Wind Resource Temporal Variability Report

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

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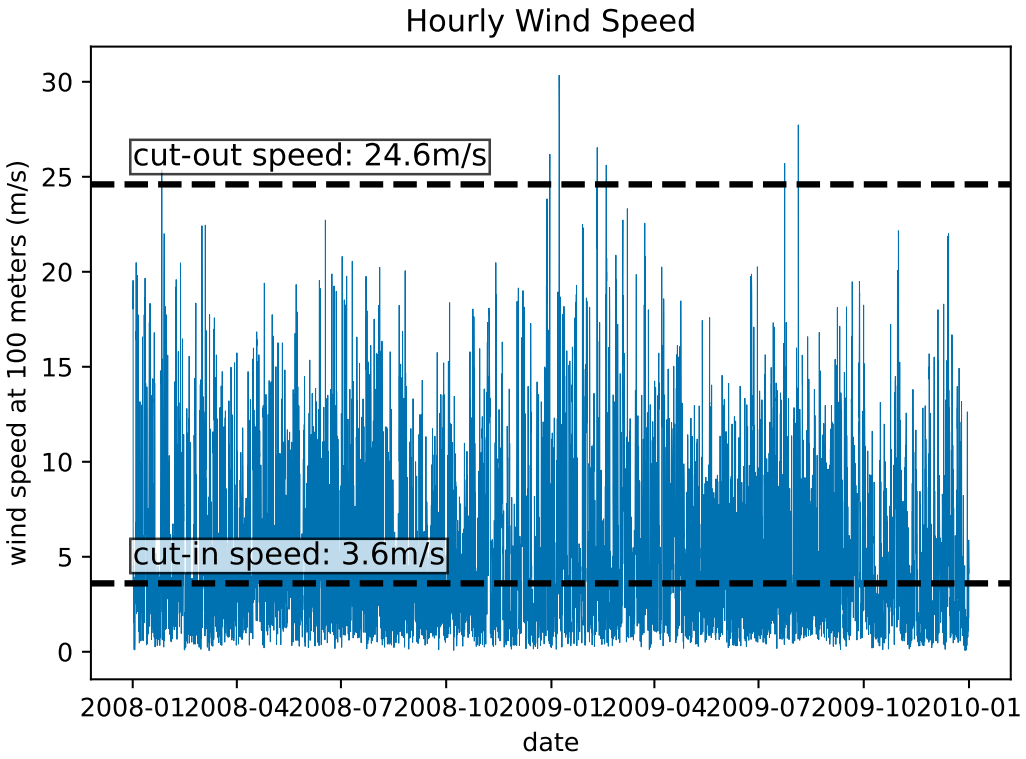
Introduction

This report provides an overview of wind resources for Golden, CO from 2008-01-01 to 2010-01-01. This analysis is based on the dataset of wind speed at 100 meters within the National Renewable Energy Laboratory (NREL) Wind Integration National Dataset (WIND) Toolkit.

Analysis

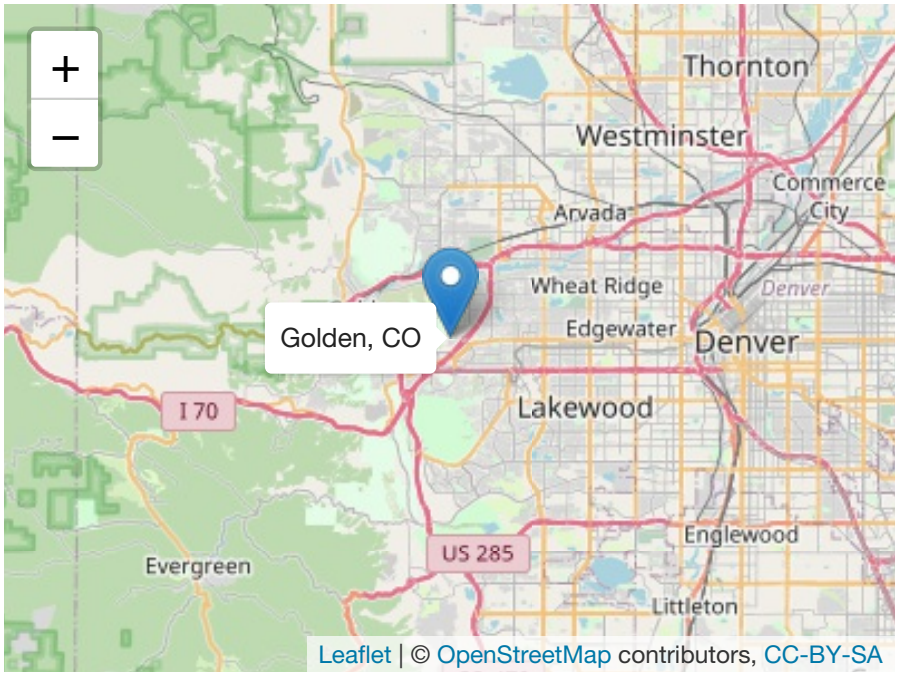
The graph below shows hourly wind speed for Golden, CO and the selected time range. Wind speed values are show in relation to the specified turbine cut-in and cut-out speeds.



The annual average wind speed for Golden, CO was 5.45 m/s. This is BELOW 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 7,631 hours. Therefore, wind turbines could not operate 43.5 percent of the time due to lack of wind. Wind speed exceeded the cut-out speed of 24.6 m/s for 19 hours. Therefore, wind turbines could not operate 0.11 percent of the time due to stong wind. Between 2008-01-01 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 9,894 hours. Therefore, turbines could operate 56.39 percent of the time.

Site Map

The map below shows the location of Golden, CO.



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.