Wind Farms Site Selection in Iowa

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Introduction

If you have ever driven along an interstate in Iowa or read any articles about wind energy, you have probably heard about wind turbines in Iowa. In recent years, Iowa has become a leader for wind energy production in the United States. In my project, I would like to examine what makes Iowa’s landscape so good for harvesting wind power and how sites are selected for these massive windfarms.

Abstract

When determining where to build a wind farm there are many qualifications that need to be taken into consideration. First of all, average wind speed at the height of the turbine is one of the most critical considerations. Different areas of the state have higher average wind speeds depending on a number of reasons usually related to topography and climate. Secondly, it is important to keep windfarms away from the population. This is largely due to their noise production, hazardous potential, and non-appealing look.

The state of Iowa has large portions of its land that meets these requirements and is suitable for windfarm development. My webpage and map will explain and demonstrate how Iowa is suitable for windfarms. The map at the center of the project will have several related layers that demonstrate these qualifications. These layers would allow the viewer the cycle between a population density map, a average wind speed map, and two base layers with one showing aerial photos of the land and one showing a basic map with highways and cities. Finally, there would also be one map with the current location of windfarms an Iowa to see how they match up with how I determined suitable locations.

Required Technology

Leaflet- I will be using leaflet for the creation of my map and displaying on my webpage.

GeoJSON.io- This be used to create a layer depicting which areas are the most suitable.

GitHub- This will be used for the hosting of my code and webpage.

Data Sources

Wind Data – shapefile - <https://catalog.data.gov/dataset/iowa-high-resolution-wind-resource-b3895>

Aerial Iowa Photos – JSON - <https://geodata.iowa.gov/dataset/2016-2017-and-2018-four-band-aerial-imagery-iowa>

Base Map- Leaflet - <https://leaflet-extras.github.io/leaflet-providers/preview/>

Population Density – Still working on acquiring

Wind Turbine Data – GeoJSON - <https://eerscmap.usgs.gov/uswtdb/data/>

I will not be gathering my own data for this project. The data I do have will be from public open GIS portals.

Challenges

I expect that most of the challenges I will face with this project will come from trying to convert my data to the right form and getting my code to add it to the map. This is the area I have frequently had the most trouble with throughout the duration of this course. So, I will likely need assistance in finding out how to convert some of my data. One other issue I often have is maintaining proper syntax and keeping my code clean. I will have to spend more time making sure I am writing out my code correctly and not making an syntax errors.