Offshore turbines on the horizon

STEVE ORR • STAFF WRITER • APRIL 18, 2010

Suddenly, the Great Lakes are awash in plans for offshore wind farms.

The New York Power Authority wants developers to place electricity-generating turbines a few miles off the shores of Lake Ontario and Lake Erie. In five years, officials say, the waters off Rochester or Wayne County could be home to dozens of turbines.

Two similar projects are proposed on the Canadian side of the lake, a sprawling 500-turbine project in western Lake Erie has been announced, and twin wind farms are being promoted in Lake Michigan.

All these proposals, and more, stem from the same reality: The five inland lakes, along with near-shore waters of the Atlantic, are the most productive wind regions east of the Mississippi River.

WEB EXTRA
Interactive photo: Compare larger photos of how the shoreline looks with and without the turbines
Innovative tech: Wind Turbines

Yet neither the Great Lakes nor the Atlantic coastline have wind turbines, despite initiatives to build them that date back years.

Wind-power experts cite several reasons: building towers in water 100 feet deep or more is very costly; concerns are raised about impact on fish, birds and other wildlife; and boaters voice fears they couldn't navigate freely.

But the experts say the biggest impediment may be the intrusiveness of a series of huge white structures, perhaps almost as tall as Rochester's tallest building (Xerox Square, at 440 feet tall), in the middle of an otherwise empty blue lake.

"The aesthetic or the visual parts of this are the most intractable or confounding of the issues, I think," said Terry Yonker, a Niagara County marine consultant who co-chairs the Great Lakes Wind Collaborative.

"You have people in one area of the Great Lakes who think that wind turbines are the most beautiful things they've seen, and 50 miles away you have a community that can't stand the sight of them."

That dichotomy is evident locally.

WEB EXTRA
How it works: Wind turbines

"I think there's a lot more facts that have to come out on the pros and cons of it. But if they're two to four miles out visually, I don't think it would bother people. It probably won't bother me," said Dan Barletta, who lives on the lake in Greece and spoke for shoreline property owners as a member of an international panel that studied lake levels. "If they can create some electricity and not cause too many bad situations with the birds or the fish, I don't see why it would be a problem."

Thirty-five miles to the east, the verdict is different. "I don't know anyone who lives on the lakeshore that's in favor of it," said Jack Steinkamp, who heads the Lake Ontario Riparian Alliance, which advocates for shoreline property owners on erosion and lake-level issues.

The illustration above shows what a wind farm on Lake Ontario might look like from the beach at Charlotte. The windmills are based on the 420-foot turbines in Steuben County. Using mathematical calculations, those images were transformed to a size as if seen from 3 or more statute miles and superimposed on a photo looking from the shore. Some of those images can be seen on the horizon above the end of the pier. To help readers see the turbines clearly, we also magnified a portion of the image, in the circle at above left. (photo illustration by JAY CAPERS)

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Wind turbines in Steuben County. (JAY CAPERS staff photographer)

COVER ILLUSTRATION

Staff photographer Jay Capers photographed Lake Ontario from the beach at Charlotte and a 420-foot-tall turbine in Steuben County using identical camera settings. He also used a GPS to determine his exact distance from the wind turbine. He then calculated how tall the turbines would appear in the beach image if they were 3 statute miles or more out in the lake.

The Great Circle Method of measurement — the distance between two points along the surface of a sphere — was used to account for the curvature of the Earth. The mathematical calculations were based on advice from Rochester Institute of Technology imaging and photographic technology professor Andrew Davidhazy — who also helped by double-checking our math.

Finally, to help readers see the turbines clearly, we also magnified a portion of the image in the circle on the left side of the illustration — as if you were looking through a ship's spyglass.

"Based on what we know, we're going to have their eyesore ... and we get no benefit from it," said Steinkamp, who lives on the lake in Sodus Point, Wayne County. "There's just a lot of unanswered questions. There probably are some positive benefits. But is it really worth it? Does it make any financial sense at all?"

Power Authority president and chief executive Richard M. Kessel acknowledged last week that visual impact is a legitimate issue. But he prefers to look on the positive side.

"They're a lot nicer to look at than (traditional) generating plants," he said. "Beauty is in the eye of the beholder."

The developments

Kessel went public with the idea of wind farms in the New York waters of Lake Ontario and Lake Erie last April. He had headed the authority for only six months, having previously served as head of the Long Island Power Authority, where he championed a wind farm off the south shore of Long Island. That proposal died in late 2007. High costs were blamed, though fierce public opposition contributed.

The current proposal would have private companies build one or more wind farms, with dozens of turbines each and a total capacity of up to 500 megawatts. That's the same capacity as the Ginna nuclear power station in Wayne County, and enough electricity to meet the average demand of 615,000 New York homes. Kessel has said the farms could be in service by 2015, though others say that timetable is overly optimistic.

Authority consultants have roughed out areas in both lakes that they deem technically suitable for wind farms (see map on this page) — meaning they have sufficient wind, are in water from 50 to 150 feet deep, are near onshore electric transmission lines and do not conflict with shipping lanes.

Most of the New York waters of Lake Erie, off Erie and Chautauqua counties, are shown, as are four areas along the Lake Ontario shoreline.

One is in the Rochester area, roughly from the Parma-Greece line eastward to the town of Ontario, Wayne County. One is off the eastern half of Wayne County, and one off Niagara County. The fourth and largest area is in the lake's east end.

Judging by a Power Authority map, the consultants believed there to be room for 50 to 100 turbines off the Monroe County shoreline. They would be about 2½ to five miles from shore.

But Power Authority officials say developers are free to propose other locations. The authority expects, but doesn't insist, that turbines be offshore at least two nautical miles, or 2.3 statute miles, to provide a visual buffer and protect birds that live or migrate along the shoreline. Developers also would have to avoid shipwrecks and dumping grounds for dredged material.

The turbines would be painted white to increase visibility and have navigation lights near the water line to warn away boaters at night. Some towers would have flashing red or white lights at the top to warn aviators. Whether fog horns would be required isn't clear.

The state owns the land under the lake and would lease it to turbine builders for an undetermined fee.

What the Power Authority has in mind would be large by current standards.

The largest offshore wind farm today, a Danish facility in the North Sea, has 91 turbines and generates 209 MW of electricity. A few offshore farms approaching 500 MW are under construction in Europe, and larger ones are still being planned.

Today, the largest offshore turbines can generate 3 MW each and stand 350 to more than 400 feet high. But behemoths that can generate 5 to 10 MW and may tower 550 feet or more above the water may be available if and when the New York farms are being built.

Kessel said 11 firms have expressed interest in submitting offshore wind-farm proposals, which are due June 1. He hopes the authority can select one or more developers by early next year.

Boating and fishing

One of the biggest uncertainties is what restrictions will be placed on boating and fishing near turbine towers, which typically are placed one-third to one-half mile apart on the water and laid out in a rectangle.

In Europe, there are few prohibitions against boating near offshore turbines, experts say, but the U.S. Coast Guard hasn't developed rules yet.

"The agencies are just sorting out their language and their regulations and stipulations around what can happen near the turbines themselves," said Steve Warner, president of Scandia Wind, a Minnesota firm seeking to build two 500-MW farms on Lake Michigan. "Based on what has happened in Europe, there's no reason to think that they will be more restrictive here."

But several anxious boaters have noted the existence of sizable security zones around nuclear plants on the lake. The zone around the Ginna nuclear plant extends almost 4,000 feet from the shore and is more than a half-mile wide. There are no similar restrictions on non-nuclear plants.

The matter is of concern to sailors, who cruise and stage races a few miles offshore, and to anglers. "That's some of our prime fishing grounds, especially when salmon are migrating," said Sam Zucco, president of the Genesee Charter Boat Association.

The extent to which fishing would be affected by placement of the turbines remains unclear. The Great Lakes Fishery Commission has said care would have to be taken so that turbine towers and underwater transmission lines didn't disrupt habitat and breeding grounds.

Some fish may like the towers. "If anything, there's a positive effect from the artificial reef phenomenon," said Jeremy Firestone, a professor at the University of Delaware, which has an offshore wind study program. "In general, they would be an attraction."

Local charter captains said that might be so for perch, bass and pike. But they said that doesn't apply to the most prized sport fish in Lake Ontario, trout and salmon, which the charter captains said are drawn to water of certain temperatures, not to structures.

"They don't need any kind of reef," said Sam Dattilo, a member of the charter association's board.

Impact on birds and bats is a concern as well. Some bird species migrate along the shoreline, away from the turbines. But Yonker, whose consulting firm specializes in bird migration, said he has seen thousands of birds flying over the middle of the lake.

"Most birds, and almost all of the small birds, migrate at night and they do migrate across large bodies of water," he said. They typically fly high enough to avoid turbines, but he said they can be forced lower by certain weather conditions and fly into blades that they can't see in the dark.

Some on-shore operators have been encouraged to monitor weather and shut down turbines when conditions threaten birds. Yonker said offshore operators should do the same.

Jim Howe, head of the western and central New York chapter of the Nature Conservancy, said the group is urging that before sites are chosen, agencies conduct lake studies to identify areas that are critical to birds, fish and other wildlife.

A 2008 study by the University at Buffalo Law School, which the Power Authority used as a blueprint for its offshore planning, also recommended doing environmental and other studies, and engaging in plentiful public participation before developers were brought in.

Neither of those things has happened. Kessel said the site-screening analysis done for the authority did involve looking at environmental issues, though detailed studies of wildlife and other environmental impacts would be left up to developers once they've decided where they want to put turbines. "Ultimately, you can't do the studies until you have the sites," Kessel said.

Officials said they also have met with local leaders in numerous lakeshore locations.

But while Kessel believes "misinformation is huge out there," the authority has called no public meetings.

"It's up to the public. They're going to have to get that information," he said.

Getting plugged in

The attraction of offshore turbines is superior wind, which experts say should translate into capacity factors greater than 40 percent — meaning they generate 40 percent of total potential power. On-shore turbines often have capacity factors below 30 percent.

The downside is offshore turbines cost more to build — at least half again as much as onshore turbines, Warner said.

Wind power generally is considered cheap power — but only because electricity and the turbines that generate it are subsidized in various ways. Both Albany and Washington contribute grants or tax credits. Other forms of power generation benefit from lesser subsidies.

Kessel said the authority is prepared to sign a 20-year agreement with offshore developers to buy their electricity, and likely would pay a premium for it.

He predicted the extra cost wouldn't be noticeable to ratepayers. Another possibility is the authority could assume ownership of the wind farms, officials said.

The authority generates power at hydroelectric and other facilities, and also buys it on the open market. Its customers include businesses, government agencies, nonprofit institutions and municipal electric companies. Utilities such as Rochester Gas and Electric Corp. acquire some of the authority's low-cost hydro power and distribute it to residential customers.

Won't be forced

In his visit to Rochester last week, Kessel repeatedly stressed that the offshore turbine project could lead to large numbers of construction and manufacturing jobs, and a smaller number of jobs maintaining the farms. "The economic development potential of this project is enormous," he said.

Political leaders in the Buffalo area seem to agree, as a number of them have endorsed the project. Their counterparts in the Rochester area have been noncommittal. Many elected officials in counties east of Rochester are opposed.

Kessel has said repeatedly that the authority won't allow turbines where communities don't want them.

That approach has been applied in west Michigan, where Scandia Wind reconfigured its project, which is as far along as any of the offshore projects in the Great Lakes. That project is expected to cost at least $2 billion, and the company believes it will take at least two years to obtain 14 required federal and state permits.

After some shoreline residents raised aesthetic complaints, Warner said, the company split the project and moved half of it to another region. The turbines, which Scandia proposes to place four to six miles offshore, can't go any farther out due to cost constraints.

"We've been very upfront about the visual impact. You can see them from shore. There's no doubt about that," he said. "We respect the people who object to that, and then we begin to balance it against other impacts and issues."

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