Introduction:

Understanding the relationship between Natural Gas Prices and Heating Degree Days (HDD) holds significance in forecasting and analyzing real-world metrics, such as in predicting oil future prices. This project aims to investigate the relationship, if any, that exists directly between HDD and Natural Gas Prices.

Background and Data Sources:

HDD days describes a metric used in meteorology and energy consumption analysis to quantify how much and for how long the outdoor temperature is below a certain level, in this case 65 degrees Fahrenheit. Natural Gas Prices are “priced per million British thermal units (BTUs) - one BTU is the amount of energy needed to change one pound of water by one degree Fahrenheit,”(Nasdaq). Finally, futures indicate that a buyer will buy a specific amount of natural gas at a fixed date and price in the future.

A graph of gas prices

Description automatically generated

This project seeks to delve into this pivotal correlation, employing computer science methodologies to construct an accurate predictive model.

By leveraging datasets sourced from online repositories, this study aims to establish a robust model capable of forecasting Natural Gas Prices based on Heating Degree Days. Through rigorous data analysis and utilization of computer science concepts, the project endeavors to uncover patterns, dependencies, and trends between these metrics.

The relevance of this experience extends beyond its immediate scope, offering invaluable insights into the construction and application of predictive models in predicting critical financial indicators like oil future prices. A meticulous meta-analysis will be conducted to assess the model's accuracy, thus shedding light on its reliability and efficacy in real-world predictive scenarios.

In essence, this project embodies the intersection of data science, computer science, and financial analysis, offering a comprehensive exploration into the predictive modeling of Natural Gas Prices in correlation with Heating Degree Days, ultimately contributing to the understanding and prediction of crucial economic metrics.

Time Series Graphs:

HDD Over Time

A blue lines on a white background

Description automatically generated

What it means

Natural Gas Price over Time

A graph showing a natural gas price

Description automatically generated

What it means

Scatter Plot relationship between HDD vs Natural Gas Price. (each point is a specific time period, x axis is time, and y will be both HDD and Natural Gas Price) Have to scale the graph’s y axis to 2 different scales.

Correlation Analysis between HDD and Natural Gas Price

Do regression analysis,

Model Prediction vs. Actual Values: Plotting predicted natural gas prices against actual prices to visualize how well the model fits the data.

Sources [Data was sourced from freely available online resources]

Natural Gas Prices (reported daily and averaged): <https://datahub.io/core/natural-gas#resource-daily>

Monthly HDD: <https://www.eia.gov/totalenergy/data/browser/index.php?tbl=T01.10#/?f=M&start=197301&end=202307&charted=32-10>

Natural Gas Future Prices:<https://www.investing.com/commodities/natural-gas-historical-data>