

## Data Collection and Preprocessing Phase

Date	24 July 2025
Project Title	Global Energy Trends: A Comprehensive Analysis of Key Regions and Generation Modes using Power BI
Maximum Marks	10 Marks

## Data Exploration and Preprocessing

Section	Description
Data Overview	The dataset was sourced from Kaggle and includes six Excel files: continent-wise and country-wise energy consumption, renewable and non-renewable generation, renewables TotalPowerGeneration and top 20 countries' energy sources from 1961–2023.
Data Cleaning	Null values were removed from all sheets to ensure consistency. Duplicate rows were eliminated. Missing numeric values were handled through default imputation or aggregation. Geothermal values were rounded to two decimal places.
Data Transformation	Power Query was used to filter by year and region, sort by energy source, and pivot/unpivot relevant tables. Country and continent datasets were unpivoted and renamed to a unified structure using "Country/Continent" and "Value" columns. Calculated columns like Total Renewable Energy were added.
Data Type Conversion	All numeric columns such as energy contributions (TWh) were converted to float or integer types. Year columns were set as integers, and categorical fields like region and source were encoded properly.
Column Splitting and Merging	No column splitting or merging was performed. Instead, unpivoting was done on the country-wise dataset into a normalized Country_Table, and on the continent-wise dataset into a Continent_Table - both having columns labeled "Country/Continent" and "Value".

Data Modeling	Data modeling was implemented in Power BI by establishing relationships between the Country_Table, Continent_Table, and fact tables using index columns. Measures such as Country Average (TWh) and Continent Average (TWh) were created using the AVERAGEX DAX function for analysis.
Save Processed Data	Final datasets were saved in .pbix format. Backup .csv files were also maintained. All preprocessing and modeling steps were documented for reproducibility.