In Search of the Wind Energy Potential

The worldwide advancement of wind energy is putting high demands on a number of underlying technologies such as wind turbine aerodynamics, structural dynamics, gearbox design, electrical grid connections, and so on. As wind is the only fuel for wind power plants, naturally, wind-meteorology and wind-climatology are essential for any utilization of wind energy. This is what we are concerned about here with a view on what has happened in wind energy potential assessments in the last 25 years where the utilization of wind turbines in national power supply has accelerated and what is the perspective for future improvements of the assessment methods. We take as the starting point the methodology of The European Wind Atlas [I. Troen and E. L. Petersen, European Wind Atlas (Risø National Laboratory, Roskilde, Denmark, 1989)]. From there to the global wind atlas methodology [J. Badger et al., The New Worldwide Microscale Wind Resource Assessment Data on IRENA's Global Atlas (The EUDP Global Wind Atlas, 2015)], and finally, the perspective for the current work with the New European Wind Atlas [E. L. Petersen et al., Energy Bull. 17, 34–39 (2014); Environ. Res. Lett. 8(1), 011005 (2013)] to be finalized in 2020.

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