Comment on wes-2021-164
Anonymous Referee #2

Dearest Authors,

The paper addresses in detail one of the most important barriers for small wind development, firstly the common lack of observational data and secondly the lack of accurate, cost-competitive, and friendly wind resource assessment tools for small wind applications. The paper contains a comparative analysis of a comprehensive number of methods for wind resource assessment of sites with obstacles based on different data sources. All the methods analyzed are quite well explained but they are obviously very sensitive to the quality of obstacles description and input data.

The most relevant requirement nowadays is to get rid of the use of high computationally time-consuming tools based on HF CFD models but keep the accuracy in a wide range of applications. In this way, the main contributions of the paper, apart from the comparative multi analysis, are the development of AI (AN /ML)-accelerated CFD tools and the adaptation of friendly commercial urban dispersion models to small wind turbine site assessment applications. Both solutions offer time to results significantly shorter allowing a faster analysis with reduced cost and error for the specific conditions of the trial test. (Flat terrain, limited obstacles and similar 300 small wind turbines with available certified power curve) but it seems to be difficult to replicate this procedure in other sites with different conditions (for instance complex terrain, significant obstacles and/or different level of wakes, blockage, etc.).

Regarding the type of obstacles included in the analysis, only buildings and significant vegetation (trees) have been included, but there are other kinds of obstacles like fences, walls, very common that also plainly affect the wind inflow in small wind applications.

The results obtained are clearly represented by standard error metrics but I would like to highlight the contribution of an application-specific measure of error as the relative error in annual energy production. I consider that these new metrics proposed are quite useful for actual small wind applications.

Finally, just to highlight the significant influence, in the performance of the different models, of the relative situation of the obstacles, the wind turbine, and wind flow directions even using IEC Met tower or turbine validation data sets. The hybrid approach
to combine a data-fitted site-level bias correction with a subsequent obstacle model is really interesting to reduce the uncertainty in the performance of the models.

In conclusion, the content of this paper is considered very appropriate and relevant research for DW applications. The conclusions are well-reported and supported by the results obtained, the tables and figures included are consistent.