Phase 1-A and 1-B
Project Group - 10

Title: Energy Insights: Visualizing Global Trends and Correlations

WHAT: what data is being visualized?
The data being visualized is a comprehensive dataset related to energy consumption, production, and related metrics. The data includes various variables such as coal production, gas production, oil production, energy consumption, electricity generation, renewable energy sources, population, and more. These variables encompass a wide range of information related to energy and its usage, making it a rich source of data for visualization and analysis.

The goal of visualizing this data would be to gain insights into trends, patterns, and relationships within the energy sector, both at a global and regional level. Visualization techniques can help uncover valuable information from this dataset, facilitating better decision-making and understanding of energy-related issues.

WHY: What are the tasks (Action/Target) of the visualizations (5 out of 8 will be included in final submission, more based on feasibility)

1. **Action: Compare - Target: Trends**
    - Compare the annual percentage change in energy consumption (energy_cons_change_pct) across different countries over time to identify trends in energy consumption patterns.
2. **Action: Analyze - Target: Relationships**
    - Analyze the relationship between primary energy consumption per capita (energy_per_capita) and the share of electricity consumption from renewables (renewables_share_elec) to understand if there's a correlation between renewable energy adoption and energy consumption.
3. **Action: Discover - Target: Patterns**
    - Discover patterns in electricity generation by examining the annual changes in electricity generation from coal (coal_electricity) and wind (wind_electricity) and identify any recurring patterns or anomalies.
4. **Action: Explore - Target: Distribution**
    - Explore the distribution of per capita electricity consumption from nuclear power (nuclear_elec_per_capita) across different countries to understand the variability in nuclear energy usage.
5. **Action: Investigate - Target: Outliers**
    - Investigate outliers in primary energy consumption (primary_energy_consumption) by identifying countries with unusually high or low energy consumption and explore potential reasons for these outliers.
6. **Action: Present - Target: Comparisons**
    - Present a comparative analysis of the annual changes in fossil fuel consumption (fossil_cons_change_pct) and renewable energy consumption

(renewables_cons_change_pct) to highlight the shift in energy sources over time.

7. **Action: Search-Locate - Target: Regional Trends**
    - Search for and locate regional trends in electricity generation from solar (solar_electricity) and hydro (hydro_electricity) sources to identify areas with significant renewable energy contributions.
8. **Action: Annotate - Target: Extremes**
    - Show extremes in carbon intensity of electricity production (carbon_intensity_elec) and annotate the reasons or possible causes for regions with exceptionally high or low carbon intensity.

HOW: The final visualization will contain (5 out of 8 will be included in final submission, more based on feasibility):

1. **Action: Compare - Target: Trends**
    - Compare the annual percentage change in energy consumption (energy_cons_change_pct) across different countries over time to identify trends in energy consumption patterns.
2. **Action: Analyze - Target: Relationships**
    - Analyze the relationship between primary energy consumption per capita (energy_per_capita) and the share of electricity consumption from renewables (renewables_share_elec) to understand if there's a correlation between renewable energy adoption and energy consumption.
3. **Action: Discover - Target: Patterns**
    - Discover patterns in electricity generation by examining the annual changes in electricity generation from coal (coal_electricity) and wind (wind_electricity) and identify any recurring patterns or anomalies.
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    - Explore the distribution of per capita electricity consumption from nuclear power (nuclear_elec_per_capita) across different countries to understand the variability in nuclear energy usage.
5. **Action: Investigate - Target: Outliers**
    - Investigate outliers in primary energy consumption (primary_energy_consumption) by identifying countries with unusually high or low energy consumption and explore potential reasons for these outliers.
6. **Action: Present - Target: Comparisons**
    - Present a comparative analysis of the annual changes in fossil fuel consumption (fossil_cons_change_pct) and renewable energy consumption (renewables_cons_change_pct) to highlight the shift in energy sources over time.
7. **Action: Search-Locate - Target: Regional Trends**
    - Search for and locate regional trends in electricity generation from solar (solar_electricity) and hydro (hydro_electricity) sources to identify areas with significant renewable energy contributions.
8. **Action: Annotate - Target: Extremes**

- Show extremes in carbon intensity of electricity production (carbon_intensity_elec) and annotate the reasons or possible causes for regions with exceptionally high or low carbon intensity.

Relation between Visualizations:

The visualizations of energy consumption tell a compelling story of our society's evolving relationship with energy. Beginning with a historical line chart, we see a gradual rise in energy usage over the years, representing our growing dependence on it for various aspects of modern life. As we delve deeper into the data, bar charts illustrate the distribution of energy sources, showcasing the shift from fossil fuels to renewable energy, symbolizing our collective commitment to sustainability. Moving forward, a geo-spatial map layer adds a unique dimension to our energy consumption story. By visualizing energy consumption patterns across regions, it highlights areas of high demand and identifies potential disparities in access to energy resources.

Interaction between of the user will help:

The user interactions will provide detail on demand on the following aspects:

1) Country wise population
2) Country wise GDP
3) Year filter
4) Carbon emission
5) Energy production
6) Energy consumption
7) Energy per capita
8) Energy per GDP
9) Share of fossil fuels
10) Share of renewable energy