

Wind Shortfalls Make Grid Guys Nervous

[Ken Silverstein](#) | Mar 02, 2011



When it comes to integrating wind into the transmission lines, system operators say that they are challenged. While they understand and appreciate the reasoning, they are saying that the networks lack the flexibility to handle wind variation.

Green energy has a lot of public appeal. But the intermittent nature of wind and solar power coupled with the relatively higher costs put the grid's traffic cops in an untenable position. Those are the fellows whose job it is to schedule the resources to where they need to be so that the electricity keeps flowing. Their task is to maintain that reliability with the lowest-priced fuels.

"We have to be truthful about what the impact will be," says Jim Detmers, principal in Power Systems Resources and the former chief operating officer of the California ISO. "The devil is in the details. These new embedded costs will be significant." Better communication with policymakers is essential.

In the case of California, it now has 3,000 megawatts of wind. In a few years, that will be 7,000 megawatts. A few years later, it will be 10,000 megawatts. By 2020, the goal is to have 33 percent of electricity generated from renewable energy. "That's making grid operators nervous," says Detmers, who spoke at [Wartsila's](#) Flexible Power Symposium in Vail, Colo.

Simply, the wind does not blow on demand. Ditto for the sun. So these resources must be backed up with other, "dispatchable" forms of generation. But such "firming" or "cycling" creates two distinct issues: The first is that the power is not free and the second is that if coal plants are "cycled" up and down, they release more pollutants per unit of output than if they ran full steam ahead.

No doubt, the price of wind and solar energy is falling while their productivity rates are increasing. But the technologies still have a ways to go.

"If you are a grid operator, you must be dispassionate and follow the engineering," says David O'Brien, former head of the Vermont's Department of Public Service and now a consultant for Bridge Energy Group, during a phone call. "The best thing they can do is to provide the data to their stakeholders and to be an honest broker. But they have to ultimately accept the policy mandates."

Public Demands

According to Steve Lefton, director of Intertek ApteK who also spoke at the Wartsila conference, those base-load coal units developed decades ago were never designed to firm-up wind generation. They were made to run at full capacity. So when they are used as such, they create excess emissions.

As wind energy increases its market share, thermal plants can be expected to rev up and down more often. If coal is the main fuel source that is dispatched, it will decrease the emissions savings from wind.

“The actual emissions reduction rates from wind are far less than what the lobbyists are touting,” if system operators do not have the flexibility to use cleaner backup fuels, says Brannin McBee, energy analyst for [Bentek Energy](#), a speaker at the conference. “Thermal plant cycling is also very expensive,” particularly if the older coal plants are used to firm up the wind generation.

With the public demands to increase green energy growing, what might be an optimal firming fuel? The answer could be natural gas. Regulators tend to favor it because it releases far fewer emissions than coal while the price is expected to remain low at \$4-\$7 per million BTUs.

Coal facilities without carbon capture and sequestration cannot get the permits to operate, says Doug Egan, chief executive of Competitive Power Ventures. And if the plants are built with such capacity they are too costly. Even those with coal gasification that nearly eliminate the sulfur, nitrogen oxide and mercury but which don't capture and bury the carbon are prohibitively expensive, he adds.

In recent years, developers have abandoned their plans to build 38 coal plants, says the [Sierra Club](#). Meanwhile, it says that 48 more can be expected to be retired.

Natural gas is the most plausible option to firm up wind and solar. More than enough of it exists with the recent discoveries of shale gas, the unconventional source that is extracted from rocks more than a mile beneath the ground using hydraulic fracturing. That withdrawal technique, though, is under fire from some community organizations that say it is polluting their drinking water.

The U.S. Environmental Protection Agency wants developers to voluntarily disclose the chemicals they are using as a way to ease tensions. Producers are balking for now, saying its exploratory methods are proprietary.

“Fracking can be dealt with,” says Egan. “Producers will share their secret sauce. It will make it the process slightly less efficient. But a deal with get cut.”

Managing a grid and keeping the lights on is difficult. Green energy's role will increase but so too will the challenges associated with delivering it -- facts that must be relayed to policymakers and customers alike. Older coal plants present the most issues but the newer gas-fired generation may be more accommodating.