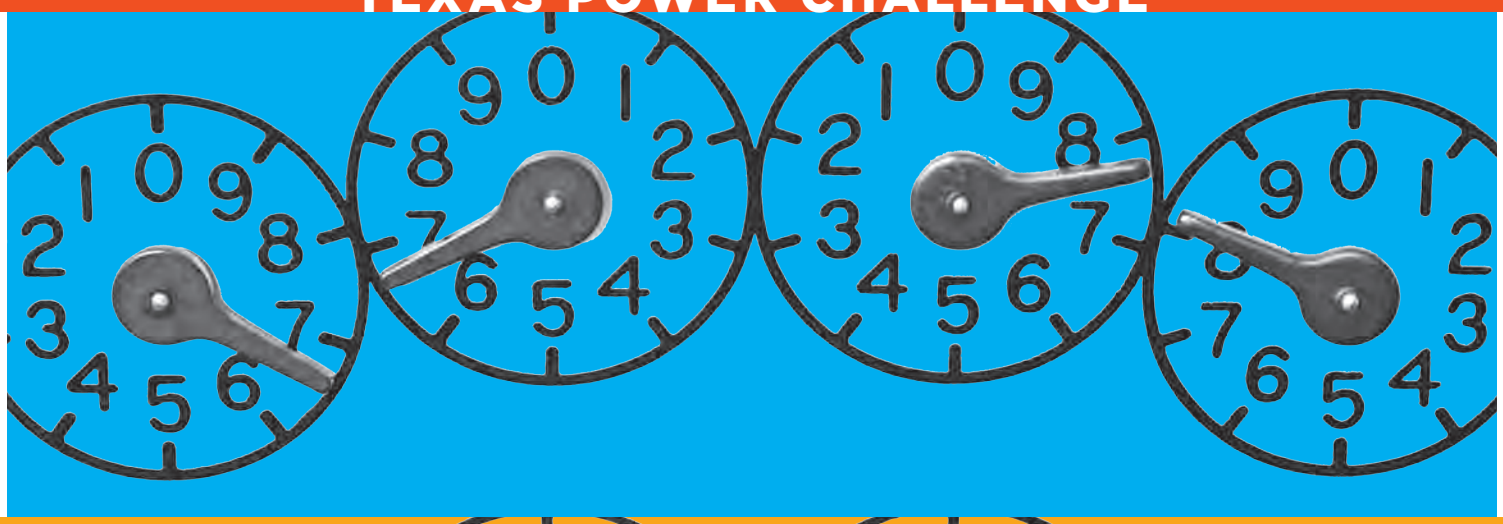
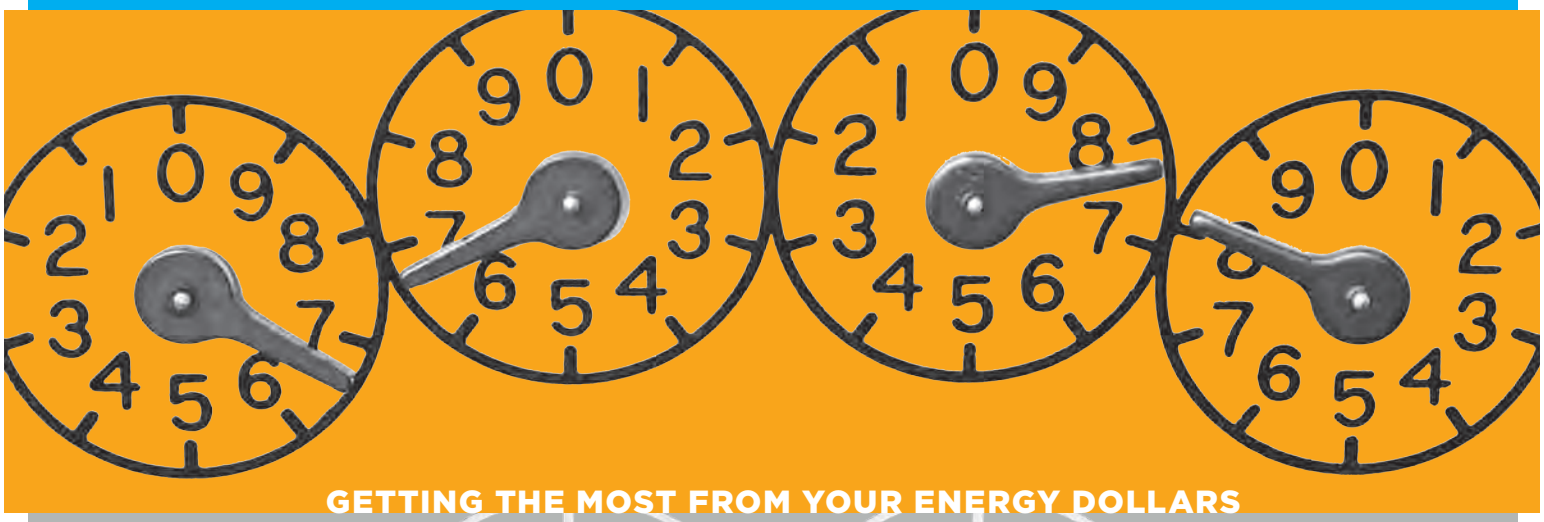
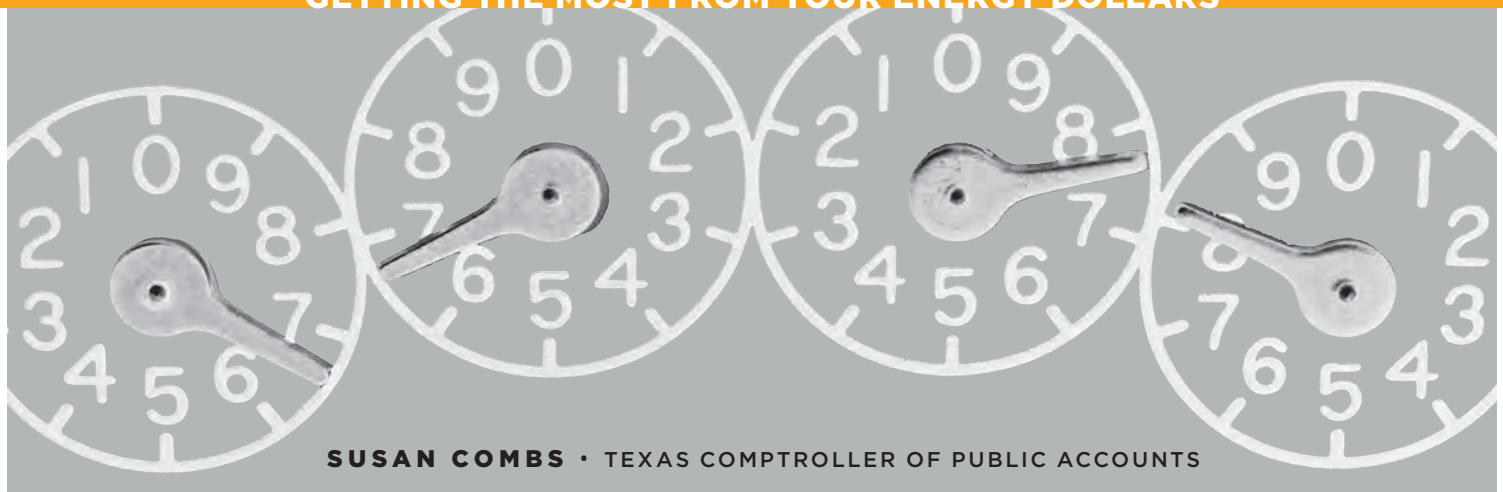
TEXAS POWER CHALLENGE



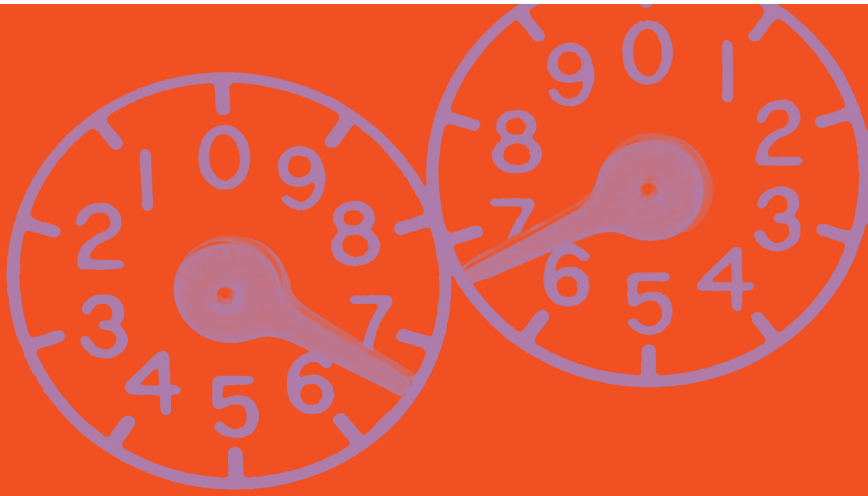


GETTING THE MOST FROM YOUR ENERGY DOLLARS



SUSAN COMBS • TEXAS COMPTROLLER OF PUBLIC ACCOUNTS

THE ELECTRIC RELIABILITY COUNCIL OF TEXAS OPERATES A **$34 BILLION** WHOLESALE POWER MARKET DESIGNED TO EFFICIENTLY PROVIDE RELIABLE ELECTRICITY TO TEXANS.



ELECTRICITY GRIDS SERVING TEXAS

The Electric Reliability Council of Texas (**ERCOT**) manages system reliability and power supply for **24 million** consumers in the state. It serves **75 percent** of the state's land area and provides **90 percent** of its electricity.

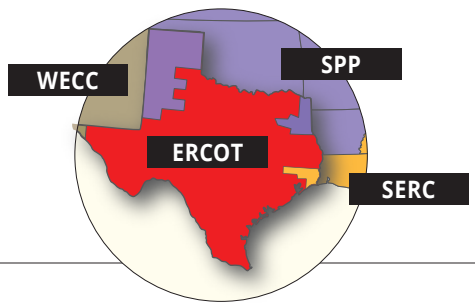
- ERCOT's system includes **43,000 miles** of transmission lines and **550** generation units.
- ERCOT supports the state's **$34 billion** wholesale power market through a settlement clearinghouse.

Three other grids serve parts of Texas: the Western Electricity Coordinating Council (**WECC**), the Southwest Power Pool (**SPP**) and the Southeastern Reliability Corporation (**SERC**) (**Exhibit 1**).

The **Public Utility Commission of Texas** (**PUC**) oversees nearly all aspects of the state's electricity market. Ensuring consumer protection is one of the PUC's main responsibilities.

EXHIBIT 1

THE TEXAS ELECTRICITY GRIDS



SEPTEMBER 23, 2014

Ladies and Gentlemen:

Texas is the envy of the nation thanks in no small part to the manufacturing, industrial, petrochemical and oil and gas industries that form the backbone of our economy. Without reliable and affordable electricity, however, Texas' success would not be sustainable.

The utilities, transmission companies and generation providers that serve electricity to every part of Texas face many challenges to remain affordable, competitive and reliable. By meeting these challenges head on, Texas will be able to keep the lights on.

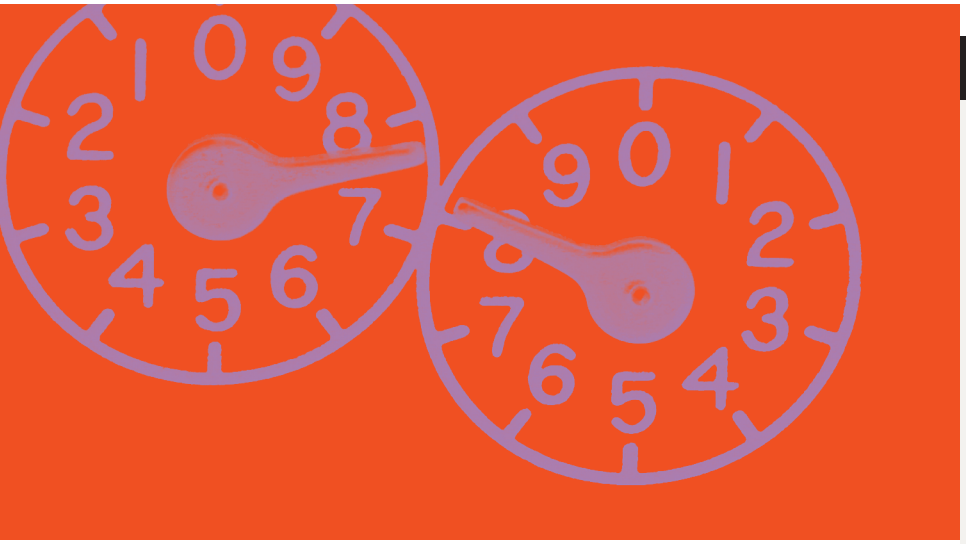
Texas has already given much of the responsibility for producing and transmitting electricity to the private sector. As with other successful areas of the Texas economy, a light regulatory hand frees the market to ensure that environmental goals and standards do not place excessive burdens on Texas consumers.

When taxpayers are asked to foot the bill for energy policy choices, we need to be sure they are the right choices. Adding generation is expensive no matter the source, but as policymakers and elected officials, we must ascertain if we have chosen correctly or if changes are both good and necessary.

We hope you find this report useful as decision-makers work to ensure Texans continue to have the reliable and affordable power they need to keep this state growing and great.

Susan Combs

SUSAN COMBS
TEXAS COMPTROLLER OF PUBLIC ACCOUNTS



RELIABLE ELECTRICITY IS KEY TO ECONOMIC SUCCESS

Reliable electricity has helped fuel Texas' population and economic growth. With no slowdown in sight, continued growth will require additional reliable electricity generation.

- Since 1990, annual **electricity consumption in Texas** has increased by nearly **128 Million MWh** — that is more than **one-eighth of total U.S. growth** in electricity sales and is more than the combined growth of the second- and third-ranked states.
- As expected peak demand in Texas climbs, **the challenge is to develop additional affordable and reliable sources of electricity**. While energy efficiency can **slow** power consumption, it cannot halt the increase in overall demand.
- **Natural gas generation** contributes the **largest share** of Texas electricity, particularly during peak demand (**Exhibit 2**). During off-peak times, when demand can be a half or two-thirds of the daily peak, many power plants stand idle; **operating reserves** are needed, however, when demand increases again, or to react to sudden losses of generation or transmission problems caused by equipment failure or bad weather.

EXHIBIT 2

COMPARISON OF GENERATION AVAILABILITY

GENERATION SOURCE	AVAILABILITY OF INSTALLED CAPACITY, 2013	2013 GENERATION (% OF TOTAL)	ELECTRICITY DELIVERED AT 2013 PEAK DEMAND
GAS (ALL TYPES)	81%-89%	41%	59%
COAL (ALL TYPES)	84%-86%	37%	29%
NUCLEAR	85%	12%	7.5%
WIND	8.7%*	10%	3.5%

Note: *Because wind generation varies so much each day, wind percentage is reported as the effective load-carrying capacity used by ERCOT for forecasting purposes. Total available wind capacity was 11,066 MW as of May 1, 2014. Other resources were excluded from this comparison due to their limited capacity.

Source: Electric Reliability Council of Texas and Texas Reliability Entity

GLOSSARY

CREZ: The Competitive Renewable Energy Zones are areas where private transmission lines and substations were built specifically to deliver wind generation from rural West Texas to urban areas. The CREZ lines were completed in 2014 and cost ratepayers $6.9 billion.

Demand Response: A deliberate reduction of electricity consumption in response to cost incentives offered to alleviate possible energy shortages.

Dispatchable: This refers to generation that can be brought into service as needed to serve demand because the fuel source (e.g. natural gas) can be stored and made available at any time. (Wind and solar are not dispatchable.)

Kilowatt (kW), Megawatt (MW): A measure of electrical power being generated or demanded. For example, 1 kW would be needed to power 10 100-watt lightbulbs.

Kilowatt-hour (kWh), Megawatt-hour (MWh): A measure of the electrical power delivered for an hour. For example, a Texas home averages 39.1 kWh of electricity use per day.

Peak Demand: The maximum amount of power required by all users in an electricity grid system. In Texas, the system peaks during hot summer afternoons. The all-time ERCOT peak of 68,305 MW was set between 4 and 5 p.m. on Aug. 3, 2011, when temperatures in every major Texas city topped 100 degrees.

Production Tax Credit: The 10-year federal subsidy payment for electricity generated available to eligible renewable energy generators, including wind, that began development prior to Jan. 1, 2014.

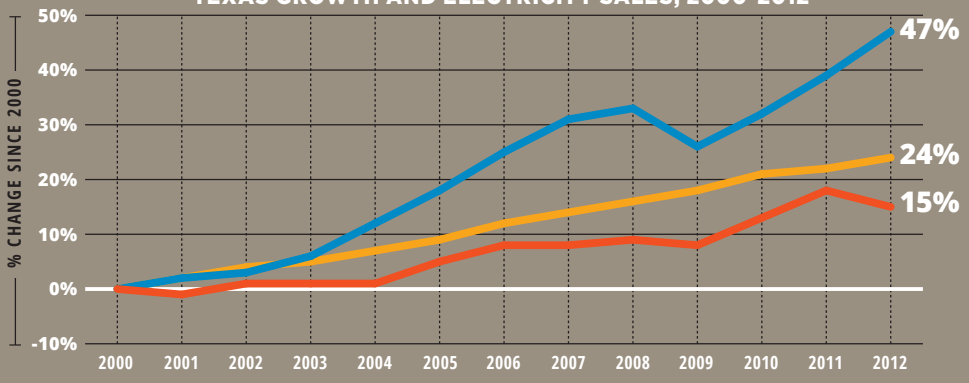
Renewables: Energy generation from a naturally replenished fuel source. In Texas, new renewable generation is primarily wind and solar.

Reserve Margin: The generation resources available (in MW) in excess of the expected peak demand for power. This excludes resources unavailable for maintenance, and accounts for seasonal variability in renewables by only including a percentage of their rated capacity.

TEXANS TYPICALLY PAY **MUCH HIGHER BILLS IN SUMMER,** WHEN AIR CONDITIONING IS NEEDED MORE THAN OTHER TIMES OF YEAR.

EXHIBIT 3

TEXAS GROWTH AND ELECTRICITY SALES, 2000-2012



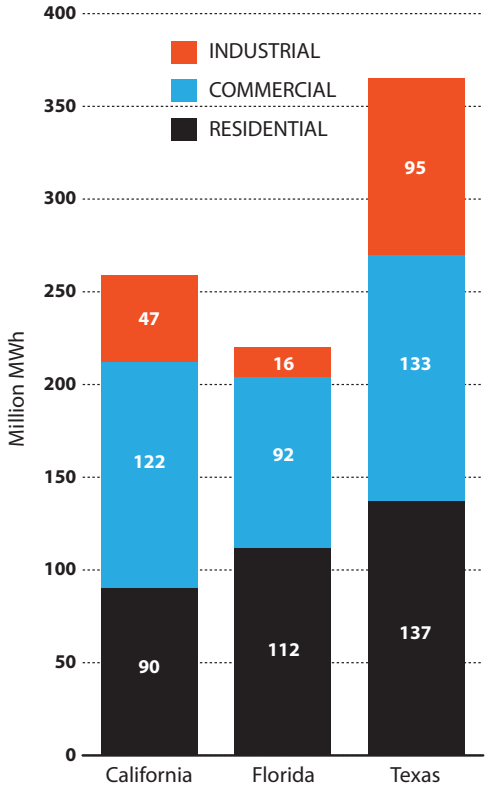
Long-term growth of retail electricity sales in Texas trends upward as the economy and population surge. Electricity growth is tempered by more energy-efficient appliances, homes and consumer behavior.

Source: U.S. Census Bureau, U.S. Bureau of Economic Analysis and U.S. Energy Information Administration

EXHIBIT 4

STATE COMPARISON: RETAIL SALES BY SECTOR, 2012

Texas, California and Florida are the biggest energy-consuming states, combining for almost **23 percent** of U.S. electricity use in 2012.



Note: The transportation sector was excluded due to its small volume of retail sales.
Source: U.S. Energy Information Administration

ELECTRICITY DEMAND AND ECONOMY BOTH GROWING

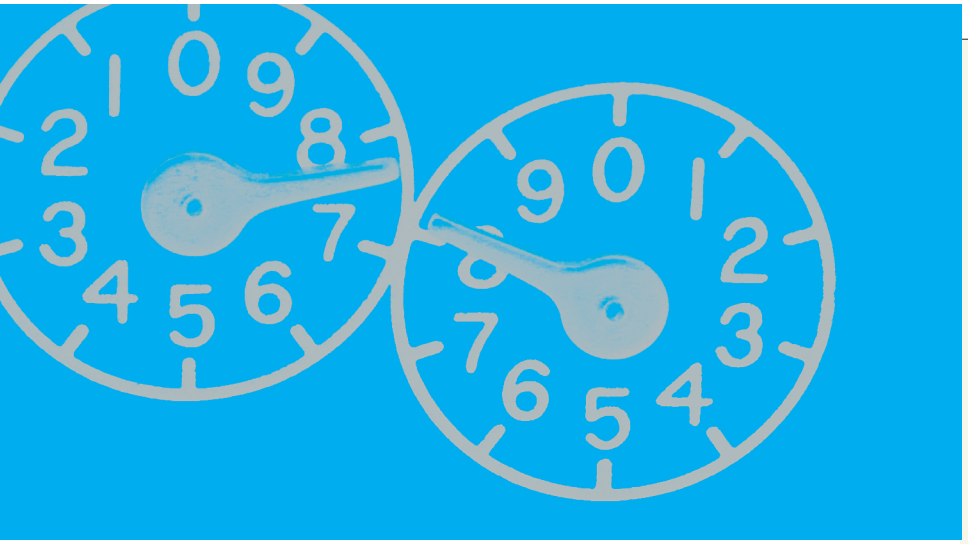
Texas' rapid population and economic growth have boosted demand for electricity (**Exhibit 3**).

- Texas' population is increasing by more than **1,000** people per day, the majority moving to metropolitan areas.

Retail electricity providers primarily serve **residential, commercial and industrial** customers (**Exhibit 4**).

- Texas is by far the nation's largest consumer of electricity, accounting for **365 million MWh in 2012**; that's about **40 percent** more than second-ranked California, even though California's population is **46 percent** larger.
- Texas' consumption is driven by its **energy-intensive industries** such as petrochemicals, aluminum and glass manufacturing, and a commercial sector serving a large and growing population.
- Almost **two-thirds** of electricity is used by Texas industry, businesses, hospitals, schools and other non-residential users.
- Demand for electricity within ERCOT's region is increasing at an average annual rate of **2 percent**, from **285 million MWh** in 2003 to **332 million MWh** in 2013.
- Because of higher demand for air conditioning and a greater proportion of homes heated using electricity, average **residential** electricity consumption in Texas is **26 percent** higher than the average for all states, but similar to neighboring states with similar climates.

Electricity grids are the **lifeblood** of modern society and industry, so reliability is imperative. The U.S. Department of Energy reports that power outages and interruptions caused by transmission problems or lost generation cost the U.S. economy at least **$150 billion** annually.



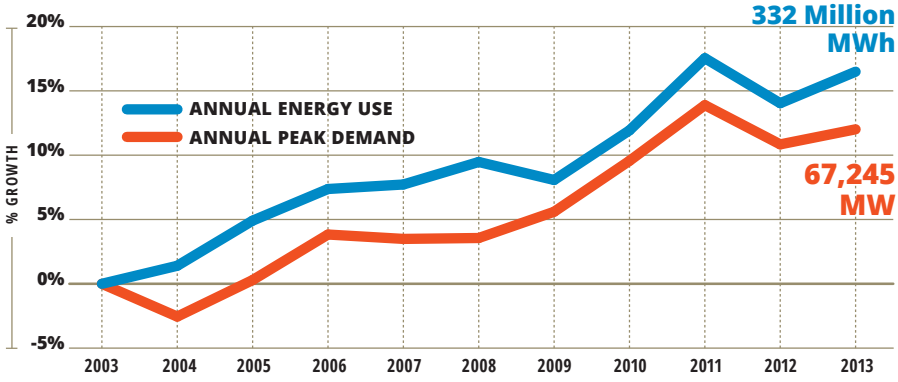
MORE GENERATION NEEDED TO SERVE PEAK DEMAND

As Texas continues to grow, it must invest in more power generation to **ensure reliable service** during peak demand.

- ERCOT's **peak demand** increased by nearly **12 percent** in the past decade (**Exhibit 5**).
- 2011's record-breaking heat wave spurred a **5 percent** increase in overall electricity demand. On Aug. 3, 2011, ERCOT saw a new peak demand of **68,305 MW**, and came close to using all of its reserve margin.
- To encourage additional power generation, the PUC has increased the **system-wide offer cap** (SWOC) — the maximum allowed price in the wholesale power market. The SWOC rose from **$5,000** to **$7,000 per MWh** in 2014, and will rise to **$9,000** in 2015. These "scarcity" prices kick in when supply is not keeping up with demand.
- Policies and incentives have resulted in wind, the least available power source at peak, becoming Texas' largest source of renewable energy (**Exhibit 6**). When wind fluctuates and is not available, however, other generation has to be dispatched to back up the loss of renewable power.

EXHIBIT 5

ERCOT ANNUAL ENERGY USE AND PEAK DEMAND, 2003-2013



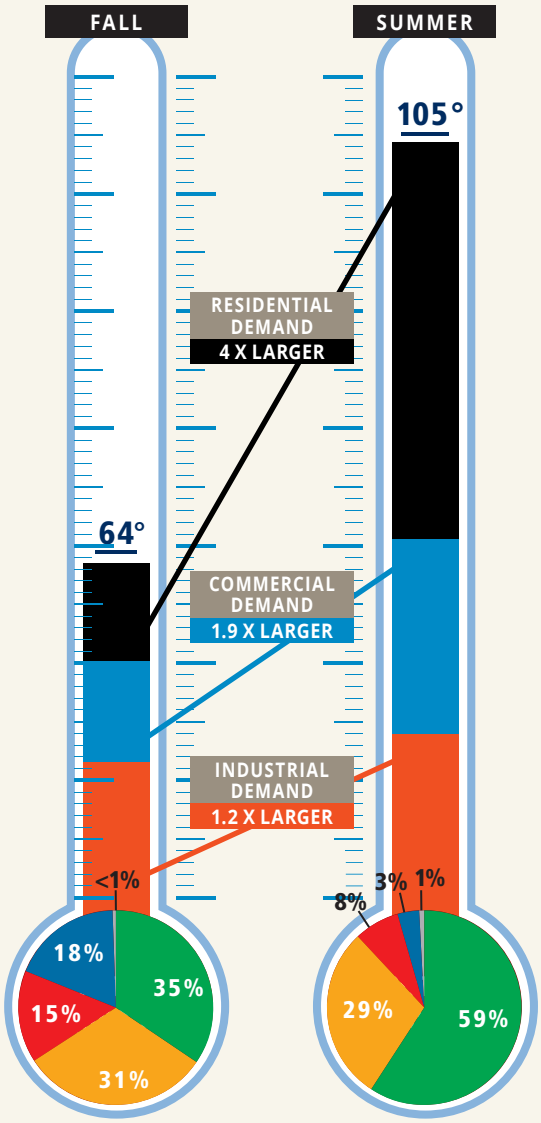
Source: Electric Reliability Council of Texas

EXHIBIT 6

CONTRASTING PEAK DEMAND

On days when temperatures **peak in the 60s**, non-residential customers use **more than two-thirds** of the power generated in the ERCOT region.

On the **hottest Texas summer days**, electricity demand by residential customers quadruples to **more than half** of the state's total load, peaking in the late afternoon. This requires thousands of megawatts of **natural gas** generation to be fired up, a flexibility not available with wind generation that is dependent on weather conditions.



Note: The chart represents statewide peak demand when the 4 to 5 p.m. temperature in Dallas was 64 degrees in November 2013 and 105 degrees in August 2013.

Source: Electric Reliability Council of Texas and National Climate Data Center

RENEWABLE ENERGY EXPANSION

Adding renewables, as Austin's experiences illustrate, creates **challenges** to providing **reliable and affordable** energy.

INEFFICIENT BIOMASS INVESTMENT

In 2008, the Austin City Council approved a 20-year, **$2.3 billion** contract to buy **100 MW** generated at an East Texas biomass plant.

- Proponents who said impending federal carbon legislation and natural gas price volatility would justify its **15-cent-per-kWh** price were proved wrong — carbon-trading legislation failed and natural gas prices **plummeted**.
- Low power prices mean the plant is usually too costly to operate, but Austin still pays a **capacity charge** (borne by customers) even when no energy is generated.

SOLAR COSTS DECLINE

In 2014, Recurrent Energy announced a planned **150 MW** West Texas **solar farm** to supply Austin.

- The contract price of **5 cents per kWh** is the cheapest solar in the U.S., although it is **still higher** than Austin's average energy cost.
- The city council approved a generation task force recommendation to acquire **600 MW** of **solar** to replace the Decker natural gas plant. **Austin Energy officials have stated publicly that adding so much solar energy would increase energy costs substantially**.

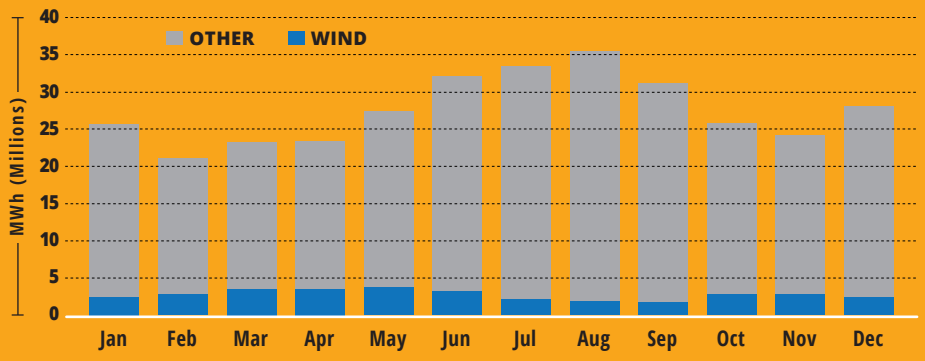
RENEWABLES NEED CONVENTIONAL POWER BACKUP

Diversifying Texas' energy portfolio has put wind and solar generation on the grid but has created a new quandary for grid managers: where can power be obtained quickly **when the wind stops or clouds reduce solar yields**?

- When wind turbines produce **less** electricity than predicted, grid operators must **compensate** by relying on dispatchable power plants that can ramp up production quickly to meet demand, and ramp down due to rapid increases in wind generation.
- Daily forecasts can give a general expectation of renewable output, but **quick-ramping gas turbines have to be on standby to backstop renewables** that are expected to produce only a fraction of their full operational capacity.
- For summer 2014, even though Texas had more than **11,000 MW** of total wind capacity, ERCOT counted on just **963 MW** of wind generation being available. The lack of wind generation during summer peak demand means that energy **planners**, such as ERCOT, have to ensure that a lot of flexible natural gas generation is available **to meet the reserve margin**.
- Wind producers occasionally have to curtail their operations during high generation due to localized transmission infrastructure constraints; this could be alleviated if economical local energy storage technologies existed.
- Although peak solar energy production tends to coincide with peak demand, Texas' limited solar capacity leaves CREZ transmission lines underutilized when the West Texas wind typically is lowest in early afternoon.
- The **reserve margin** ordinarily meets the needs of the electricity market because grid operators can **dispatch flexible generation** to meet higher-than-expected demand or unexpected supply loss. When the operating reserves are **insufficient**, customers are asked to **reduce consumption** through demand response programs that reduce the load. In a worst-case scenario, forced rolling outages would be implemented.

EXHIBIT 7

WIND GENERATION VS. ALL OTHER GENERATION, 2013



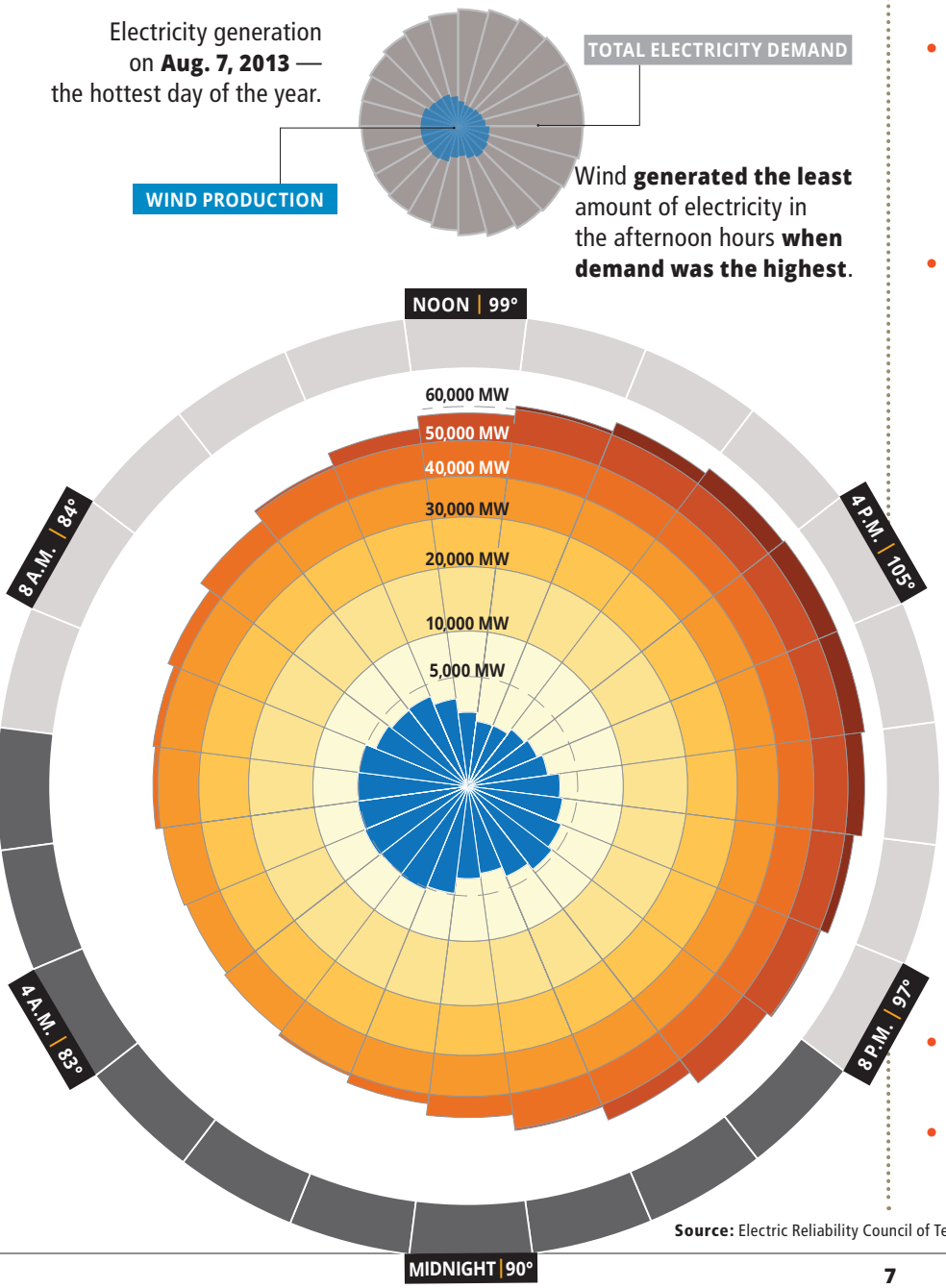
Source: Electric Reliability Council of Texas

THE ELECTRICITY GRID CANNOT RELY ON SIGNIFICANT WIND GENERATION DURING PEAK SUMMER DEMAND.

EXHIBIT 8

WHEN THE WIND BLOWS

Electricity generation on **Aug. 7, 2013** — the hottest day of the year.



Source: Electric Reliability Council of Texas and National Climate Data Center

FOSSIL FUEL GENERATION OFFSETS HIGH COSTS OF WIND CONTRACTS

- The City of Austin's utility, Austin Energy, is finding that **being an early adopter of renewables comes with a high cost**. Older wind and solar contracts cost more than the market price of energy.
- Responding to a task force's plan to accelerate the retirement of a natural gas plant and Austin's coal generation, the utility says that **in fiscal 2013**, the **22 percent** of generation from renewables cost **$80 million** more than the market price of energy. Conversely, **fossil fuel generation** brought in **net revenue of $180 million**.

DEMAND RISES, WIND POWER FALLS

- Wind generation is lowest during the summer months when energy demand is highest. **Exhibit 7** shows the proportion of electricity generated from wind compared to all other sources.
- **Exhibit 8** shows the proportion of electricity generated from wind during the hottest summer day of 2013.
- **4 A.M.** – Wind generation peaks when overall demand for electricity is **lowest**.
- **4 P.M.** – Wind generation is near its lowest when overall demand is at its **highest**.

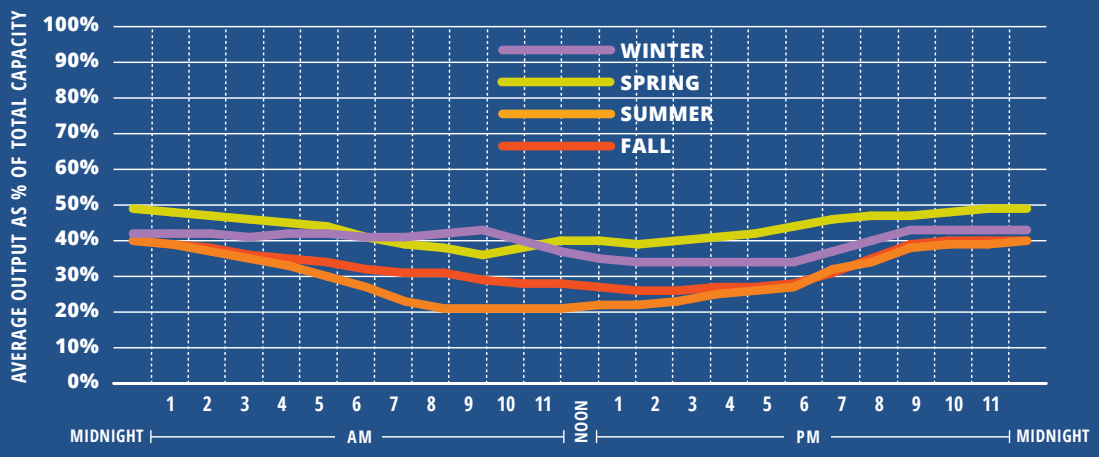
EXHIBIT 9

TEXAS WIND GENERATION AVERAGE OUTPUT

Average wind production is much lower than its maximum capacity, and lowest during the hottest hours of summer days when demand is highest.

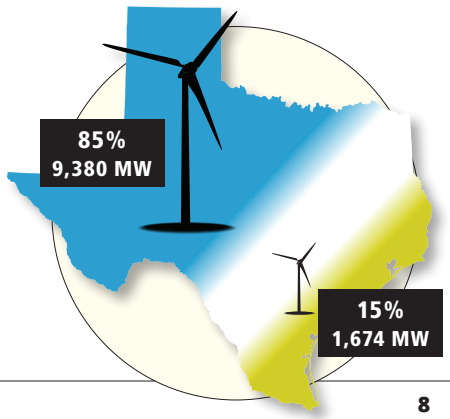
Note: These profiles are based on ERCOT data for 1996-2012.

Source: Electric Reliability Council of Texas



THREATS TO RELIABILITY

- The leading cause of U.S. power outages is **severe weather**, which cost the U.S. **$18 to $33 billion** annually between 2003 and 2013.
  - **Freezing weather** in February 2011 disabled **50** Texas power plants, losing more than **7,000 MW** and causing rolling outages.
  - **Extremely hot weather** can raise the temperature of cooling water enough to force thermal power plants, such as nuclear plants, to shut down during peak demand.
- **Unplanned maintenance** or repairs can reduce or completely shut down power generation, with potentially significant effects on the grid.
- Conventional fuels, such as coal and natural gas, are vulnerable to **supply disruptions** from rail or pipeline congestion.
- **Wind energy** displaces dispatchable generation sources that still must be kept in reserve for when wind generation is inadequate.



WIND HAS RELIABILITY CHALLENGES

Renewable energy poses **reliability challenges**. The leading concern is whether it can provide electric power **every second of every day**.

- Major renewable energy sources are fundamentally limited in **how, where and when** they can be used; the sun doesn't always shine and the wind doesn't always blow, so natural gas backup generation is needed.

VARIABILITY AND INTERMITTENCY

Wind power is tied to **weather** and thus produces **variable energy output**.

Wind variability creates complications for grid operators working to integrate wind power into a grid **not historically designed for fluctuations**.

Historical wind generation data reveal that the **peak production** for the majority of Texas wind generation is at night and **does not align** well with the **peak electricity demand** during summer afternoons (**Exhibit 9**).

- Non-coastal wind turbines generated only about **20 percent** of their installed capacity during **summer peak-demand hours**, while coastal wind production was more than **50 percent** of capacity in 2013.
- Non-coastal wind represents **85 percent** of both total installed wind capacity and annual wind generation in the ERCOT region (**Exhibit 10**).

EXHIBIT 10

COASTAL AND NON-COASTAL WIND GENERATION IN ERCOT, 2013

	ANNUAL PRODUCTION	TOTAL INSTALLED CAPACITY
COASTAL	5,013,114 MWh	1,674 MW
NON-COASTAL	27,671,170 MWh	9,380 MW
TOTAL WIND	32,684,284 MWh	11,054 MW

Note: Total installed capacity is reported as of Dec. 31, 2013.

Source: Electric Reliability Council of Texas

TEXAS HAS ONLY **470 MW** OF GRID-CONNECTED ENERGY STORAGE PROJECTS PLANNED OR CURRENTLY IN OPERATION; THAT REPRESENTS **LESS THAN 1 PERCENT** OF PEAK DEMAND.

UTILITIES PUSH ENERGY EFFICIENCY PROGRAMS

State law requires investor-owned utilities to employ energy efficiency programs.

- **MARKET TRANSFORMATION** programs are intended to drive behavioral changes that increase the adoption of energy-efficient technologies and practices for high-use customers such as schools and businesses.
- **STANDARD OFFER** programs allow utilities to contract with energy efficiency providers to operate residential, commercial and industrial load management programs.
- **SELF-DELIVERED** programs allow utilities in non-competitive areas to directly market and provide incentives to customers. Utilities in competitive areas could offer direct incentives after receiving approval through a contested case process.

LOAD MANAGEMENT BENEFITS RETAIL CUSTOMERS

Keeping demand as low as possible during peak hours reduces the amount of extra generators that have to be fired up for short periods of time.

Many utilities encourage customers to install Internet-connected smart thermostats by offering rebates. Some require participation in demand-response programs that allow the **utilities to adjust the thermostats** for short periods to reduce peak demand.

STORAGE NEEDED TO IMPROVE RENEWABLES

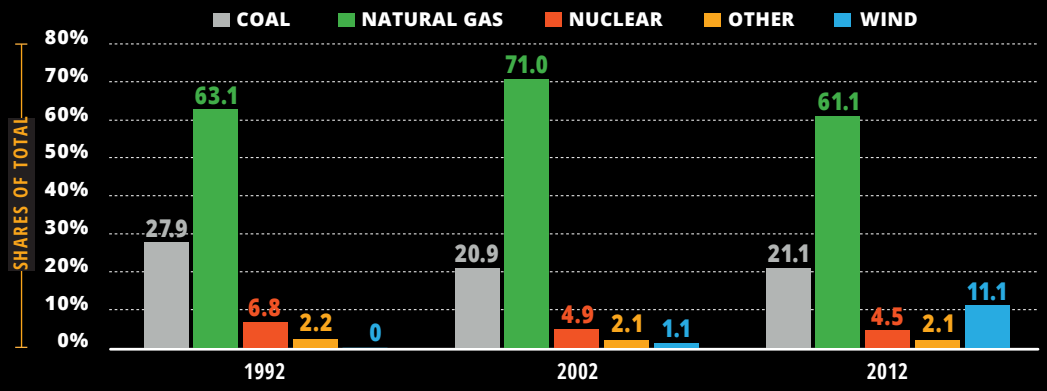
The main reliability challenge facing electricity generation, especially renewable generation, is **how to store excess production**. There is **no** widely deployed utility-scale, **cost-effective storage** in the U.S. electricity market.

- Although Texas ranks **first** in installed wind capacity, the U.S. Department of Energy ranks **Texas 15th** for capacity among the **38 states** with ongoing energy storage projects.
- Current storage methods include using excess power to **compress air** that can be released later to generate energy.
- Another technique, **thermal energy storage**, involves cooling or heating a storage medium, such as water or molten salts, so that the "stockpiled" thermal energy can be used at a later time.
- **Lithium ion** and other **advanced batteries** are promising but need further refinement to achieve better efficiency.
- Off-peak electricity prices in Texas are typically lower than when demand is high. If **off-peak renewable** generation that is currently **displacing** other cheap generation could be **stored** and used later, this could help market planners better prepare for peak demand.
- Unless the market can deploy **affordable** large-scale electricity **storage**, Texas consumers will continue to get the least electricity from the state's heavily subsidized wind generation when power is needed most.

EXHIBIT 11

ELECTRIC POWER INDUSTRY CAPABILITY BY PRIMARY ENERGY SOURCE, 1992-2012

Policy decisions have pushed wind generation expansion in Texas.



Source: U.S. Energy Information Administration

CHANGING ELECTRICITY GENERATION

In the last quarter-century, Texas has added tens of thousands of megawatts in electricity capacity.

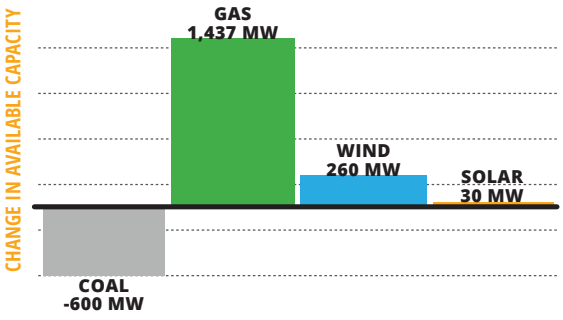
The combination of legislation, **plentiful natural gas reserves**, federal production tax credits and property tax reductions subsidizing wind farms significantly influenced new generation development. **Between 1992 and 2012**, Texas generation capacity from all sources increased by almost **56 percent**.

The **fuel mix** of Texas' generation capacity also has changed over time (**Exhibit 11**).

Generation in the ERCOT region is expected to change further in the coming years (**Exhibit 12**).

EXHIBIT 12

ERCOT FORECAST GENERATION CHANGES, 2015-2017



Note: Fuel type is based on the primary fuel. Information reflects data published by ERCOT on May 1, 2014, and does not include any capacity announced after ERCOT's report was published.

Source: Electric Reliability Council of Texas

TEXAS GENERATION POLICY PUSHED WIND

Local, state and federal generation policies have **pushed certain types of generation** regardless of whether they are the most **cost-effective**.

GENERATION DIVERSITY TARGETS

State policy has affected the mix of energy generation in Texas.

1999: Senate Bill 7 established Renewable Portfolio Standards (RPS) to encourage energy development.

New generation capacity **targets**:
- **2,880 MW** of renewable capacity built by 2009
- At least **50 percent** of new generation fueled by natural gas

2005: Senate Bill 20 increased the RPS **targets**:
- **5,880 MW** of renewable capacity by 2015
- **10,000 MW** of renewable capacity by 2025
- At least **500 MW** goal of non-wind renewable capacity

RESULTS: Texas has **met or exceeded** all of these targets:
- **10,000 MW** target for renewables on the grid in 2009
- **500 MW** goal for non-wind renewables on the grid in 2011
- Natural gas fuels **68 percent** of capacity installed since 1999

- These mandates have changed the composition of Texas' electricity generation.
  - By 2012, reliable **natural gas** — which runs at full capacity when needed — **dropped** to **61.1 percent** of Texas' total generation capacity.
  - At the same time, **wind** generation grew from barely **1.1 percent** of total capacity in 2002 to more than **11 percent** in 2012.
- PUC deems the **natural gas and renewable energy capacity targets as no longer necessary** and in 2013 recommended they be repealed.

THE **$6.9 BILLION** COSTS FOR CREZ TRANSMISSION LINES TO TRANSMIT ELECTRICITY FROM WEST TEXAS TO URBAN AREAS WILL BE RECOUPED FROM RATEPAYERS FOR 15 TO 20 YEARS. THE ORIGINAL ESTIMATE WAS **$4.9 BILLION**.

TRANSMISSION LINES FOR WIND

The 2005 Texas Legislature approved a major transmission project, the **Competitive Renewable Energy Zones** (CREZ), to carry mostly **wind energy** generated in West Texas and the Panhandle to high-demand cities (**Exhibit 13**).

- The project was forecast to cost less than **$5 billion** but ballooned to more than **$6.9 billion** to build nearly **3,600** miles of transmission lines and dozens of substations.
- The completed project has capacity to transmit about **18,500 MW** of electricity to major load centers in ERCOT — that would serve more than **4 million** Texas homes.

COST TO CONSUMERS

Consumers will pay for CREZ lines **carrying wind energy** for **15 to 20 years**.

- The PUC estimates residential customers will pay roughly **$5 to $7 per 1,000 kWh used**. Based on the average household's electricity use, that will cost **$70 to $100 per year**.
- An ERCOT official told the PUC in August 2014 that further **expansion** of the West Texas transmission grid could cost an additional **$2 billion**.

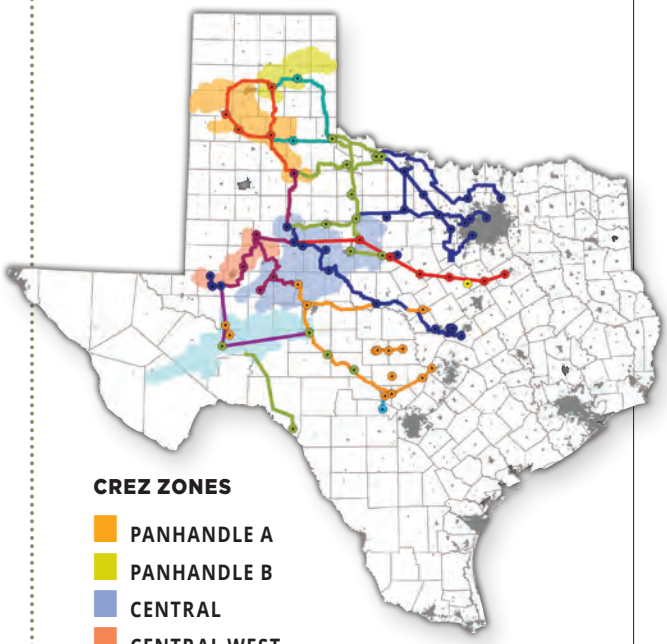
An ERCOT study is under way to provide new and improved transmission from Panhandle wind generation that extends outside its service area.

- The **Panhandle Renewable Energy Zone** could provide transmission lines (expanded from the existing CREZ) that would transport electricity to the populated areas of Texas where demand is increasing. **No price tag has been identified for these new transmission lines**.

The PUC has begun to study whether **future transmission infrastructure** costs should continue to be paid by **all ratepayers** or whether **electricity generators** — specifically renewables that are located far from where the energy is used — should be required to fund any of the costs.

EXHIBIT 13

CREZ PROJECTS, APRIL 2014



Source: Public Utility Commission of Texas

FEDERAL AND STATE TAX CREDITS SUBSIDIZE THE PRICE OF WIND POWER COMPARED TO TRADITIONAL SOURCES OF ELECTRICITY GENERATION.

SUBSIDIES DISTORT THE MARKET

Because of the substantial value of the **federal production tax credit** — up to **$23 per MWh** for the first 10 years of an eligible wind facility's operation — the dynamics of the energy market are **artificially skewed**.

- Subsidies are significant factors in deciding what generation to build, because there are alternative electricity sources to wind and solar farms that are **less expensive** and/or **more flexible** for responding to changing electricity demand (**Exhibit 15**).
- The RPS targets required electricity retailers to source some power from renewable resources. Retailers have to buy and retire **Renewable Energy Credits** (REC) from qualified companies that built new generation. Because Texas has long surpassed the RPS generation targets, REC **values have declined** and provide a minimal subsidy.
- However, **billions of dollars of avoided property tax payments** through Chapter 313 agreements executed with wind farms **provide subsidies for wind-farm operators** as they seek to recoup their investments.
- Although two nuclear plant expansions and an integrated gasification combined cycle coal plant have submitted Chapter 313 **applications**, those plants have not been built, leaving renewable projects as the sole electricity generation to avoid **local school property taxes** — foregone revenue that state taxes have to replace.

TEXAS TAX POLICY

Texas provides tax exemptions, limitations and other benefits that both directly and indirectly shift the cost of electricity generation.

WIND PROJECTS HAVE BENEFITTED MOST FROM CHAPTER 313

The Texas Economic Development Act, **Chapter 313** of the Tax Code, **directly benefits some energy generators**, mostly wind.

- Through this program, school districts can provide property tax credits and property valuation limitations for private entities that build facilities and create new jobs within their districts (**Exhibit 14**).
- In 2013, this subsidy equated to an estimated **$2.29 per MWh** from wind.

School districts may decide to waive job creation requirements if they deem that the Chapter 313 job quota exceeds industry standards for the operation of that project. According to the 2013 Texas Economic Development Act report, of the **52 projects** that had received job waivers, **85 percent of them were for wind projects**.

- Non-wind renewable Chapter 313 project applications — primarily solar — have increased in 2014. New **solar** projects can qualify for **federal investment tax credits through 2016**.

EXHIBIT 14

TEXAS CHAPTER 313 PROJECTS

SECTOR	NUMBER OF ACTIVE PROJECTS	TOTAL ESTIMATED TAX BENEFIT TO PROJECT	ESTIMATED JOBS	ESTIMATED TAX BENEFIT TO PROJECT PER JOB
WIND	76	$840,443,658	480	$1,750,924
NON-WIND RENEWABLE ENERGY	2	$32,355,604	44	$735,355
OTHER ENERGY	3	$429,080,572	600	$715,134
NON-ENERGY	47	$1,085,775,080	5,552	$195,565

Note: The data represents projects with agreements executed through August 2012. Agreements may be canceled or fail to meet the minimum qualified investments in the required time frame following the reporting of this data. An updated number of projects, market values, job commitments and estimated tax benefits will be available in the biannual Report of the Texas Economic Development Act (January 2015).
Source: Texas Comptroller of Public Accounts

EXHIBIT 15

ESTIMATED LEVELIZED COSTS OF ELECTRICITY (LCOE) FOR NEW GENERATION RESOURCES IN ERCOT ($/MWh)

	LEVELIZED CAPITAL COST	OPERATIONS & MAINTENANCE		TRANSMISSION INVESTMENT	TOTAL SYSTEM LCOE
		FIXED	VARIABLE (INCL. FUEL)		
NATURAL GAS - CONVENTIONAL COMBINED CYCLE	$12	$2	$46	$1	$61
WIND	$63	$14	$0	$3	$81
COAL - CONVENTIONAL	$55	$4	$27	$1	$87
ADVANCED NUCLEAR	$68	$12	$12	$1	$93
SOLAR PHOTOVOLTAIC	$93	$11	$0	$3	$107
NATURAL GAS - CONVENTIONAL COMBUSTION TURBINE	$35	$3	$81	$3	$122

Note: Levelized cost of electricity (LCOE) compares the cost (in 2012 dollars per megawatt-hour) of building and operating different generating technologies over an assumed financial life and operating schedule. The LCOE estimates are based on a 30-year cost recovery period for various types of power plants that start operation in 2019 and do not include subsidies.
Source: U.S. Energy Information Administration

FEDERAL TAX POLICY

Billions of dollars of federal energy subsidies have helped Texas wind generators get established in the wholesale energy market. **About 21 percent of U.S. wind generation capacity is in Texas**.

- The **2.3 cent-per-kWh** federal production tax credit expired for new renewable projects that began construction after Dec. 31, 2013.
- In August 2014, the IRS and the Treasury Department announced that renewable energy facilities, designed as single projects comprising multiple facilities (for example, a wind farm comprising multiple turbines), can qualify for some tax credits if the costs incurred prior to Jan. 1, 2014, are at least **3 percent** of the total cost of the facility, down from the previous threshold of **5 percent**.

- From 2008 through 2014, **U.S. wind companies** received an estimated **$7.6 billion** in federal tax credits. Wind production tax credits to generators are estimated to be **$4.9 billion** from 2015 through 2017.
- The most recent federal review of subsidies to electricity production found that wind received **42 percent** of all federal subsidies in 2010 while only comprising **2.3 percent** of net generation. (It should be noted that **97 percent** of wind subsidies in 2010 came from American Recovery and Reinvestment Act stimulus programs.)
- In 2010, **wind** received nearly **eight times more federal support than natural gas** for electricity production.
- The National Academy of Sciences found that renewable tax credits have had a **minimal role in reducing carbon dioxide emissions** from the power sector. In a 2013 report, it estimated that the incremental impact of these tax credits was only a **0.3 percent reduction in emissions**.

TEXAS NATURAL GAS SUBSIDIES

Texas provides three main incentives for natural gas severance taxes, valued at an estimated **$804 million** in savings to natural gas producers in fiscal 2013.

Approximately **20 percent** of the natural gas produced in Texas is used to generate electricity. It is difficult to project to what extent, if any, state tax incentives **indirectly** benefit electricity generation, but incentives equate to an estimated **$0.87 per MWh** produced in 2012 using natural gas.

EXHIBIT 16

ELECTRICITY SUBSIDIES COMPARISON

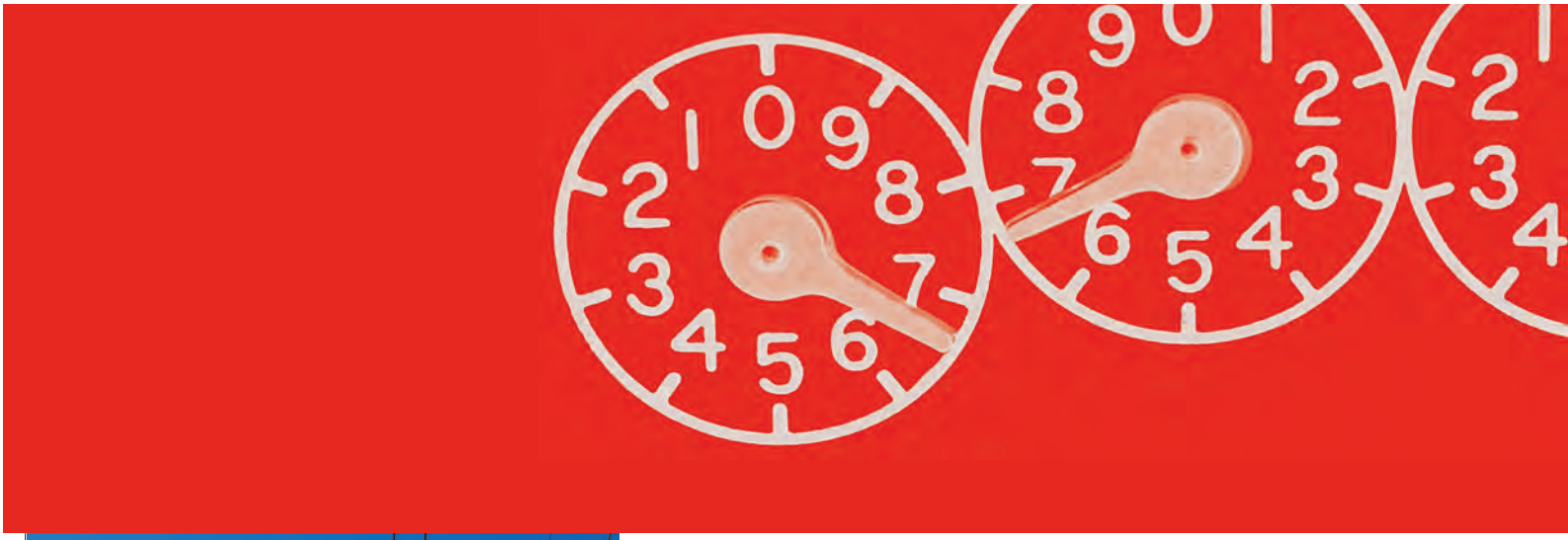
FEDERAL WIND PRODUCTION TAX CREDITS: $23 PER MWH (2013)

STATE WIND CHAPTER 313 SUBSIDIES: ESTIMATED $2.29 PER MWH (2013)

FEDERAL NATURAL GAS SUBSIDIES: $0.63 PER MWH (2010)

STATE NATURAL GAS TAX CREDITS: ESTIMATED $0.87 PER MWH (2012)

Note: Estimates are from most recent years for which data are available. Wind tax subsidies and tax credits apply directly to electricity generators. Most Texas natural gas subsidies and tax credits apply to the fuel producers and have only an indirect effect on electricity generation.
Source: U.S. Energy Information Administration and Texas Comptroller of Public Accounts



FINAL OBSERVATIONS

It is time for the wind energy industry to stand on its own feet (**see page 10**).

Texas has spent billions of dollars building CREZ lines to transport wind energy from where it is generated to where it is needed. Every Texas consumer is paying for this infrastructure (**see page 11**).

It is time for wind power generators to use this system to make money if they can, and end the tax credits and property tax limitations on new generation that helped grow the industry, but today give an unfair market advantage over more reliable power sources **(see pages 12 and 13)**.

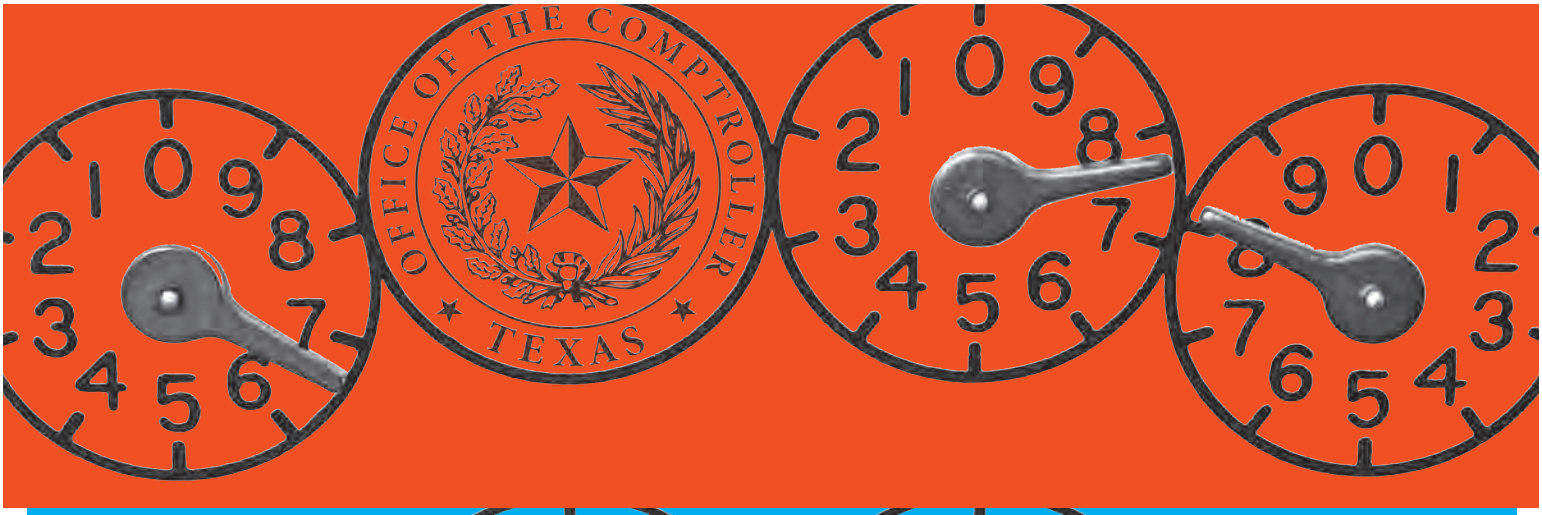
Renewable generators have been given a major helping hand to develop their industry. Developing technology to store renewable energy, so that it can provide reserve capacity available to the grid during peak demand, should be part of the renewable industry's responsibility before it adds generation that would further displace traditional power sources.

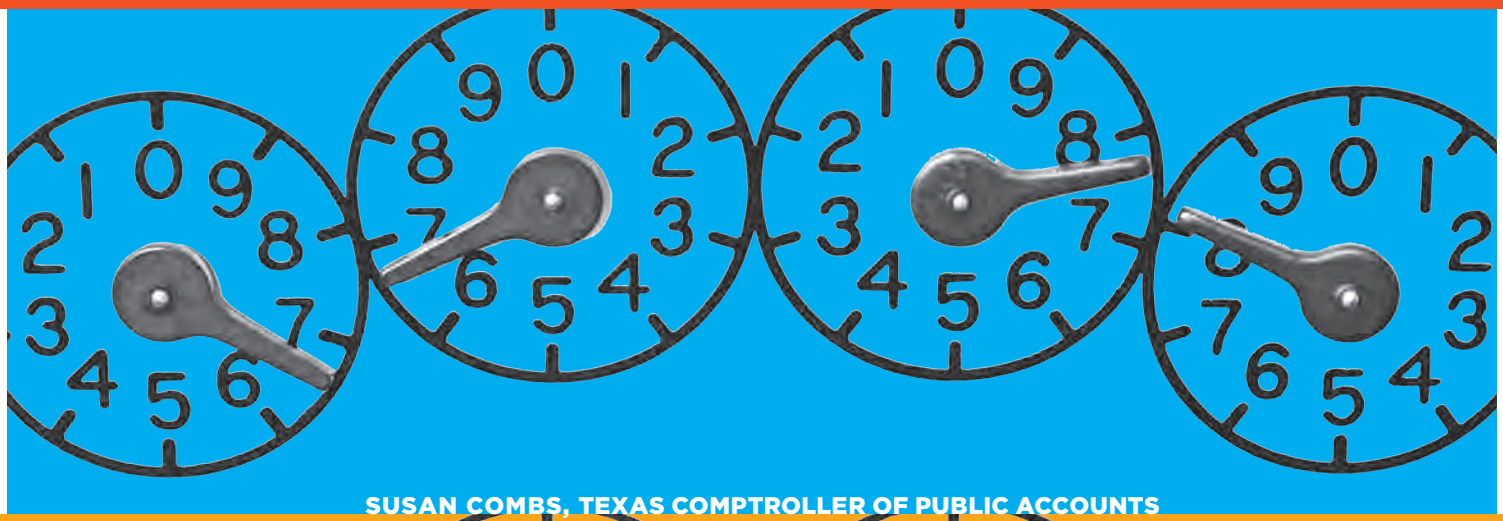
Texas should maximize existing transmission capacity before adding more.

In West Texas, wind energy usually falls off during hot afternoons, precisely when we need it most to cool our businesses, factories, offices, hospitals and homes. When this happens, lots of capacity exists on the CREZ transmission system that other generators could exploit, helping to maintain grid reliability (**see page 8**).

Planners and developers of new generation should study where future energy sources — whether renewables or traditional — can be cost-effectively located to maximize recently built CREZ and other existing transmission infrastructure. ERCOT, the PUC and energy companies must be responsible to ratepayers who will bear the cost of the CREZ system for 15 to 20 years, and who cannot realistically opt out of the electric grid.

The renewable sector has benefitted most from the $6.9 billion CREZ transmission infrastructure that is already in place. It should not proceed with future investments that would require significant additional infrastructure development over opportunities to maximize the existing grid, especially if these investments require tax abatements or other subsidies to be financially viable. Ratepayers and taxpayers are the same Texans, and careful planning is needed to ensure that we are not doubly burdened with infrastructure costs and tax subsidies that are not needed to reliably serve demand.





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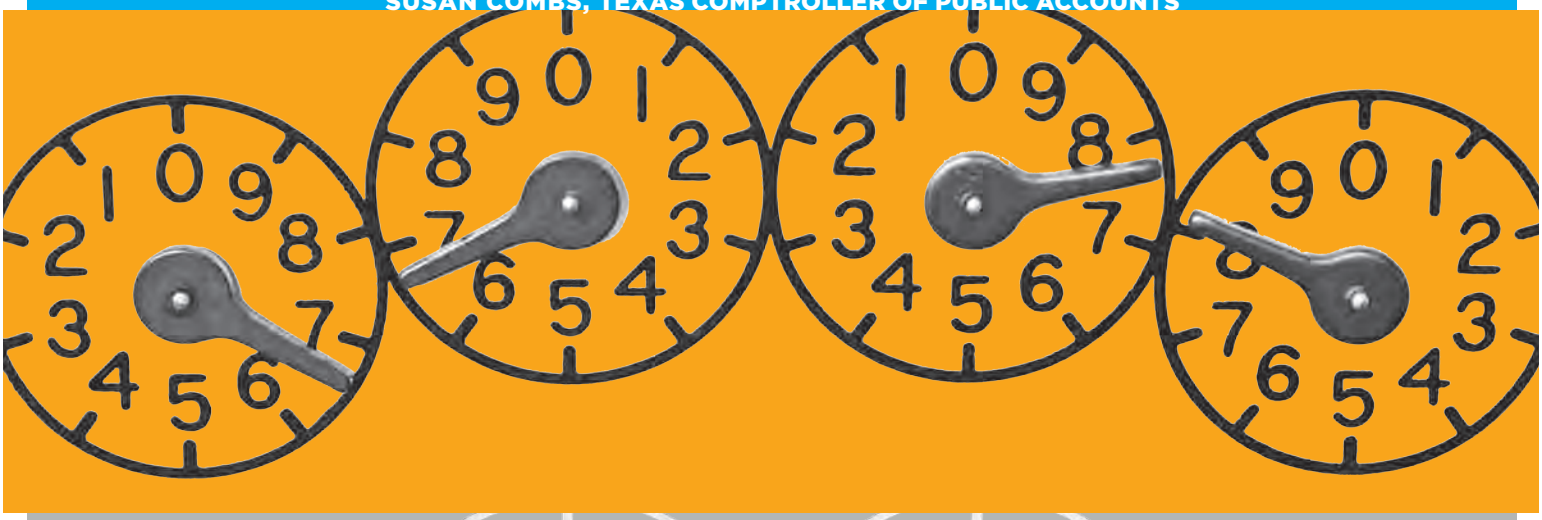

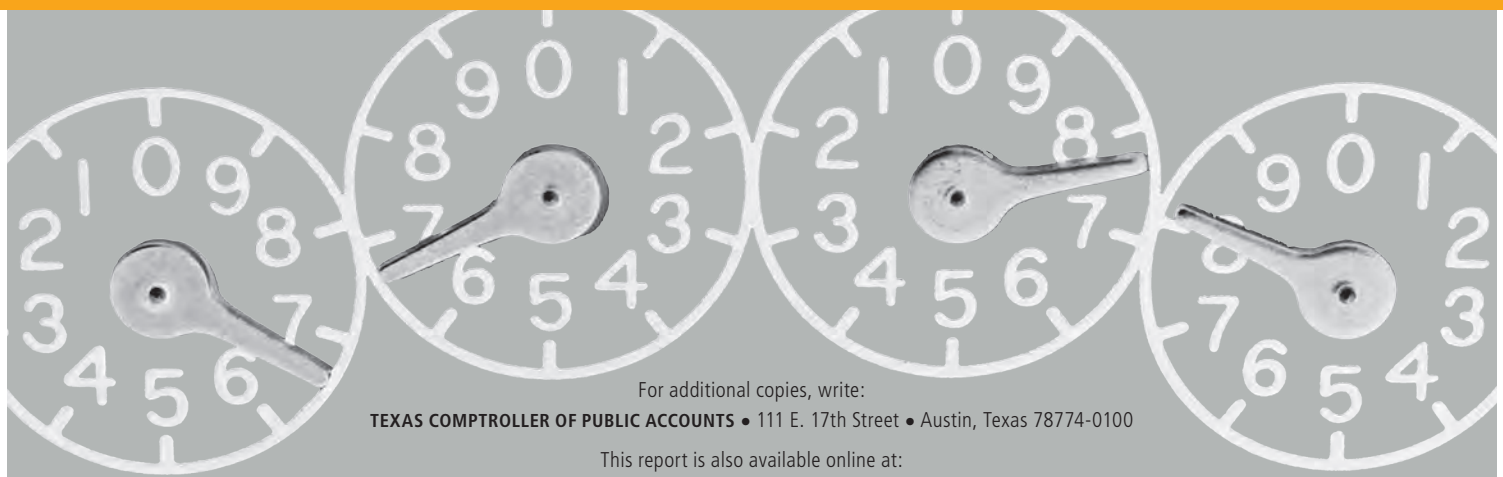

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