



Smart Grid's Potential for Clean Energy

**EPA State Climate and Energy
Technical Forum**

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Public Utility Commission of Texas

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“.... we must continue our commitment to conservation, energy efficiency and customer demand response. We are going to need every resource to meet the growing electricity needs of Texas.”

- Chairman Barry Smitherman

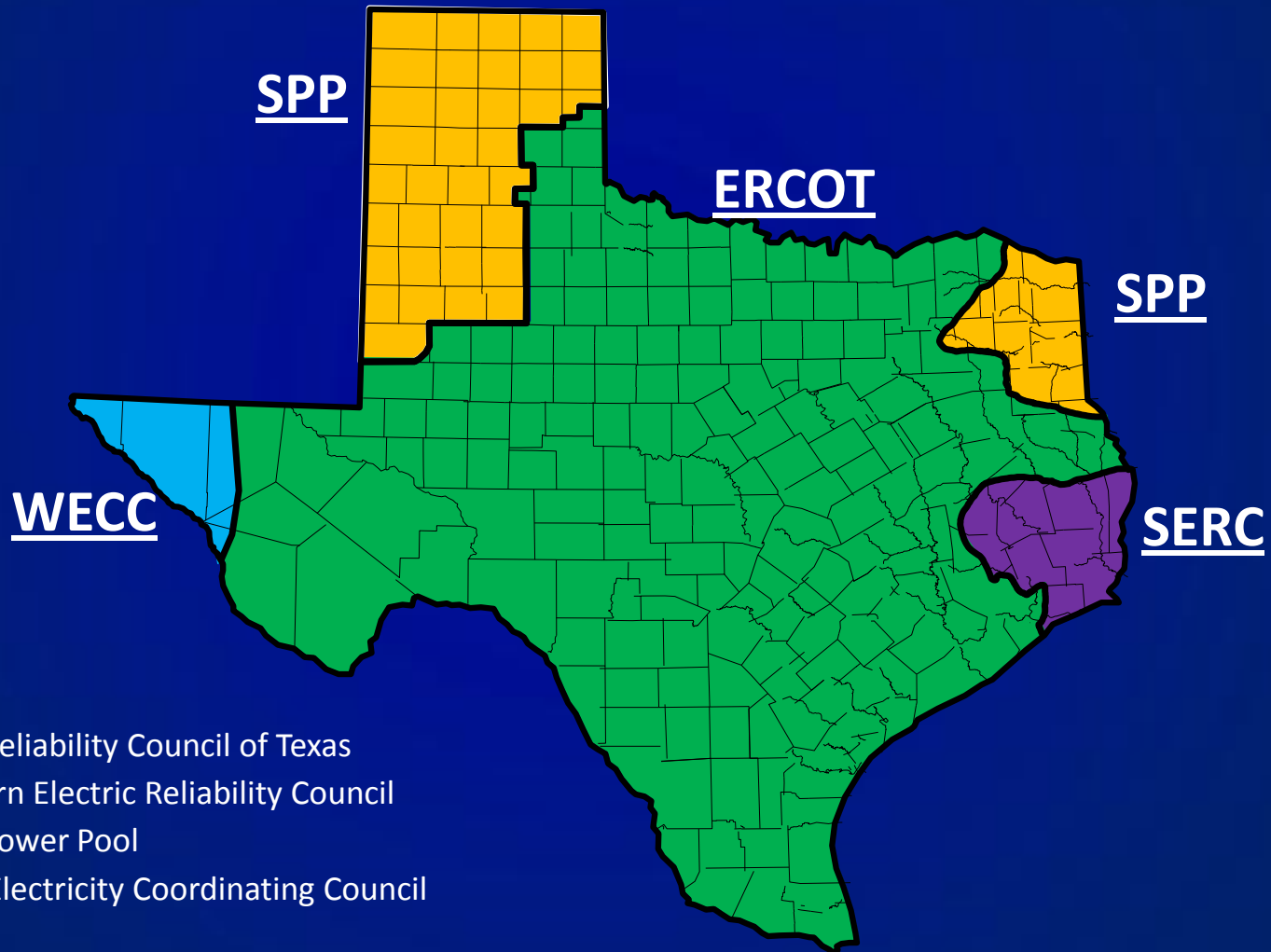


Electric Market Overview

Four electric scenarios in Texas

1. Municipal Electric Company (ex. Austin Energy, Lubbock Power & Light, etc.)
 2. Co-Op (ex. Bluebonnet Electric Co-Op, Pedernales Electric Co-Op)
 3. **Investor-Owned Utility** (ex. Entergy, SWEPCO). Investor Owned Utilities outside of ERCOT are integrated service providers. Investor Owned Utilities in ERCOT (Transmission and Distribution Utilities) provide regulated delivery service
 4. **Competitive Market:** service from Retail Electric Providers (REPs). REPs only operate inside ERCOT.
- *The PUC has limited authority over Municipal Electric Companies and Co-Ops.*
 - *The PUC regulates Investor-Owned Utilities (IOUs). PUC sets retail rates for integrated utilities and delivery rates for Transmission and Distribution Utilities.*

Within Texas, the ERCOT grid serves 85% of the electric load, and covers 75% of the land



- ERCOT** – Electric Reliability Council of Texas
- SERC** - Southeastern Electric Reliability Council
- SPP** – Southwest Power Pool
- WECC** – Western Electricity Coordinating Council

Texas at a Glance

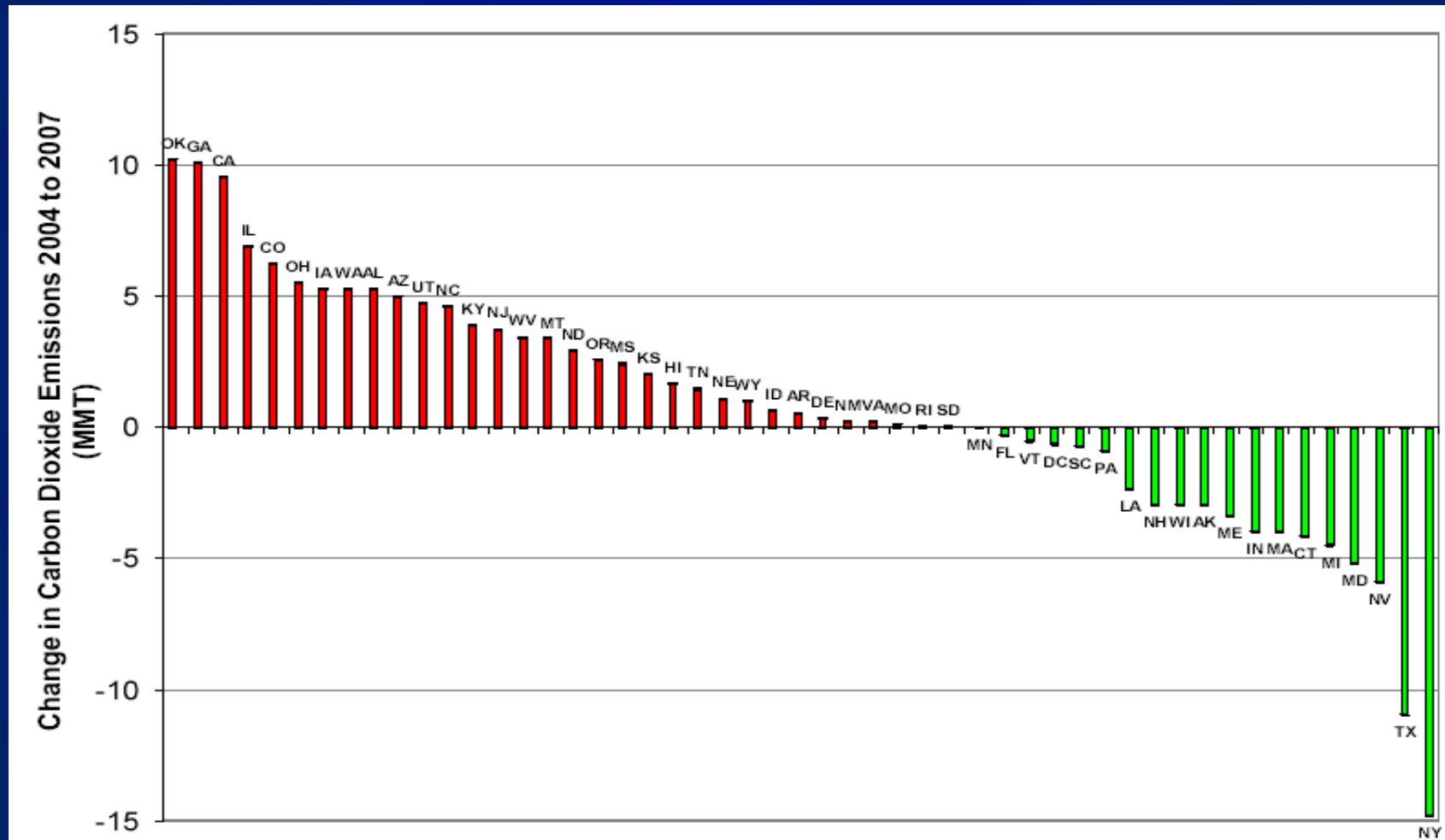
- Reduction of CO₂ emissions
- CREZ transmission plan approval, TSP selection process, and build-out
- 9000 MW Wind, going to 18,500 MW
- Smart grid implementation
- Non-wind renewable rulemaking
- More nuclear, clean coal, and shale gas
- Preparing for EV/PHEVs
- More energy efficiency
- Low electric prices
- Robust resource margins



Reduction of CO₂ in Texas

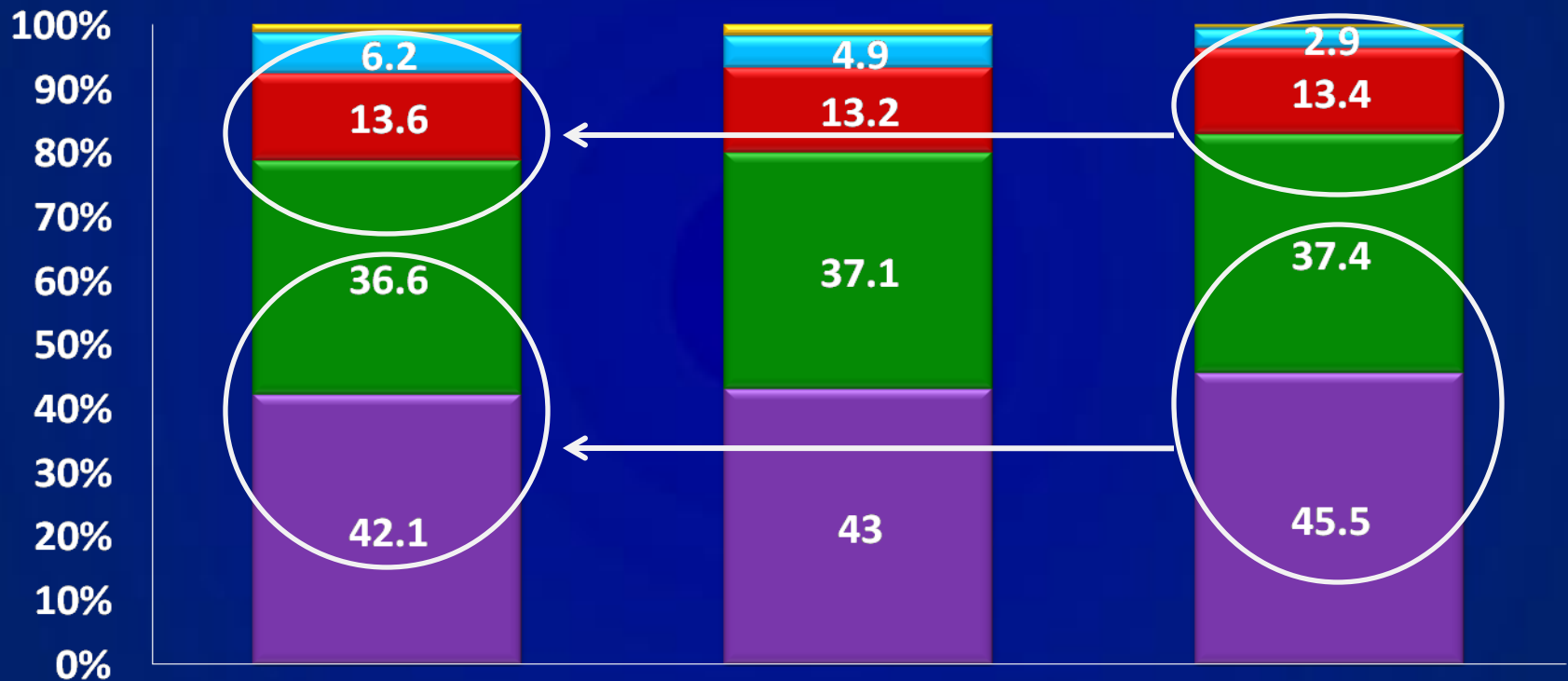
- A recent report by Environment Texas, “Too Much Pollution,” highlights the decrease of CO₂ emissions in Texas over the past several years.
- **Between 2004 and 2007, Texas saw the second highest total decline in CO₂ emissions in the United States.**
- “On a per capita basis, emissions from electric generators in Texas fell by 4 percent between 2004 and 2007—the result of reduced reliance on coal and an increase in the share of power produced by natural gas and wind.”
- “Texas—which is now America’s number one producer of wind power—has been able to use its growing wind power portfolio to reduce the need for additional fossil fuel generation, keeping emission growth from the electricity sector at bay.”
- “Texas, meanwhile, has led the nation in wind energy installations, helping to stabilize emissions from its power sector...[showing] that switching from highly polluting fuels such as coal and oil to cleaner sources of power, including renewable energy, can lead to rapid and substantial reductions in emissions.”

Reduction of CO₂ in Texas



2007-2009 Energy Generated in ERCOT by Fuel Type

No CO₂ emissions



Lower % use of fossil fuels

2009 Natural Gas
 Coal
 Nuclear
 Wind
 Water
 Other

Wind Generation Records

- On October 28, 2009, at about 8:15 PM, ERCOT set a record for instantaneous wind generation of 6223 MW, nearly 70% of installed wind capacity. Total load at that time was approximately 35,700 MW.
- That same day at 3:00 AM, wind generation served nearly 25% of total load - load was 22,893 MW, and wind generation was 5,667 MW.
- Higher levels of wind generation are becoming more common. At about 6:30 AM on January 28, wind produced nearly 6,000 MW at the time when load was approximately 30,000 MW, or nearly 20% of total load.

ERCOT – Big Picture

The CREZ projects will involve the construction of more than 2,300 miles of 345 kV transmission lines, enable a total of more than 18,000 MW of wind capacity in Texas, and cost nearly \$5 billion

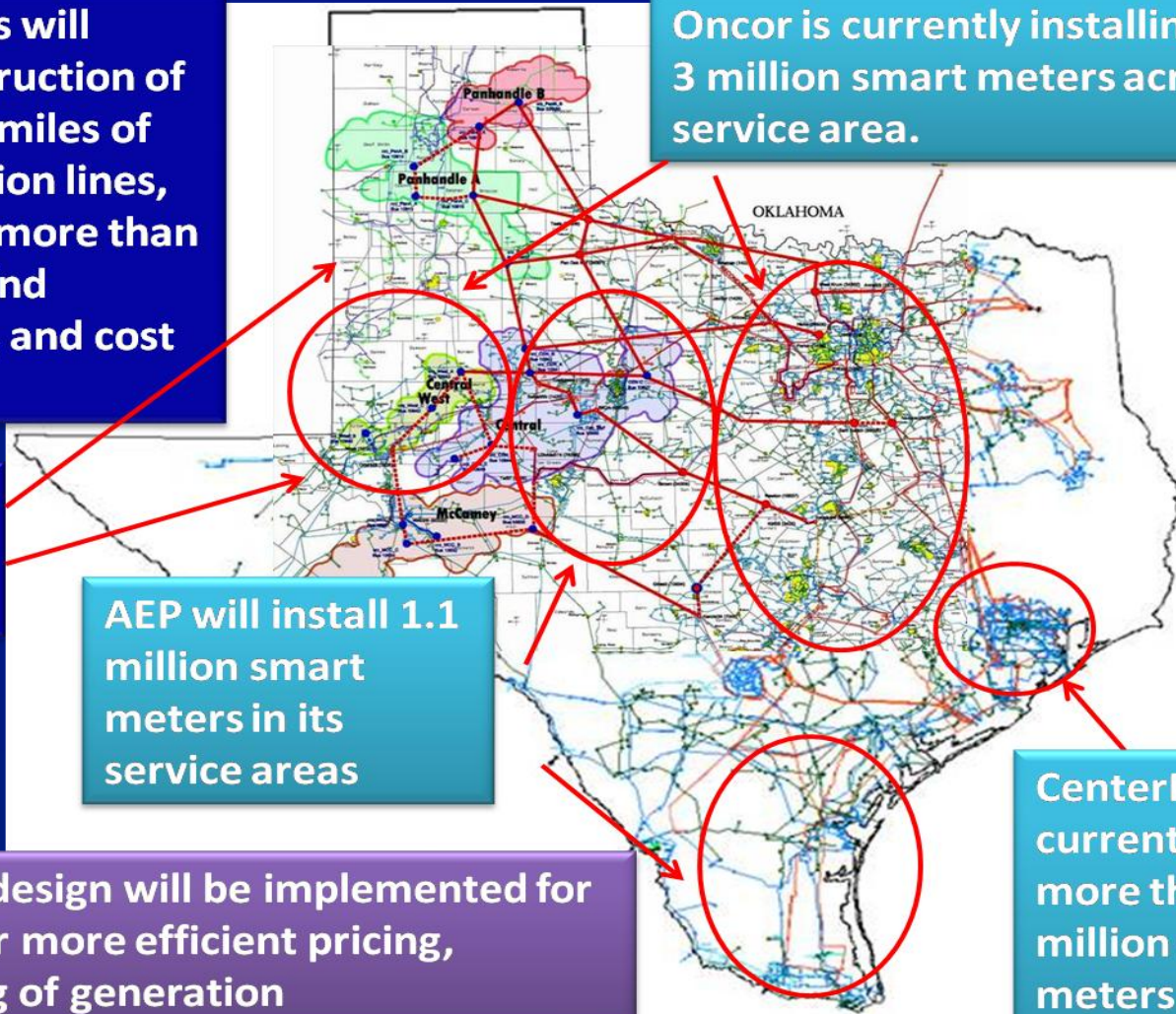
Area of best wind generation in Texas

AEP will install 1.1 million smart meters in its service areas

The nodal market design will be implemented for ERCOT, allowing for more efficient pricing, dispatch, and siting of generation

Oncor is currently installing more than 3 million smart meters across its service area.

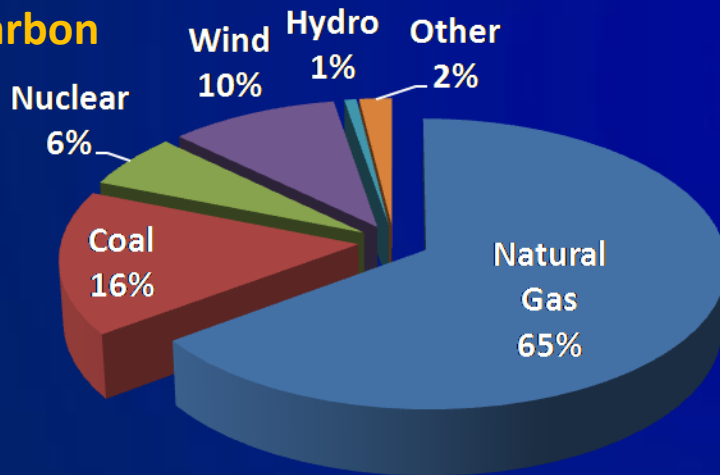
CenterPoint is currently installing more than 2 million smart meters in its service area.



ERCOT in 2009

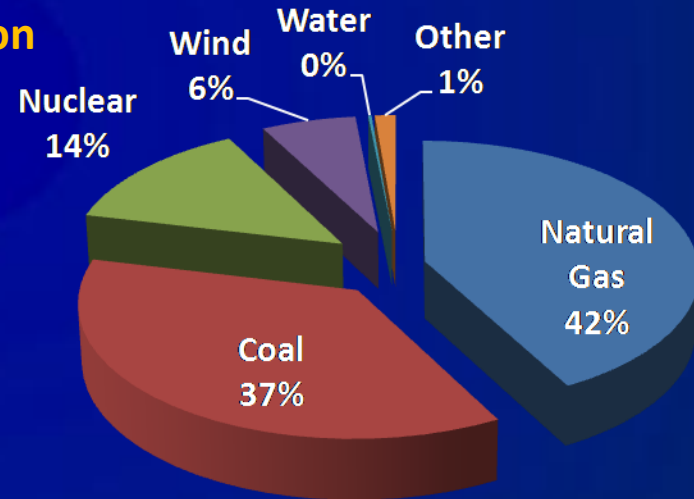
2009 ERCOT Generation Capacity by Fuel Type

17% Zero Carbon



2009 Electric Generation by Fuel Type

20% Zero Carbon

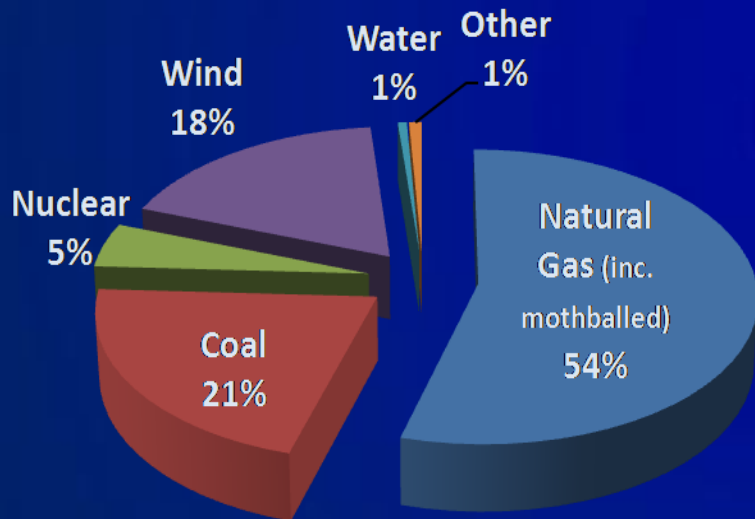


Note: Natural gas produces 1,135 lbs/MWh of CO₂, compared to 2,249 lbs/MWh for coal. Natural gas also produces 0.1 lbs/MWh of SO₂ and 1.7 lbs/MWh NO_x, compared to 13.0 lbs/MWh and 6.0 lbs/MWh, respectively for coal.

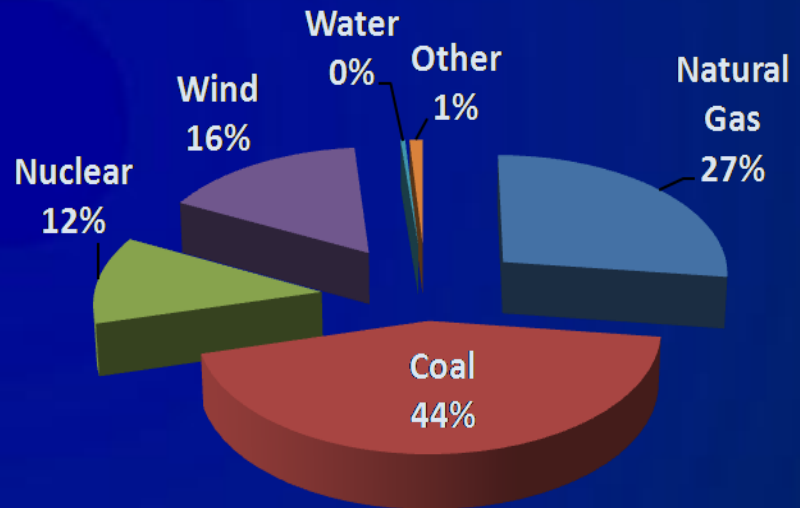
ERCOT in 2013

Assuming 18,000 MW of wind, approximately 5,600 MW of new coal, 4,300 MW of new natural gas

2013 Installed Capacity



2013 Energy Generation

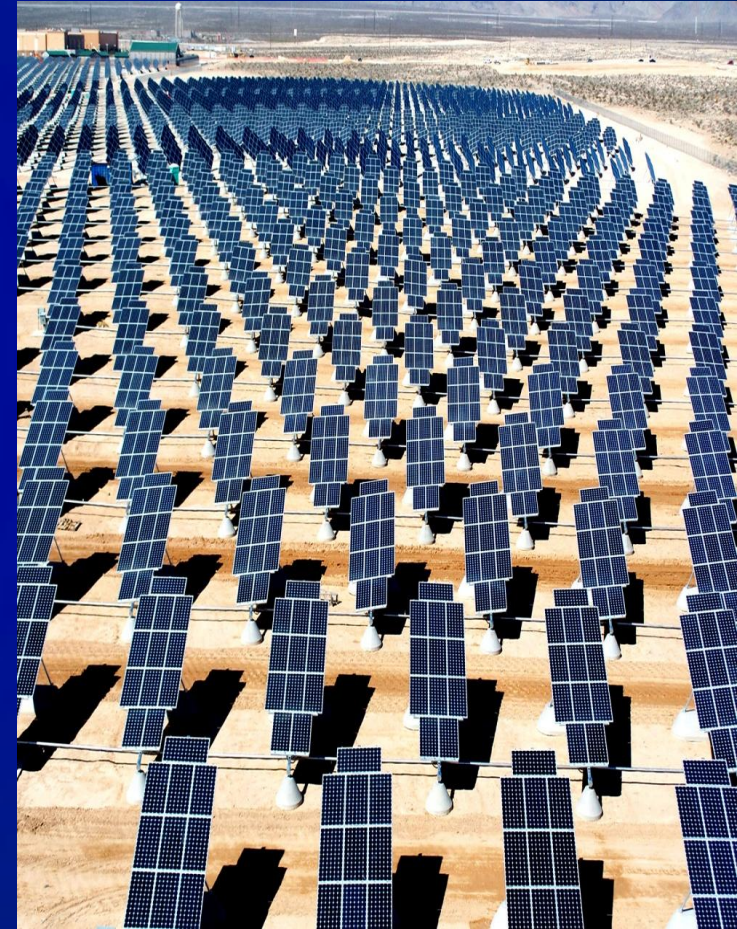


Nuclear Power

- Nuclear generation emits no CO₂ in its operation and is a reliable source for baseload power.
- On February 16, 2010, it was announced that Southern Co. will receive approximately \$8 billion in loan guarantees from the DOE for two new nuclear reactors in Georgia.
- The proposed addition of South Texas Project units 3 and 4 are still on the short list with two other facilities to receive loan guarantees.
 - On February 17, 2010, CPS Energy and NRG reached an agreement ending all litigation between the two and giving CPS a 7.625% interest, and NINA/NRG 92.375%, in units 3 and 4, allowing development to move forward.
- Comanche Peak units 3 and 4 are currently the first alternate on the DOE loan guarantee list.

Non-Wind Renewable Resources

- While the Legislature made several proposals to increase non-wind generation, none of the proposals passed.
- PURA 39.904(a) sets a target of having at least 500 MW of renewable generation other than wind.
- Commission Staff issued a strawman rule proposal in Project No. 35792 on January 11, 2010.



Energy Efficiency

- Commission authorized proposal for publication at the January 29, 2010 open meeting.
- The amendment to the rule:
 - Increases standards from 20% to 30% of the electric utility's annual growth in demand of residential and commercial customers by program year 2012,
 - Requires the larger of either 40% annual growth in demand or 0.7% of the electric utility's peak load by program year 2013,
 - Requires the larger of either 50% annual growth in demand or 1.0% of the electric utility's peak load by program year 2014,
 - Updates the cost effectiveness standard by adjusting the avoided cost of capacity and the avoided cost of energy;
 - Increases the performance bonus for an electric utility that exceeds its goal.
- The rule should be in place in 2Q 2010 to allow utilities and service providers to implement for the 2011 calendar year.

Preparing for Electric Vehicles

- Market participants, such as Reliant, Oncor and TXU, have announced support for deployment of EVs in Texas.
- Use of smart meters, with time-of-use products, could help insure that customers charge their vehicles with inexpensive off-peak energy and take advantage of wind energy generated at night.
- The City of Houston, with Reliant Energy and Nissan, announced plans to install vehicle charging stations downtown and purchase an addition 25 electric vehicles this year, bringing the total to 40 electric vehicles for the city fleet.

Smart Meters

- Approximately 800,000 smart meters have been deployed in ERCOT. Over 6 million smart meters will be deployed by the end of 2013.
- The joint web portal, www.smartmetertexas.com, is expected to go live for consumers this month. The web portal is used by consumers, REPs, and TDUs to track and manage energy use, and will include HAN management tools in future releases.
- ERCOT ISO now settles approximately 700,000 smart meters daily.
- Several REPs are offering products and services that utilize smart meter functionality, such as energy monitoring, time-of-use pricing, or pre-paid service.

The Link with Clean Energy

- Impact on deployment of central station generation
- Facilitates the assimilation of distributed resources
- Facilitates bringing in more centralized applications of intermittent resources

More Information

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[Advanced Metering Implementation Project](#)

<http://www.puc.state.tx.us/electric/projects/34610/34610.cfm>

[Energy Efficiency Programs](#)

<http://texasefficiency.com/>

[Power to Choose](#)

www.powertochoose.org

Appendices

Current Residential Retail Prices in ERCOT

Lowest Offers Available

(Price based on use of 1000 kWh, February 24, 2010, from www.powertochoose.com)

Service Area	Fixed-Price Offers (term of at least 3 months)	Variable Price Offers	Renewable Generation Offers (100% renewable)	Dec. 2001 prices (Not adjusted for inflation)	Dec. 2001 prices (inflation adjusted)
AEP – TCC	10.4¢/kWh	8.9¢/kWh	9.6¢/kWh	9.6¢/kWh	11.7¢/kWh
AEP – TNC	9.6¢/kWh	8.8¢/kWh	9.3¢/kWh	9.6¢/kWh	12.2¢/kWh
CenterPoint	9.9¢/kWh	9.0¢/kWh	9.5¢/kWh	10.4¢/kWh	12.7¢/kWh
Oncor	9.4¢/kWh	8.2¢/kWh	8.8¢/kWh	9.7¢/kWh	11.8¢/kWh
TNMP	9.2¢/kWh	8.1¢/kWh	8.9¢/kWh	10.6¢/kWh	12.9¢/kWh

Austin: 9.0¢/kWh; San Antonio: 8.0¢/kWh (based on 1000 kWh)

ERCOT Reserve Margin Changes

	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
May 2007	10.1%	8.3%	6.7%	5.9%	n/a	n/a	n/a
December 2007	12.1%	14.0%	11.2%	10.5%	8.2%	n/a	n/a
May 2008	16.5%	17.3%	15.0%	14.5%	12.3%	n/a	n/a
December 2008	15.8%	21.2%	18.7%	17.8%	17.9%	15.8%	n/a
May 2009	16.8%	20.1%	18.8%	17.0%	16.3%	13.9%	n/a
December 2009	n/a	21.8%	19.9%	18.1%	14.7%	12.3%	10.2%

- The following units have recently begun commercial operation, are under construction, or have been announced: JK Spruce 2 for 750 MW (expected completion date of June 2010), Oak Grove 1 (completed) and 2 (mid 2010) for 1710 MW, Sandy Creek for 925 MW (2012), Nueces Bay for 112 MW (1Q 2010), Barney Davis for 348 MW (1Q 2010), Sandow 5 for 581 MW (completed), Limestone 3 for 800 MW (2012) and more than 2,200 MW of wind generation with signed interconnection agreements.
- The reduction of the reserve margin in 2013-2015 reflects the exclusion of the Cobisa Greenville Project, a 1,792 MW natural-gas fired plant that was scheduled for completion in 2013, after the company announced a delay in the construction of the facility.
- ERCOT only counts 8.7% of wind generation nameplate capacity when calculating reserve margins.