

## EXECUTIVE SUMMARY

In 1882, Pearl Street Station, the first utility-scale power plant in the United States was built in the center of New York City. Built by the Edison Illumination Company, it was a steam turbine, a coal-fired boiler sending compressed steam across a dynamo, turning it and generating electricity, which was then used to power over 400 lamps in 82 homes and businesses. Since then, the use of electricity has skyrocketed, and is only due to increase over time. However, the exact mixture of how that energy is generated is a major question in the world today, primarily regarding the use of renewable energy over other, more polluting, resources. To that end, this project was created with a mind to find out how quickly renewable resources will reach the symbolic metric of 50% of all electricity generated in the United States.

In order to make that prediction, I used data from the U.S. Department of Energy, which collected yearly data from 1949 to 2011, and overlapping monthly data from 2001 to April of 2019. I used ten total sectors in my analysis:

### Nonrenewables:

- Coal
- Petroleum
- Natural Gas
- Nuclear
- Other Gases

### Renewables:

- Wind
- Solar
- Geothermal
- Hydroelectric
- Biomass

I fit a different model for each sector, then, once my predictions were validated and collected, I compared them in aggregate with the available data, and generated predictions out to 2050. Based on those predictions and my own analysis, total electrical generation in the United States will be at least 50% renewable for the first time between 2033 and 2042.

## KEY FINDINGS

- Both Coal and Petroleum will continue their downward trend to eventually both bottom out in the early 2030's.
- Natural Gas will continue to hold an increased share of the energy sector, as more is extracted and further infrastructure (pipelines) is constructed.
- Wind and Solar will see vast increases as government policy and good economics drive innovation. However, the greatest advances must be in the storing of energy, not in its production, as Wind and Solar energy are inherently reliant on proper weather conditions, and redundancy is vital to maintain proper levels at peak hours.