Wind Power Predictive Modeling

Final Project for **Ironhack** Bootcamp

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GoaL

Weather conditions

Wind Farm

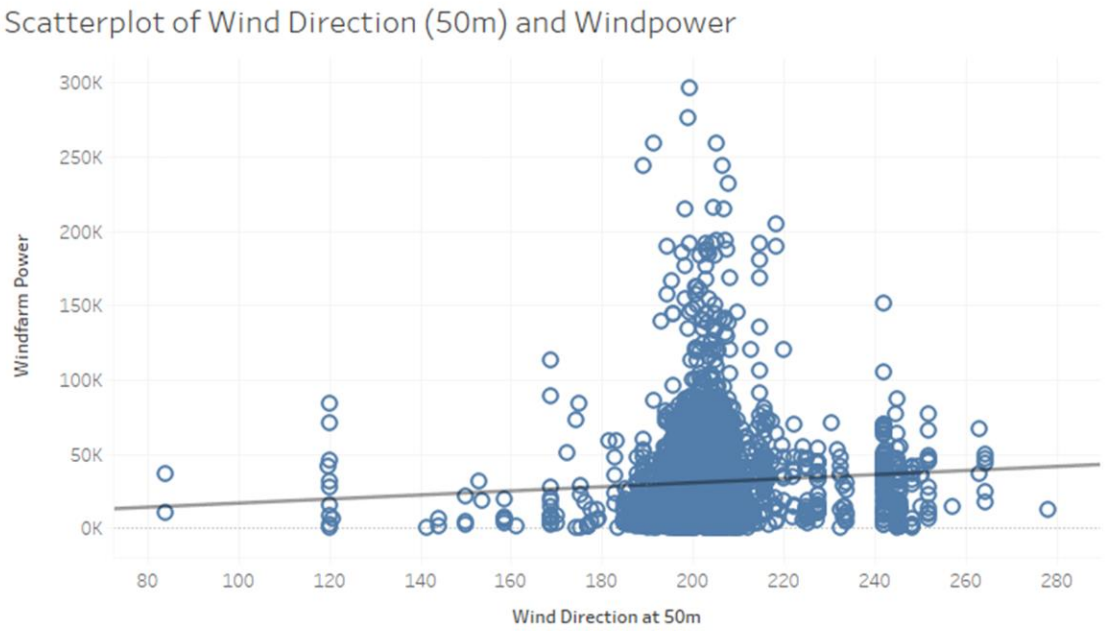
Power Production

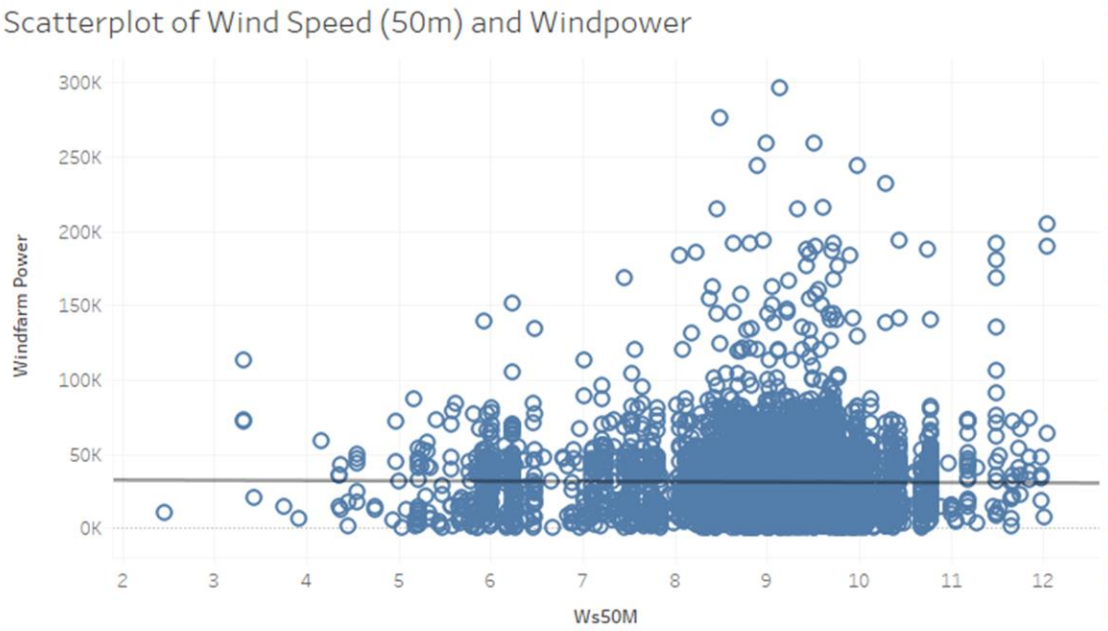
Improve the **planning** and **management** of the integration of renewable energy into the grid.

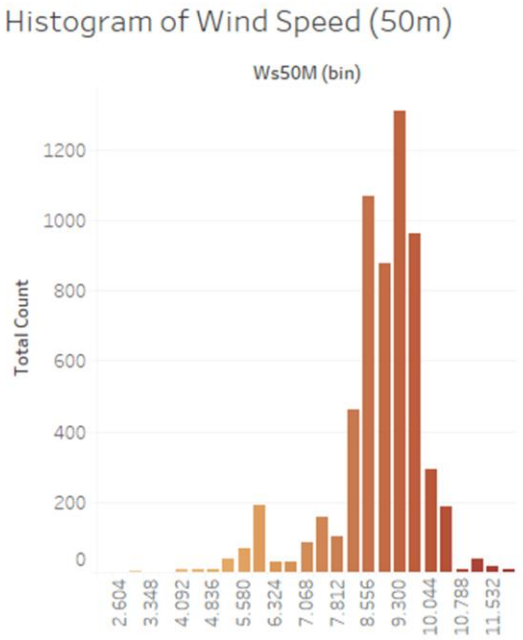
Predict the **excess** energy production and then **optimize** the energy storage system to store that excess energy for future use, and vice versa.

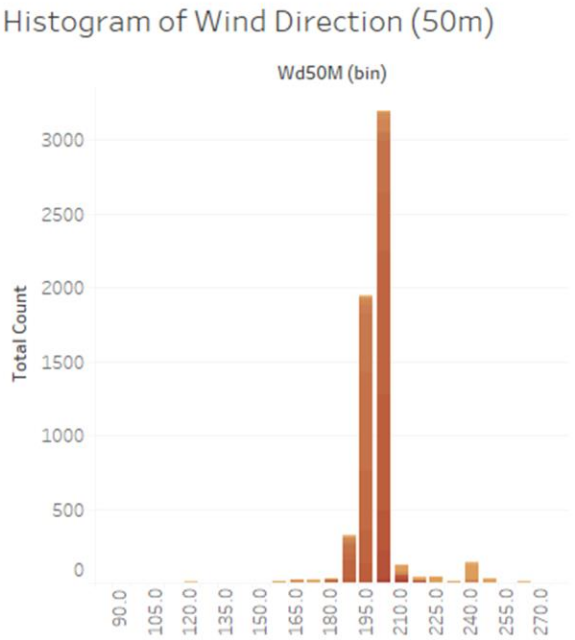

Data Insights

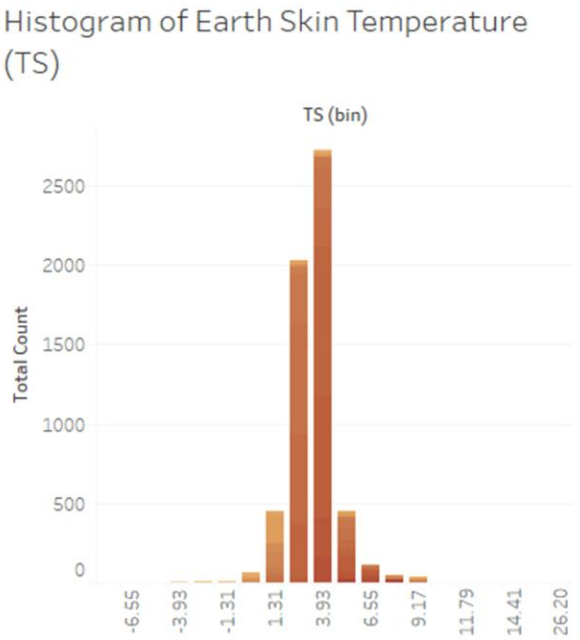
Scraped Wind Farm Data Statistics

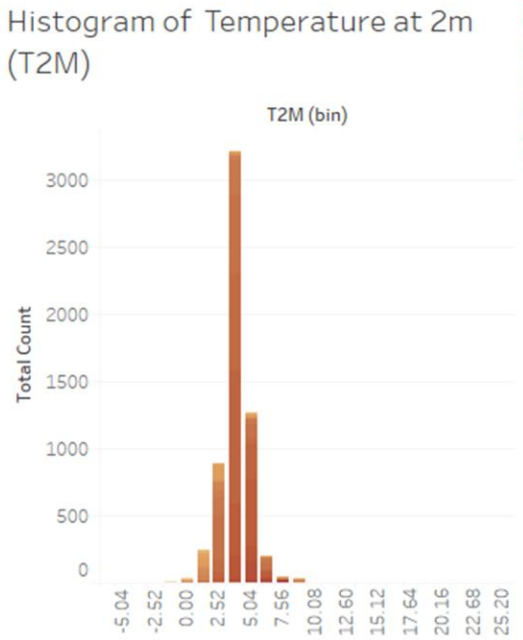






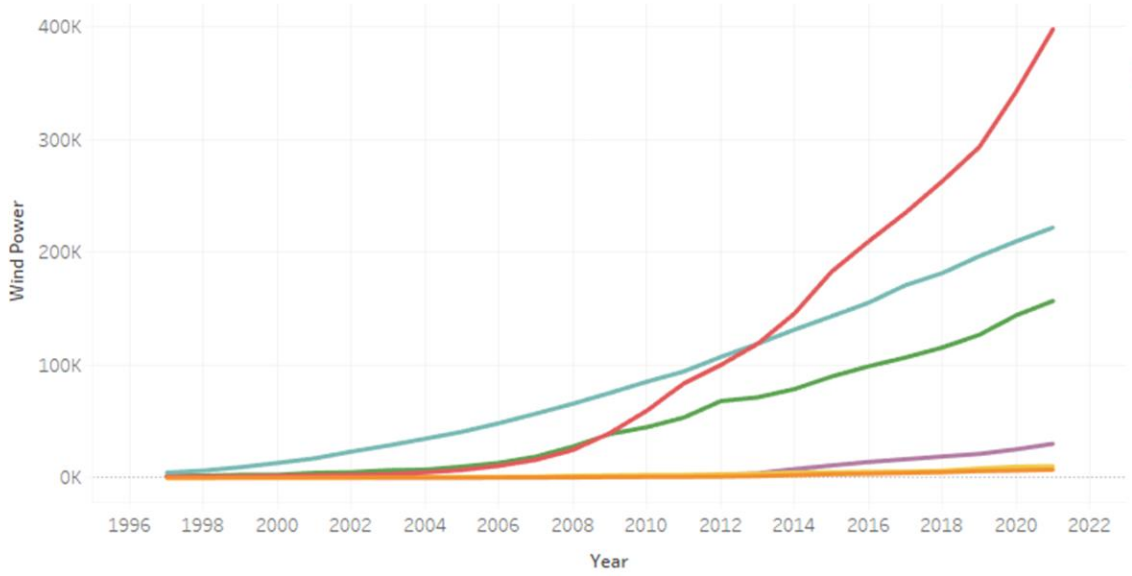




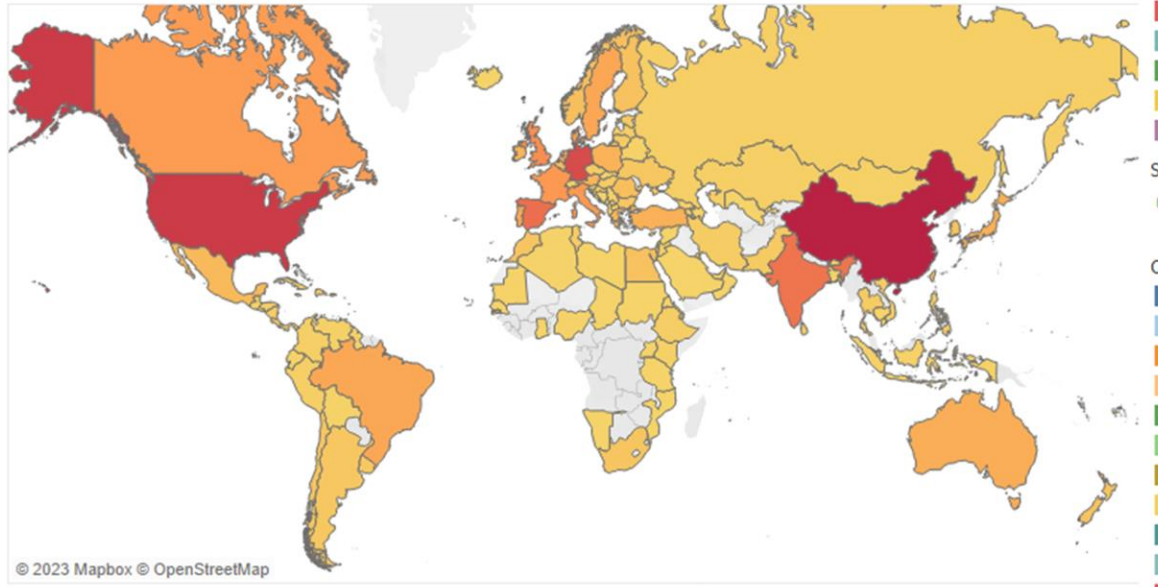


Wind Farm by Country Statistics

Production Growth of Wind Power per Continent



Wind Power Capacity by Country (Map)

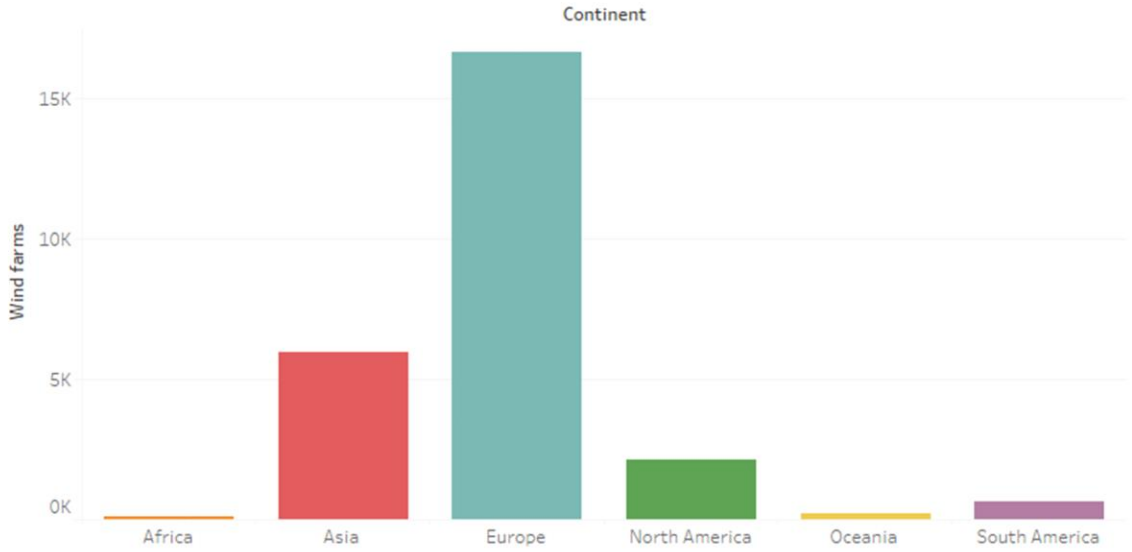


Continent
- Africa
- Asia
- Europe
- North America
- Oceania
- South America

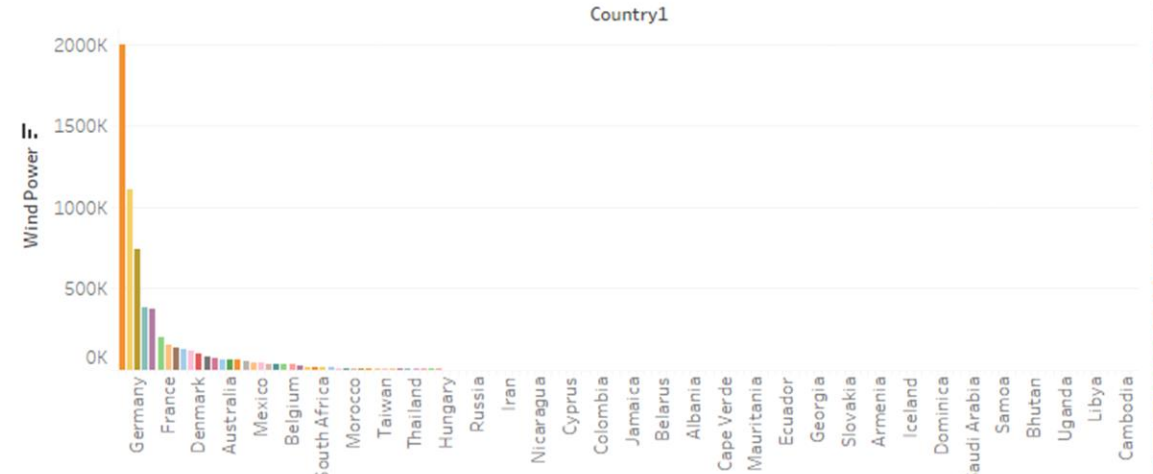
SQ Wind Power
0 — 5,235

Country1
- Albania
- Algeria
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Bhutan
- Bolivia
- Bosnia and Herze..
- Brazil
- Bulgaria
- Cambodia
- Canada
- Cape Verde
- Chad
- Chile
- China
- Colombia
- Costa Rica
- Croatia
- Cuba
- Curaçao
- Cyprus
- Czech Republic
- Denmark
- Djibouti

Number of Wind Farms per Continent



Wind Power by Country



Where does the **model** fits in?

Historical Weather
Data

Predictive
Modelling

Power Output
Forecast

What can we achieve?

Fluctuations in Weather Data (wind forecast data)

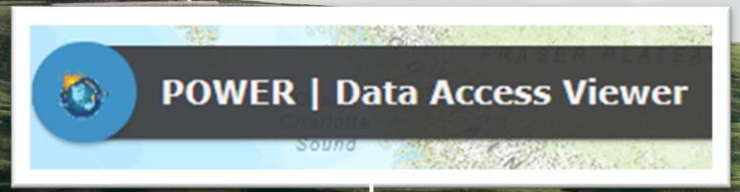
Predictive Model

Power Output **Forecast**


The Approach (Taken)

Web API

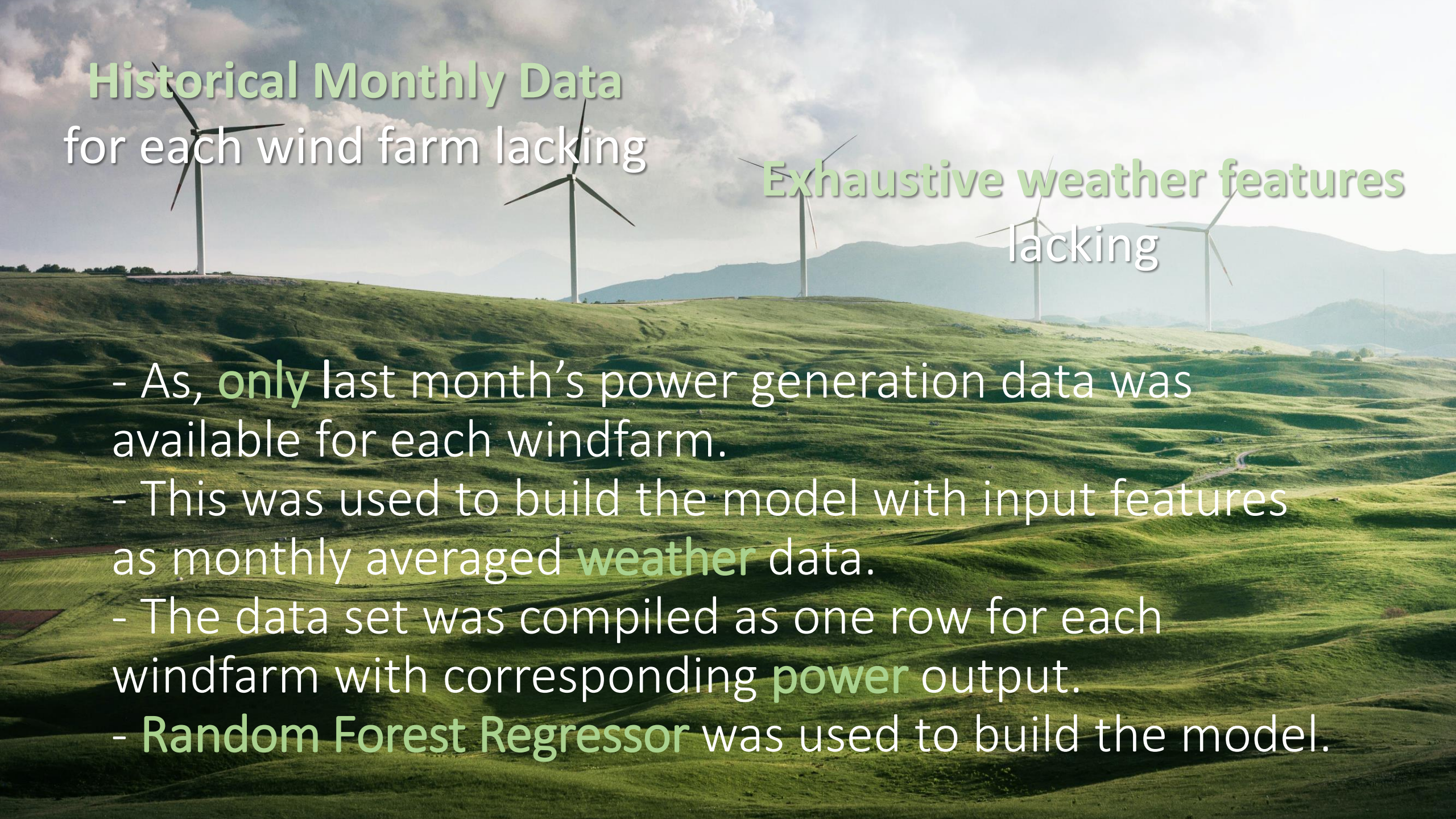
Web Scraping



Selenium

Web Scraping

X	y



Historical Monthly Data
for each wind farm lacking

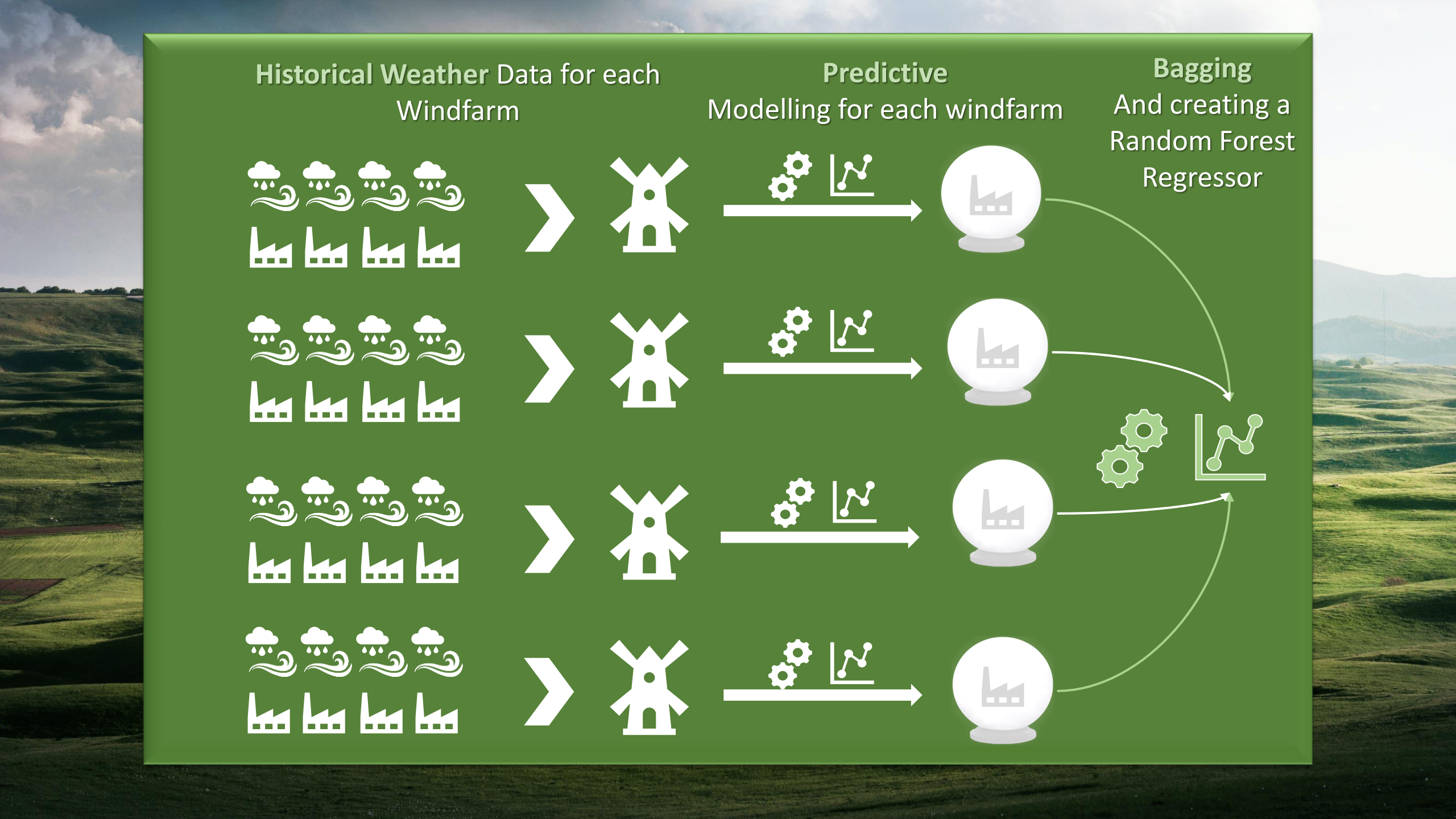
Exhaustive weather features
lacking

- As, **only** last month's power generation data was available for each windfarm.
- This was used to build the model with input features as monthly averaged **weather** data.
- The data set was compiled as one row for each windfarm with corresponding **power** output.
- **Random Forest Regressor** was used to build the model.

The Approach (Ideal)

How to scale and improve the model

WARNING: Seeing multiple icons on next slide might make you overwhelmed.


Historical Weather Data for each Windfarm
Predictive
Modelling for each windfarm
Bagging
And creating a Random Forest Regressor

धन्यवाद!

Thank you!

¡Gracias!

*A pinwheel in my backyard