

Technical Potential of Renewable Energy

Problem:

Quantifying and analyzing the potential of renewable energy in the U.S.

Identifying and categorizing the key sources, consumers and barriers to realize those measured potentials

Dataset:

The dataset will be scraped and extracted from multiple sources:

- <https://www.nrel.gov>: The National Renewable Energy Lab is a national lab under the Department of Energy and provides the primary source for the data. In terms of the problem, the dataset should provide state-wise key metrics related to the current utility (Power, Energy, Area, No. of sites, etc), and energy potential metrics of almost all kinds of renewables, such as Solar, Wind (Onshore and offshore), Biopower (Solid and Gaseous), Geothermal and Hydropower.
- Furthermore, the key states identified in the above sub-problem can further be broken down using statewide energy data. As an example, following are some of the sources for reliable state-wise data:
 - State-wise Data on Wind Energy: <https://windexchange.energy.gov/>
 - US Energy Information and Administration: <https://www.eia.gov/>

Proposed Solution and Real world Application :

Our team would utilize the data science techniques we learned in class to make a general analysis about the potential of renewable energy in the U.S. The same can be used to quantify and realize key metrics of renewables. For example, identifying states with the maximum use of renewables, classifying states with maximum realizable potential according to each source of renewables and classifying states with the maximum and minimum urban/rural consumption. Also, other energy-specific factors such as maximum or minimum power, energy, land consumption would be measured for comprehensive analysis.

The project finds widespread real world application in the current scenario of the climate crisis. A data-based approach to study renewables will most definitely result in a more sustainable use of renewable energy sources. The findings can help our government systematically plan and implement policies so that the renewable energy production can be maximized.

Project Steps

Step	Estimated Completion Time	Person(s)-In-Charge
Scraping, extracting and cleaning up data	1.5 weeks	Swapnil Aggarwal
Categorization and identification of key metrics	1.5 weeks	Bolun Yan, Yiqing Hua
Data visualization of the obtained metrics	1 week	Yiwen Xia