U.S. DEPARTMENT OF ENERGY

STATE ENERGY PROGRAM STELLAR PROJECTS

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

Market, Legislation Make Wind an Attractive Investment

West Texas has a new crop: electricity.

Those odd shaped structures popping up out in West Texas aren't funny looking oil rigs and they're not genetically altered cotton plants. They're wind turbines, an old technology with a 21st century update. Once too expensive for commercial production, the addition of computers to wind turbines and the rise in fossil fuel prices has brought the cost of wind-generated electricity in line with other power sources.

A push by the 1999 Legislature to restructure the retail electric power market put in place rules that encourage wind generation. One rule requires Texas utilities to get an additional 2,000 megawatts of their power from renewable resources such as wind and solar power by 2009. Rules easing the cost of transmitting electricity from remote areas also aid the development of wind farms in West Texas.

PIX 05612 Credit: Les Wollam

The 6.6-MW plant consists of twelve 550-kW Zond Z-40A wind turbines, representing a new generation of U.S. developed wind technology.

Buyer's market

The biggest boost, however, is the market. The cost of wind-generated electricity has dropped from 38 cents a kilowatt-hour in 1980 to about 4 cents a kilowatt-hour in 2000, a rate comparable to other sources of electricity.

The major utilities have been quick to respond. While several Texas utilities have invested in wind generation since the mid-1990s, the projects had been relatively small, the largest being a 75-megawatt wind farm.

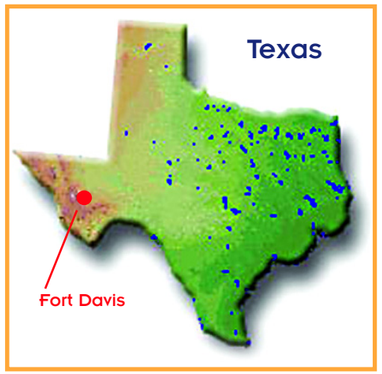
Propelled by the market and the legislation, however, wind has picked up in the last year and a half. Utilities in Houston, Dallas, Austin, San Antonio and Amarillo are proposing projects with a total capacity of more than 500 megawatts of power. The two largest should come online by the end of 2001. If all of these projects are completed, Texas utilities will be well on their way to the 2009 goal.

Mountain top

A 200-megawatt project, to be built on the mesa top of 3,141-foot King Mountain near McCamey, is billed by Reliant Energy of Houston as the largest single installation of its kind in the world. Reliant will buy 75 percent of the electricity generated at the site. Austin Energy, the municipal utility for the city of Austin, will buy the rest.

The project will produce electricity from 160 wind turbines-each capable of generating about 1.3 megawatts-and will supply enough power to serve nearly 65,000 households.

Joe Bob Perkins, Reliant wholesale group president and chief operating officer, says the electricity produced by the project will be sold into the state's power grid, to rural electric cooperatives, and to other retail energy providers after the state's energy markets are restructured. Perkins calls the wind farm an environmentally friendly project that meets the need for additional electricity while benefiting many of the state's rural electricity consumers.



The second large project, a 160-megawatt wind farm from which Dallas-based TXU will buy electricity, will also be in the high mesa area of West Texas and is scheduled to be completed by the end of the year. Rand LaVonn, spokesman for TXU, says, "There is a surprisingly fast turn-around on some of the wind turbine projects. "He says that adds to the economic attraction of such projects, because companies can begin to get a return on investment sooner. The project will be built and operated by FPL Energy, which runs wind farms in five states.

PIX 05616 Credit: Les Wollam

American Electric Power operates this demonstration wind power plant, rated at 6.6 megawatts (MW), near Fort Davis, Texas. The plant features new wind turbines developed by Zond Wind Corporation (now GE Energy Wind) of Tehachapi, California and developed with partial support of DOE's Wind Program.

Most ambitious in the nation

TXU has other wind projects installed and planned. In December 1998, the utility began drawing electricity from the 41-megawatt Big Spring Wind Power Project, which has the tallest wind turbines in North America. TXU and the Lower Colorado River Authority also are planning an 82.5-megawatt project at the Indian Mesa Wind Farm in Pecos County.

LaVonn says the Big Spring project came before the legislative mandates and was in response to dropping costs and customer interest. He says the current scramble to put up wind turbines by TXU and other utilities is a direct result of the state's electric utility restructuring legislation. "These new projects are part of the deregulation bill that calls for more renewables."

The American Wind Energy Association (AWEA) has labeled Texas' renewable energy initiative as the nation's most ambitious and praised the state for being well on its way to meeting the 2009 goals for renewable energy production. Randall Swisher, AWEA executive director, says there are four reasons Texas is setting an example for the nation.

"A combination of factors has come together in Texas to make this happen: a heck of a wind resource, a drop in the costs of wind energy technology, a well-crafted renewable energy requirement and non-discriminatory electricity transmission rules," Swisher says. "Texas provides a textbook example of what could be achieved nationwide with these fabulous four (reasons)."

High tech, new rules

The electricity transmission rules help keep the costs down. The 1999 electric utility restructuring legislation requires the postage stamp method of pricing for wholesale transmission services within a bulk electric system that serves about 85 percent of Texas.

Mike Sloan, president of the Texas Renewable Energy Industries Association (TREIA), explains that postage stamp pricing means users pay the same price for electricity shipped over the lines regardless of how far it is shipped. "Doesn't matter if it is across the street or across the state," Sloan says.

Until the new rules were in place, a developer of transmission services could charge the full cost of the service directly to whatever utility or other customer was using the service. That made it expensive to run new lines from remote places such as West Texas. Developers can still recover reasonable costs for providing the transmission services, but now the costs of constructing the transmission lines are spread among all the customers in the system.

The pro-developer rules have really helped wind," Sloan says. Projects still must be approved by the Public Utility Commission, however, and if one is too costly, it may not get approved. Also helpful to the economics of wind power is a marriage to high tech.

"What's on top of the turbine is a weather meter tracking the direction of the wind," LaVonn says. "It tells the computer which tells the turbine which way to turn (to get the best wind). Also, a different computer tells the blades which degree to turn. "That makes the wind turbines operate more effectively, picking up the best wind speed available, even when it changes direction.

Don't need water

The economics of wind energy are not limited to a cost per megawatt of electricity that is comparable to other energy sources. Wind is bringing investments to a part of Texas that is at the mercy of the fluctuations of oil and gas prices and a water-dependent agricultural economy.

Pam Groce, an analyst with the Comptroller's State Energy Conservation Office (SECO), says landowners in West Texas are eager to lease land for wind developments that are likely to have a longer life than an oil project and do not depend on water. "Water is a critical issue to West Texas farmers and ranchers," she says.

TREIA's Sloan agrees. "It takes an average of 4,000 pounds of water to make one megawatt-hour of electricity (in a conventional power plant)," he says. The wind generator doesn't use any water. Besides preserving a scarce West Texas resource, not using water keeps costs down.

Finally, the success of the wind power industry is built on a foundation of some 30 years of research and development in Texas. The Alternative Energy Institute, now a part of West Texas A&M University, has been funding demonstration projects since the mid-1970s. SECO also has funded several wind demonstration projects over the past seven years.

SECO helps Texans learn about the economic benefits of renewable energy. SECO projects renewable energy sources hold promise for meeting future needs for electric power. Texas has more renewable energy resources than any other state. These resources can be harnessed to provide an inexhaustible supply of energy to power Texas into the future.

For more information:

Texas State Energy Conservation Office
Diane Stauffer
11th Floor
111 E. 17th Street
Austin, TX, 78701
Phone: 512.463.9246
Email: Diane.Stauffer@cpa.state.tx.us

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