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Pete Warnken  
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825 NE Multnomah  
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Dear Pete:

I have a few comments on the wind integration methodology white paper posted on your web site at [http://www.pacificorp.com/es/irp/wind\\_integration.html](http://www.pacificorp.com/es/irp/wind_integration.html).

First, I think the paper shows a lot of good work by your analysts, and I want to commend that effort and also to commend the receptiveness to suggestions that I've observed in your public discussions.

Second, I've read the comments submitted by Ken Dragoon and Michael Schilmoeller and I support them. Their comments cover a number of issues well, better than I could, so I don't want to duplicate their comments. I'll limit my comments to a couple of areas where they might add something to the discussion:

- 1) I'm not certain from the paper but it appears that the proposed analysis uses an estimated standard deviation of load net of wind to calculate the size of deviation that need to be covered by operating reserves to be able to balance load net of wind with generating resources 97% of the time (assuming deviations are distributed normally?).

The BPA analysis simulated the load net of wind for every minute and determined what reserves would be necessary to cover the simulated deviations 95% of the time, both for regulation and load following as they define it. The simulation of every minute deviations would avoid the necessity to assume a distribution for the deviations, and would provide a more detailed picture of the resource capabilities necessary to cover various ramp-rates that are likely to be necessary (see Michael Schilmoeller's comments, bullet #5). Further, it would avoid the necessity for assuming a particular distribution for the deviations. It doesn't seem like a simulation approach would be significantly more difficult than what you seem to be describing.

If I have misinterpreted your methodology, my apologies, although if I have managed to misinterpret I may not be the only one and you might want to see if you can make the description clearer.

- 2) The working definitions of regulation and load following in the third paragraph on page 1 seem to match the definitions used by BPA in their analysis, but the description of load following on page 6 (in “Regulation and Load Following”) seems to equate load following to the difference between each hour’s average actual load net of wind and the average forecasted load net of wind, or the hourly imbalance. I agree with Ken Dragoon that it would be desirable to use standard definitions for regulation and load following; you may have compelling reasons to use other definitions, but the definitions need to be clear and consistent throughout your document.

To reiterate, I think there’s much good work in the white paper, and I appreciate this is a difficult task that nobody has entirely mastered. I hope my comments are helpful.

Ken Corum