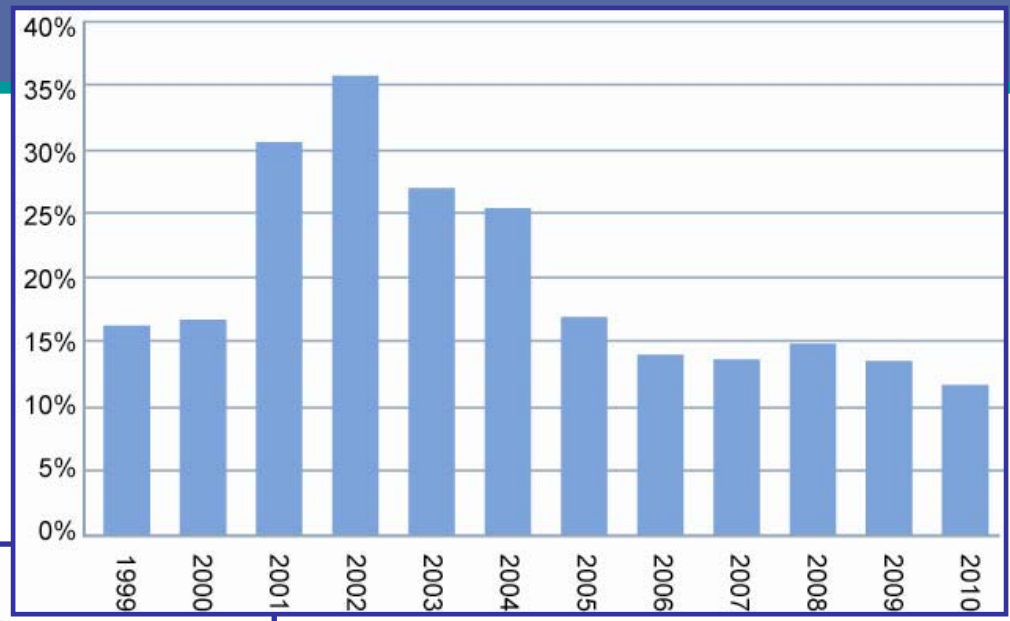


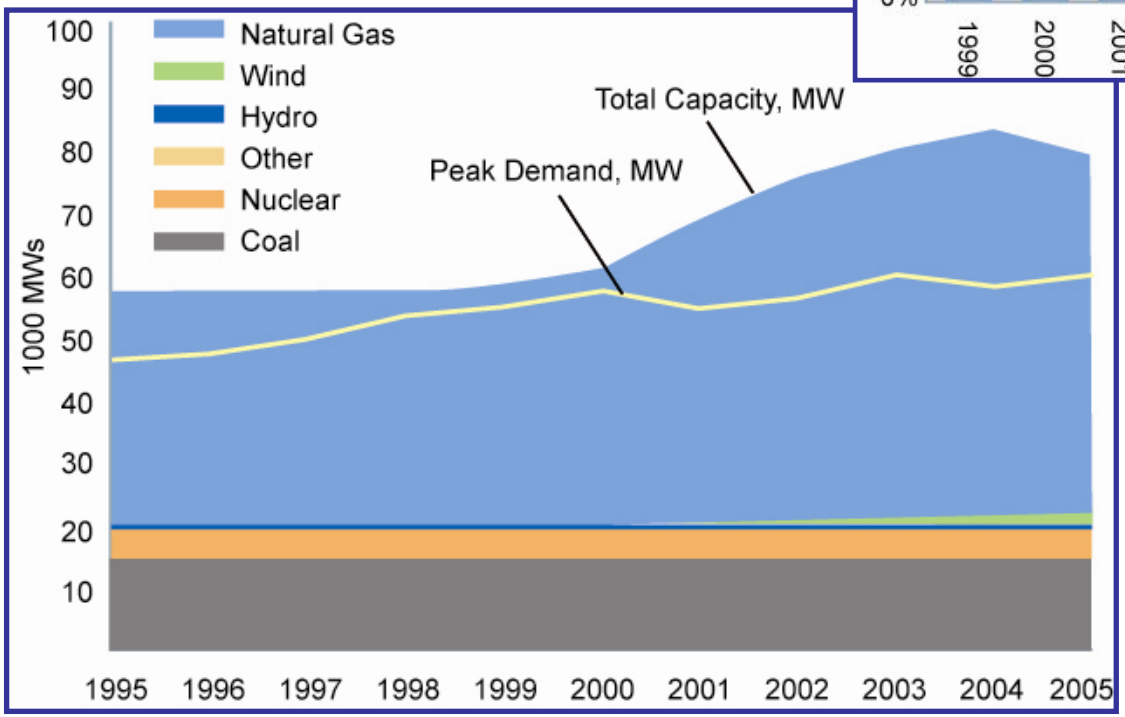
Reserve Margins

Margin for 2005 was projected at 16.9%

2005 Report projected Reserve Margin for 2006 at 13.6%

New evaluation will be published prior to summer peak season





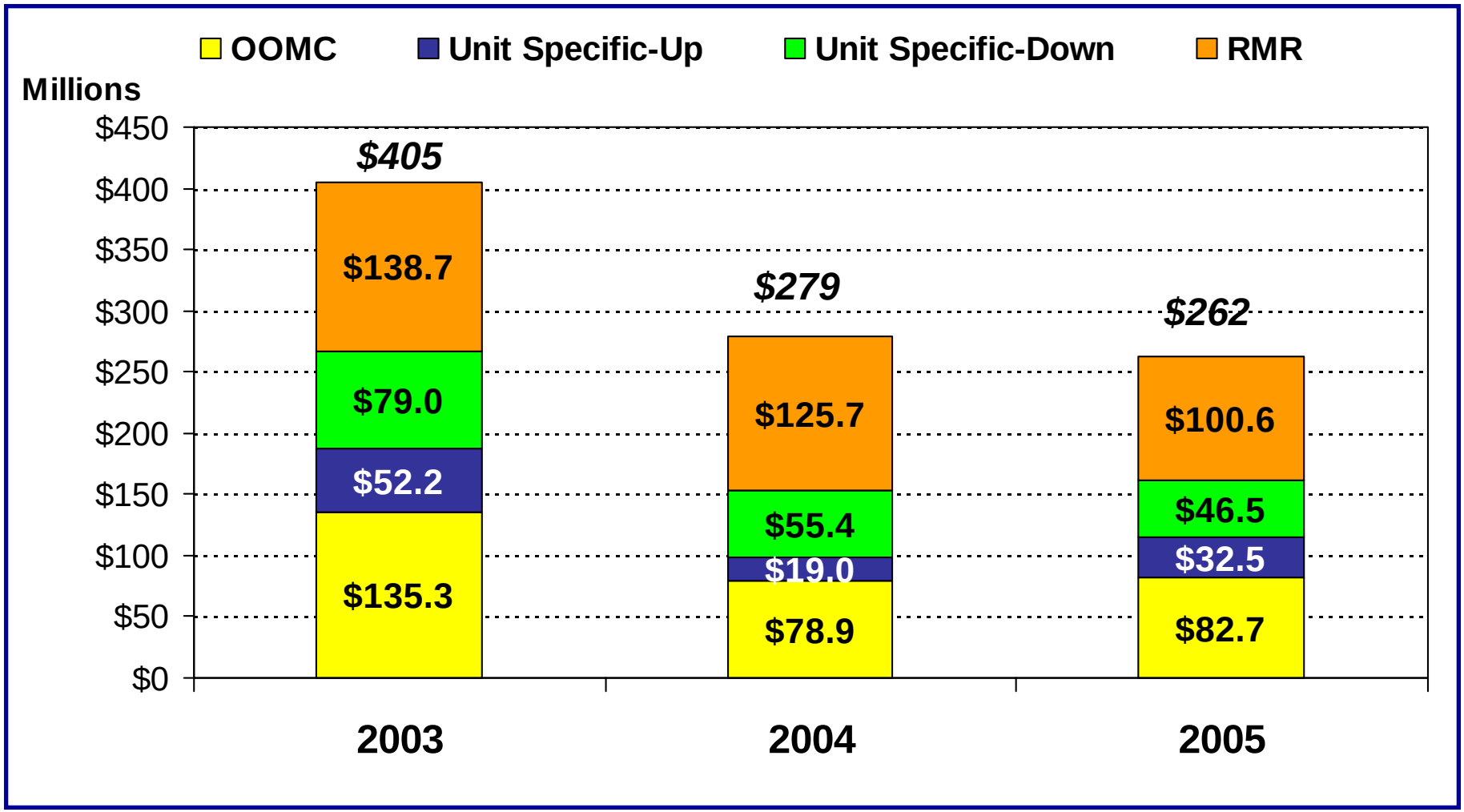
Planned Generation

Capacity in MW
Data as of March 29, 2006

Fuel Source	*Publicly Announced*	*Non-Public*	*Total*
Natural Gas	**2,850**	**3,350**	**6,200**
Coal	**4,450**	**3,209**	**7,659**
Wind	**2,353**	**9,297**	**11,650**
Other	**12**	**425**	**437**
TOTALS	9,665	16,281	25,946

NOTE: Includes projects under consideration or in planning that may or may not be built.

Local Congestion Costs in ERCOT Market

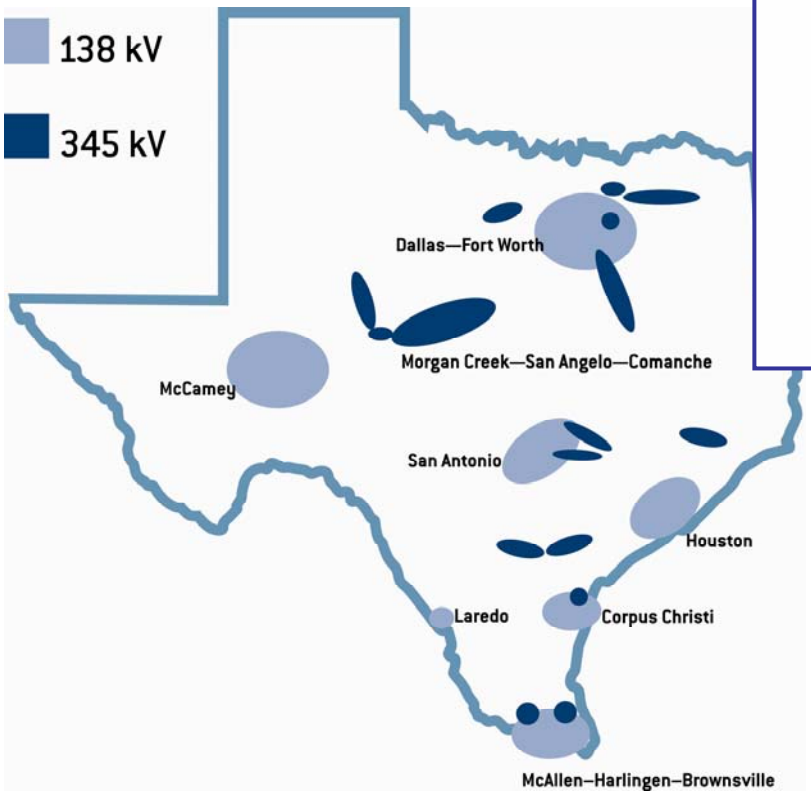


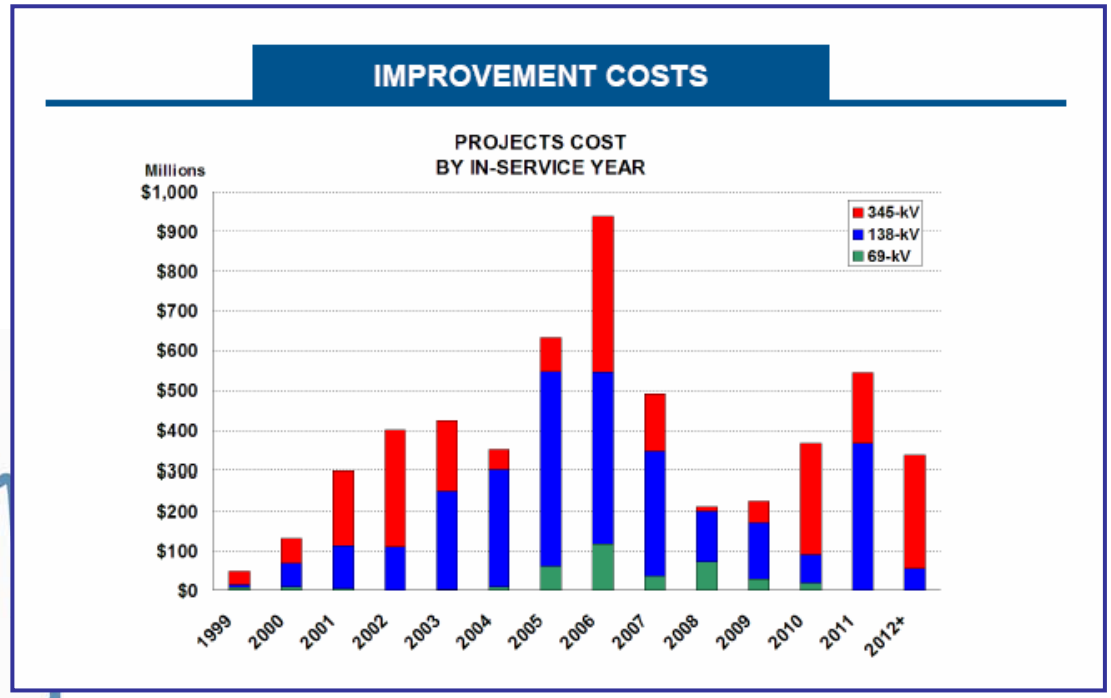
Congestion Management

- **A key component of ERCOT's role in grid reliability and the wholesale market**
- **Local congestion cost uplift (including RMR):**
  - Decreased 35% from 2003-05 ($405 million to $262 million)
  - Decreased 6% in 2005 while fuel index increased by 40%
- **Some reasons costs have decreased:**
  - Transmission system additions & upgrades
  - Dynamic ratings for line limits
  - Improved congestion analysis

New Transmission Investment

Major Transmission Additions Completed



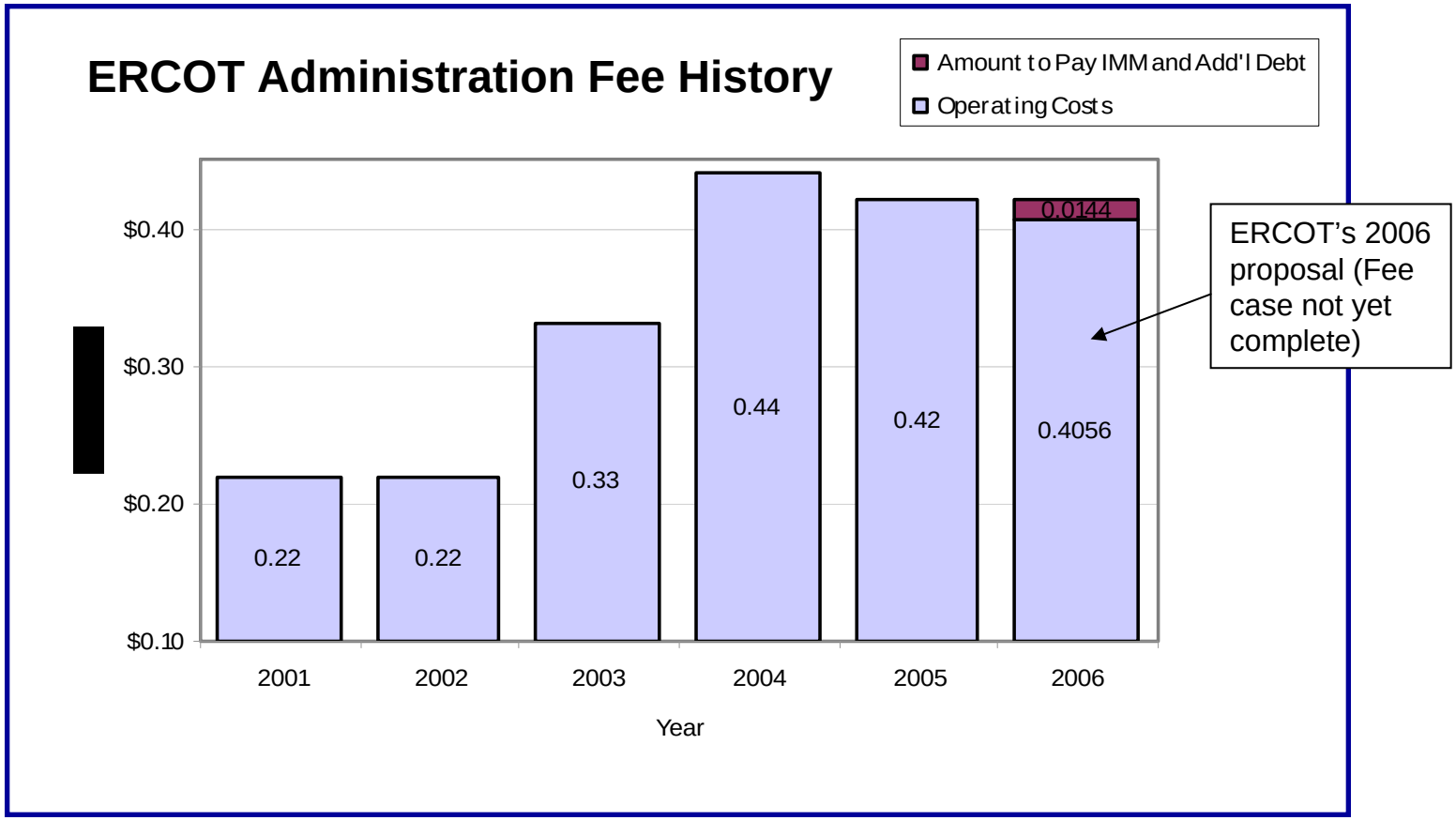


Transmission Investment in the ERCOT Region

1999-2005	**$2.2 billion**
2006-2011 (projected)	**$2.8 billion**

ERCOT Fee

- **Proposed base Fee for 2006 is 8% lower than 2004**
- **ERCOT has become a more stable operating organization**



SB 408 Compliance (Sunset recommendations)

- **ERCOT fully acknowledges and is cooperating with PUC oversight authority**
- **Board meetings are open to the public**
  - Agenda posted in advance
  - Materials distributed to email lists open to all
- **Board chair now an independent member**
- **Independent Board Member additions**
  - One new member already seated
  - Executive search underway for 2nd new member
- **ERCOT Bylaws now conform to SB408 requirements**
  - Conflict of interest provisions adopted
- **Independent Market Monitor**
  - ERCOT has worked closely with PUC on this issue
  - Substantive Rule implementing IMM approved by Commission April 13

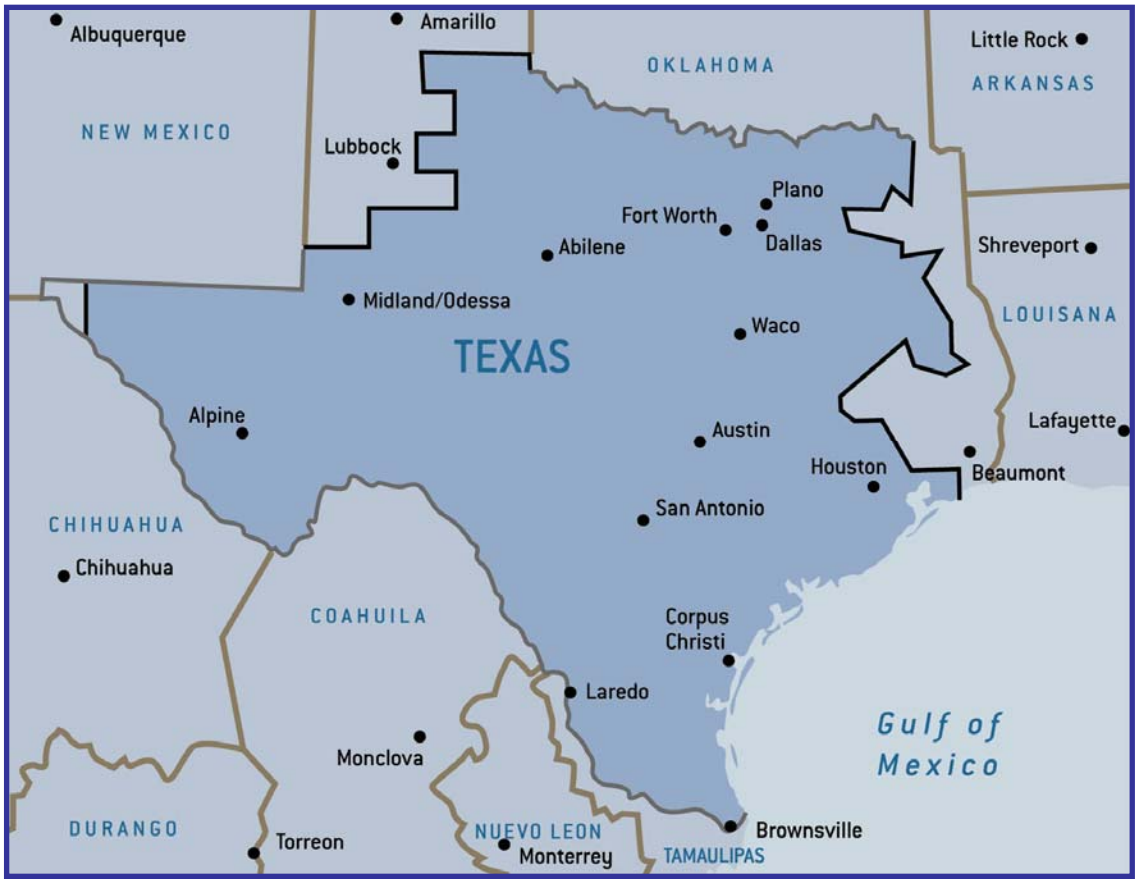
Q & A

Questions?

ERCOT Mission

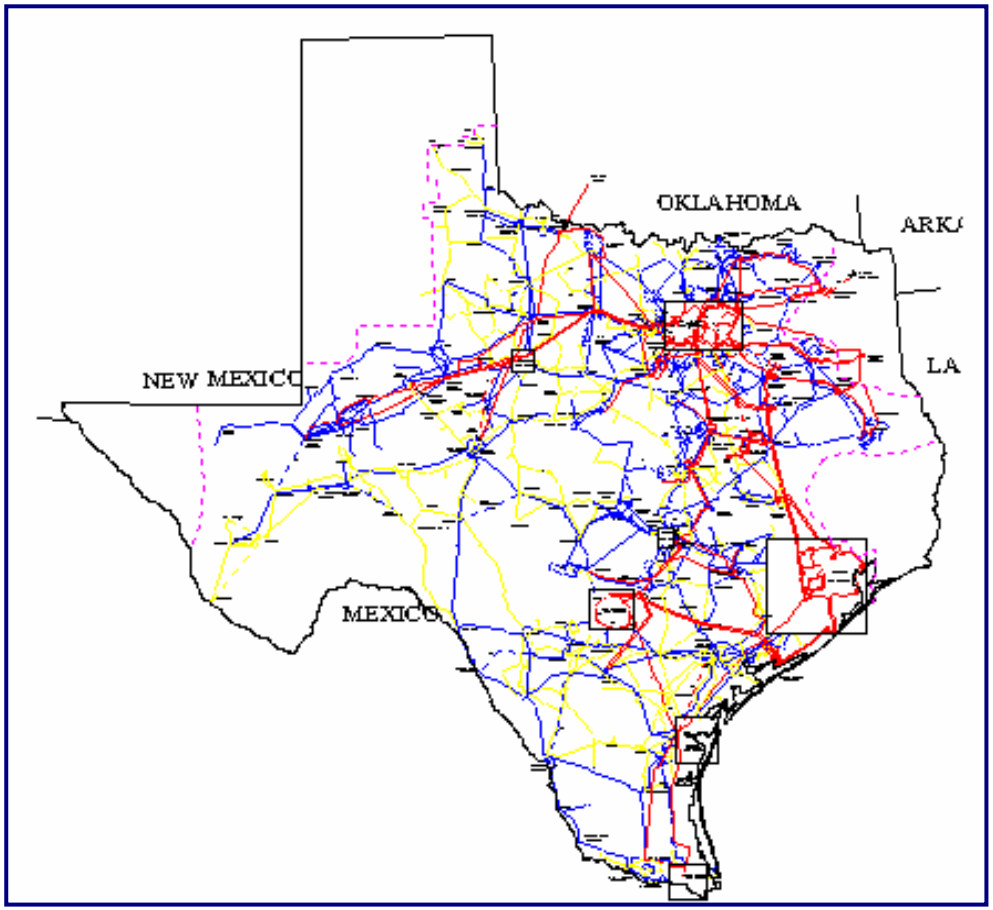
ERCOT's Mission is to direct and ensure reliable and cost-effective operation of the electric grid and to enable fair and efficient market-driven solutions to meet customers' electric service needs.

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**
  - Grid operations
  - Administrator of the wholesale & retail markets
  - Neutral registration agent for retail customers
  - Supervisor of the transmission planning process
- **Public Utility Commission of Texas jurisdictional**

Appendix B: ERCOT Region Facts & Figures



- **200,000 square miles**
  - 75% of Texas (not including Panhandle, El Paso area, 2 areas of East Texas)
  - 85% of Texas load
  - 20 million end-use customers
- **38,000 miles of Transmission Lines**
  - Nearly 700 miles of 345 KV lines added since 1999
- **77,000 MW of total resources**
  - 583 generation facilities
  - 26,000 MW new generation capacity added since 1998
- **60,272 MW peak load (2005)**
- **16.9% reserve margin for 2005**
- **3 DC Ties**
- **Single point of control**