

Texans are fond of reminding visitors that theirs is the only U.S. state that was a nation before joining the federal union. Residents of the "Lone Star State" assert their independent spirit to this day while treasuring their legendary reputation for exaggeration. It should come as no surprise then that Texas has vaulted ahead of the 49 other U.S. states in the latest round of wind power development. As Sam Enfield, an experienced developer explains it, "Texas is commanding market attention."

The pace of development is picking up intensity throughout the States as the clock ticks toward another scheduled expiration of the 1.7 cent/kWh federal tax credit. The pace in Texas is no different as developers busily run the gauntlet of tasks leading to the critical "in service" deadline of December 31, 2001 (NEW ENERGY 1/2000). All of the market leaders are busy forming alliances with each other and/or utility customers, responding to power supply requests for proposals (RFPs), ordering turbines, applying for permits and scores of other activities.

Bob Gates, of Enron Wind Corp. and retiring President of the American Wind Energy Association (Awea), predicts that new development in Texas could reach 500 MW by the end of next year, tripling the state's existing capacity. "We will see Texas outpace Minnesota (...) while consumers benefit from the vigorous competition." Gates adds that he expects that new projects in Texas will average "at least 50 MW with most in the 100 MW range."

Business activities:

Construction of the Southwest Mesa Wind Energy Project has created more than 200 new jobs. 107 NEG Micon 600 kW and 750 kW machines had to be erected 350 miles southwest of Dallas.



Rough conditions: The Southwest Mesa Wind Energy Project is exposed to the extreme mesa where annual average wind speed measures 9.5 meters per second.



BIGGER & BETTER

Texas finds room in its big heart for renewable energies

by Robert Kahn

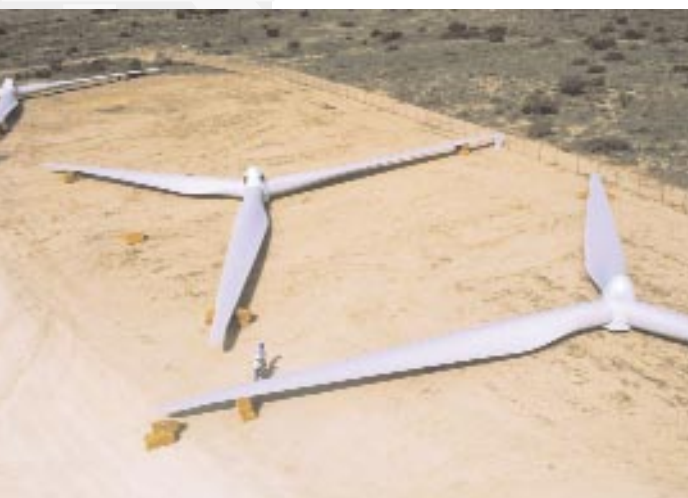
renewable energy's profile in Austin, the state capital. While the group met with a warm reception from the administration of then-Democratic Governor Anne Richards, they got little more than "lip service". During this period only the 35 MW project developed by now-defunct Kenetech in the Delaware Mountains of western Texas and a handful of "demonstration" projects were built. The foundation was laid, however, for a brighter future.

What the Texan people want

The renewable advocates' prospects ripened in the mid-1990's when Texas' private, investor-owned and public-owned utilities began to query their customers. While this so-called "deliberative polling" exercise was initially prompted by the state's regu-

latory agency, the Public Utilities Commission, eventually even the most regressive utilities found value in it. The polling process showed that Texans from all walks of life and from all regions of the state wanted renewable energy developed. Once utility management and policy makers realized the depth of public support, resistance lessened. After all, utilities recognized that with restructuring on the horizon, their best hope for retaining customers was to offer Texans what they wanted. Four utilities signed up to purchase wind power and, as a result, by the middle of 1999, 188 MW were operating. These projects, located in the vast desert reaches of western Texas, featured a variety of wind turbines including those manufactured by Vestas, NEG Micon, Enron Wind Corp. (Zond), and Kenetech.

TXU Electric and Gas (TU), headquartered in Dallas, began investigating



Texas' status at the epicenter of the contemporary U.S. market began over ten years ago when visionary wind developers and manufacturers linked up with experienced consumer and environmental advocates to raise

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Photos (2): FPL Energy

its German Tacke subsidiary. Danish manufacturer Bonus, long absent from the U.S. market, may return to serve the Texas market. Meanwhile, Vestas, Nordex and NEG Micon are scheduling production destined for the Lone Star State.

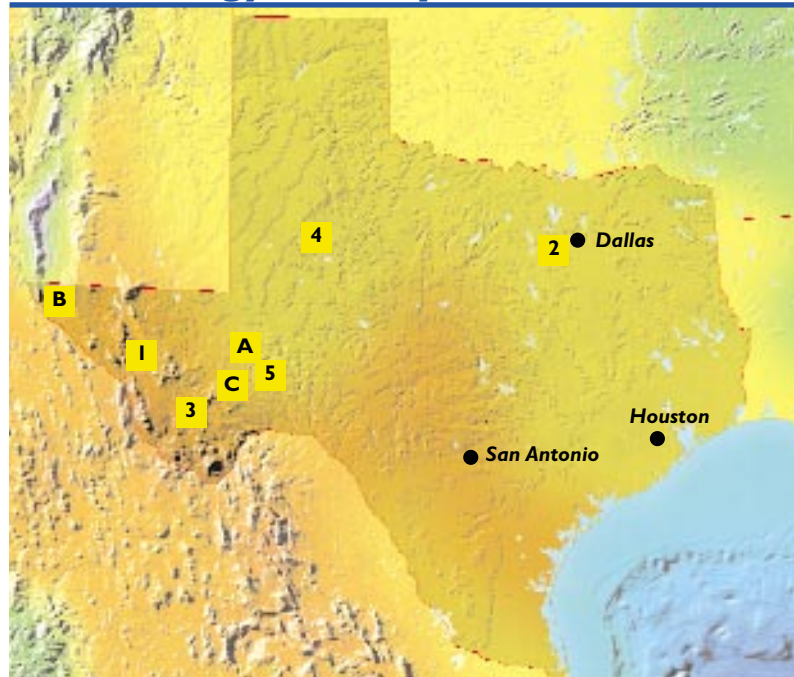
Infused in the culture of the Texans

Two of the state's largest utilities were first out of the gate this year with renewable energy RFPs. These include Southwestern Public Service based in Amarillo, and Dallas' TU. Another indication of the intensifying market is that the agency which manages transmission services in the state,

the Electric Reliability Council of Texas, had as of this Spring, received 15 interconnection requests for 2,560 MW of renewable projects to come on stream in 2002.

There are two explanations for this intense focus on one U.S. state. One is cultural, the other, political. Mark Haller, a 20 year industry veteran who developed Big Spring before moving on to Dallas-based International Wind Corp., points to an "energy culture" underlying Texans current infatuation with wind power. "Energy is infused in the culture here that you don't find anywhere else. Texans grow up in the oil and gas business," says Haller. "There are thousands of people who have built and serviced oil derricks and laid pipelines and everyone is used to seeing these

Wind Energy Development in Texas



Project or Area	MW Installed*	Annual Energy Output (Year)	Power Purchaser/ User	Turbine
1. Culberson County	35.00	80,700,000 kWh (1998)	Lower Colorado River Authority	Kenetech
2. Dallas-Ft. Worth	0.90	800,000 kWh (1998)	TU Electric	Carter
3. Fort Davis	6.00	8,700,000 kWh (1998)	Central & SW Services	Zond
4. Big Spring I Howard County	34.32	117,000,000 kWh (1999 Est.)	TU Electric	Vestas
4. Big Spring II Howard County	6.60	Online June 1999	TU Electric / York	Vestas
5. Southwest Mesa McCamey	74.90	Online June 1999	Central & SW Services	NEG Micon
1. Culberson County	30.00	Online June 1999	Reliant Energy HL&P/ LCRA	Zond

New Wind Projects in Texas

Utility/Developer (Project)	Location	MW Capacity	On Line By / Turbines
A Texas Windpower	King Mountain	21.6	2000
B El Paso Electric	West Texas	160.0	2001
C Texas/New Mexico Power	Fort Stockton	3.5	2000

Sources:

* Installed & Projected MW - AWEA

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

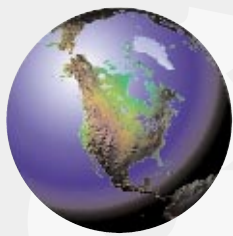
temperatures of West Texas on a 2,000 foot

wind power in 1993. It commissioned several studies and even showcased a Carter turbine it had bought at the Dallas Fort Worth international airport. The company later contracted with York Research to develop the \$40 million (€42.9 million) Big Spring wind power project near Midland. This 40 MW project includes among its 46 turbines four Vestas V66 units, the first megawatt-class machines installed in the United States.

Megawatt machines will be the norm

Like most of the Texas projects built to date, the Big Spring project is arrayed along a mesa, an elevated ridge line rising 200 to 300 feet out of any otherwise flat, unobstructed landscape. The winds accelerate as they move up and over the mesa. Annual average hub-height wind speeds at the site range from 18.4 to 22.2 miles per hour. Annual production is estimated at 117 million kilowatt-hours (kWh). Megawatt-scale machines will be the norm as developers plan the next round of development. The combination of often modest winds, coupled with vast landscapes and low pricing, virtually demand large machines. "If you're going to make money in Texas," one insider emphasized, "you're going to use megawatt machines."

The response is predictable. Enron Wind Energy Corp. is currently gearing up its Tehachapi, California assembly plant to build the 1.5 MW machine successfully commercialized by



structures on the landscape. It's as if energy is a Texan's birthright," he adds. Enron's Gates agrees with Haller, adding "we notice the attitude nearly everywhere. Texans are willing to take economic advantage of their natural resources in a responsible way." Gates especially appreciates the willingness of public officials to work through permit applications. "We've found that everyone is very straightforward," he says. "It's refreshing."

"Wind energy is here to play and stay"

The second, more tangible reason why Texas will lead the U.S. wind energy industry well into the new century is political. The Lone Star State is one of eight states with a renewable portfolio standard (RPS). This policy, long promoted by Awea



Photo: Enron Wind/Herzinger

First phase of a 250 MW windfarm: Forty Zond 750 kW turbines have been running at the Delaware Mountain Windfarm since last year.

and its allies, requires in-state utilities to acquire renewable energy in clearly defined percentages of their total resource base.

Texas' RPS was enacted as part of an overall restructuring law enacted by the Legislature and signed into law last year by Governor George W. Bush. It is by far the most aggressive RPS yet enacted, calling for 2,880 MW

Net metering for small wind turbines

The U.S. is a leading producer of small wind turbines. In fact, four U.S. manufacturers command about one-third of the global wind power market. During 1999, the market for small wind systems (those with less than 100 kW of generating capacity) grew more than 35%. The U.S. has about 15 MW of rated capacity of small wind turbines, and the industry averages a 50-50 domestic-international sales mix. The American Wind Energy Association (Awea) expects continued growth in this market.

Texas has a net metering regulation that applies to all electric utilities in the state except for municipal utilities and electric cooperatives. The rule requires the utilities to offer net metering to facilities using renewable resources (including wind) with an aggregate design capacity of 50 kW or less. These facilities are interconnected through a single meter that runs forward and backward. Any net production for a given billing period is billed at retail rates, while any net consumption for a given period is purchased at the utility's avoided cost of power.

Texas recently established standardized requirements for interconnection of "distributed generation" facilities. The requirements apply to all generating technologies (including wind energy systems) up to ten megawatts (MW) in size and connected to the utility system at a voltage less than or equal to 60 kilovolts (kV). The requirements cover both technical issues and non-technical issues. The rules impose specific technical requirements on distributed generating facilities.

Texas also offers a number of incentives for the installation of small wind energy systems including:

★ Solar and Wind-Powered Energy Systems Exemption

This statute exempts taxpayers from any value added by a qualified renewable energy source for property tax purposes. Qualified equipment includes any active

solar equipment and any wind devices, as well as transmission equipment.

★ Solar Energy Device Franchise Tax Deduction

The franchise tax is Texas's equivalent to a corporate tax; their primary elements are the same. This statute allows a corporation to deduct the cost of a solar (or wind) energy device in one of two ways: (1) the total cost of the system may be deducted from the company's taxable capital or (2) 10% of the system's cost may be deducted from the company's income. Both taxable capital and a company's income are taxed under the franchise tax.

For information on these state programs, contact: Pam Groce, State Energy Conservation Office (www.seco.cpa.state.tx.us).

The Texas State Energy Conservation Office also maintains extensive information on renewable energy including maps identifying the location of wind monitoring stations in Texas, a wind power map of Texas, and descriptions of topography. The site also contains graphs of average summer afternoon wind speeds at 50 meters above the ground. The Texas State Energy Conservation Office's Renewable Energy Demonstration Program (REDP) has extensive data on the state's wind energy resources.

The Alternative Energy Institute (www.wtamu.edu/research/aei) maintains an index of Texas wind maps, an index of South Texas wind maps, and wind-related GIS maps. The U.S. Department of Energy (<http://rredc.nrel.gov/wind>) has produced wind resource maps for each state, including maps for East Texas and West Texas. The U.S. Department of Energy's Energy Efficiency and Renewable Energy Network (www.eren.doe.gov/state_energy) has also collected wind resource data for Texas.

of renewable energy by 2009. The Texas Utilities Commission which is overseeing the program, is refining rules for various elements of the RPS including a tradable renewable energy credit that converts the capacity target into megawatt-hours requirements for each electricity supplier (including public and private utilities).

Texas State Senator David Sibley, who helped lead the effort to enact the RPS asserts that it "will ensure that Texas remains a beacon for the energy industry. Wind energy is here to play and stay, and can bolster our energy security

and competitiveness," Sibley said in a recent address to Awea's annual conference. It was sometime early in the 1990's that Texas tripped over from an exporter of energy to a net importer. While the transition was not widely reported, it left an impression on a state that wraps much of its identity around its sense of independence and its favored industry. While wind power isn't likely to win Texans away from their love affair with "Big Oil," the uppity young renewable form of energy has most certainly won its way into Texan hearts. ●