CA_02 REPORT

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Global Renewable Energy Production Dashboard

1. Introduction

The move to renewable energy towards the least harmful use of energy to the environment is not an environmental concern only anymore, but a strategic mission of both nations and corporations. The world has been driven into finding a cleaner and sustainable source of power due to climate change, geopolitical changes, and the rising energy demands. Industries, governments, and other institutions now spend generously in purchasing renewable energy to have stability in the future, economic prosperity, and the balance of ecology.

Here, the Global Renewable Energy Production Dashboard will give a statistical picture of the developments in renewable energy uptake by major nations between 2010 and 2023. It combines both environmental variables such as CO 2 emissions and socio-economic. variables such as GDP, population, and electricity prices to provide comprehensive information. Utilizing the interactive visuals generated by Power BI, the dashboard enables the stakeholders to examine trends in the matter of energy production, affordability, and environmental impact, as well as progress on country level, throughout the years.

2. Dataset Overview

Data used to drive the dashboard consists of a file named. complete_renewable_energy_dataset.csv which summarizes the annual data on different. countries and energy types. It combines the aspects of the environment and economy to give a broad image of the renewable energy sector.

The list of the most significant columns that are found in the dataset is as follows:

•**Country**: The country under analysis is being named, and there is a possibility of regional (cross-country) comparison.

•**Year**: Shows the period (20102023) and makes it possible to analyze past trends.

•**Energy Type**: Describes the type of renewable energy that is being used e.g., Solar, Wind, Biomass.

•**Energy Consumption**: Energy consumption is the total consumption of renewable energy of a given year.

•**CO 2 Emissions:** Represent the amount of carbon emissions that were released during energy consumption, and they have been divided into types and locations.

•**GDP**: Give an indication of gross domestic products in each country from an economic perspective.

•**Electricity Prices:** Provides access to information about the affording of energy by the average national electricity prices.

• **Population**: Reflects on demographic environment with the emphasis on demand for drivers and population-energy relationships.

The choice of these variables was done meticulously to have the concept of how energy, economy, emissions, and demographics converge in various regions within a multidimensional scope.

3. Dashboard Visuals and Their Purpose

The dashboard on Power BI and Tableau uses different visuals to show patterns and relations in the data, and it provides a summary of the data relating to the big picture and detailed breaks.

Summary Cards

Key performance indicators (KPIs) are located at the top of the dash, and they give an overview of worldwide metrics:

- Total Energy Consumption: 1,24 billion
- World GDP: 253 trillion dollars
- Total units of CO 2 Emissions: 1.23 billion units
- Total population: Which is currently pictured as being 2 trillion (this probably needs fixed)

Electricity Prices: Aggregate value of 690.61 should be some kind of index or mean.

They also have slicers, which is used to dynamically filter visuals according to country and type of energy. This gives a personalized look according to regions or renewable sectors.

Geospatial Map

This map shows a country based renewable energy activity through spatial mapping. It uses country names, sources of energy, and energy use amount to depict the contribution to the world about renewable efforts in the region. This map is interactive and reacts to user filters (year or type of energy), which allows comparing the level of energy consumption across geographical boundaries quite easily.

Energy Consumption Timeline

The line and Sankey charts show energy consumption with time. These illustrations are used to show the change in energy use in various countries and types of energy. The statistics show that such nations as India and China experienced considerable expansion of Solar and Wind energy over the period of ten years (2010-2023), which earns them the title of renewable energy leaders.

CO_2 Emissions Donut Chart

This bar chart segregates total CO 2 emissions according to type of energy and provides the user with an idea as to the sources of emissions that cause maximum emissions in the world. Even though renewable energy is cleaner than fossil fuel, certain forms like Biomass may. still be a major contributor of the emissions. It is through the chart that areas requiring more improvement or innovation are highlighted.

Population Trends

A line plot shows the trend of the population in different countries from 2019 to 2023. The is visual that aids in the discussion of energy demand because energy demand can be greater with increasing population. The constant development of the population is seen in such. countries as India, Brazil, or the United States, which is why the infrastructure (in general) and energy one should be scalable and sustainable.

Electricity Prices vs Population (Area Chart)

This dual axis plot superimposes the prices of electricity and the amount of population in the country. It exposes any shortages in affordability and accessibility. The fact is that in most situations, the population of a country is large, and the power prices are high, and the issue of equal access to clean power is present. This chart can be adopted as a measurement of the ability of a market or the performance of a policy in various geographies.

4. Insights & Key Observations

Based on the dashboard analysis, it is possible to point out some key insights:

Generating Trends in Renewable Energy

- The use of the Biomass in the chosen counties is high in Australia, which means that there is a high investment made in this source of energy.
- India, China, and France have been consistent in Solar and Wind energy use in the last ten years and this correlates with national energy policies.
- Even with renewable energy preference, the amount of CO 2 emitted; not including methane, is still remarkably high so either we should work on having cleaner energy sources or we should work to control the emissions.

Economic and Population Trends

- A higher GDP of the country tends to show more-diversified renewable portfolios implying an economic strong nation has a wider base to invest in clean energy.
- Mill population-dense countries, especially with the countries of Asia and South America, are affected by the problem of affordability since electricity tariffs and demand are increasing.
- A direct connection between the increase of population and usage of energy is. plain, which further supports the necessity to embrace investments into energy that can be gathered sustainably and on a large scale.

5. Target Clients & Use Cases

This dashboard is targeted at professionals, businesses, as well as organizations working in the energy sector, sustainability, policymaking, or financial investment. The following are the points about priority client groups and the ways of applying this tool to them:

Client Type	Use Case	Example Companies & Institutions
Renewable Energy Firms	Explore market opportunities by energy type and region.	*Siemens Gamesa, Vestas, Ørsted, Enel Green Power*
Government & Energy Ministries	Monitor national goals, emissions, and energy transitions	*Ministries in Australia, India, EU Commission*
Technology & Manufacturing Giants	Guide to operational sustainability and sourcing strategies	*Tesla, Apple, Google, Microsoft*
Investment & Asset Managers	Evaluate risks and opportunities in green sectors.	*BlackRock, Macquarie Capital, Brookfield Renewable Partners*
NGOs & Research Institutions	Drive policy recommendations and awareness campaigns.	*World Resources Institute, IEA, UN Energy, Carbon Tracker*

Both stakeholders can use the dashboard to make a better decision either in terms of making an investment in any emerging energy market, in terms of formulating strategies on emission reduction, or in terms of running a long-term sustainability program.

6. Conclusion

Global Renewable Energy Production Dashboard provides an effective scope by which. players can learn the dynamics of clean energy at the international level. This tool combines energy use, environmental performance, financial stability, market dynamics, and population growth to provide the user with information on directional strategy, based on data.

Be it a multinational energy company thinking about where to invest in energy related to projects, a policymaker monitoring national emission targets, or a researcher who examines longer term climate statistics- the dashboard offers both the big picture and the micro view necessary to plan responsibly in the renewable age.

Representing a resourceful tool to help in representing the future of global energy; this site has all the correct information, ease of use and nice filters.