Natural Gas Consumption Forecasting

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Summary

The goal for this analysis was to build a model that can forecast natural gas consumption for the next three years.

Model produced results with an AIC Score of 6829.150 and an RMSPE of 4.74%

The trend for natural gas consumption is increasing

Outline

Business Problem

Data

Methods

Results

Recommendations

Business Problem

The stakeholder for this project is the North American Electric Reliability Corporation (NERC) and at the end of this analysis, three recommendations will be given on how gas and utility companies can meet the increasing demand for natural gas in the United States.
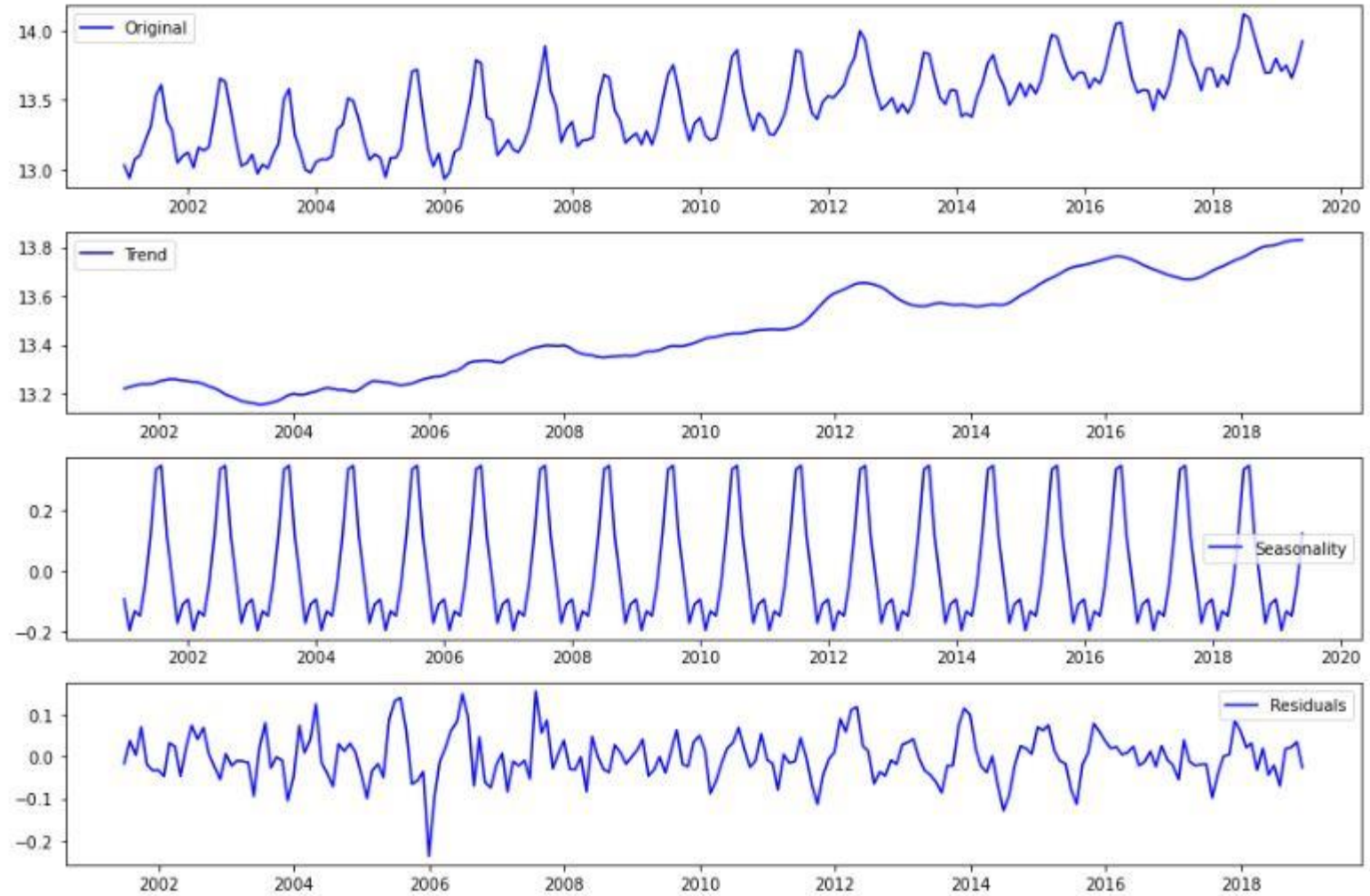
Objective:
Given monthly averages of natural gas consumption, this project aims to determine whether machine learning can predict the next three years of gas use with high accuracy.
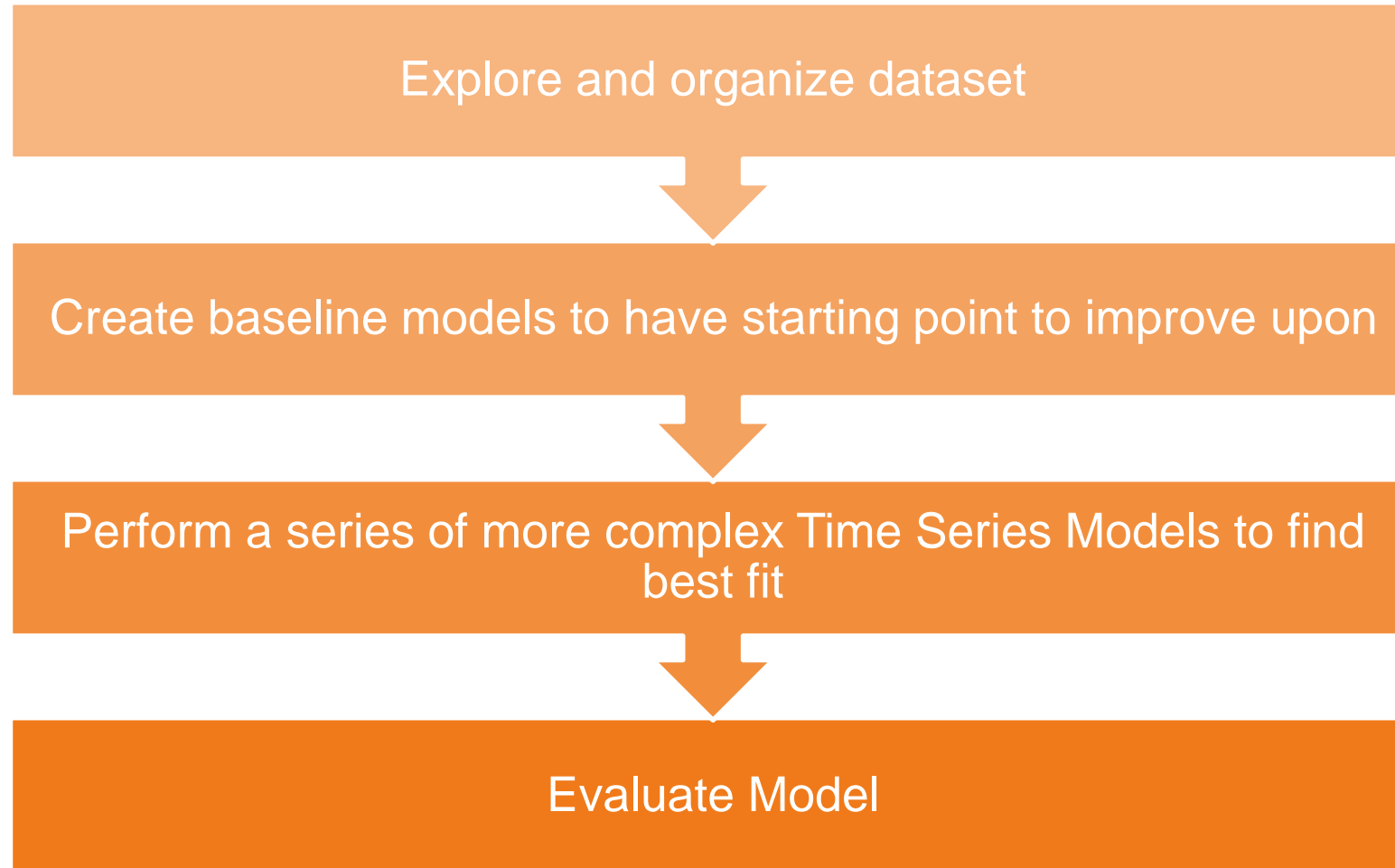
Data

- Source: US Energy Information Administration

- Approximately 270 records

- Monthly averages of natural gas consumption from January 1, 2001, to December 1, 2023

Methods

Explore and organize dataset

Create baseline models to have starting point to improve upon

Perform a series of more complex Time Series Models to find best fit

Evaluate Model

Metrics Used

- RMSPE, Root Mean Square Percentage Error, is a measure of prediction accuracy which calculates the square root of the average squared percentage error between the predicted and actual values.

- AIC Score, Akaike Information Criterion, is a measure used to compare different models on the same dataset. The model with the lowest AIC is generally considered the best because it achieves a balance between model complexity and fit to the data.

Results

- RMSPE: 4.74%
- AIC: 6829.150

Natural Gas Consumption
Three Year Forecast
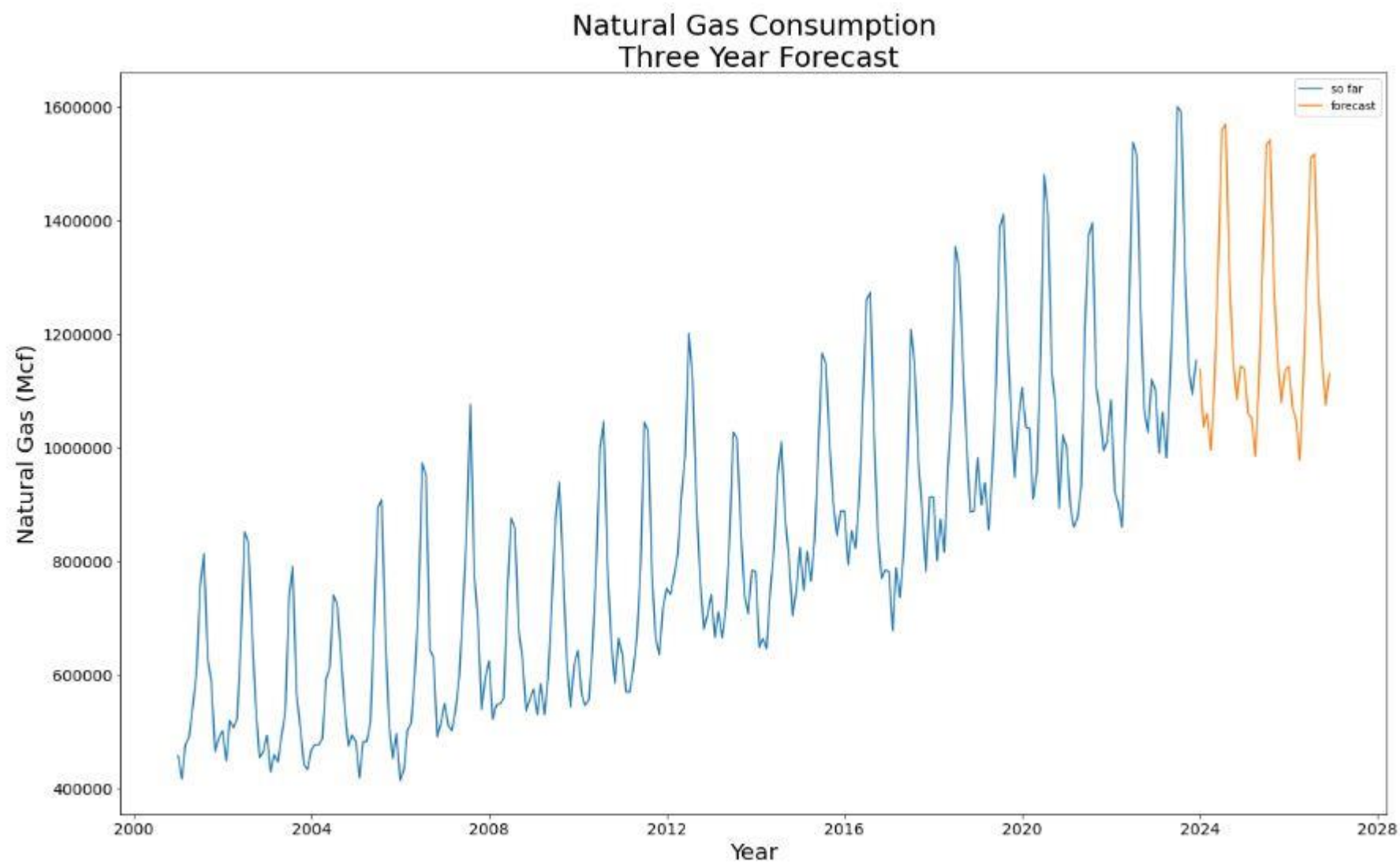
Recommendations

- Invest in Infrastructure
- Diversify Supply Sources
- Enhance Energy Efficiency Programs

Next Steps:

- Include renewable energy sources
- Go more in depth on the seasonal variations
- Perform this analysis on a much larger dataset

Thank You!

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