

Wind Resource Temporal Variability Report

Diurnal and monthly variability of wind resources based on data from the NREL
Wind Toolkit

Marie Rivers

2022-10-12

Contents

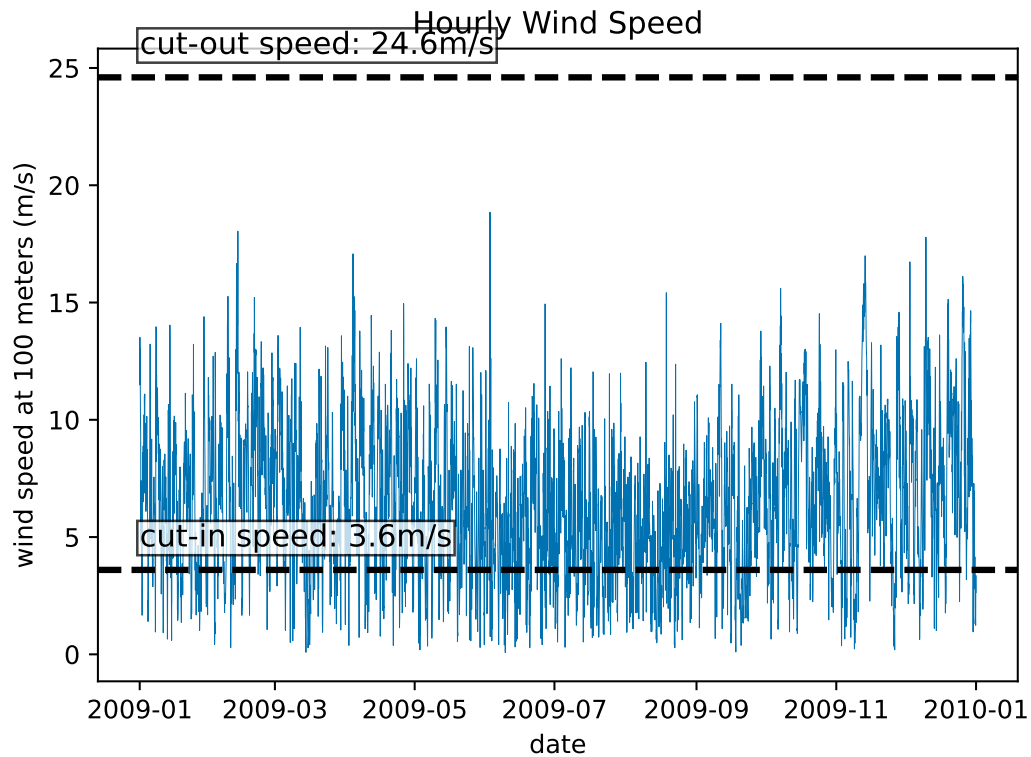
Introduction	1
Analysis	1
Site Map	2
Citations	3

Introduction

This report provides an overview of wind resources for University of Delaware from 2009-01-01 to 2010-01-01. This analysis is based on the wind speed at 100 meters dataset within the National Renewable Energy Laboratory (NREL) Wind Integration National Dataset (WIND) Toolkit.

Analysis

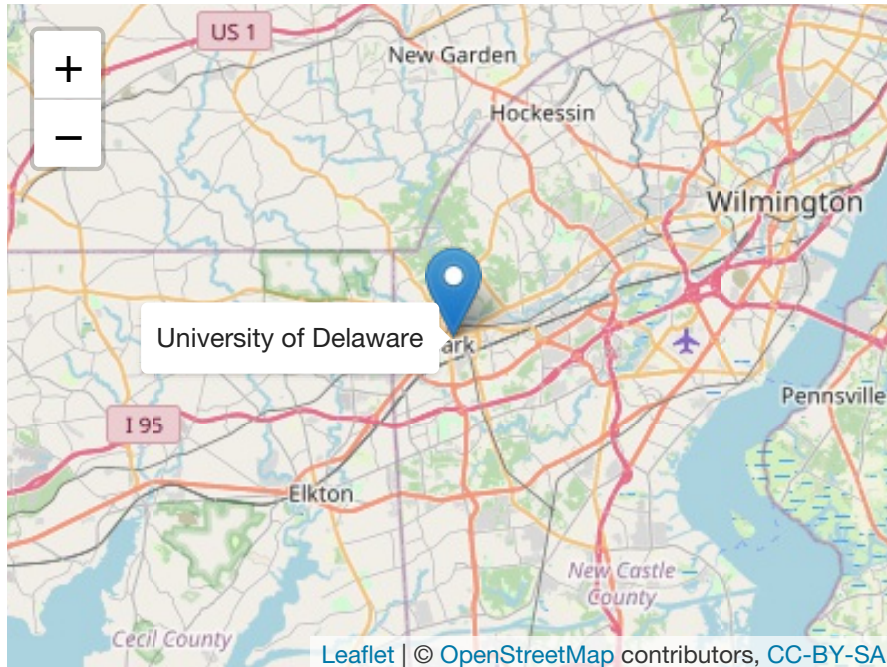
The graph below shows hourly wind speed for University of Delaware and the selected time range. Wind speed values are show in relation to the specified turbine cut-in and cut-out speeds.



The annual average wind speed for University of Delaware was 6.37 m/s. This is ABOVE the value of 5.8 m/s recommended by the U.S. Energy Information Administration. Wind speed was below the cut-in speed of 3.6 m/s for 1,846 hours. Therefore, wind turbines could not operate 21.07 percent of the time due to lack of wind. Wind speed exceeded the cut-out speed of 24.6 m/s for 0 hours. Therefore, wind turbines could not operate 0 percent of the time due to strong wind. Between 2009-01-01 to 2010-01-01, wind speeds at this location were within the acceptable operating range of 3.6 m/s to 24.6 m/s for 6,914 hours. Therefore, turbines could operate 78.93 percent of the time.

Site Map

The map below shows the location of University of Delaware.



Citations

Draxl, C., B.M. Hodge, A. Clifton, and J. McCaa. 2015. [Overview and Meteorological Validation of the Wind Integration National Dataset Toolkit](#) (Technical Report, NREL/TP-5000-61740). Golden, CO: National Renewable Energy Laboratory.

Draxl, C., B.M. Hodge, A. Clifton, and J. McCaa. 2015. “[The Wind Integration National Dataset \(WIND\) Toolkit](#).” *Applied Energy* 151: 355366.

Energy.gov. “How Do Wind Turbines Survive Severe Storms?” Accessed October 11, 2022. <https://www.energy.gov/eere/articles/how-do-wind-turbines-survive-severe-storms>.

King, J., A. Clifton, and B.M. Hodge. 2014. [Validation of Power Output for the WIND Toolkit](#) (Technical Report, NREL/TP-5D00-61714). Golden, CO: National Renewable Energy Laboratory.

“Where Wind Power Is Harnessed - U.S. Energy Information Administration (EIA).” Accessed October 11, 2022. <https://www.eia.gov/energyexplained/wind/where-wind-power-is-harnessed.php>.