The Texas Lyceum

E-Journal Summer 2010 Midland

Texas Energy: Present and Future

Can Texas meet the needs of 25 million and still achieve energy independence?

- **The answer, my friend, is blowing in the wind**
  — *Texas Tech wind expert Andy Swift*
- **Why can't we use ALL our resources to power up?**
  — *Luminant VP Phil Wilson*
- **A Texas battle cry for energy independence!**
  — *PUC Commissioner Donna Nelson*

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Texas Energy: Present and Future

Texans have multiple renewable energy choices before them

By Phil Wilson
Senior Vice President – Public Affairs, Luminant, and
Midland Meeting Chair

We've wrestled with it for the past half-century. Through war, embargo, rationing, and other foreign policy challenges, we have fought to ensure our domestic security when it comes to energy. Now, with energy independence as the goal, the question is – how do we get there?

Currently, the United States imports 12.6 million barrels of oil a day. This costs American consumers $349 billion annually -- an enormous wealth transfer out of our country that ultimately supports other economies and their successes. For example, nearly 50 percent goes to the Persian Gulf, Venezuela, Mexico, Nigeria and Saudi Arabia. And in many of these countries, much of the production is nationalized. By importing their oil, we're supporting governments who run from neutral to hostile to our country's interest. The geo-political consequences are tremendous.

So where does all of this imported oil go, and what does it do? A large percentage is used to operate personal vehicles and fleet trucks to carry us or our goods across Texas and the rest of the country. Gasoline and diesel fuel have been the lifeblood of our country for more than 100 years, but there are other, more forward-thinking options for us to consider.

For example, the T. Boone Pickens plan proposes using natural gas to replace diesel in fleet trucks. America has more than a 100-year supply of this resource (natural gas), of which Texas could provide a large portion. With the significant developments in various shale gas fields across the country, horizontal drilling makes natural gas much more accessible and should keep costs on a stable and reasonable level.

Because of its investment in wind energy, Texas is poised to move to a much more aggressive investment in electric cars and the infrastructure they require. We have invested $5 billion in Competitive Renewable Energy Zones (CREZ) to move power from West Texas to our cities. This natural resource is most abundant at night, the same time when electric vehicles would plug in to recharge. Not only is electric transportation cost-effective, comparable to about $1 per gallon of gasoline, it has enormous clean air benefits. With electric vehicles now capable of well over 100 miles per trip, Texans have the potential to truly make an impactful change.

Another plentiful American resource is coal. With more than a 250-year supply, we have been called the Saudi Arabia of coal. This fuel source is a tremendous resource and one that will continue to be further utilized and needed. As technologies continue to improve for IGCC and carbon sequestration, this resource will become an increasingly important contributor to the environmental conversation.

Lastly, our country needs to recognize nuclear power for the safe, environmentally friendly, and low-cost fuel source for electricity that it is. While nuclear plants are expensive to build, they have an extraordinarily long lifespan and a proven legacy of providing stable, reliable, clean-air electricity for generations to come. The federal government recently acknowledged this strength by passing an expansion of its federal loan guarantee program – a substantial step in providing the certainty companies need to accelerate this nuclear renaissance.

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Fuel, transportation and electric power are clearly intertwined. By taking control in these areas, we have the opportunity to keep our wealth at home, ensure a cleaner, greener environment, and most importantly, achieve the energy independence for which we've strived. It will take a commitment, but it's one we can't afford to discount.

About the author:

Phil Wilson is Senior Vice President of Public Affairs for Luminant, a competitive power generation subsidiary of Energy Future Holdings Corp. Luminant's activities include plant and mine operations, wholesale marketing and trading, and construction and development of new power plants. Wilson has oversight of the company's community relations, communications, regulatory and government affairs efforts.

Wilson has a long, distinguished career in Texas government, serving in key advisory roles for three statewide elected officials, including Secretary of State in 2007-2008. In 2010, Governor Rick Perry named Phil Wilson to the oversight committee for the Cancer Prevention & Research Institute of Texas. A native of Brownwood, Texas, Wilson earned a bachelor's degree from Hardin-Simmons University in Abilene and a master's degree from SMU.

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Wind energy: value and challenges for West Texas

By Andrew Swift, Sc.D., PE
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Wind Energy continues to be one of the fastest growing sources of electrical power. Growth rates have exceeded 30 percent per year over the past decade, with Texas being a national leader. Table 1 shows the annual growth in Texas wind power capacity for the past decade, with most of the installations in West Texas. Table 2 shows the current state rankings.

The Texas wind energy expansion had its roots in the mid-ninety's when, according to Thomas Freidman (Op Ed, *New York Times*, 2006) then Governor George Bush told Pat Wood, Chairman of the Texas Public Utility Commission, to look into wind energy. A utility deliberative poll followed that showed the citizens of Texas strongly in favor of renewable energy development in the state, which led to a state-wide Renewable Portfolio Standard, RPS, in 1999. The RPS mandated that Texas utilities install 2,000 megawatt (MW) of renewable energy, mostly wind, by 2009. That mark was easily reached in 2006-2007 and then expanded to a 5,000 MW RPS by 2015, which has also been exceeded.

Cost and value of wind energy

The present cost of a new wind energy power plant is about $2 million per MW, installed. At a good wind site this translates to an energy cost of about $60 per megawatt hour (MWHR). Retail costs for electric energy in West Texas vary from about $100 to $120 per MWHR. Typically, the cost of electrical energy from an existing coal, natural gas, or nuclear power plant is below the cost of wind energy. However, when compared with the projected energy costs from new coal, natural gas or nuclear facilities the situation is quite different. Pending federal energy legislation could impose limits or additional costs on emissions of carbon dioxide affecting new coal and natural gas facilities, while regulatory hurdles – and the recent call for the cancellation of the Yucca Mountain High Level Nuclear Waste storage facility – add to the economic uncertainties of conventional new power plant construction.

The value of wind energy is related to the fact that the resource is clean, abundant, domestic, and renewable. Additionally, thermal power plants such as coal, gas and nuclear consume cooling water in large quantities – on average about 500 gallons per MWHR. Current Texas wind energy generation displaces not only fuel, but also conserves water - approximately 14 billion gallons annually or about the annual consumption of Lubbock.

Transmission constraints

The transmission infrastructure to move wind energy from its source to the load in population centers is inadequate. Texas leads the nation in addressing this issue. The Competitive Renewable Energy Zone, or CREZ program, will provide transmission capacity for an additional 18,000 MW of wind power at an estimated cost of $5 billion. The benefits are expected to be significant. A recent CREZ impact report by the Perryman Group (The Perryman Group; *Winds of Prosperity*, May 2010, info@perrymangroup.com) indicates that CREZ will:

- create $30 billion in economic gains
- generate more than 40,000 jobs
- add $2 billion in state and local taxes

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- annually conserve approximately 17 billion gallons of water
- reduce carbon dioxide emissions by as much as 16 percent
- reduce nitrogen oxide emissions by up to 13 percent.

Challenges

An old saying in the energy business is that "There is no such thing as a free lunch." The same is true for wind energy. There are environmental challenges and the wind resource is intermittent. Better wind power forecasting can address this issue, but that is a relatively new enterprise. Additionally, we do not now have the education and workforce development programs in place to address the planned expansion of wind energy. Wind energy is a highly multi-disciplinary field, requiring expertise from two-year trained technicians to university educated professionals in a variety of fields. Several programs exist in the state, but more are needed to meet the demands anticipated by this industry.

None of these issues are easy, but harvesting energy from the West Texas plains is something that this state has done for generations, and the strong start and positive attitude that most citizens have toward this technology will make wind energy a strong player in the electrical energy generation mix for Texas for the foreseeable future.

Table 1

Installed Capacity of Wind Power in Texas 1999-2009
One megawatt provides annual energy for approximately 300-400 households.

Year	Total Installed Wind Power Capacity, MW
1999	47
2001	186
2003	1098
2005	1301
2007	2740
2009	7118

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Table 2

Installed Capacity of Wind Power by State

Data from the American Wind Energy Association; July 20, 2010

Rank	State	Installed Wind Power Capacity, MW
1	Texas	9,506
2	Iowa	3,670
3	California	2,723
4	Oregon	1,920
5	Washington	1,908
6	Illinois	1,848
-	National Total	35,702

About the Author:

Andy Swift is a wind power, energy, civil engineering expert and professor at Texas Tech University in Lubbock. He is the former director of the Wind, Science and Engineering Center at Texas Tech and spent 20 years at the University of Texas at El Paso, from 1983 to 2003, six years of which as Dean of the College of Engineering. Andy is also a veteran of the U.S. Air Force and the U.S. Army Corps of Engineers.

The *Texas Wind Energy Institute* is a partnership between Texas Tech University and Texas State Technical College. Recognizing that the future of Texas wind energy lies in the hands of a well-educated, highly skilled workforce, the vision of the Institute is to position Texas as the leader in technical, managerial and professional education and development for the wind energy industry. The Institute provides flexible educational opportunities from technical training to a Ph.D. in Wind Science and Engineering.

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A battle cry for energy independence

By Donna Nelson
Commissioner Public Utility Commission of Texas

At a time when people and businesses are fleeing states like California, New York and Florida because of oppressive taxes and regulatory policies, Texas continues to grow. *Forbes* magazine recently recognized Texas as ***THE*** place to be for economic recovery. It seems that at least once a month Texas is recognized for its excellence.

When it comes to the natural resources necessary to provide plentiful energy for its citizens, Texas has a diversity that is the envy of other states. From the wind that blows across West Texas and the Panhandle to the oil and gas that spans our great state, Texas is uniquely positioned to provide its citizens — and the citizens of the world — with the energy necessary to drive cars, heat and cool homes, and to fuel industry.

Texas is a fiercely independent state. That fierce independence led Texas to build its own electric grid, separate from that of all other states in the United States. Texas is the only state in the continental United States with its own electric grid, a grid that provides power to 85 percent of Texas citizens. That independence allows Texas to control its own destiny in providing electricity to Texans. That independence allows Texas to generate far more wind energy than any other state in the country.

Indeed, Texas generates more wind energy than all but four countries in the world. Texas also has one of the most successful competitive electric markets in the world. A market that leads the world in innovation, while providing Texans with an abundance of competitively priced power.

Like all states, Texas occasionally faces challenges that threaten our independence, our prosperity and our standard of living. Today's challenge is excessive meddling by the federal government that will raise the cost of energy to Texans. Lawmakers and bureaucrats in Washington want to tell Texans what fuel we should use to generate electricity, either by setting renewable mandates or by taxing traditional forms of generation that emit carbon dioxide, a colorless, odorless gas that exists in nature. Humans breathe it out and plants depend on it to sustain life. Congress initially attempted to pass such legislation but, as the public became increasingly aware of the cost of the government mandates, the legislation failed to pass.

One would think that overwhelming opposition by the public would end the discussion, but it did not. Believing they can shape a one-size-fits-all mandate that would apply equally to both net producers and net consumers of energy, bureaucrats at the federal Environmental Protection Agency declared carbon dioxide a toxic substance.

Texas is a net producer of energy, meaning that we produce more energy than we consume. For example, Texas produces over one third of the natural gas in the U.S. and 20 percent of the petroleum. The EPA's action, if finalized, will have a devastating effect on Texas' economy, and it will greatly increase the cost of energy to all Texans.

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This one-size-fits-all mentality has the potential to take away the competitive edge that Texas enjoys today. It will drive business out of our state and out of our country just as similar policies have driven businesses out of states like California. And this comes at a time when Texans can ill afford to lose jobs.

"Don't Mess with Texas" is more than a slogan for the Texas Department of Transportation. It signifies our state's belief that we Texans know what is best for Texas. Energy is no exception.

About the Author:

Donna Nelson was appointed to the Public Utility Commission by Governor Rick Perry on August 15, 2008. Nelson served as a special assistant and advisor to Governor Perry on energy, telecommunications and cable, budget and policy issues. She also assisted the Governor's competitiveness council with preparation of the Texas 2008 state energy plan. Nelson previously served as director of the PUC telecommunications section and legal advisor to the PUC Chairman. Additionally, she is a former assistant attorney general of Texas, where she specialized in anti-trust law. Nelson received a bachelor's degree from Black Hills State College and a law degree from Texas Tech University.