Sustainability & Climate Change Reporter

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Can There Really Be Too Much Renewable Power?

The frequent critique of renewable energy, and wind power in particular -- that it's too intermittent and requires carbon-emitting backup capacity -- is turning into a flawed premise. The National Renewable Energy Laboratory's recent Western Wind and Solar Integration Study (WWSIS) concludes that no additional backup generation would be required if renewable power provided up to 20 percent of the region's power, and reaching 35 percent could be accomplished through changes to operating practices. WWSIS is the latest in a series of reports that have come to such a conclusion.

The intermittency argument, however, keeps popping up on a regular basis. Take for example, a recent on-line column by Association of Washington Business President Don C. Brunell, which mirrored an earlier article, entitled "Wind Power Has a Dirty (Carbon) Secret." Both argued as more wind power comes to the grid it will require more backup by coal and natural gas to account for the intermittency of renewables. Mr. Brunell used the critique to argue for more nuclear power as a non-carbon generating backup source.

Perspective

In the first place, neither Washington nor Oregon, separately or together, are in any danger of reaching 20 percent renewable energy generation anytime soon. While the two states have set renewable portfolio standards -- 15 percent by 2020 for Washington and 25 percent by 2025 for Oregon -- according to the American Wind Energy Association 2009 Annual Market Report (PDF) both states are still in the single digits for actual renewable generation relative to their total generation (Washington, 3.28%; Oregon, 6.4 %).

Intermittency

It's true that wind power is intermittent in the sense that the wind obviously doesn't blow all the time (although it may seem that way in parts of eastern Washington). Similarly, a solar project also is intermittent because it can't operate at night and during certain heavy overcast days. But intermittency is not a new issue in the electricity generation world. System operators have always had to deal with it because no power plant or system operates at 100 percent capacity all of the time. Even as load fluctuates outages occur, sometimes unplanned.

This is true even for nuclear power. For example, the Nuclear Regulatory Commission noted as part of its most recent Annual Assessment (PDF) of the Columbia Generation Station, the lone nuclear power plant in Washington state, that six unplanned outages had occurred in the past two years and called on the operator to improve. And when a large power plant, such as the Columbia Generating Station, goes off-line unexpectedly, it means a loss of as much as 1000 MW of capacity, which can give new meaning to the word intermittent.

Operational Adjustments

But reviews of European and U.S. wind farms also have concluded that not every megawatt of renewable capacity needs to have a corresponding megawatt of nonrenewable or hydro backup generation. According to one study: "It is now clear that, even at moderate wind penetration, the need for additional generation to compensate for wind variation is substantially less than one-for-one and is often closer to zero." A report (PDF) by the European Wind Energy Association agreed:

> The already established control methods and backup available for dealing with variable demand and supply are more than adequate for dealing with the additional variable supply such as wind power at penetration levels of up to 20% of gross demand.

This is the finding of the WWSIS as well, which concluded that only 89 hours of the year would require backup generation due to high demand. Rather than build additional backup generation, the WWSIS recommends the following changes in the way the system operates:

- Sharing reserves over a large geographic region to reduce overall variability of renewables and load, and provide broader access to existing non-renewable generation for balancing;
- Implementing demand response, which would allow utilities to ask customers to reduce their load in exchange for favorable rates (a system already in use in Texas);
- Changing from hourly scheduling to sub-hourly for generation and interstate exchange;
- Using state-of-the-art wind and solar forecasts for day-ahead commitments; and
- Providing better access to underutilized transmission capacity.

Changing practices is not easy, but its also not impossible and far cheaper than building more backup generation. Consequently, the WWSIS study strongly suggests that the intermittency/ backup generation critique of wind power doesn't quite fly.

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Lane Powell PC | Your Pacific Northwest Law Firm®
Seattle
1420 Fifth Avenue
Suite 4100
Seattle, WA 98101-2339
Phone:
206.223.7000

Fax:
206.223.7107
Portland
601 SW Second Avenue
Suite 2100
Portland, OR 97204-3158
Phone:
503.778.2100

Fax:
503.778.2200
Olympia
111 Market Street NE
Suite 360
Olympia, WA 98501
Phone:
360.754.6001

Fax:
360.754.1605
Anchorage
301 West Northern Lights Blvd.
Suite 301
Anchorage, AK 99503
Phone:
907.277.9511

Fax:
907.276.2631
London
Office 2.24
148 Leadenhall Street
London, EC3V 4QT, England
Phone:
020.7645.8240

Fax:
020.7645.8241