# Comparative Analysis Report: Forecasting Supply and Demand of Electrical Energy in Chicago

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## Objective

The primary aim of this report is to compare the roles, methodologies, and outcomes of the project that forecasts the future energy supply and demand in Chicago using a dataset from 2021. By analyzing the contributions of each team member, we can understand how their efforts collectively impact the project's success.

## Project Overview

A dataset from the City of Chicago for the year 2021 serves as the foundation for this analysis. The dataset includes vital information regarding energy consumption across different community areas. This report contrasts the contributions of various roles in the project, focusing on their processes and the results obtained.

## Team Roles and Responsibilities

### 1. Project Manager

Responsibilities: Define project objectives, coordinate team efforts, and ensure stakeholder communication.

Outcome: A well-structured team was formed to cover all critical roles. As well as project scope defined as Real-world example of a data science project aimed at forecasting supply and demand for electrical energy in Chicago. The project will utilize real-world data to predict energy usage based on historical patterns.

### 2. Data Engineer

Responsibilities: Clean and preprocess the dataset, ensuring accurate data types and completeness.

Outcome: Successfully prepared the data, including conversion of electricity_use_kbtu and year_built to numeric formats.

### 3. Data Analyst

Responsibilities: Evaluate electricity consumption patterns across various community areas to detect trends in energy usage.

Outcome: Certain community areas demonstrated higher energy consumption in 2021. The analysis results are as follows:

| Community Area | Electricity Use (kBtu) |
|---|---|
| Albany Park | 5886519.1 |
| Archer Heights | 26995924.9 |
| Armour Square | 18735089.4 |
| Ashburn | 17643873.0 |
| Auburn Gresham | 7649742.7 |

### 4. Data Scientist

Responsibilities: Forecast future energy demand using historical data.

Outcome: The model indicates a gradual increase in energy consumption. The forecast results are as follows:

| Year Built | Forecast (kBtu) |
|---|---|
| 1881 | 2.886443e+06 |
| 1889 | 2.815708e+06 |
| 1890 | 5.192307e+06 |
| 1891 | 7.372267e+06 |
| 1892 | 1.333251e+07 |

### 5. Business Analyst

Responsibilities: Analyze forecasts and calculate growth rates.

Outcome: The projected growth rate in electricity demand indicates an average increase of 12.93% per year.

### 6. Frontend Developer

Responsibilities: Create visual representations of actual and forecasted energy consumption.

Outcome: The visualizations provide a clear comparison between historical energy consumption from 2021 and the forecasted demand, allowing stakeholders to interpret the results easily.

## Visualizations

1. Actual Consumption: Displaying actual energy consumption per community area.

2. Forecast: Line plot illustrating forecasted energy demand over the years with the moving average of 3 years.

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Frontend Developer: Rendering the forecast visualization...
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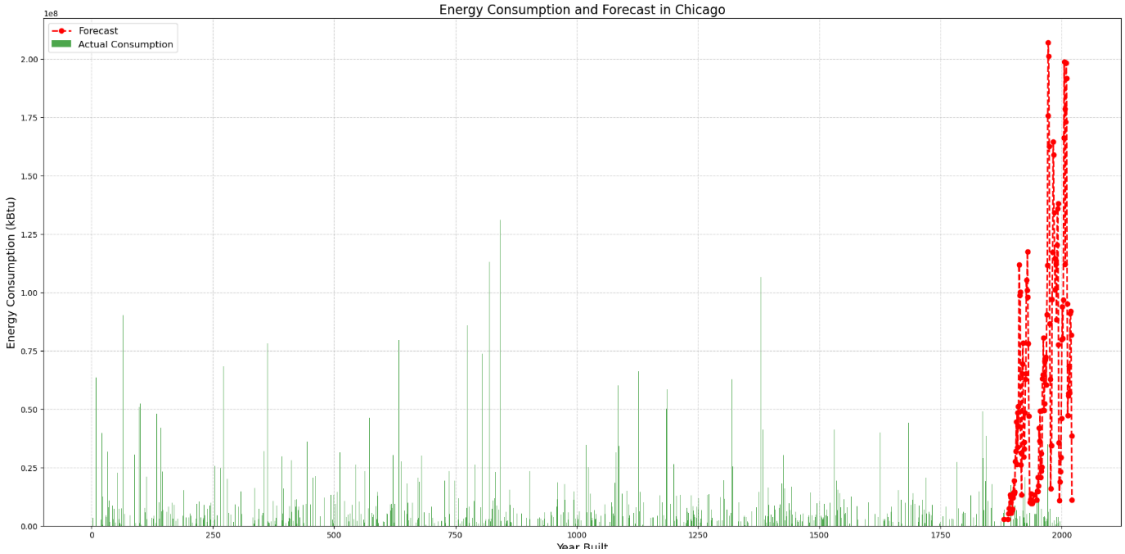


## Conclusion

This project successfully predicts Chicago's future energy consumption using the 2021 dataset. The analysis findings suggest that there will likely be a greater need for power, particularly in developing regions. The predictions emphasize the importance of updating the city's energy infrastructure and implementing sustainable energy practices to meet future demand.

By leveraging the combined expertise of a diverse team, the project offers both technical and business insights that can inform future energy planning decisions in Chicago. The integration of data engineering, analysis, modeling, business interpretation, and visualization enables a comprehensive understanding of Chicago's energy consumption trends and their trajectory.