Exploring Global Energy Transition Trends

Group 6
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Github: https://github.com/dylankayyem/4502-Project-06

Question(s) sought to answer:

✓ Study Objectives

- To analyze the interplay between economic growth, population dynamics, and renewable energy consumption.

✓ Key Research Questions

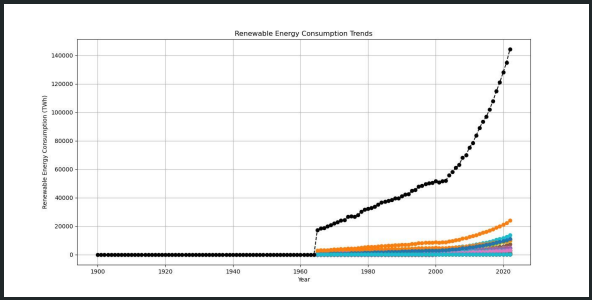
- How do economic and demographic factors affect renewable energy consumption?
- What is the impact of energy efficiency on the reduction of carbon intensity in electricity?
- Can economic growth indicators predict a country's renewable energy consumption?
- What does the carbon intensity trend indicate about global progress towards sustainable energy?

✓ Why This Matters?

- Understanding these dynamics is crucial for shaping future energy policies.
- Insights can guide investment in sustainable energy infrastructure and technology.

Data preparation work:

- ✓ Data Cleaning
- ✓ Filtering Data
- ✓ Feature Engineering
- ✓ Data Segmentation
- ✓ Visualization Preparation
- ✓ Feature Selection



R-squared: 0.93
Mean Squared Error: 74405.55
Feature importances:
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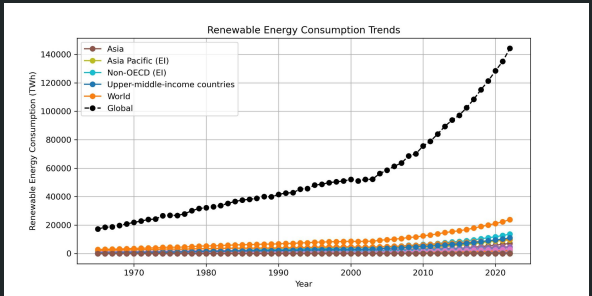


Tools used:

✓ Libraries:

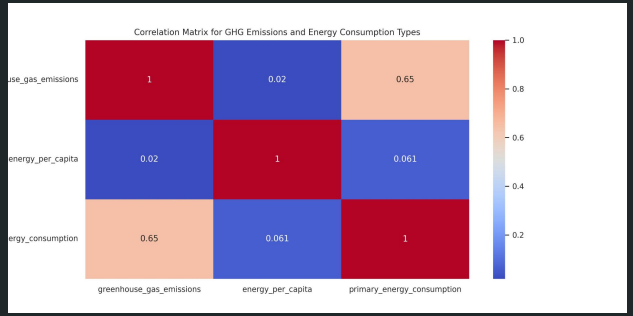
- Python
- Pandas
- NumPy
- Matplotlib
- Seaborn
- Scikit-learn
- SimpleImputer

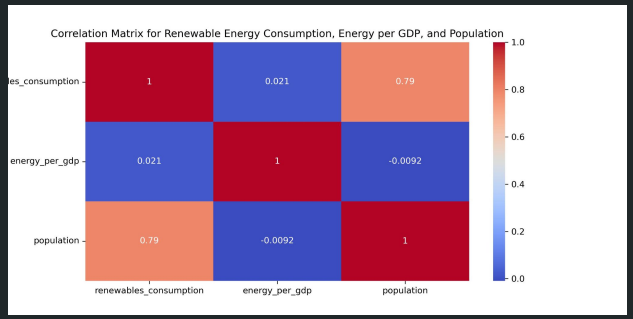
✓ Visualization Tools:

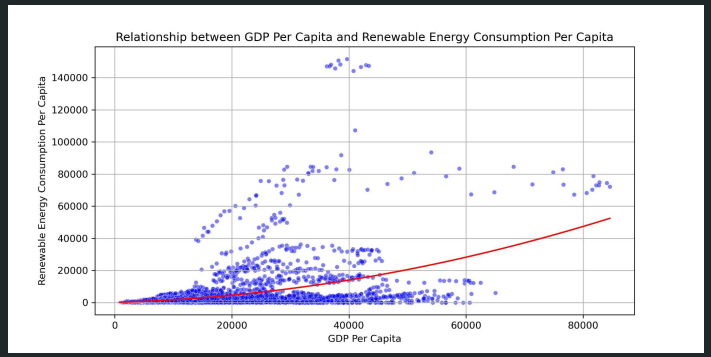
- Heatmaps
- Scatter Plots
- Line Plots

Classification/clustering applied:

- ✓ Regression Analysis
- ✓ Correlation Analysis
- ✓ Trend Analysis





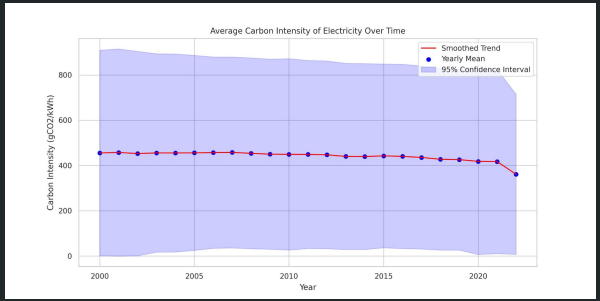


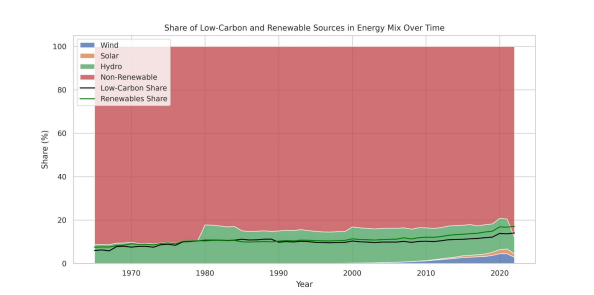
Correlation between GDP per Capita and Renewable Energy Consumption Per Capita: 0.398641289199194

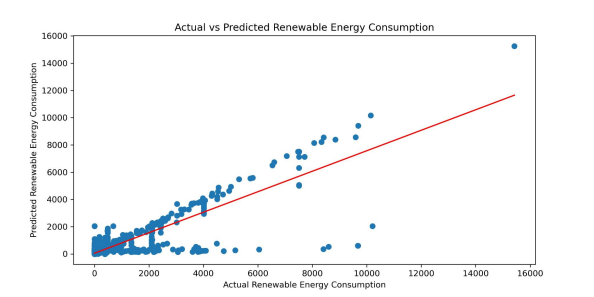
Knowledge gained:

- ✓ Understanding Energy Dynamics
- ✓ Model Predictions
- ✓ Energy Mix Trends
- ✓ Environmental Implications

Statistics for the most recent year (2022):
mean 360.940089
std 180.486997
min 28.818000
max 768.733000
Name: 2022, dtype: float64







R-squared: 0.77
Mean Squared Error: 199031.08
Feature importances:
[0.00130559 0.7304025 0.0120487 0.06564366 0.19059955]

How that knowledge can be applied:

- ✓ Informing Policy and Investments
- ✓ Driving Growth and Security
- ✓ Fostering Global Cooperation
- ✓ Tailoring Energy Policies
- ✓ Accelerating Sustainable Transitions
- ✓ Holistic Approach to Energy Security
- ✓ Setting Research Agendas