

Texas' Renewable Energy Experiment: High Costs, Poor Results

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Recommendations

- Eliminate statutory requirement that 50 percent of new generation be generated by natural gas.
- Eliminate the Renewable Portfolio Standard.
- Require wind, solar, and other renewable generators to meet the same standards as other generators.

While much of the criticism of the restructuring of the electricity market over the last few years has focused on its alleged role in increasing prices, most of the actual increases in consumer costs have been brought about by fuel and energy efficiency mandates. For instance, subsidies for Texas wind energy through the federal Production Tax Credit should cost taxpayers about \$300 million in 2010—though this is a tax subsidy, not an add-on to the electric bill.¹ The cost of wind Renewable Energy Credits—perhaps \$41 million this year—are passed on to consumers through the price of electricity.² Finally, Competitive Renewable Energy Zone transmission lines—being built to transmit electricity from wind in West Texas—will add as much as \$1.3 billion annually to electricity bills once the lines have been completed.³ The extra annual cost to consumers and taxpayers for wind energy could reach \$2 billion by 2020.⁴ Likewise, government-mandated energy efficiency programs today generally work by increasing the cost of electricity in order to reduce electricity consumption. In all of these cases, consumers or taxpayers pay more for electricity. The result is reduced economic growth and decreased wealth for most Texans.

A common defense of subsidies for renewable energies is that traditional energy sources receive subsidies, so why shouldn't wind, solar, biomass, and other renewable energy sources? While it is true that most energy sources get some sort of government subsidy, this argument ignores the fact that subsidies for certain renewable energy sources are far higher on a per unit of production basis than traditional sources of energy.

Texas subsidies today also favor renewable fuels, certainly on a per unit of production basis, and probably on an absolute basis. The Texas Comptroller noted that \$6.2 million of Texas subsidies went toward renewable energy sources in 2006—much less than subsidies to conventional energy sources.⁵ But that was quite early in Texas' rapidly growing commitment to renewable energy.

For 2008, the Electric Reliability Council of Texas (ERCOT) estimated that renewable energy credits (RECs) cost between \$13 and \$65 million.⁶ The Foundation estimated the 2008 costs at \$28 million, and 2009 costs at \$41 million.⁷ Through 2025, the cost of RECs could total as much as \$1.4 billion.

These high levels of subsidies for renewable do far more to distort the market and introduce inefficiencies into the system than the minimal subsidies for traditional fuels. Other distortions and inefficiencies come from regulatory mandates and restrictions on different fuel sources. These often come in the form of mandates for certain levels of production—renewables and natural gas currently have such mandates in Texas. They also come through restrictions on production from fuels such as coal and nuclear material.

While it is impossible to know exactly what the generation mix would be today if not for the interventions in the market, it is safe to say that the environmental restrictions on nuclear and coal have at least partially accomplished their purpose and reduced generation from these sources, that natural gas has benefitted from

Most recent increases in consumer electricity costs resulted from fuel and energy efficiency mandates.

the absence of these fuels and has a higher market share that it would otherwise, and that wind—which has received the bulk of renewable energy subsidies in Texas—has substantially increased its production levels above where they'd be in an unfettered and subsidized market.

Recommendation: Reassess the Need for CREZ Lines

The most significant renewable energy subsidies are yet to come. The Foundation has not yet examined the costs of current and proposed subsidies such as tax credits for these technologies—including clean coal and carbon-capture, but we did look at the costs of transmission lines being built in response to the Legislature's mandate to collect wind-generated electricity from designated Competitive Renewable Energy Zones (CREZ).

To date, the CREZ lines are the most expensive subsidy adopted for renewable energy. Unlike RECs, the cost to build the CREZ transmission lines will be added to the bill of every electricity consumer in ERCOT. While this same process is true of all transmission built in Texas, it is proper to characterize these costs as subsidies for renewable energy—particularly wind—because these lines are being built to where there is little other generation except wind. And that is likely to remain the case.

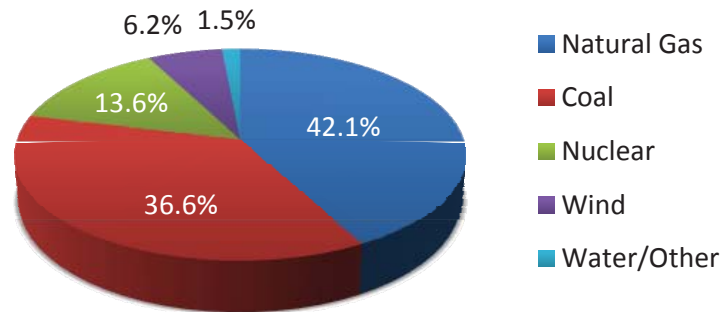
As discussed more below, the characteristics of wind energy—particularly in light of the federal production tax credits (PTC)—will make it difficult for other fuels to economically compete for transmission space on CREZ lines. The CREZ lines were built because the Texas Legislature mandated a system for the collection of electricity generated by wind. Combined with the economics of wind energy and the fact that consumers—rather than producers—have to pay for the CREZ lines, the vast majority of the costs of building the CREZ lines will be of direct benefit of wind producers at no cost. These lines would not have been built in a marketplace free of mandates and subsidies.

The process for building the CREZ lines is just getting underway. It is likely that the lines will not begin to come on line until 2011. The cost of each line won't be known until it is completed, and only after that point will the charges be added to consumers' bills.

Table 1: Federal Financial Interventions and Subsidies in Energy Markets, 2007

Fuel	FY 2007 Net Generation (billion kWh)	Subsidy & Support Value (million dollars)	Subsidy & Support Per Unit of Production (dollars/MWh)
Solar	1	\$14	\$24.34
Wind	31	\$724	\$23.37
Nuclear	794	\$1,267	\$1.59
Geothermal	15	\$14	\$0.92
Biomass (and biofuels)	40	\$36	\$0.89
Hydroelectric	258	\$174	\$0.67
Coal	1,946	\$854	\$0.44
Natural Gas and Petroleum Liquids	919	\$227	\$0.25

Source: Energy Information Administration

Figure 1: 2009 ERCOT Generation by Fuel Type

Source: Barry Smitherman, PUC chairman, April 29, 2010 presentation

The overnight cost of building the CREZ transmission lines was originally estimated to be \$4.93 billion.⁸ However, this amount does not include costs such as financing and escalation in construction costs. Adding these would raise the price to an estimated \$7.8 billion.⁹ This price still does not include profit or costs to transmission companies such as operations, depreciation, interest, and maintenance over the life of the project. The Foundation has used a conservative recovery factor of 17 percent to calculate the annual impact of all of these costs on Texas consumers.

Using this formula, the Foundation estimates that the CREZ lines will cost Texas consumers up to \$17.9 billion through 2025. Costs should top out at about \$1.3 billion annually toward the middle of this decade.

Recommendation: Eliminate statutory requirement that 50 percent of new generation be generated by natural gas

In the 1990s, natural gas' low price and lower emissions made it an attractive fuel source for generating electricity. In 1999, the 76th Texas Legislature passed Senate Bill 7 to deregulate the retail electricity market in Texas. One provision in SB 7 attempted to take advantage of the attributes of natural gas by mandating that 50 percent of all new generation be produced by natural gas. According to its bill analysis, SB 7 mandated that "50 percent of the megawatts of generating capacity in-

stalled in this state after January 1, 2000, use natural gas." The law enforces this generation mandate through the natural gas energy credits (NGEC) trading program. According to Sec. 25.172, Title 16, Texas Administrative Code, an NGEC will be issued to a power generation company for each megawatt of new generation capacity fueled by natural gas.

Natural gas prices did not cooperate with the intent of SB 7. The wellhead cost of natural gas per thousand cubic feet (Mcf) increased from an average of \$2.17 in 1999 when SB 7 was passed to \$10.33 in 2005 after Hurricanes Katrina and Rita, and hit its peak in July 2008 at around \$11.32.¹⁰ Spot prices rose even higher, to over 13 cents. At these higher prices, electricity produced by natural gas was no longer a bargain when compared to coal- and nuclear-generated electricity. Of course, natural gas prices are much lower today than they were during the last decade's peak. The average wellhead price in February was \$4.89—still twice as high as the 1999 price.¹¹

SB 7 also required the Public Utility Commission of Texas to "establish a program to encourage utilities to comply with this section by using natural gas produced in this state as the preferential fuel." So not only was SB 7 designed to give a preference for natural gas as the best fuel for generating electricity, it was also designed to increase the market share of Texas producers of natural gas.

There are other examples of well-intentioned but ultimately harmful government mandates to secure energy supplies. The oil crisis in 1973 inspired a campaign for conservation among environmental activists and regulators who were afraid that oil and natural gas resources would run out. As a result, in 1978 the Power Plant and Industrial Fuel Use Act (FUA) restricted construction of power plants using oil or natural gas as a primary fuel source. At the same time, the FUA also encouraged the construction of coal and nuclear power as “alternative” energy.

By the mid-1980s it was obvious that we were not going to run out of natural gas for a while, as prices declined and supplies increased. And coal soon became an unpopular fuel source among environmental activists. In 1987, the Natural Gas Utilization Act repealed some of the FUA restrictions on natural gas use. Although some restrictions remained in place (certain operating conditions needed to be met), all power plants built after 1987 were unrestricted and free to use oil and natural gas as a fuel source.

It is not clear that today's mandate has led to Texas' heavy reliance on natural gas for new generation. Regulatory restrictions on coal and nuclear plants, the high price of renewables, and the rapid growth of demand in ERCOT has made natural gas the natural choice for most of the new generation since restructuring began. Yet, low prices or these other factors don't make a mandate for natural gas—or any other fuel—an efficient means of producing electricity.

Recommendation: Eliminate the Renewable Portfolio Standard

Despite reports to the contrary, wind, water, biomass, and the sun are about the oldest energy sources put to use by mankind. Over time, the inherent limitations in each of these sources has motivated people to seek out better, more efficient fuels to power society.

The challenges of renewable energy sources are well documented throughout history. For instance, in 1865, W. Stanley Jevons wrote:

“No possible concentration of windmills ... would supply the force required in large factories or iron works. An ordinary windmill has the power of about thirty-four men, or at most seven horses. Many ordinary factories

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would therefore require 10 windmills to drive them, and the great Dowlais Ironworks, employing a total engine power of 7,308 horses, would require no less than 1,000 large windmills!”

More recently, the Texas Comptroller's office acknowledged, “[T]he peak use of farm windmills was in the 1930s and 1940s when over 6 million were in operation. ...”¹² Why did farmers turn away from windmills? Because the electrification of the country brought farmers a power source that was more reliable and less expensive than wind.

Of course, modern technology allows renewable energy fuels to be used more efficiently today than they were 150 years ago, or even 50 years ago. But the same is true for fossil fuels—not to mention our most modern of energy resources—nuclear energy. Absent a significant, expensively-gained technological breakthrough, fossil and nuclear fuels will remain more efficient and less expensive than renewable fuels.

There are many who dispute this. Even the PUCT has said, “[R]enewable generation has reduced wholesale and retail energy prices during some periods. ... Wind generation has had the impact of reducing wholesale and retail prices of electricity.”¹³ Yet this analysis looks only at prices, and ignores the numerous other costs of renewable such as subsidies, tax breaks, and inefficiencies introduced into the market.

For instance, one reason wind energy can bring down prices is because wind producers sometimes pay consumers to “buy” it from them. They can do this because of the federal PTC, which pays producers for every kilowatt generated. Thus, if the wind is blowing and a producer cannot find a buyer for its electricity, it can actually pay the “buyer” a portion of the subsidy to take delivery of the electricity and still turn a profit, at least based on marginal costs.

Energy experts report that industrial wind power is proving to be exceptionally expensive to consumers once required backup and additional infrastructure are factored in.

So while the price may be lower in some instances, the total costs of renewable energy are higher than fossil and nuclear fuels. Consumers will always bear these higher costs, either in the form of prices or taxes. Thus, unlike fossil fuels where the risks of bringing new generation online are borne mainly by investors, the cost of developing renewable fuels are increasingly being paid for by consumers.

Eliminating the renewable portfolio standard (RPS) would save Texas consumers as much as \$41 million this year and over \$1 billion through 2025. However, if the RPS is not repealed, consumer costs could grow much greater as pressure mounts on the Legislature to increase the subsidies for renewable energy, particularly for solar and biomass. One bill proposed last session would have increased the residential cost of the RPS as much as \$220 million annually—without factoring in the cost of the bill to businesses which eventually pass those costs through to consumers.¹⁴

Recommendation: Require wind, solar, and other renewable generators to meet the same standards as other generators

Wind is free—there is currently no property right to wind—but wind energy is expensive. In fact, it has been called “the most expensive form of generation we have in Texas.”

According to Richard Baxter:

Wind is not a typical energy source. It is variable, and the best wind resources generally require longer-distance transmission of the power than for other forms of generation. These considerations raise the cost of utilizing this resource. Even relatively recent estimates put the cost of integrating wind energy into the grid at 5 percent to 30 percent of the cost of generation.¹⁵

In a report compiled for Ontario (Canada) electricity consumers, Keith Stelling writes, “Energy experts report that industrial wind power is proving to be exceptionally expensive to consumers once required backup and additional infrastructure are factored in.”¹⁶

Stelling attributes the high cost to (1) the need to maintain backup generating reserve to cover times when the wind does not blow, (2) the need to stabilize the grid when wind produces power that is not needed by current demand, and (3) government subsidization and tax benefits for the wind industry.

The backup generation and grid-related costs of wind energy will be passed on to ERCOT ratepayers. Adding over 11,000 MW of wind generating capacity to take advantage of the CREZ transmission capacity could increase ERCOT's system production costs by \$1.82 billion per year.¹⁷

One problem in ERCOT with these costs of wind is that they are not paid for by wind generators. When a conventional generator doesn't provide the electricity promised, the costs to the system are paid for by that generator. That is not the case with wind. When the wind unexpectedly stops blowing and new generation has to be brought immediately online, the costs are socialized. In other words, consumers rather than generators pay for the unreliability of wind.

Wind subsidies, especially the PTC, exacerbate this problem. The below market cost of wind floods the system with more wind than it would otherwise have, increasing the challenge of maintaining system reliability and the costs of ancillary services. Additionally, the below market prices tend to suppress prices system wide. There is growing evidence that this is dampening investment in peaking generation. Not only could this have a detrimental impact on system reliability at peak loads, it could also threaten the success of Texas' energy-only market. The market relies on market incentives to provide the right mix of generation capacity, particularly peaking capacity. If the right signals are not sent, resource adequacy will be a problem, and may lead to political action modifying the energy-only market.

ERCOT has for over a year been working on the development of a Wind Cost Allocation Proposal. The PUCT recently instructed its staff to open a project on this issue. Either ERCOT, the PUCT, or the Legislature should take action resulting in the allocation of wind costs to wind generators. ★

Endnotes

- ¹ Bill Peacock, *The True Cost of Wind Energy*, Texas Public Policy Foundation (Oct. 2008).
- ² Ibid.
- ³ Ibid.
- ⁴ Bill Peacock, "Texas' New Energy Taxes," Texas Public Policy Foundation (May 2009).
- ⁵ State Energy Conservation Office (SECO), Texas Renewable Energy Resource Assessment 2008, Comptroller of Public Accounts (Dec. 2008) 9-6.
- ⁶ ERCOT, "ERCOT Renewable Energy Credit Program Most Active in US" (Apr. 2008).
- ⁷ Bill Peacock, *The True Cost of Wind Energy*, Texas Public Policy Foundation (Oct. 2008).
- ⁸ ERCOT System Planning, Competitive Renewable Energy Zones (CREZ) Transmission Optimization Study (Apr. 2008).
- ⁹ Scott Norwood, "Direct Testimony on Public Utility Commission of Texas Docket No. 33672" (May 2008) 49.
- ¹⁰ U.S. Energy Information Administration.
- ¹¹ Ibid.
- ¹² SECO, 4-1.
- ¹³ Public Utility Commission of Texas, *Scope Of Competition in Electric Markets in Texas* (Jan. 2009) 65.
- ¹⁴ Bill Peacock, "Texas New Energy Taxes," Texas Public Policy Foundation (May 2009).
- ¹⁵ Richard Baxter, "A call for back-up: How energy storage could make a valuable contribution to renewables," *Renewable Energy World* (1 Sept. 2007)with Implementing Wind Energy," Al Howatson and Jason Churchill, The Conference Board of Canada, Ottawa (Feb. 2006).
- ¹⁶ Keith Stelling, "Calculating the Real Cost of Industrial Wind Power" (Nov. 2007).
- ¹⁷ Scott Norwood, Direct Testimony (Page 23), PUC Docket No. 33672 (23 May 2008).

About the Author

Bill Peacock is the vice president of research and director of the Texas Public Policy Foundation's Center for Economic Freedom. He has been with the Foundation since February 2005.

Bill has extensive experience in Texas government and policy on a variety of issues including, economic and regulatory policy, natural resources, public finance, and public education. His work has focused on identifying and reducing the harmful effects of regulations on the economy, businesses, and consumers.

Prior to joining the Foundation, Bill served as the Deputy Commissioner for Coastal Resources for Commissioner Jerry Patterson at the Texas General Land Office. Before he worked at the GLO, Bill was a legislative and media consultant. He has also served as the Deputy Assistant Commissioner for Intergovernmental Affairs for then-Commissioner Rick Perry at the Texas Department of Agriculture and as a legislative aide to then-State Rep. John Culberson.

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