

Public Abstract

First Name:Rachel

Middle Name:Nicole

Last Name:Redburn

Adviser's First Name:Neil

Adviser's Last Name:Fox

Co-Adviser's First Name:Anthony

Co-Adviser's Last Name:Lupo

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With energy needs on the rise and our current energy consumption methods polluting the atmosphere, it is the right time to look at alternative forms of energy production. Six Tall Tower wind observation sites were studied in Northwestern Missouri in order to observe the wind resource available along with some interesting effects.

A verification of existing wind maps for the State of Missouri has been performed to assist in the positioning of wind farms. Validation of current wind maps using observational data is of key importance because the observational data is actually coming from the heights at which wind turbines will operate. Diurnal variations in the wind fields were also studied to determine if the area is capable of sustaining wind energy resources along with the times of peak generation throughout the day and seasonal changes in wind speed. Another aspect researched involved pairing tower data with wind profiler data to determine if profiler data can be used as a proxy for lower level winds. Plots of profiler winds versus tower winds were also analyzed to determine a threshold for indicating the presence of low-level jets. This method for the detection of the low-level jet has shown to be promising. Learning more about these aspects will allow for more to be known concerning the sustainability of wind energy resources in Missouri and help in determining if site locations will be efficient.