# Report

Date	19 December 2025
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Project Name	Global Energy Trends: A Comprehensive Analysis of Key Regions and Generation Modes
Maximum Marks	5 Marks

This project analyses multi-year global energy datasets to explore patterns in production and consumption across regions, countries and generation modes. Using cleaned CSV data (continent, country, renewable and non-renewable generation, and top 20 country breakdowns), I developed a three-page Power BI dashboard, Global Overview, Renewable Deep Dive and Country & Regional Analysis, featuring KPIs, time-series trends, composition charts, and drill throughs. The dashboard supports interactive exploration of trends (TWh), renewable share, source composition and top energy consumers to inform policy, planning and investment decisions.

RENEWABLE ENERGY ANALYSIS
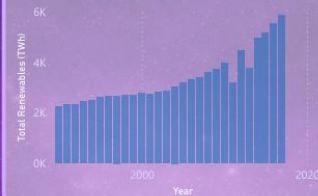
58.34K	**Tidal**	**5.82%**
Total Energy (TWh)	Top Renewable Source	Renewable Growth (%)

Global Renewable Energy Generation by Source

Renewable_So... ● Biofuel_T... ● Geother... ● Hydro_T... ● Solar_PV...

Renewable Energy Ge...
5K
0K
1990   2000   2010   2020
Year

Renewable Energy Growth

Total Renewables (TWh)
6K
4K
2K
0K
2000   2020
Year
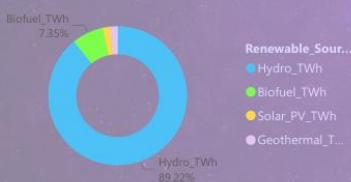
Year
1990   2017
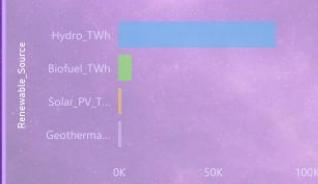
Key Insights

- Renewable energy generation has shown a consistent upward trend, indicating a global shift toward cleaner and sustainable energy sources.
- Hydropower remains the dominant renewable source, contributing the highest share of total renewable energy production.
- Solar energy exhibits the fastest growth rate, especially after 2005, reflecting increased investments and technological advancements.
- Bioenergy contributes moderately, while geothermal energy remains comparatively limited but stable.
- Overall renewable energy growth highlights a strong global transition toward low-carbon and sustainable power systems.

Share of Renewable Energy Sources

Biofuel_TWh
7.35%

Hydro_TWh
89.22%

Renewable_Sour...
- ● Hydro_TWh
- ● Biofuel_TWh
- ● Solar_PV_TWh
- ● Geothermal_T...

Top Renewable Sources

Renewable_Source
Hydro_TWh
Biofuel_TWh
Solar_PV_T...
Geotherma...

0K   50K   100K
Renewable by Source (TWh)

Country & Regional Energy Analysis

Top Energy Producing Country **308.22K**	Total Countries **44**	Total Country Energy (TWh) **308.22K**
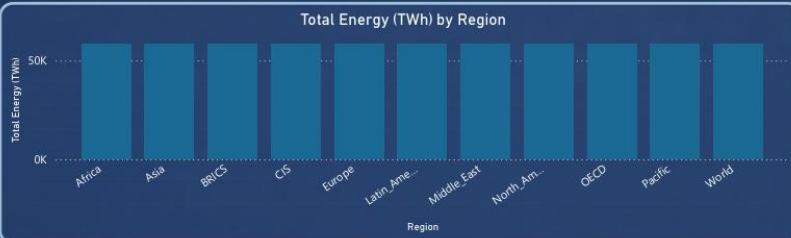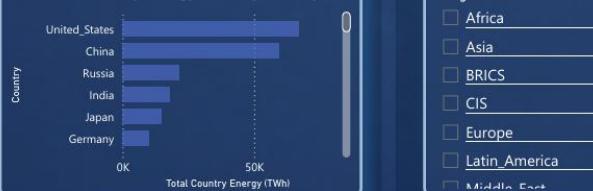
Total Energy (TWh) by Region

Total Energy (TWh)
50K
0K
Africa Asia BRICS CIS Europe Latin_Ame... Middle_East North_Am... OECD Pacific World
Region

Year
1990   2020

Key Insights

- A small number of countries dominate global energy consumption.
- Rapid growth is observed in developing economies due to industrial expansion.
- Renewable energy penetration varies significantly across regions.

Total Country Energy (TWh) by Country

Country
United_States
China
Russia
India
Japan
Germany

0K   50K
Total Country Energy (TWh)

Region
- ☐ Africa
- ☐ Asia
- ☐ BRICS
- ☐ CIS
- ☐ Europe
- ☐ Latin_America
- ☐ Middle_East

Observations drawn from the Power BI reports

1. **Overall growth:** Global total energy generation has increased steadily over the observed period, energy demand is structurally rising with economic activity and electrification.
2. **Renewable momentum:** Renewable generation has grown consistently, the renewable share of total energy is increasing year-on-year, signaling progress toward decarbonization.
3. **Source dynamics:** Hydropower remains the largest renewable contributor in absolute TWh, while **solar** shows the fastest growth rate and is the primary driver of incremental renewable capacity.
4. **Year-on-year acceleration:** YoY analysis shows acceleration in renewable growth in later years (post-2005/2010 window), indicating policy and cost-driven deployment.
5. **Regional concentration:** Energy consumption is highly concentrated, **Asia** (and major economies within Asia) and **North America** are the largest consumers, together driving a substantial portion of global demand.
6. **Country concentration:** A small set of countries (e.g., China, United States) account for a disproportionate share of global energy consumption, targeting these yields the highest impact for policy interventions.
7. **Country composition variability:** The renewable/non-renewable mix varies significantly by country, some countries are hydro dominant, others are rapidly scaling solar, this suggests tailored policy strategies rather than one size fits all.
8. **Top 20 country profiles:** Composition bars for the top 20 countries reveal differing strategies, countries with large hydro fleets show stable renewable baselines, emerging solar leaders show high growth but lower absolute totals.
9. **Actionable policy signals:** Regions with rising demand but low renewable share are strong candidates for targeted investment in solar, storage and grid upgrades. Regions with high renewable penetration should focus on flexibility (storage, demand response).
10. **Data & model limitations to note:** Year ranges differ across source files and some country-year cells have missing values, comparisons should use overlapping years or be annotated, per-capita and GDP normalized analysis is not included and would refine policy insights.
11. **Operational implication:** Utilities and grid operators in high growth regions must prepare for variability, planning should prioritize storage, forecasting and transmission upgrades.
12. **Monitoring & next steps:** The dashboard enables quick monitoring and should be extended with population/GDP layers and forecasting models to support scenario planning and per-capita metrics.