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Does the wind blow enough?

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In this July 19, 2009 photo, the blades of a windmill blur as they catch the wind on Stetson Mountain in Range 8, Township 3, Maine.

Arguments over wind power can take on a “does not”/“does too” quality to the technically unschooled.

Even the basic question of what the technology can do for the environment seems to get mired in contradictory claims. Can wind power displace fossil fuel consumption, thus reducing the amount of greenhouse gases entering the atmosphere?

“Of course, that’s the point,” say the developers. “No it can’t, because …” reply anti-wind activists, before launching into explanations that sound arcane to those unfamiliar with the workings of the power grid. Whom to believe?

The short answer, according to experts who work for neither wind power companies nor anti-wind advocacy groups, is yes — building wind turbines will reduce emissions from fossil fuels.

The longer answer is, well, longer. Wind is no magic bullet, according to the experts, but its alleged shortcomings fail to crowd out its benefits when you look at the big picture.

“I think you can, pretty straightforward, make a case that for every kilowatt-hour you make with wind, you’re not going to make one with fossil fuel,” said Dave Lamont, director for regional utility planning at the Vermont Department of Public Service.
Wind is not a constant. It blows at different speeds, and sometimes not at all.

Bruce Bentley, director of integrated planning and regional transmission at Central Vermont Public Service Corp., said he would expect wind towers in the area to run at an average of 15 percent to 20 percent of capacity over a year, higher in winter than in summer. He said he thought estimates of 30 percent capacity were “optimistic.”

“It’s an intermittent resource,” Lamont said. “If you think about ‘the grid’ and what it is set up to do, you have supply on one side and demand on the other side.”
That, in and of itself, is no indictment of wind power.

Lamont said multiple factors affect the ratio of supply to demand. Demand is also intermittent, with people turning lights on and off, and appliances cycling on and off. The system must also take into account the possibility of generators breaking.
“There’s a lot of resiliency built in, already, to the system,” he said.

New England receives power as a region, Bentley said. Hydro power requires no fuel to be turned into electricity, so bids from hydro producers come in low and utilities buy that power first. They buy more power from increasingly expensive producers as needed to keep up with demand.

“On a hot day, like today or yesterday, we were buying power that cost 10 cents a kilowatt,” he said Tuesday. “The last month, I think the average was four or five. A peak day can double the price.”

The utility can’t take a kilowatt-hour off a warehouse shelf. Nor can it ask a wind tower to produce more, but it can with a gas or oil plant.

“Any time there are wind turbines producing power, we can back down these more expensive units, run them a little less,” he said. “They’ve got a role — they offset oil and gas. … As long as you’ve got enough capacity that you can call on when you need it, you’ve got enough.”

Right now, he said, Vermont has plenty of capacity and the recession has reduced demand. If the load grows or production units retire, both of which Bentley expects, then the area will need more generation.

While Hydro-Quebec and Vermont Yankee give CVPS a relatively low carbon dioxide output, Bentley said natural gas is usually at the top of the “dispatch mix.” Any reduction or addition of kilowatt-hours will change the amount of natural gas generation.

“Those emissions aren’t big because natural gas is so much cleaner than oil or coal, and it’s efficient,” he said.

Still, Bentley said every kilowatt-hour of wind would mean about a pound less carbon dioxide in the atmosphere.

“If we had a lot of wind turbines, which we don’t, they could run and reduce oil and gas consumption,” he said.

Bentley said the region would have a problem if it had a lot of wind generation but no other plants to cycle up and down. The studies he's seen indicate a region does not have that problem until at least 20 percent of its energy comes from wind.

New England's load is roughly 27,000 megawatts, Lamont said, and wind accounts for only a "tiny fraction," in the neighborhood of 1 percent.

"You can't think of this as a wind turbine being backed up with a battery and a power plant," Bentley said. "This is a big mix. As long as you've got a big mix that can accommodate wind power, you don't have a problem."

Bentley also said that if there were wind towers all over New England, they would at least partly back one another up as some would likely spin when others do not.

Rich Sedano, a director at the Regulatory Assistance Project, a Montpelier-based energy policy think-tank, said emerging technologies can even help wind farms store excess energy from especially windy days.

"I think storage is going to be more functional the more development we see from wind," he said. "That's speculation, but there's a lot of technology that's been developed that's waiting for a time when the market's calling for it."

Bentley said CVPS is getting ready to experiment with hooking car batteries into the power grid. Other areas are using batteries the size of tractor-trailer trucks to store excess power, letting it out as needed.

"These things are a little pie-in-the-sky right now," he said. "They're expensive. They're not common."

Utilities also can work together. The federal government is looking at where the best renewable resources are and building high-power transmission lines to them.
"It doesn't have to be in Vermont, although it's nice to have things locally," Bentley said.

Regulation, though, makes the case a little less straightforward. Lamont said New England is part of the Regional Greenhouse Gas Program, a cap-and-trade system in which energy providers must buy emissions certificates for carbon they produce.
This fixes the amount of carbon produced in a given year.

"Whether you have wind or not, you still have 100 million tons (of carbon dioxide), or whatever the number is," he said. "It's a little bit difficult to argue wind's going to displace carbon, because the cap is the cap."

Difficult, Lamont said, but far from impossible. Again, it requires a look at the big picture. Additional wind generation decreases the demand for carbon generation, Lamont said, and the cap is not designed to stay at one level forever.

"As policy makers look to reduce the cap, which is the ultimate goal, then it's easier to do because the cost is less," he said. "It's a little bit delayed, but carbon is a long-run problem. It reduces carbon, but it's difficult to make the kilowatt-hour-for-kilowatt-hour case for that."