



BUTTERFLY
DATA

Visualization of Weather Data to Assess Green Energy Suitability

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Will Hauwert

Will is an experienced consultant with 15 years of SAS® expertise in data management, benefiting industries like government, banking, retail, and automotive. His adaptability and skills make him a reliable and versatile consultant. Specializing in SAS® Intelligent Decisioning®, Data Integration Studio®, and SAS® Studio®, he crafts data-driven solutions, empowering clients with valuable insights.

Luke Coldridge

Luke is an experienced SAS® professional with a strong background in Mathematics. As part of the Butterfly Data team, he excels in data analysis, visualization, and solution development. Luke's expertise lies in being a trusted advisor for data consulting, particularly in SAS® Macro® language and SAS® Viya® toolset. His passion for data analytics shines through his unassuming and determined approach.

Butterfly Data

Butterfly Data is a team of experienced technology consultants, based in the United Kingdom and Canada, specialising in data science and data management. We prioritise making a positive impact on society, whether it is through data to assist achieving Net Zero targets or helping Government departments combat crime and fraud. We help organisations achieve data-driven results, through digital transformation using cloud services.

“ Using open source weather and energy data, assess green energy suitability based on a users location, land orientation and local sentiment within the United Kingdom.

Offer the user an intelligent recommendation using the available data on the most suitable form of green energy for them, considering the above factors. Present the information through visual and interactive reports. ”

The Solution



Data Preparation and Enrichment

Enriched data on locations of green energy projects with weather data and that of local sentiment.

Dashboard with Drill-Down

A summary page on the front, with data on following pages grouped by energy type.
Interactive filters and charts to draw out key insights.

Weather API

We streamed live weather data from an API, so the user can be sure their decisions are well-informed.

Additional Visualizations

Other charts were added to aid decision making around expected energy output, number of local competitors and wind direction / optimal orientation of turbines.

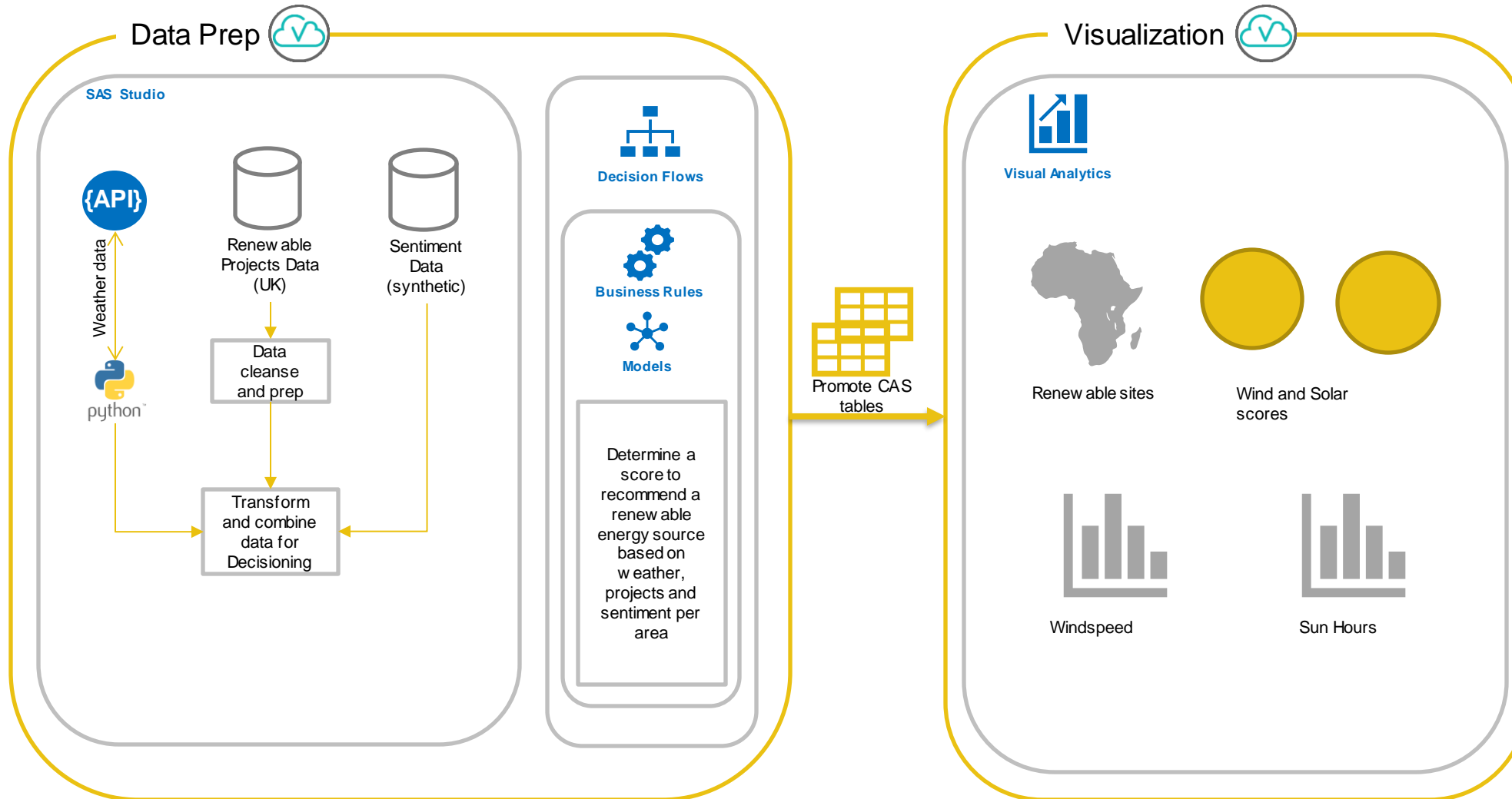
Custom Suitability Scores

Local sentiment analysis, number of local wind/solar projects and weather data were factored into the suitability scores.
One for each county.

Local Sentiment Analysis

Created synthetic opinions and segmented them by county and whether they were positive, negative or neutral.
The distribution of these sentiments was visualized with a word cloud.

Design and Architecture



Walkthrough - Summary

Summary

Region by Counties



[A1.1](#)

Total Solar Score



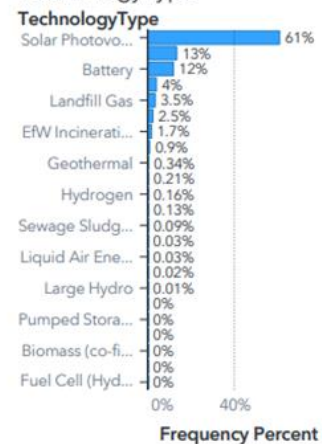
[A1.2](#)

Total Wind Score

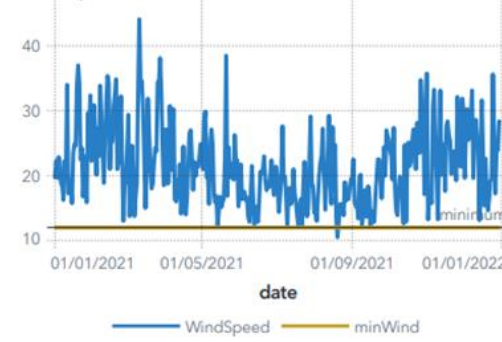


[A1.3](#)

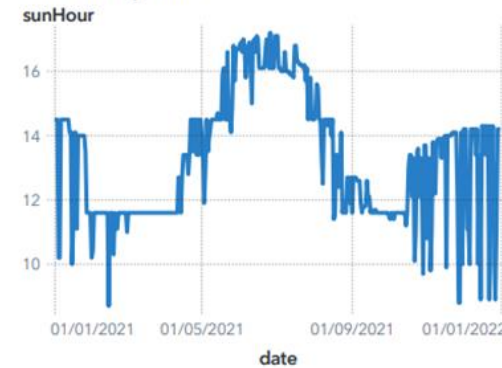
Frequency Percent of TechnologyType



WindSpeed, minWind by date



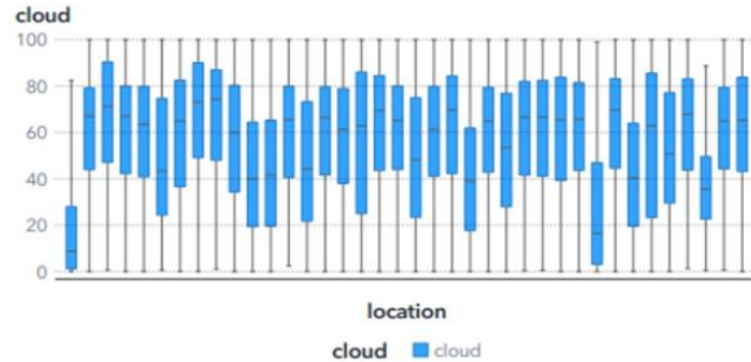
sunHour by date



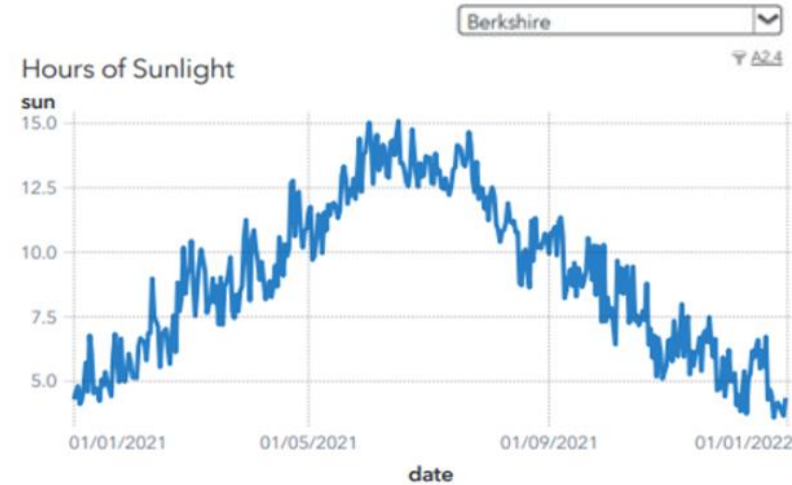
Walkthrough - Solar



Cloud Cover by County



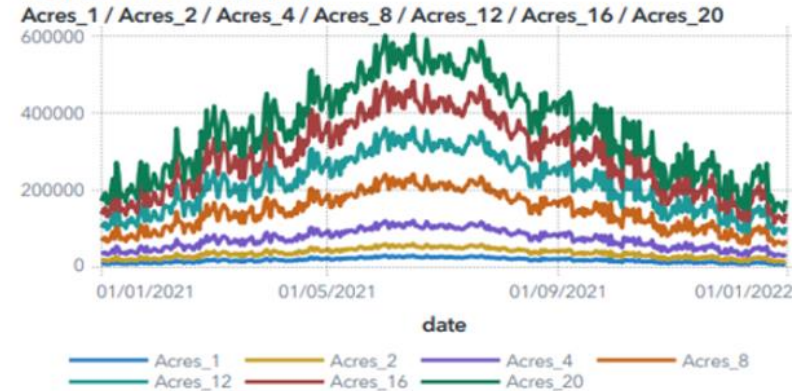
Hours of Sunlight



Local Sentiment



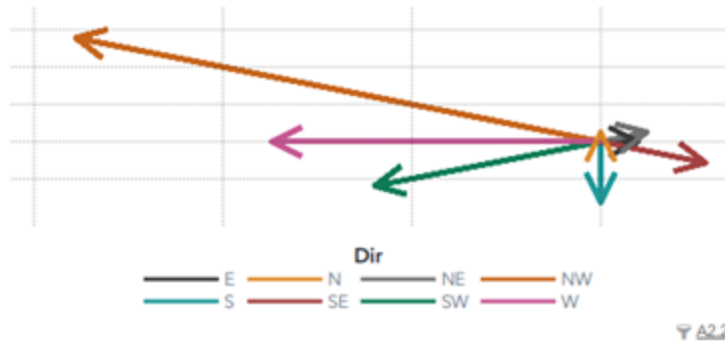
Output by Acreage (KW)



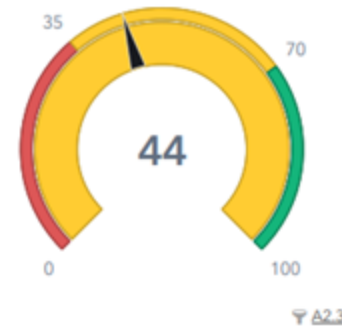
Walkthrough - Wind

Berkshire ⌵
A2.1

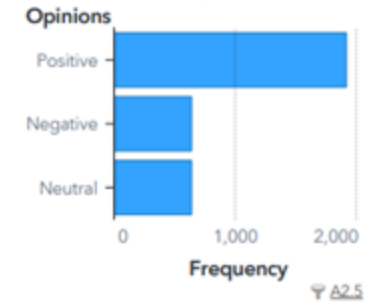
Wind Direction



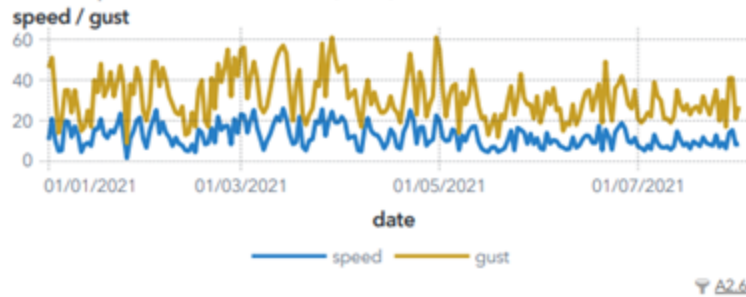
Wind Score



Sentiment Analysis



Wind Speed and Max Gust (KPH)

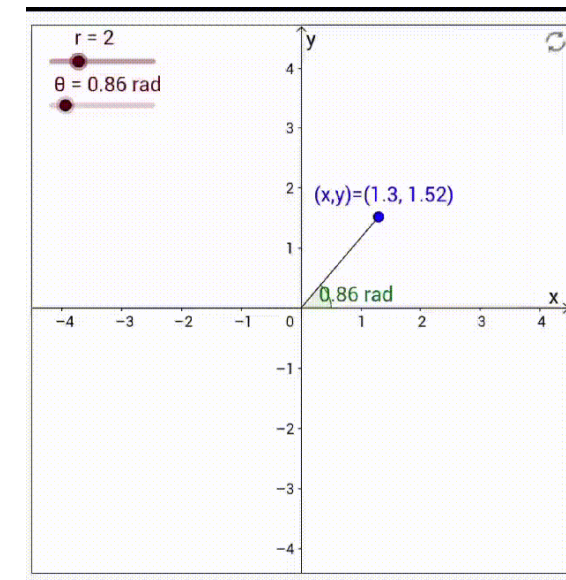
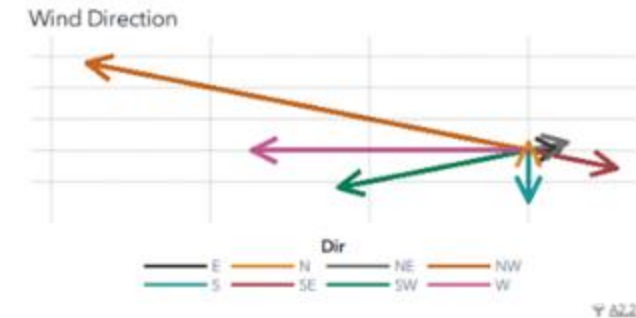


Local Sentiment



Vector Plot

- Wind directions in degrees: 8 bins for points of compass and NE, SE etc.
- Used polar coordinates to map degrees (1 number) to (x,y) with length r.
- $x=r \cos\theta$
- $y=r \sin\theta$
- θ is direction in radians
- Used Proc Freq on the 8 bins, then used the frequency percentage as a multiplier (F).
- Set r to be some small number
- $x= F * r \cos\theta$
- $y= F * r \sin\theta$



How and Who does this help?

The tool has a wide audience base: homeowners, property developers, housing associations building apartment blocks, council (state/municipality) authorities looking to decarbonize, business park owners.

Any landowner, or organization that is looking to maximize the potential of green energy either to drive NetZero or generate cheaper energy.

Next Steps and Enhancements

Building on the SAS Viya and Microsoft Azure architecture, package into an application.

The architecture can be enhanced to offer real time energy calculations, to indicate to the user what they could be generating currently.

Enhance the solution with a wider range of renewable energy sources to give a greater range of recommendations.

SAS **HACKATHON** 2023
VISUAL ANALYTICS

Butterflies

Butterfly Projects, UK



CHAMPION

Using weather data to assess green energy location suitability.

Thank you



Any Questions?

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