Global Energy Consumption and Sustainability Analysis

# Overview of the Project and its Purpose

This project aims to analyze global energy consumption trends using the World Bank Open Data and the Global Energy Consumption Dataset from Kaggle. The focus will be on identifying changes in energy consumption over time and comparing fossil fuels with renewable energy adoption across different regions.

# Dataset Sources

1. World Bank Energy Consumption Dataset: Global energy consumption per capita by country.  
2. Kaggle Global Energy Consumption Dataset: Energy consumption data categorized by coal, renewables, and oil.

# Database Choice

We will use PostgreSQL to store and manage the data, as it allows for structured queries and easy data manipulation. The dataset will be loaded, cleaned, and transformed before being stored for analysis.

# ETL Workflow

The raw data will be extracted from the World Bank and Kaggle datasets, cleaned to remove missing values, and transformed to ensure consistency in energy units. The cleaned data will be loaded into PostgreSQL for analysis.

# Visualizations

We will create three key visualizations:  
1. A line chart showing trends in energy consumption over time for different regions.  
2. A bar chart comparing fossil fuels versus renewable energy sources for a selected year.  
3. A geographical map that visualizes energy consumption per capita by country.

# User Interaction

A Flask app will be built to allow users to select specific regions and energy sources for customized visualizations. The app will serve interactive plots based on user inputs such as region and year.

**Step forward: Impact of Energy Usage on Climate Change and Pollution**One critical aspect of energy consumption is its effect on climate change and environmental pollution. Fossil fuels, such as coal and oil, are major contributors to greenhouse gas emissions, which drive global warming. According to data from Our World in Data and the Intergovernmental Panel on Climate Change (IPCC), approximately 73% of global greenhouse gas emissions come from the energy sector, with a large portion tied to fossil fuels.  
  
On the other hand, renewable energy sources such as wind, solar, and hydroelectric power can significantly reduce harmful emissions. Analyzing this trend may show how countries with higher adoption rates of renewable energy are more successful in reducing carbon emissions and improving air quality.  
  
Relevant data sources for this analysis include:  
1. Our World in Data - Comprehensive reports and datasets on greenhouse gas emissions and climate change: <https://ourworldindata.org>   
2. IPCC Reports - Intergovernmental Panel on Climate Change reports on the effects and predictions of climate change: <https://www.ipcc.ch/reports/>

# Conclusion

This project will offer a concise analysis of global energy consumption trends, highlighting shifts toward renewable energy sources. The use of PostgreSQL and Flask will enable smooth data processing and user interaction.