



Texas Renewable Program and Technology Demonstration

Dub Taylor, Director
State Energy Conservation Office (SECO)



About SECO...

- ❖ **Mission:** to increase the efficient use of energy and water while protecting the environment.
- ❖ Public sector energy/water efficiency
- ❖ Project implementation, education, outreach – no R&D
- ❖ DOE/EERE state level program conduit
 - ❖ State Energy Program
 - ❖ Demonstration & Deployment focus
- ❖ 56 state/territory State Energy Offices

Presentation Outline

- ❖ The Texas Energy Picture
- ❖ Renewable Energy Resources
- ❖ Policy and Economic Impact
- ❖ Renewable Energy Projects
- ❖ Education & Support

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The Texas Energy Picture

- ❖ Oil & Gas production peaked in 1972
- ❖ Texas became a net energy importer in 1993
- ❖ 5th largest energy user in the world
- ❖ Texas accounts for 12% of U.S. energy consumption - why?
 - ❖ 60% of US petrochemical production
 - ❖ 25% of US refining capacity
 - ❖ 19 million automobiles
 - ❖ 22 million population (7.5 million households)

The Texas Energy Picture

- ❖ Annual growth in electrical use averaged +2.5% over last 10 years
- ❖ 437 electric generating plants
- ❖ Electricity generation
 - ❖ Natural gas 49%
 - ❖ Coal 39%
 - ❖ Nuclear 10%
 - ❖ Renewable* 2%

*Leads US in combined renewable energy potential

Top Twenty States for Wind Energy

As measured by annual potential in billions of kWhs, factoring in environmental and land use exclusions for wind class of 3 and higher:

1	North Dakota	1,210	11	Colorado	481
2	Texas	1,190	12	New Mexico	435
3	Kansas	1,070	13	Idaho	73
4	South Dakota	1,030	14	Michigan	65
5	Montana	1,020	15	New York	62
6	Nebraska	868	16	Illinois	61
7	Wyoming	747	17	California	59
8	Oklahoma	725	18	Wisconsin	58
9	Minnesota	657	19	Maine	56
10	Iowa	551	20	Missouri	52

Source: An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States, Pacific Northwest Laboratory, 1991.

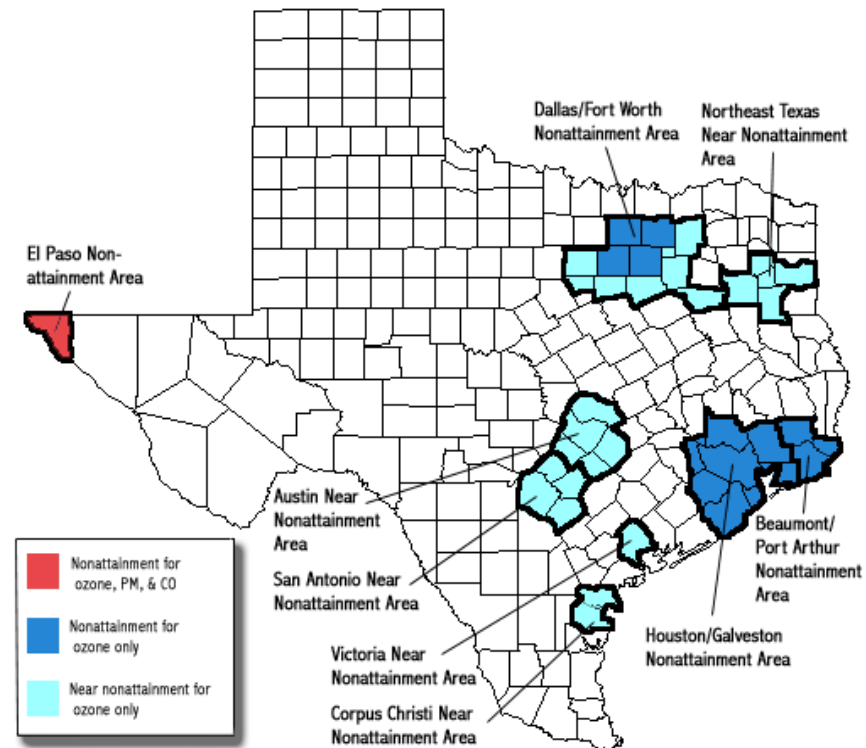
Texas Air Quality Challenges

Ozone Non-Attainment

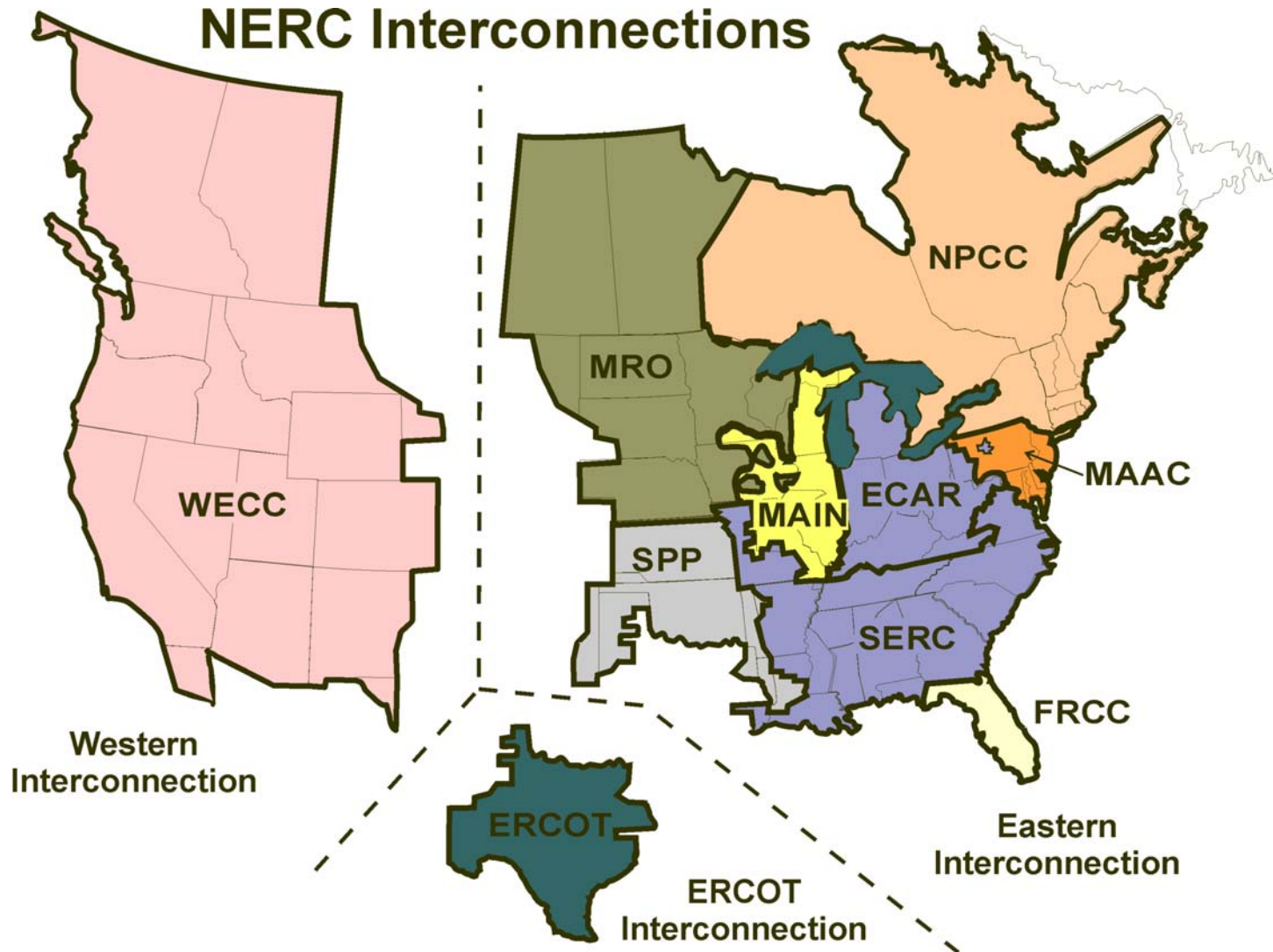
- ❖ Dallas/Fort Worth
- ❖ Houston/Galveston
- ❖ Beaumont/Port Arthur
- ❖ El Paso

Ozone Near Non-Attainment

- ❖ Austin/San Antonio
- ❖ Corpus Christi/Victoria
- ❖ Tyler/Longview/Marshall

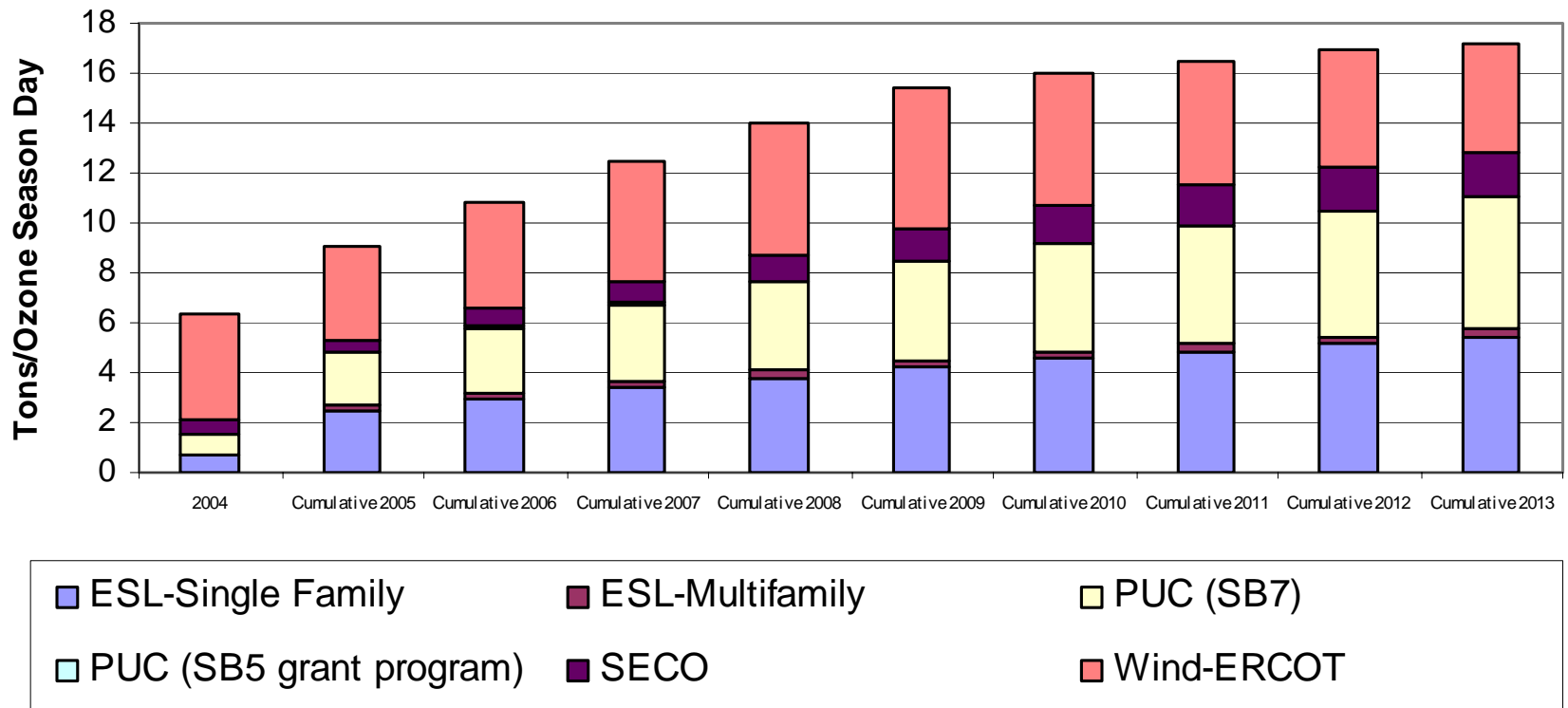


The Electric Power Grids of North America



The Texas Energy Picture

OSD NOx reduction levels ERCOT Wide



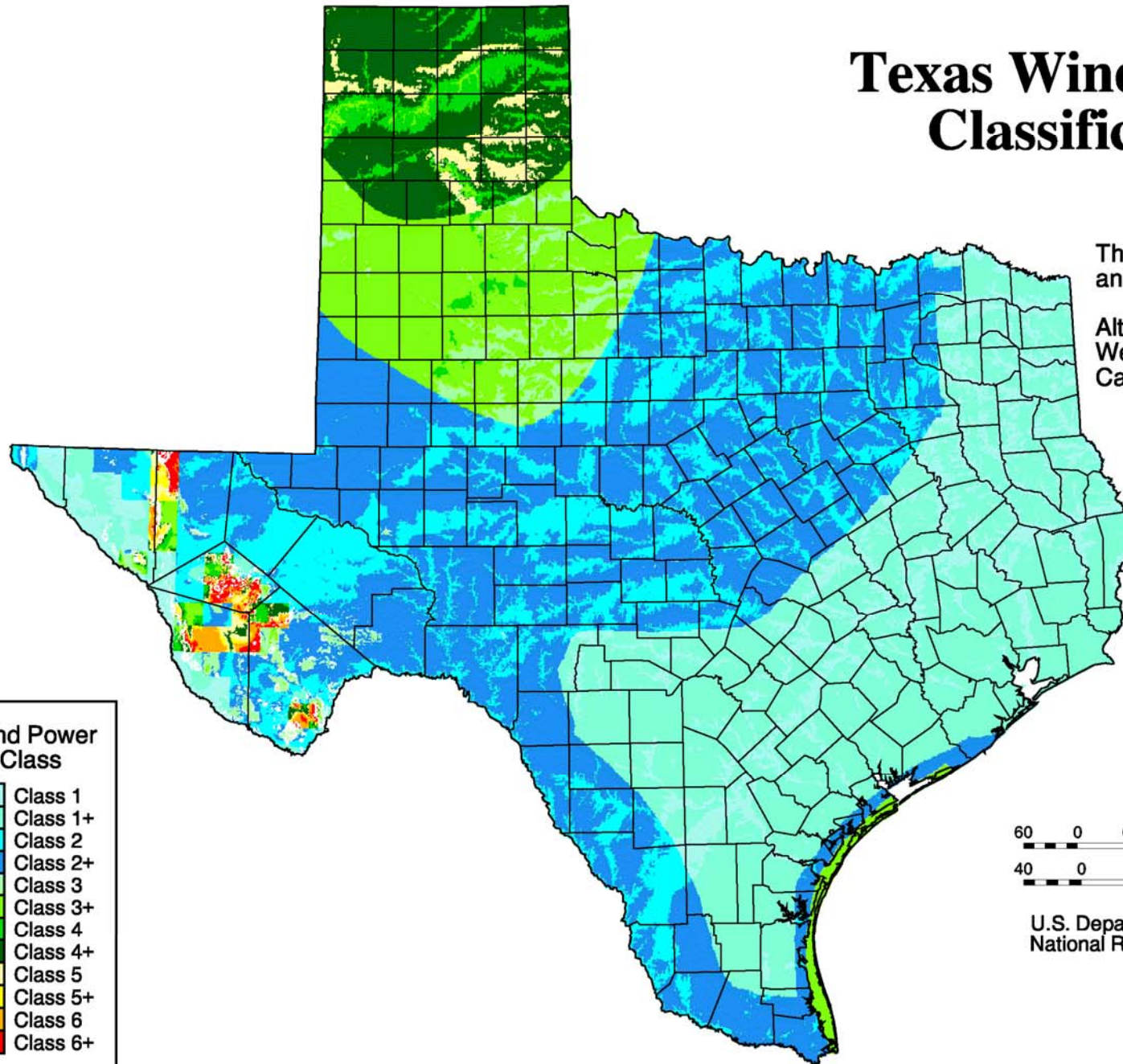
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Texas Wind Energy Classification

The data was produced and provided by:

Alternative Energy Institute
West Texas A&M University
Canyon, Texas



Wind Power Class

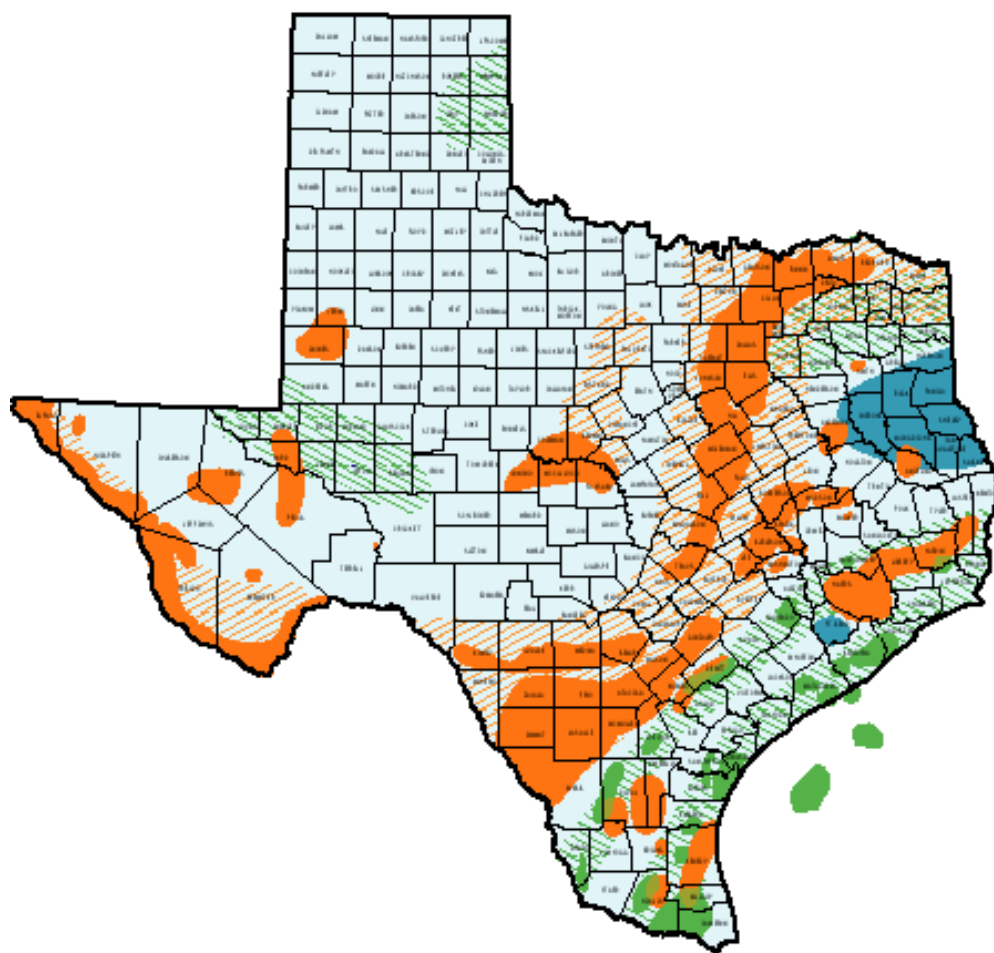


60 0 60 120 180 240 Kilometers

40 0 40 80 120 160 Miles

U.S. Department of Energy
National Renewable Energy Laboratory





TEXAS GEOTHERMAL AREAS, CHARACTERISTICS, AND USES			
	HYDROTHERMAL	GEOPRESSURE	HOT DRY ROCK
AREAS	<ul style="list-style-type: none"> ■ Known ▨ Potential 	<ul style="list-style-type: none"> ■ Known ▨ Potential 	<ul style="list-style-type: none"> ■ Known
CHARACTERISTICS	<ul style="list-style-type: none"> • 900-160F Water (500-5,000 ft. deep) • In some cases Water is Potable 	<ul style="list-style-type: none"> • 300- 450F Brine (>13,000 ft. deep) • High Pressure • Dissolved Methane 	<ul style="list-style-type: none"> • Gradient > 450C/km • Little or No Water
USES	<ul style="list-style-type: none"> • Space Heating • Fish Farming • Desalination • Resort Spas 	<ul style="list-style-type: none"> • Heating • Enhanced Oil Recovery • Electricity 	<ul style="list-style-type: none"> • Heating • Electricity

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Texans Want Renewable Energy

IRP Deliberative Polls™ ('95-'98)

Preference?

- ❖ Renewables 49%
- ❖ Efficiency 31%
- ❖ Fossil 14%
- ❖ Buy and Transport 5%

Will you pay more?

- ❖ Renewables + \$5
- ❖ Efficiency + \$2
- ❖ Fossil + \$0

(8 largest IOUs, 67% of Texas customers)

Texas Renewable Energy Portfolio Standard (RPS)

Enacted - 1999

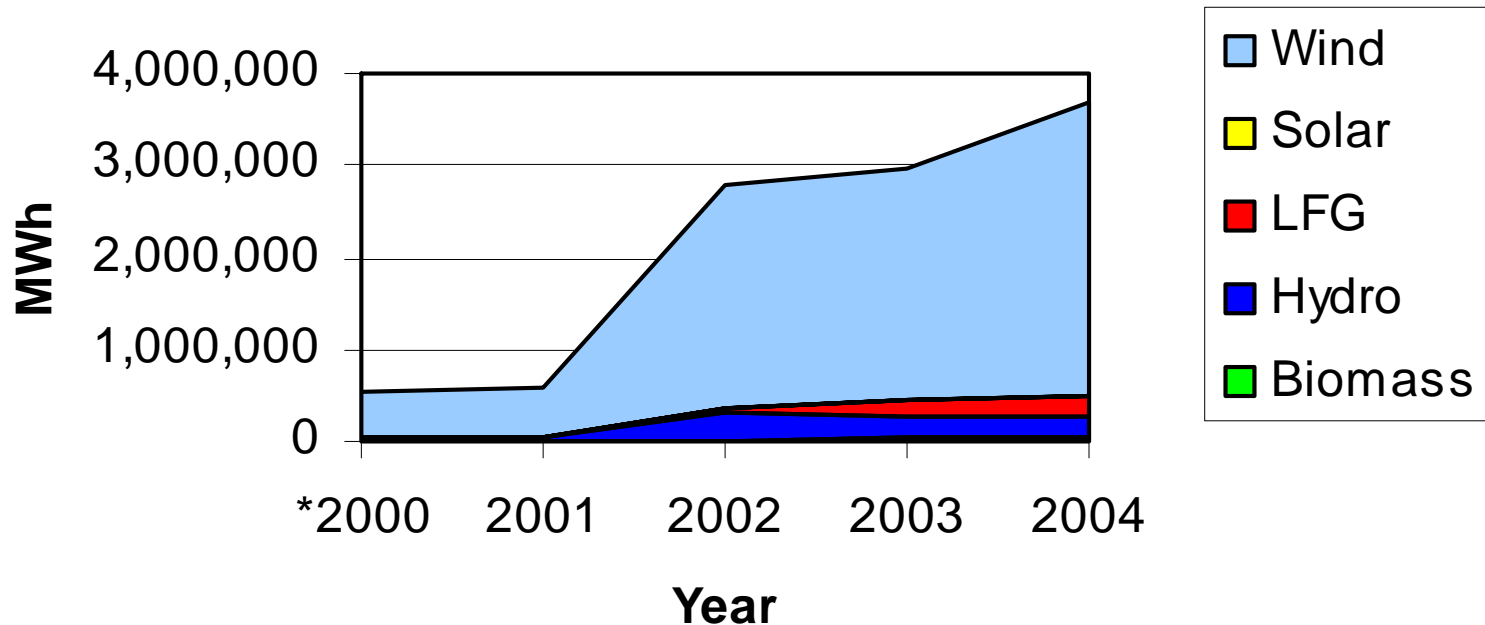
- ❖ 2,000 new MW by 2009

Status - 2005

- ❖ 1322 MW added (large wind)
- ❖ 486 MW under construction
- ❖ 720 MW authorized/permitted
- ❖ Over \$1.5 Billion invested
- ❖ Construction, O&M jobs

The Texas Energy Picture

Texas Renewable Energy Generation (ERCOT REC Program)



RPS Local Economic Impact

- ❖ *"2nd industry in 80 years"*
Mayor Sherry Phillips - McCamey, TX



- ❖ New school via property taxes
Trent, TX
- ❖ Tower paint shop – 300 jobs
Coleman, TX

Texas Renewable Energy Portfolio Standard (RPS)

Expansion by 2005 Legislature

- ❖ 5,000 new MW by 2015
- ❖ 500 MW non-wind carve out
- ❖ Fixes “chicken-and-egg” problem:
 - ❖ PUC designates best development zones
 - ❖ Transmission will be built to zones
 - ❖ Cost recovery for transmission owners is assured
- ❖ \$3.5 billion net economic benefit

RPS Net Economic Benefit

Net Economic Benefit of Expanding Transmission Infrastructure to Connect Additional Renewable and Other Energy Generated in West Texas and Developing Renewable Generating Facilities to Achieve 10,000 MW (Net Increase of 7,633 MW) Capacity by 2015			
	<i>Output Gain*</i>	<i>Employment Gain</i>	<i>State and Local Tax Revenue</i>
Construction of Transmission Lines (including offset for added costs recovery from users)**	\$587,746,718	10,085 Person-Years of Employment	\$89.9 million
Construction of Additional Renewable Capacity	\$4,623,126,266	57,984 Person-Years of Employment	\$277.7 million
Overall Gains From Ongoing Implementation (post Construction) of Renewable Facilities (net benefits cumulative through 2015)***	\$2,148,730,298	28,721 Person-Years of Employment	\$998.3 million****
*Output as measured by Gross State Product (2005\$). **Values reflect only the portion of net (of costs) transmission facilities' construction benefits allocated to renewables (approximately 40%). ***Includes cumulative net benefits derived from operations, landowner royalty payments, power cost savings, and reductions in natural gas prices. ****Net property taxes are assigned to operations rather than construction.			



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Utility-Scale Wind Farms



- ❖ 1503 MW operating
- ❖ 496 MW under construction
- ❖ Over \$1 billion invested

Small Wind Demonstration

- ❖ Alanreed, TX
 - ❖ At IH-40 Rest Stop
 - ❖ Highly Visible
 - ❖ Traffic Draw
- ❖ 50 Kw Wind Turbine
- ❖ Grid-connected



Solar On State Facilities

UT Health Science Center
Houston



56 kW PV

UT Medical Branch
Galveston



20 kW PV

Colonias Water Purification Webb County

- ❖ Solar Powered Reverse Osmosis System
- ❖ 8 Kw PV
- ❖ 24/7 Operation
 - ❖ Grid Backup
- ❖ Treats 14,000 Gallons/day



Biomass Energy Projects

Ethanol – Dumas, TX

- ❖ Input: 12 million corn bushels
- ❖ Outputs: 30 million ethanol gallons & 90,000 distillers grains tons



Biomass Energy Projects

Dairy Biogas – Hico, TX

- ❖ Anaerobic digester
- ❖ 75 kW electricity production
- ❖ 80% phosphorus removal
- ❖ Compost mgmt



Purchasing Renewable Energy

- ❖ 100% via **GreenChoice®**
- ❖ 685,000 kWh annually
- ❖ Early subscriber to **GreenChoice®**
- ❖ Saved \$15,700 from 4/01 – 9/05



Purchasing Renewable Energy

- ❖ 100% via **GreenChoice®**
- ❖ 13 million kWh annually
- ❖ Early subscriber to **GreenChoice®**
- ❖ Saved \$315,000 from 4/01 – 9/05



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Energy Efficiency in the Oil Field

❖ Dashboard Guide to Energy Efficiency

(www.naseo.org/energy_sectors/fossil/oil_guide.htm)

- ❖ 14 recommendations – many no/low cost
- ❖ General operations, surface equipment, downhole equipment

❖ Technical Workshops

- ❖ SECO, RRC, TIPRO, Texas Electric Cooperatives, PTTC
- ❖ Odessa, Irving, San Antonio

Geothermal Projects/Outreach

UTPB - Conversion of Deep Gas Wells and Fields into Geothermal Energy Wells

A project to identify optimum geologic and geographic sites for converting depleted deep gas wells and fields into geothermal energy wells to generate renewable electrical power.

SMU - GeoPowering the West: Texas Geothermal Outreach and Networking

Project will coordinate a new organization, the Texas Geothermal Collaborators, comprised of individuals and groups related to geothermal energy, and strategic player/organizations most capable of establishing geothermal in the public perception as an effective energy alternative. The goal of this project is to increase geothermal awareness among Texas citizens and development of additional geothermal projects in Texas.

Renewable Energy Education

- ❖ InfinitePower Campaign
 - ❖ Educational materials
 - ❖ Lesson Plans
 - ❖ Fact Sheets
 - ❖ Interactive Calculators
 - ❖ Answers to FAQ's
 - ❖ Website:



Renewable Energy Education



Alternative Energy

- ❖ Secondary-science curriculum supplement
 - ❖ Interactive CD
 - ❖ 25 lessons correlated to current educational standards
 - ❖ Over 1,500 workshop attendees
 - ❖ Award-winning video
 - ❖ www.propane.tx.gov/education/index.html

Clean Energy Technology Incubator

- ❖ **Powertube, Inc.**
 - ❖ Clean energy
 - ❖ Closed-loop, down-hole system
 - ❖ Geomagnetic
 - ❖ Low/Medium temp
110-200 C
 - ❖ 1-5, 10 MW



Questions?

Dub Taylor, Director
State Energy Conservation Office

www.seco.cpa.state.tx.us

