

Global Energy Trends – Full Project Documentation

1. Problem Statement

With global energy demands rapidly increasing, there is a critical need to monitor and analyze how energy is produced and consumed across different countries.

Environmental concerns and the push for renewable energy make it essential to differentiate between renewable and non-renewable sources.

By using Power BI, this project aims to explore historical energy data to uncover trends, top energy contributors, and CO₂ emissions patterns.

These insights will support policymakers and researchers in promoting cleaner energy alternatives and better resource planning.

2. Project Proposal

Objective: Analyze global energy consumption patterns and differentiate between renewable and non-renewable usage using Power BI.

Scope: Focuses on visualizing trends from 1980–2020 using data from OWID. It compares countries, energy types, and calculates key metrics like total energy, median, standard deviation, and variance in TWh.

Tools Used: Power BI, MS Excel, GitHub

Deliverables: Interactive dashboard, visual charts, PDF reports, video demo

Target Audience: Government bodies, researchers, environmental organizations

3. Initial Project Planning Report

Phase: Data Collection – Task: Source selection, dataset download – Duration: 2 days

Phase: Data Preprocessing – Task: Cleaning, null handling, column unification – Duration: 2 days

Phase: Data Visualization – Task: Chart creation in Power BI – Duration: 3 days

Phase: Dashboard Development – Task: KPIs, cards, slicers, formatting – Duration: 2 days

Phase: Report & Documentation – Task: PDF & MP4 creation, documentation – Duration: 1

day

Phase: GitHub Setup – Task: Folder upload, README.md – Duration: 1 day

4. Data Collection Plan

The dataset was collected from Our World in Data (OWID) energy repository.

Focused on energy production and consumption categorized by country, year, and type (coal, gas, nuclear, renewables, etc.).

Collected energy data (in TWh), GDP, population, CO₂ emission, and energy intensity.

Energy types were manually grouped into Renewable and Non-Renewable for dashboard purposes.

5. Data Sources Identification

Our World In Data (OWID) - <https://ourworldindata.org/energy>

Fields: Country, Year, Energy_Type, Energy_Consumed_TWh, CO₂, GDP

World Energy Outlook - <https://iea.org>

Used for understanding categories (non-technical reference)

6. Data Quality Report

Checked and removed duplicates – none found.

Null values:

CO₂: 2.1%

GDP: 1.6%

Population: 1.3%

Cleaned data by removing or replacing nulls.

Converted energy units to TWh where needed.

Grouped energy types manually:

Renewable: hydro, solar_pv, wind, geothermal, biofuel

Non-Renewable: coal, natural_gas, nuclear, petroleum

7. Business Questions

1. Which countries are the top contributors to global energy consumption?
2. What is the trend of renewable energy usage from 1980–2020?

3. What is the comparison between renewable and non-renewable energy sources?
4. Which energy sources contribute the most in recent years?
5. What is the standard deviation and variance of global energy consumption?

8. Final Report Insights

Asia and China have the highest energy consumption.

Hydro electricity is rising and coal dominates non-renewables.

Top 20 countries range from 12.4 to 1819.94 TWh in total energy.

Biofuel and geothermal are positively correlated.

Biofuel: 3.88 to 1127.31 TWh

Geothermal: 36.42 to 85.34 TWh

Hydro: 2191.67 to 4197.29 TWh

9. Tools Used

- Power BI
- MS Excel
- GitHub
- Google Docs

10. Contributor

Prepared by: Chandni Yadav

Date: June 2025

Project Title: Global Energy Trends