Dear Authors,

Thank you for a well-written paper. You have collected a comprehensive dataset of wind measurements (62 sites) and production data (55 small wind turbines) and used it to evaluate three wind resource models (WIND Toolkit, ERA5, and MERRA-2) and three simulation tools (SAM, Wind Report, and MyWindTurbine.com). It is an ambitious analysis. The comprehensive evaluation is the strength but also the weakness of the paper. There are many uncertainties associated with energy yield assessment, wind measurements and small wind turbine performance (e.g. SAM and MyWT assumes 18% & 7% loss), but the manuscript can not detail all aspects. I would like to see a general discussion about the prediction error and whether it is within the expected uncertainty - does the simulation tools provide added value, or are wind measurements needed for proper energy yield assessments?

Thank you, Dr. Bechmann, for your time, thoughtful review, and suggestions for improvement of our article. We are very appreciative and have addressed your comments in the revised draft as outlined below. Many thanks again!

We completely agree that many challenges and uncertainties exist with measurements and simulations for both wind speed and energy production. We are attempting to bring together observations and simulation in a validation dedicated to helping the small wind community account for model and tool uncertainty and to help identify challenges for model and tool developers. We are thankful for your help in this endeavor by providing us valuable feedback.

Given the rarity of tool validations using actual small wind turbine observations and our inability to locate expected uncertainty information in the tool documentation, we hope that this work provides some of the foundational information for setting such expectations. Per your helpful suggestion, we have added the following general discussion on the value of simulation tools to our conclusions on lines 529-538:

"Given the significant time and costs associated with collecting pre-installation onsite wind resource measurements for small wind turbine deployment, the tools evaluated in this manuscript provide essential value to the small wind community by providing quick, low-cost energy production estimates that can be adjusted using the validation results of this study. In addition to the energy production estimates, each tool offers unique features that are beneficial to the small wind community. SAM and Wind Report provide customizable wind shear exponents in their calculations, allowing for energy production simulation during under different atmospheric stability regimes. MyWindTurbine.com enables users to input actual building and vegetation dimensions into their flow model in order to account for obstacle losses. GWA3 provides especially high spatial resolution for wind resource and energy production mapping. Of significant importance given the findings of this work, SAM incorporates multiple individual years of wind resource modelling that provide guidance on setting interannual energy production expectations."

Wind Report and SAM make estimates by interpolating within coarsely resolved wind resource grids (2 and 5km). MyWT is fundamentally different in that it uses high-resolution micro-scale and obstacle flow models (<1m) to downscale the large-scale forcing found from the wind resource model (50km in GWA1). The paper hints that the poor performance of MyWT is due to the coarse resolution of the wind resource model. However, as the sheltering effect of nearby trees and buildings can be significant for small turbines (like the 8.9 kW turbine), they should be included in the analysis. MyWT requires the user to input the exact location and type of obstacles; these are not defaults. The paper does not mention if obstacles were included, but if not, it should be noted as the probable cause for the high wind speeds predictions.

Thank you for pointing out the necessity of including whether obstacles were incorporated in the assessment of MyWindTurbine.com, and we apologize for neglecting this information in the first draft. We have made clarifications on lines 188-191 of the revised draft as follows:

"In addition to the static loss assumptions, MyWindTurbine.com provides high resolution obstacle flow modelling to simulate wake loss. As this feature requires the knowledge of the precise dimensions of obstacles, it is not considered in this performance analysis, but should be utilized in practice in order to take full advantage of the MyWindTurbine.com modelling capabilities."

The Global Wind Atlas 3 (GWA3) is another easy-to-use tool to estimate wind speed and the energy yield of wind turbines. The GWA3 is based on large-scale forcing from WRF simulations (3km) with global coverage down-scaled to 250m resolution. It would be interesting to compare GWA3 (3km) and GWA1 (50km) as this could indicate if the prediction error is caused by the resolution of the wind resource model or the lack of an obstacle model.

Thank you for this excellent suggestion! We have added GWA3 to the energy production validation alongside MyWindTurbine.com, SAM, and Wind Report throughout the revised draft. Lines 7-10 in the abstract now read: "Observations from small wind turbines across the United States provide references for validating energy production estimates from the System Advisor Model (SAM), Wind Report, MyWindTurbine.com, and Global Wind Atlas 3 (GWA3), which are seen to overestimate actual annual capacity factors by 2.5, 4.2, 11.5, and 7.3 percentage points, respectively." We believe the addition of GWA3 to be highly beneficial to the validation study and are very grateful for your suggestion.

While we lack the obstacle information required to investigate the obstacle modelling capabilities, we did perform a wind resource comparison of GWA1 and GWA3 at 10 m and 50 m (Fig. 6c, 6d in the revised draft). Across the 55 turbine locations, GWA1 is on average 0.5 m s^{-1} faster than GWA3 at 10 m and only 0.1 m s^{-1} faster than GWA3 at 50 m. At 10 m, the 55 wind speeds from GWA1 range from 2 m s^{-1} to 9 m s^{-1} while the speeds from GWA3 range from 2.5 m s^{-1} to 6 m s^{-1}. At 50 m, the 55 wind speeds from GWA1 range from 3 m s^{-1} to 9 m s^{-1}, while the 55 wind speeds from GWA3 range from 4 m s^{-1} to 8 m s^{-1}.