

## **Testimony at UTC Hearing on PSE 2017 IRP, 2- 21-2018 (Docket 160918)**

I would like to commend PSE for the readability of this IRP and thank them for their responses to questions. I have serious concerns; however, with the assumptions used in the IRP analyses of renewable energy costs, especially Montana wind for which I will comment. Nearly every item of the Wind Cost Components chart (Fig. 6-47) has been contradicted by reports or comments from energy industry and other experts.

The 2017 Levelized Cost of Energy Analysis<sup>i</sup> from highly respected Lazard shows wind continues to be the lowest cost source of energy available today.

A Synapse study<sup>ii</sup> of the IRP reports that 1) the IRP fails to account for wind capital cost reductions of about 25% over the past 5 years, 2) variable operations & maintenance costs for wind are unjustified, and 3) the MT wind transmission cost data is overstated.

Research on transmission costs by myself and others has identified an alternate approach<sup>iii</sup> to the IRP cost assumption of building a new long transmission line to connect to the Broadview substation. Building instead a new substation along the existing Montana Intertie line significantly reduces the transmission cost and the operational line loss cost.

Finally, there is fresh market data from new wind projects in Alberta<sup>iv</sup> set to open in 2019, located just 50 miles north of the Montana border. Bids for four plants ranging in capacity from 31MW to 248 MW have been approved with an average 20 year price of Canadian 3.7 cents/kwh. This equates to US\$29/MWh in comparison with the IRP's \$90/MWh LCOE for MT wind. After adjusting for the difference between LCOE and Power Purchase Agreement prices<sup>v</sup> the Alberta cost is nearly 50% lower than the IRP cost.

It is my opinion that 1) the IRP MT wind cost assumptions are seriously inflated, 2) use of this flawed data invalidates the results from subsequent IRP analyses that rely on this data, such as portions of scenario, sensitivity, portfolio optimization, and build analyses and 3) ultimately calls into question the IRP conclusion that gas powerplants are needed in the future.

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<sup>i</sup> Levelized Cost of Energy Analysis, Lazard, <https://www.lazard.com/media/450436/rehcd3.jpg>

<sup>ii</sup> Comments on Puget Sound Energy's 2017 Integrate Resource Plan (January 19, 2018), Synapse Energy Economics re Docket UE-160918 & UE-160919, <https://www.utc.wa.gov/layouts/15/CasesPublicWebsite/CasItem.aspx?item=document&id=00167&year=2016&docketNumber=160918&resultSource=&page=1&query=160918&refiners=&isModal=false&omitItem=false&doItem=false>

<sup>iii</sup> Letter to David Danner, UTC, from Willard Westre, (January 15, 2015) re Docket UE160918.

<sup>iv</sup> Edmonton-based company among 3 chosen to build 4 Alberta wind power projects (December 19, 2017), Global News Canada, <https://globalnews.ca/news/3915558/edmonton-based-company-among-3-chosen-to-build-4-alberta-wind-power-projects/>

<sup>v</sup> NREL report 2015 Cost of Wind Energy, page 21, <https://www.nrel.gov/docs/fy17osti/66861.pdf>