

February 2010 #10-03

Summary

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Word Count 847

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Increased Costs Are Blowin' in the Wind

By Todd Wynn and Eric Lowe

Wind energy on the Pacific Northwest's electricity grid has increased substantially over the years, and this is leading to a number of problems. The Bonneville Power Administration (BPA), the Pacific Northwest's federal power marketing authority, is charged with integrating the large influx of wind power into the electricity grid. In 1998, the BPA's wind generation was roughly 25 megawatts (MW). Today, it totals 2,200 MW; and, with the Oregon Renewable Portfolio Standards passed in 2007, over 6,000 MW of wind power is expected to be on-line by 2013. Often overlooked are the impacts of increasing wind generation on the reliability and affordability of electricity that very well might outweigh any of the promised environmental benefits.

The negative aspects of wind power are quite apparent. Obviously, wind is unpredictable and inconsistent, which creates a significant problem for BPA and electric utilities. To prevent brownouts or overloads on the grid, BPA must schedule energy production in advance. However, the ability to predict when and how hard the wind will blow is extremely limited (usually a two- or three-day window) and often inaccurate.

Because wind power is so unpredictable, every megawatt must be backed up by an equal amount of reliable energy sources in reserve to replace the energy lost when the wind dies down. This means BPA must have a “balancing” reserve equal to or greater than the wind power capacity utilized at any given time. In the Pacific Northwest the backup source traditionally has been federally owned hydroelectric dams, which are shut on and off to respond to fluctuations in wind energy.

According to BPA, the ability of the federal hydro system to serve as a balancing reserve maxes out between 3,000 and 3,500 MW of installed wind generation. This means that BPA can only back up roughly half of the projected increase in wind power. In the near future, BPA will be forced to consider other options to establish a satisfactory reserve for integrating the large influx of unreliable energy.

Some efforts to rectify the integration problem include evaluating the feasibility of dynamic scheduling, which means breaking down the periods of time wind generation is scheduled (e.g. from hour-to-hour to 30-minute increments). Additionally, BPA is analyzing better ways to forecast wind speed and is researching storage technologies (such as compressed air or flywheel technology). Such advances are generally far-off, or would fail to address the problem completely.



Therefore, BPA eventually will be forced either to buy additional dispatchable generation capacity from third-party suppliers or to build additional backup capacity. This leads to additional costs for BPA, the utilities which purchase power from BPA, and ultimately Oregon ratepayers.

Where this additional backup energy comes from is a critical question. PGE has begun the permitting process for a natural-gas fired plant in North-Central Oregon, and plans for a second natural gas plant in 2015 are underway. These plants will become even more necessary as the ability to use hydroelectric dams as backup is strained and wind generation capacity keeps expanding due to legislative mandates.

Building new natural gas facilities to serve as a backup for additional wind sources has several related problems. First, natural gas is subject to price volatility, similar to buying gasoline at the pump. Uncertainty in production and delivery lead to significant fluctuations in natural gas costs. Further, natural gas facilities produce greenhouse gas emissions, which at least partly negates the purpose of the renewable energy mandates. Thus, not only are electricity rates increasing because of additional wind generation, but the subsequent increase of natural gas reliance further exacerbates the problem by introducing volatility.

In 2009, BPA requested the Oregon Public Utility Commission (OPUC) to allow an electricity rate increase to reflect the costs of integrating wind. BPA proposed an increase of \$2.79 per kilowatt-month, and the OPUC set the final rate increase at \$1.29. According to BPA, the associated costs of the \$1.29 rate increase broke down as follows: \$0.05 for regulatory expenses, \$0.26 for load following (e.g. wind forecasting) and \$0.98 to correct imbalances (e.g. balancing reserves such as natural gas or hydro). The previous rate of \$0.68 per kilowatt-month did not reflect the costs associated with imbalances in wind production. The new rate represents a doubling of wind integration costs, and this rate will continue to increase as more wind energy is added to the grid. These additional costs are eventually passed on to Oregon ratepayers.

It does not seem wise to promote and force Oregonians to purchase an energy source that has so many associated costs. At best, wind power simply replaces a clean, reliable and affordable source of energy: hydroelectricity. At worst, it invites increased price volatility, increased rates, and the prospect of more greenhouse gas-emitting facilities. Ultimately, increasing wind generation leads to financial burdens on businesses and individuals across the state that ought to be considered further. Legislators should not attempt to choose “winners” in emerging energy technologies, nor should they force costly energy sources upon ratepayers. Instead, utilities should allow ratepayers to pay the full cost of renewable energy voluntarily and to expand renewable energy according to ratepayer demand.

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