

Interactive comment on “How wind speed shear and directional veer affect the power production of a megawatt-scale operational wind turbine” by Patrick Murphy et al.

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This paper quantifies the power production of a wind turbine in the high plains of North America to wind speed shear, directional veer, and atmospheric stability. Various metrics of each are analyzed. The log wind-shear exponent, bulk rotor-disk-layer veer, total rotor-disk-layer veer and rotor-equivalent wind speed (REWS) are considered, along with permutations of many. REWS includes directional veer. The REWS metric had the most impact on power production at this site. The log wind-shear exponent metric is not as useful and is sensitive to chosen critical values of it, probably at least partly because it represents not the actual wind speeds hitting the rotor disk but only

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a quantity of wind shear. This study found only small impacts of directional veer and stability compared to shear on power production.

The authors explain how their findings align or conflict with previous studies, and provide possible explanations for such similarities and differences in findings.

Tables 1 and 2 provide key information in this paper. Addition of more space (empty lines) between rows in Table 1 would make it more readable.

The findings in paper are valuable because they can be used to estimate more accurate estimates of power production, which are important not only to energy system planners and grid operators, but also to financiers who facilitate development of wind plants.

Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2019-86>, 2019.

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