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As the cost of traditional utilities increases, some seek alternatives

Reap the wild wind

By Mike Boyer
Enquirer staff writer

The cold winter wind that's fueling higher heating bills across the region these days could help keep those same electric and natural gas bills in check some day.

It's unlikely wind power soon will replace coal and natural gas in Southwest Ohio, Northern Kentucky and Southeast Indiana, where wind power technology ranges from nascent to nonexistent and coal is abundant.

But as Cincinnati-based utility Cinergy Corp. explores its options for wind power in Indiana, the promise ahead is of wider use of the technology and a wider base of energy sources on which this region can draw. And wind is one option as Cinergy looks to diversify its sources of energy for economic and political reasons.

So far, Kentucky and Indiana have no large-scale wind farms and Ohio has only one – four turbines capable of generating up to seven megawatts of power for the city of Bowling Green's municipal power company, enough to serve about 3,000 families there.

And power in Bowling Green is proving to be as economical as natural gas at current rates, according to Bill Spratley, chairman of the Ohio Wind Power Working Group and a former Ohio Consumers' Council.

Spratley's wind power group, a coalition of public and private agencies, thinks it could play a much larger role in the future as utilities try to insulate themselves from the rising cost of other generating fuels, such as oil and natural gas, and face pressure from government agencies to reduce pollution.

Whether adoption of wind power will translate to lower bills for consumers is unclear. Cinergy raised its rates in Ohio for the first time in a decade last month in part because of fluctuations in the prices of coal, natural gas and crude oil.

See WIND, Page J5

The Associated Press/Don Ryan

Wind turbines like these in Oregon are being considered as an alternative energy source by Cinergy.

How it works

The wind turbine spins wind into electricity. As the blades turn, the shaft rotates, and the generator, which is connected to the shaft, makes electricity.

The electricity is then carried down a transmission line in the center of the tower, to a transformer. Electrical energy is then sent to the power grid, distributing it to homes and businesses.

This graphic shows a 2.0 MW utility-scale turbine with a height of about 300 feet. It can produce more than 5 million kilowatts, enough to power more than 500 households. The amount of energy produced depends on the size of the turbine; the smaller the turbine, the less electricity.

- **A Rotor:** The blades and the hub together are called the rotor. They can be over 112 feet long and weigh over 35,000 pounds.
- **B Controller:** This is the brain of the wind turbine. With the help of information from the anemometer, which measures wind speed and the wind vane, which determines wind direction, the controller makes adjustments to all the systems.
- **C Pitch:** Blades are turned, or pitched to control rotational speed depending on wind strength. When blades face 90° to the wind, rotation stops.
- **D Yaw drive:** Communicates with the wind vane through the controller to properly face the turbine into the wind.
- **E Gear box:** Increases the rotational speed to 1,200 to 1,500 rpm, the required speed for the generator to produce electricity.
- **F Generator:** Converts mechanical power to electrical power.
- **G Brake:** A disc brake that can be applied to stop the rotor in emergencies.
- **H Tower:** Made from tubular steel, it houses the cabling and provides access for maintenance. Wind speed increases with height, so taller towers generate more electricity.
- **I Foundation:** Over 400 tons of concrete is used to make a slab as the foundation.
- **J Transformer:** Transfers electrical energy through a series of underground cabling to a substation. Electrical energy is then sent to the power grid, distributing it to homes and businesses.

Units of energy

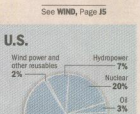
Electricity generated is measured in watts.

1 kw = 1,000 watt hours.
1 MW = 1 million watts.
1 gigwatt = 1 billion watts.

Did you know a 2.0 MW turbine could power a 100-watt light bulb for 5,708 years?

Energy sources in the U.S.

Although wind is our nation's least tapped energy resource, it may be one of the most environmentally safe, as well as cost effective, alternatives to coal. When the first utility-scale turbines were built in the 1980s, wind-generated electricity cost as much as 30 cents/kilowatt. But today, the energy produced by wind power has dropped by almost 80 percent, costing as little as 4 cents/kilowatt.



Source: American Wind Energy Association

THE COST OF COMFORT

The Enquirer/Reporting: Yasmine Noujaim, Graphic: Randy Mazzola

Wind: Cinergy first eyes Indiana plans

From Page J1

In comparison, the cost of wind power is not based on commodity prices but is mostly upfront, in building the wind turbine farms, and so would not fluctuate.

"Wind power is clearly commercial now and is viewed by most utilities as a current or potential part of their energy mix," Spratley said. "That is one of the reasons wind power is the fastest-growing energy technology worldwide."

But Alan Schriber, chairman of the Public Utilities Commission of Ohio, which regulates the state's utility companies, says developing cleaner-burning coal plants will continue to be the primary focus for meeting the state's future energy needs.

"Ohio has embraced coal because we have a lot of it," he says.

And while natural gas is more expensive now, he said, natural gas prices will fall as liquid natural gas and other gas sources are developed in the years ahead.

"The problem with alternative generation like wind is that it isn't available 100 percent of the time," he said. It requires other sources of generation as a backup.

But Schriber says renewable energy should have a role in the state's power supply.

Projects get new life

Nationally, a combination of higher energy costs for oil and natural gas and a two-year extension of a federal tax credit for wind energy projects is putting new life into wind power development.

A record 2,500 megawatts of power was installed nationally last year, according to the Washington D.C.-based American Wind Energy Association. This year, the trade group is forecasting more than 3,000 megawatts of additional wind generation capacity.

Still, wind represents less than 1 percent of total U.S. electric generation, while in Denmark it represents 23 percent and in Germany 14 percent, say advocates.

Wind generation historically has been more expensive than electricity generated by oil and natural gas.

But with oil costing more than $60 a barrel and natural gas selling for as much as $15 per thousand cubic feet earlier this winter, wind generation costs have become more attractive, say developers.

Part of that calculation is the extension of the 1.8 cents per kilowatt-hour production tax credit for wind generation included in the Energy Policy Act signed into law last August by President Bush. Congress in the past has extended the credit only one year at a time, creating a boom-bust cycle in the wind generation industry. But the act signed by Bush extends the credit through the end of 2007.

"There's no price for wind," says J. Turner Hunt, vice president for wind power developer Orion Energy LLC, who is based in Cincinnati. "The price of a kilowatt-hour will be the same 20 years from now as it is today. With nuclear, oil and gas, the costs go up and down."

'There's no price for wind. The price of a kilowatt-hour will be the same 20 years from now as it is today.'
J. Turner Hunt,
vice president for wind power developer Orion Energy LLC

From his downtown Cincinnati office, Hunt has been working for the last three years to develop the first large-scale wind farm in Indiana on about 10,000 acres of leased farmland in Benton County in the northwestern part of the state.

And while on that month, Oakland, Calif.-based Orion expects to learn whether it is a successful bidder to supply up to 100 megawatts of power from renewable sources to Cinergy Corp.'s PSI Energy unit, which serves 750,000 customers in 69 of Indiana's 92 counties.

Cinergy asked for proposals in December to supply the renewable energy to its Indiana system to help it reduce pollution.

"Cinergy is the key. We need a wholesale buyer of the electricity we generate," said Hunt of Cinergy. Of a Orion's bid, Hunt said the wind farm could be up and running by the end of 2007.

"Environmental rules continue to tighten, and it's important that we look at all our options including renewable energy," PSI spokeswoman Angeline Protogere said. The utility declines to say who or how many companies have submitted bids to supply the renewable power.

Jim Lefeld, Cinergy's director of renewable and energy efficiency, said the utility has no immediate plans to seek similar renewable energy sources in Ohio.

"At this time we're focusing on Indiana. When we complete (the Indiana) project we may consider a similar (project) in CG&E's service area," he said.

A spokesman for the Kentucky Public Service Commission says he's not aware of any plans to develop wind farms in the commonwealth.

"Most of the talk about renewable energy in Kentucky has focused on *motor vehicle fuels such as biodiesel* and ethanol," said Andrew Melnykovych, spokesman.

'Green' electric choices

This spring, Cincinnati Gas & Electric plans to ask the Public Utilities Commission of Ohio to approve so-called carbon-free or "green" electric rates for customers willing to pay a premium to buy power from renewable sources.

Under this plan, customers who wanted to support renewable energy would pay an additional $2.50 for each 100 kilowatt-hours of power they use each month. CG&E would use the money to buy power from renewable energy sources.

Developing a wind farm project takes at least three years, says Hunt. Using wind flow data, developers typically collect a year's worth of actual wind readings from sites they think have potential, he says, and then spend another year or two lining up leases with land owners.

Several wind power developers have been prowling Ohio's rural counties trying to lease farmland for potential projects, says Dale Arnold, director of energy services for the Ohio Farm Bureau.

Nobody knows how much land in Ohio has been leased by wind farm developers, but Arnold said developers have been active in Darke, Mercer and Preble counties among others. Leasing for wind farms can be lucrative for farmers, generating up to $6,000 per acre annually, he said.

An economic upside

Arnold says the growth of wind power is also a boon to Ohio manufacturers who are supplying turbine components to build the huge turbines, which weigh thousands of pounds and typically are 250 feet in the air to tap the best wind currents.

For example, Magna Machine, a Forest Park metal-cutting job shop, and Cast-Fab Technologies, a metal foundry in Oakley, have both seen an uptick in business supplying parts for wind turbine builders.

Arnold said a 2004 study by the federally funded Renewable Energy Policy Project ranked Ohio second only to California in terms of manufacturing impact from the development of wind power.

Orion's Hunt says wind power is just one of a number of generating alternatives to meet future electricity needs.

"There is no one solution," he said. "It's like a buffet restaurant. Utilities will pick from a variety of options to supply power to customers."

E-mail mboyer@enquirer.com

Where the wind blows

California, Texas, Minnesota and Iowa lead the nation in use of wind power, while Cinergy is exploring the option in Indiana and possibly Ohio some day.

State	Installed (Megawatts)	Planned (Megawatts)	Number of turbines
California	2,150	603	unknown
Texas	1,995	160	1821
Iowa	836	249	809
Minnesota	744	228	765
Oklahoma	475	120	296
New Mexico	407	0	339
Washington	390	230	405
Oregon	338	140	410
Wyoming	288	201	276
Kansas	264	30	272
Colorado	229	282	190
New York	196	477	124
Montana	138	500	102
Pennsylvania	129	210	89
Illinois	107	445	98
North Dakota	98	49	89
Idaho	75	218	52
Nebraska	73	0	48
West Virginia	66	300	44
Wisconsin	53	200	ca. 35
South Dakota	44	200-400	36
Tennessee	29	0	18
Hawaii	9	61	118
New Jersey	8	0	5
Ohio	7	0	4
Vermont	6	141.5	11
Michigan	3	78	6
Alaska	1.6	0.3	24
Massachusetts	1.08	52	2
Utah	0.885	0	2
Maine	0.1	110	2
Arkansas	0.1	0	1
New Hampshire	0.05	0	1
Nevada	0	190	n/a
Maryland	0	181	n/a

Hawaii

Source: American Wind Energy Association; info as of January 2006.