

renewable news - wind

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Urban wind tech gains speed
by Mark Anderson - 5.30.07

While hundreds of megawatts of Northwest wind power are slated to come online in 2007, most of that power will have to travel many miles via transmission lines to reach electricity customers. As regional experts attempt to tackle wind integration issues [see "Grid poised for wind," *nwcurrent*, March 2007], a handful of wind technology innovations could bring small-scale wind installations where power is needed most: urban centers.

"If everyone had a 2- or 4-kilowatt (kW) system on their home, you could cut down on the amount of energy used pretty dramatically; but our culture isn't really embracing it yet," says Emile Draper, an engineer with Oregon-based wind turbine manufacturer Abundant Renewable Energy.

Still, over half of U.S. consumers are willing to pay more for renewables, according to a recent survey by the energy and resources group of Deloitte and Touche. Advances in technology, a growing interest in clean energy, rising energy costs and concerns over climate change have helped increase the appeal of renewables to CEOs and policy makers alike. Yet in most cases, small-scale urban wind projects have been left out of the deal.

Upfront costs, unpredictable winds and local ordinances can prevent urban wind installations from moving forward. Even the smallest propeller-driven turbines require 35-foot towers and plenty of space. Noise pollution and vibration usually preclude rooftop installation on buildings of any size, expanding the list of drawbacks. And Northwest electricity, costing roughly half as much as California's, provides scant motivation to electricity customers.

"People start looking at alternatives when it hits their pocketbooks directly," Draper says.

While incentives for small-scale wind have long been neglected at both state and federal levels, new policies are more inclusive of wind. Starting this year, Washington residents can receive 15 cents per kilowatt hour (kWh) up to \$2,000 per year for small-scale wind generation [see "Cash for kilowatts," *nwcurrent*, Nov. 2006].

In Oregon, which has lagged behind the Evergreen State, proposed legislation would include wind power generation in an existing four-year, \$6,000 maximum residential incentive for solar power generation. Additionally, federal legislation introduced in February could provide a tax credit of \$1,500 per 0.5 kW for small-scale wind systems totaling less than 100 kW. The Oregon Renewable Energy Act allows the Energy Trust of Oregon to devote more resources to small-scale renewable energy projects [see "Current Power Brokers: Margie Harris & Tom Foley," *nwcurrent*, June 2007].

But even with incentives, customers are hard-pressed to find affordable devices that operate efficiently in low winds. "First you have to prove effectiveness," says Alan Cowan, renewable energy program manager at Energy Trust of Oregon. "Then other people can step in and help produce quantities."

Many experts agree vertical-axis turbines could be the most practical small-scale wind technology currently available. The devices, which catch omni-directional winds similar to a revolving door, are not yet widely used.

"There's going to be a lot of answers to the energy problem," says Dresden Skees-Gregory, coordinator of the sustainability program at Portland State University. "And there's a good chance that vertical axis will be one."

One manufacturer of vertical-axis turbines will be put to test this summer at Portland State. Four handmade 40-watt Helyx turbines built by Oregon Wind Corp. will spin at four different campus locations as part of a university study.

Oregon Wind's co-founder, Toby Kinkaid, designed the Helyx to begin producing power at 60 revolutions per minute with a cut-in wind speed of 5.5 miles per hour. The wind turbine will generate electricity for about \$1.50 per watt, according to Kinkaid. "That's pretty close to what the big boys can achieve," he says. He plans to sell the machines for \$60 each by the end of 2007.

One 40-inch-tall Helyx at full capacity illuminates a light bulb, according to Kinkaid. He also sells a shelving unit — the WindWall — that can pool the energy generated from 36 turbines. Kinkaid plans to offer three additional sized turbines, with the largest, at 2 kW, standing nine feet tall.

"Wind turbines are complicated systems, and this is the antithesis," says the 45-year-old Kinkaid, who seeks \$500,000 in equipment to allow mass production of the fiberglass blades, which he compares to manufacturing kayaks. "It's designed to be absurdly simple and reliable."

Other experts aren't so sure vertical axis turbines are quite up to speed.

"There's a lot of research and development on vertical axis, but none of the ideas have proven themselves out," says Heather Rhoads-Weaver, founder of eFormative Options, a sustainable energy consulting firm based in Vashon, Wash. "It's great that people are trying to come up with new solutions. But the advances are not always as great as one would hope."

Lack of a uniform rating system for small wind turbines is part of the problem, says Rhoads-Weaver, whose solution is a proposed plan for the Small Wind Certification Program, which would test and certify turbines up to 65 kW. Rhoads-Weaver hopes to get enough U.S. Department of Energy seed money to get up and running next year.

"We've documented at least 70 systems out there up to 65 kW," she says. "We're focusing on the residential market and expecting most systems to be under 10 kW. The idea is to keep the testing affordable for new manufacturers coming into the market. We want consumers to be able to compare apples to apples."



Oregon Wind Corp. vertical axis wind turbine

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Toby Kinkaid, Oregon Wind Corp.

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