

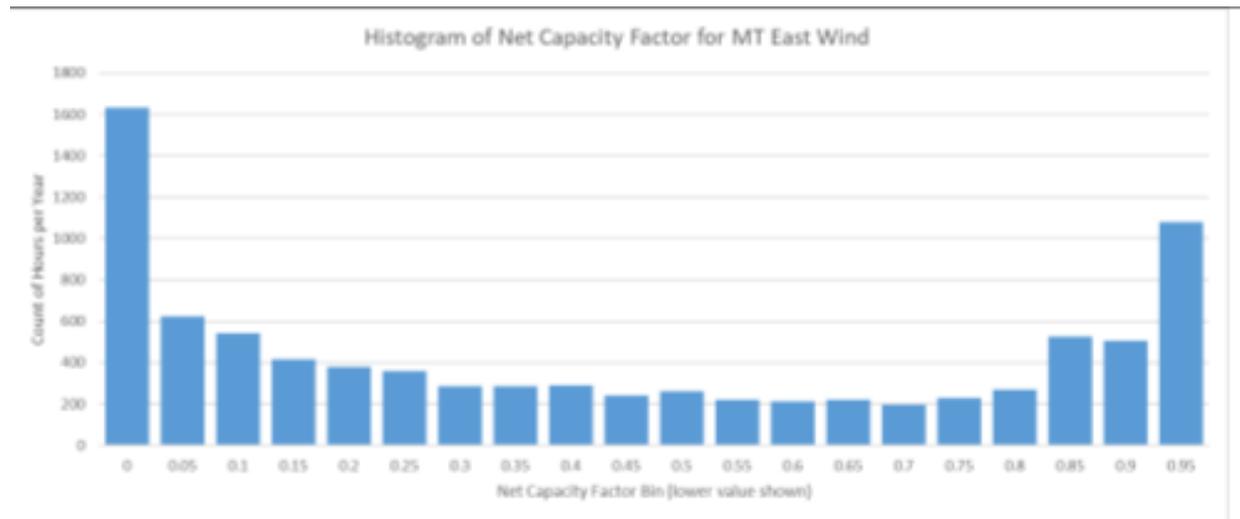
## Comment on Transmission Corridors Work Group Workshop October 20, 2021

I attended the meeting via streaming and wish to comment on one concern that was touched on briefly by Katie Ware of Renewable NW, namely Firm Transmission requirements. Although this does not pertain to the location of transmission corridors it pertains to the amount of new transmission needed and hence the number of new corridors.

The current requirement (called Firm Transmission) is that transmission capacity be matched to the nameplate rating of the generation to ensure that overload never exists. This has worked well in the past because thermal generation sources, usually baseline power, normally generate at a capacity factor of up to 95% of nameplate rating. This results in an equivalent efficient loading of the transmission line. When renewable resources, especially wind and solar, replace thermal sources this changes. These generation outputs, dependent on weather fluctuation, vary from 0-100% capacity factor but with an average of only 20-50%. This greatly reduces the actual MWh output with respect to the nameplate rating. This means that when the current Firm Transmission requirement is applied, up to 50-80% of the MWh capacity of the transmission line is not available – a very inefficient use of an expensive asset.

Addressing this inefficiency is possible but requires an innovative whole system approach to transmission development that includes generation, storage, effective control, and perhaps market factors as well as the needed transmission assets. An example follows.

This is a histogram of a wind farm located in Eastern Montana (provided by Puget Sound Energy). It shows the actual hours of output at each capacity factor over a period of a year.



Referring to the chart - if you sum up the number of MWhs produced by multiplying the hours times the capacity factors times the nameplate rating (assume 1 MW for simplicity) and divide that by the total yearly hours (8760) you see that only 42% of MWh capacity was produced. Firm Transmission requires 100% of nameplate MW, but only 42% of MWhs would be loaded, meaning the transmission line was 58% inefficient with respect to its MWh capacity. How can this be addressed?

Here is where innovation is needed. If a control system were developed that never permitted the instantaneous generation load to exceed the transmission line capacity, the Firm Transmission requirement could be retired. This would permit the transmission line to be fully loaded at any desired time. Such a control system was not possible in the past, but we are in the age of Artificial Intelligence

and 5G speed where it is not only possible but would ease the complexity of current control. With this control system, the same (existing) transmission lines could carry much higher generation capacities and reduce the need for new corridors.

Of course, there would be many times, with wind blowing at its peak, when the generated capacity was greater than the transmission line capacity or greater than the line load – what happens then? Several options: 1) generation could be partially curtailed, 2) generation could be stored (batteries) for when the wind wasn't blowing or 3) excess generation could be sold to provide the low-cost energy source being sought to make green hydrogen.

There are better solutions to the need for more transmission than creating more costly corridors with their inherent impact on the environment. Replacing Firm Transmission is one of them. I would encourage to you to study-in-depth changing the Firm Transmission requirement to establish the actual savings and reduce the need for new corridors.

Thank you,

Bill Westre

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