

CAPSTONE PROJECT - AREAS OF INTEREST

Energy Demand & Sustainable Energy Generation

What is the problem?

As UK energy prices are increasing at an unprecedented rate, the UK's reliance on energy imports has come into question. The problem is sustainable energy solutions are currently not fulfilling a large enough portion of the National Energy Demand. Of the wind, solar and other renewables that came on stream in 2020, nearly two-thirds – 62% – were cheaper than the cheapest new fossil fuel, according to the International Renewable Energy Agency (IRENA). Making sustainable energy solutions not only cleaner, but cheaper too.

The focus of this capstone project will be two fold:

The first phase of this project will be to explore the correlation between Population Growth and National energy demand for the same period. Upon isolating a potential correlation, the model will aim to forecast future energy demand.

Phase two will be to time forecast wind energy generation & solar energy generation, in order to answer the question of, at the current rate of development (in wind & solar energy generation), will these sustainable energy solutions ever be able to fulfil the national energy demand and when.

The Impact

Identifying whether there is a need to accelerate developments in sustainable energy solutions. In order to lower energy costs nationwide, and to tighten the grip on England & Wales' energy production by lowering national imports and increasing exports of energy.

Current state of UK energy

On average, energy that is provided by UK suppliers mostly comes from gas (around 41%). Renewable sources, such as wind power are used to produce around 30% of the energy provided while the percentage figures for coal and nuclear power respectively are around 13% and 11%.

Natural gas

Natural gas is still a major source of energy supply in the UK and it's readily available, although not always in this country. One of the major issues with this energy source is that some people are worried about the safety of the 'fracking' process which is being used to obtain natural gas.

Renewable sources

From a safety and availability point of view, renewable energy seems to be the way forward. Wind power is the most used form of renewable energy in this country. Wind turbines are a familiar part of the landscape across the country. The rise of wind power has been impressive. It's grown from being almost completely unused in 1990 to being a major feature of UK energy usage. Much of this rise in popularity has been due to the decrease in the expense of using this energy source.

Where does UK energy come from?

Like most European countries, the UK imports the majority of its traditional fuel supplies, especially gas. Russia is Europe's largest supplier of natural gas, providing around 35 per cent of the gas used across the continent.

The UK's reliance on Russian gas is far less significant, at just 3 per cent. About half of the UK's gas comes from the North Sea, and a third is sourced from Norway. We do have our own resources, but they are not as plentiful as they need to be.

This is why we import gas from several countries. Most of the UK's gas imports come from Norway. Some gas also comes through pipelines under the channel, from countries like Belgium and the Netherlands.

The electricity supply of the UK is produced using a variety of different fuels including coal, gas, wind power and nuclear power. Some of these resources have their origins in the UK and some are imported.

Feasibility of the project

Data Availability

National Grid provides 15 years of energy data. Office of National Statistics provides Annual Population Data

Data Completeness

- Energy - The demand data is available, along with the wind and solar power generation data. However power plants, nuclear, etc are not readily available. Population data is also available but is not as granular, the data is provided as annual figures.
- Population - External factors that could directly affect the National Demand. This data is available via the Office of National Statistics.

Property Price Data & Local Population Data

Problem

Britain's rate of inflation has surged to a new 40-year high, heaping more pressure on households struggling with the cost of living crisis, the younger generation's chances of owning a home has become an unlikely prospect. The aim of this project will be to identify if there is a link between population growth in local areas and house prices. Upon identifying such a link, this project hopes to forecast regional house price increases across England & Wales to identify future potential property investment opportunities.

Data Availability

Price paid data is available on the gov website that includes all the registered property sale prices across the UK for that period. This in combination with the population data available from the office of National Statistics, could make it a feasible project.

Noteworthy Ideas

1. Idea II - Equities

- Compensation Benchmarking, could use a classification system to select peers internally based on performance, experience, specialisation and title/rank etc.
- Executive Compensation Benchmarking, could use a classification system to select peer companies by comparing client company to public companies
- Set a salary range based on current market data
- These solutions could help digitise the compensation consulting methodology into a faster, more accessible and mathematical approach

2. Idea II - Equities

- Exploring the effect of FDA approval on biotech stock prices // Exploring the effect of new product releases on stock prices
- Time series forecasting of stock prices or a specific commodity's price
- Studying equity data to identify industries on the rise
- These questions would help traders / investors identify lower risk companies and industries for investment

3. Idea III - Fashion ecommerce

- Identifying trends early on in fast fashion world using google/ tiktok or twitter data
- Sales predictions looking at trend data to identify typical fast fashion product life cycle
- All of these questions optimise business performance

4. Idea IV - Property on Zoopla

- Using market data to identify bargain listings based on location and benchmark data across all homes in that area with similar specs
- Predicting “up and coming” areas by forecasting house prices in that area based on historical sales data and trends
- Identifying the best time of the year to find place to rent, based on historical data
- This could help property developers & aspiring homeowners more easily identify bargain investment opportunities without having to sift through every sale listing