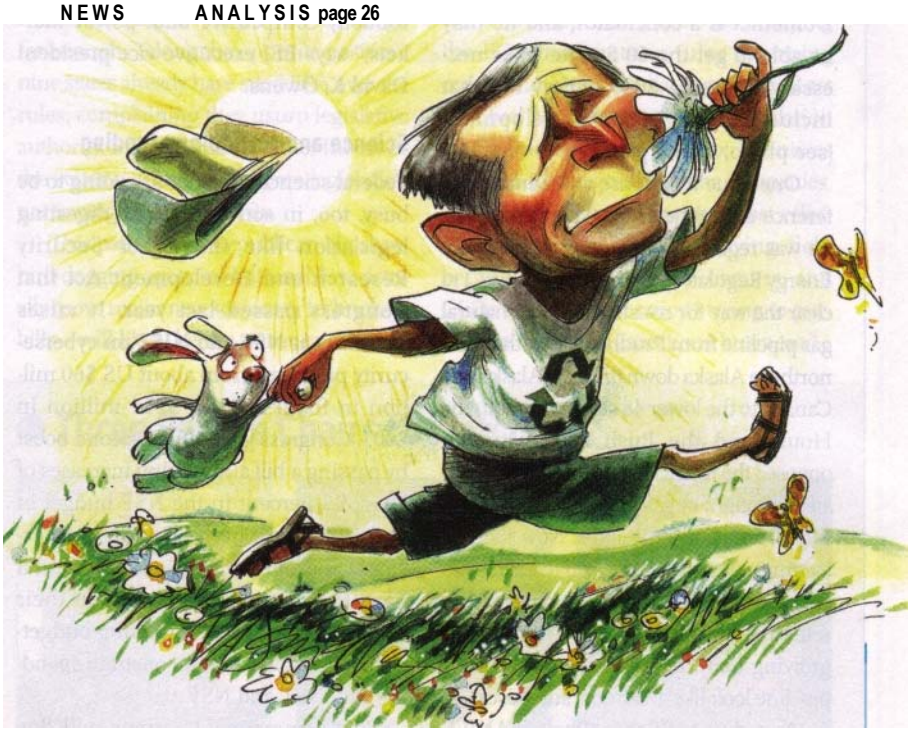


# Bush Country Cleans Up Its Energy Act

**Turbines turn on Texas wind farms**

**ENERGY** Texas conjures up images of oil rigs silhouetted against an orange setting sun or the now infamous sight of Enroris tilted-E corporate logo. So it's quite an irony that this state, emblematic of the petroleum economy and all that is right and wrong about it, may soon become a major player in the clean energy business. More ironically still, it was in part propelled into this position by George W. Bush, who as governor signed a renewaUles mandate into law in 1999, and yet as president is now associated mainly with the pro-fossil policies enunciated in his vice president's national energy plan of 2001.

In 1999, Governor Bush signed the Texas Electric Restructuring Statute, which mainly deregulated the state's electricity industry but also required distribution utilities-which it separated from generating companies-to include designated proportions of energy from renewable sources in their portfolios. Beginning in July 2001, every Texas energy retailer was required to participate in trading renewable-energy credits. The program, which applies only to renewable energy generated and metered in Texas, allocates retailers one credit per megawatt-hour, based on each year's overall target for renewaUles and each retailer's share of statewide electricity sales.

Scheduled goals were established through 2019, and those failing to meet them are penalized at US $50/MWh deficiency. New renewable energy capacity of 2000 MW must be developed by the end of 2008; by then, clean energy is to account for about 3 percent of the state's power.

As the 24th state to adopt electricity restructuring rules, Texas was a relative latecomer to power deregulation. But in mandating renewahles, it led the pack and, at least as of late last year, still was the lone star among states. That is, it was the only state to have enacted a clean energy mandate, according to a November 2002 report from a University of Texas (UT) thinktank, the $IC^2$ Institute (Austin), and the Austin Clean Energy Initiative (ACE), a loose affiliation of Austin-based business and government interests.

### The cutting edge

Wind was recognized from the outset as key to meeting initial goals for renewables. "Every day lots of wind blows across Texas plains-we need to take advantage of this," said Pat Wood III, who was chair of the Texas Public Utility Commission (PUC) at the time the renewables mandate was introduced. (He is now chair of the Federal Energy Regulatory Commission in Washington, D.C.)

The state's wind-generating capacity surged by a factor of eight in 2001 alone, according to the UT/ACE report. The fastgrowing contribution of wind was overwhelmingly the main factor in boosting the state's total renewable capacity to about 2 GW by the end oflastyear, from 880 MW at the end of 1999.

Texas now boasts the country's largest wind farms, built by companies like Green Mountain Energy Co. (which relocated from Vermont to Austin) and Cielo Wind Power LLC (Austin). Cielo launched four new wind projects in 2001: one, the Noelke Hill Wind Ranch, near McCamey, eventually will be capable of producing 624 MW-enough for 1.2 million home consumers.

But you can have too much of a good thing-too much power for transmission capacity. The wind farms are located mainly in West Texas, a sparsely populated region sliced by three of the U.S. grid systems (Texas, Western, and Eastern) and distant from the state's main load centers. Transmission capacity to carry maximum wind output is lacking.

In a January 2003 report, the Texas PUC notes that projects are under way to relieve transmission bottlenecks, but that the rush to install wind capacity will continue, mainly because a federal tax credit encouraging generation of electricity by wind turbines may soon run out. The credit of $18/MWh will expire at the end of this year unless federal legislation is passed to extend it. So wind energy will likely run into transmission constraints until late in the decade.

## Diversifying renewables

That being the case, other renewables are being vigorously developed in the state.

In late 2001, the Clean Energy Incubator (CEI) was launched by the Austin Technology Incubator and the ICZ Institute to support entrepreneurial technologies fostering renewable energy products. CEI already has six companies under its roof and is itself one of eight members of the National Alliance of Clean Energy Business Incubators, established in 2000 by the U. S. Department of Energy's National Renewable Energy Laboratory (NREL, Golden, Colo.).

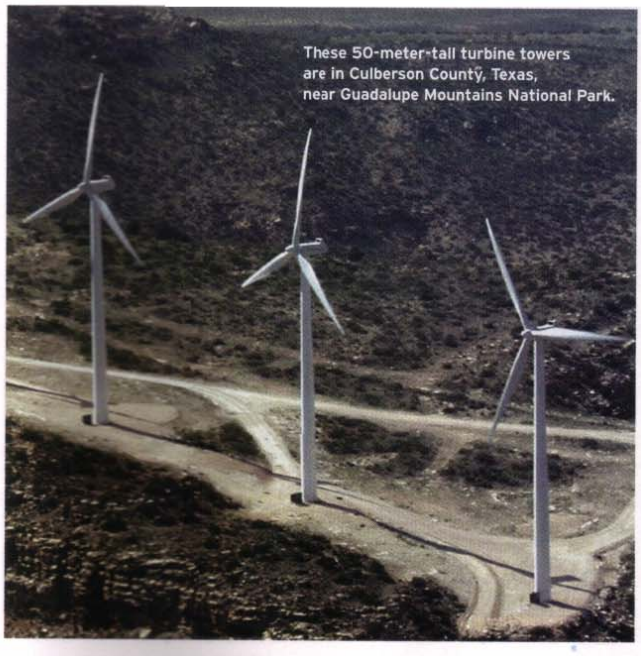
One of the first to join the incubator, Power Tube Inc. (Austin) is developing a novel means of tapping geothermal energy found 3000 meters below the surface and deeper. A double-walled tube consists of four modules stacked sequentially. Geothermal rock heats the lowest module, essentially the boiler module containing a fluid. The second-lowest module is a turbine that turns the generator at the top of the Power Tube. Between turbine and generator is a condenser that cools the fluid. The cooled fluid then flows down the outside layer to begin the cycle again. The 25-meter-long prototype is being designed to generate 1 MW of electricity.

With the prototype tube being developed at the UT J.J. Pickle Research Campus, Power Tube plans to exploit the many spent oil wells, preferably uncapped, and tap geothermal energy.

Solar and fuel-cell technologies also are being explored. An Austin start-up, HelioVolt Corp., is exploring thin-film technology employing copper indium selenide (CIS), and has received a $100 000 research grant from the Energy Department to investigate a version of the solar technology that originated at Boeing Co. (Chicago) in the 1980s.

Southwest Research Institute (SwRI, San Antonio) has developed a technology that reduces the platinum loading of fuel cell electrodes by almost an order of magnitude-a potentially important development because the high cost of the platinum catalyst discourages fuel cell adoption. Under a $12 million contract with the Energy Department, SwRI built a pilot manufacturing facility that can deposit a much thinner layer of platinum. Cost-sharing partners are W L. Gore and Associates (Elkton, Md.) and General Motors Corp. (Detroit), which thinks the more economical cells could be attractive to operators of vehicle fleets.

The fact that renewable energy is more expensive than energy from oil, gas, coal, or nuclear remains an issue. Even wind, the renewable energy closest to commercialization, yields electricity in Texas at about twice the cost of electricity from natural gas-$0.06/kWh versus $0.03/kWh. Until renewables are made more efficient, deregulation that encourages the use of clean energy can go only so far, even when coupled with federal and state energy tax credits. **-Emily Sopensky**



These 50-meter-tall turbine towers are in Culberson County, Texas, near Guadalupe Mountains National Park.

PR NEWSFOTO