PROJECT: ANALYZING GREEN ENERGY TRENDS

As countries begin to transition from traditional usage of fossil fuels to "green" forms of energy, it has become apparent that reduction in carbon emissions is not only a theoretical possibility, but a realizable goal for many nations.

While many countries are making the shift to green energy, many nations are still in the early stages of this shift and currently still retain reliance on traditional forms of energy. In this project, you will investigate the transition to green energy around the world. Data from WorldBank.org lists each country's renewable energy consumption as a percentage of its total final energy consumption for each year. As an analyst, you will utilize Microsoft Excel functions to format the raw data into a usable dataset and analyze the green initiatives of various countries.

Part 1: Data Preparation & Cleaning

1. **Access Data**
   - Open the Excel file named Green_Energy_Report.
2. **Clean Data**
   Oftentimes when using raw data, your Excel document will initially have information that you don't need or information that is hard to read, and you must take some steps to clean up the data before you can use it.
   - Delete rows 1 through 4. After doing this, cell A1 should read "Country Name".
   - We are only going to be interested in the data from 1990–2020, so delete the columns for the years 1960 through 1989 and delete the columns for the years after 2020.
   - We are not going to be using the Country Code, the Indicator Name, nor the Indicator Code, so delete those columns, as well.
   - Select all the remaining data and convert it into a table.
   - Resize the column width of Column A so that the entire name of each country is visible.
   - To improve readability, format the numerical values in each year's column to be displayed with one decimal place.

Part 2: Formulas & Calculations

1. **30-Year Average**
   - Create a new column "30-Year Average" to the right of the 2020 column of data.
   - Use the Average function to calculate the average renewable energy consumption percentage for each country from 1990 to 2020.
   - If necessary, format the numerical values in this column to be displayed with one decimal place.
   - Alter the column width for improved readability.
   - For the remainder of this project, we'll only be focusing on the data from 2010–2020, so hide columns B through U (years 1990 through 2009). Notice that hiding these columns does not change the values in the 30-Year Average column.
2. **Decade Average**
   - Create a new column called "Decade Average" to the right of the 30-Year Average column.
   - Use the Average function to calculate the average renewable energy consumption percentage for each country from 2010 to 2020.

- If necessary, format the numerical values in this column to be displayed with one decimal place.
- Alter the column width for improved readability.

3. **Growth Calculation**
   - Create a column called "Growth (2010-2020)" to the right of the Decade Average column.
   - Calculate the change in percentage points from 2010 to 2020.
   - Format the cells to "Number" with parentheses and red text for negative numbers.
4. **Status Classification**
   - Create a column called "Status" to the right of the Growth (2010-2020) column.
   - Use the =IF() function to categorize countries based on their 2020 performance:
     - If the 2020 renewable energy consumption percentage is greater than 50%, label it "Green Leader". Otherwise, label it "Transitioning".

Part 3: Analysis & Formatting

1. **Conditional Formatting**
   - Select the numerical data from 2010 to 2020.
   - Use Conditional Formatting in Excel to apply color to the values. Use the following color scheme:
     - Green with Green Text for countries whose renewable energy consumption percentage is greater than 50%
     - Yellow with Yellow Text for countries whose renewable energy consumption percentage is between 20% and 50%
     - Red with Red Text for countries whose renewable energy consumption percentage is below 20%.
2. **Sorting**
   - Sort the entire table by the 2020 column in either Ascending or Descending order.
     - Which country utilizes the highest percentage of renewable energy?
     - Which countries utilize the lowest percentage of renewable energy?
3. **Summary**
   - Using the + sign at the bottom of your Excel Workbook, create a new sheet labeled "Summary":
     - **Total Countries Analyzed:**
       In cell **A1** of the new sheet, type "Total Countries Analyzed". Below that, in cell **A2**, use the COUNTA formula to find the total number of countries analyzed in the data. The COUNTA formula counts the number of nonempty cells in a specified range. The input for this function is COUNTA(range). Notice that you'll type the formula into the new sheet, but you can reference cells in the original sheet by switching sheets.
     - **Number of Green Leaders:**
       In cell **B1**, type "Green Leaders". Below that, in cell **B2**, use the COUNTIF function to determine the number of countries that we are considering to be Green Leaders.
     - **Global Average (2020):**
       In cell **C1**, type "Global Average (2020)". Below that, in cell **C2**, find the average renewable energy consumption percentage for 2020.

Part 4: Visualizing the Data

1. **Trend Comparison**
    - On the Data sheet, filter or find the rows for “United States”, “China”, “India”, and “World”.
    - Insert a line chart that compares these four rows over the years 2010–2020.
    - Your line chart should have a line for each of the four rows, and the horizontal axis should be labeled with the years 2010 through 2020. If, instead, you have a line for each of the years and the horizontal axis is labeled with the different countries, click on the chart; a “Chart Design” ribbon should appear at the top of your Excel window. Click the “Switch Row/Column” button.
    - Add a title: “Trend Comparison”.
    - Ensure the Legend is visible.
    - If you unfilter the data to show all of the countries, your line chart will automatically update to also include all of the countries. To prevent that from happening, copy the chart (CTRL+C or right-click and select Cut or Copy). Then paste the chart as a picture (CTRL+ALT+V or right-click Paste Options, then select Picture). Now, even if you unfilter column A, the chart will not change. Paste the line chart (as a picture) on the Summary sheet.
2. **Top 5**
    - Select the Country name and the 2020 value for the top 5 countries (after you sort).
    - Insert a Bar Chart.
    - Add a title “Top 5 in 2020”.
    - Your bar chart should have a bar for each country.
    - Paste the bar chart (as a picture) on the Summary sheet.

Discussion Questions

Answer the following questions based on the data and your analytics:

1. Which country had the highest renewable energy consumption percentage in the year 2020?
2. According to your “Summary Table,” exactly how many countries are qualified as “Green Leaders” (>50%) in 2020?
3. Sort your table by the “Growth (2010-2020)” column. Which country showed the largest decrease in renewable energy percentage over the last decade?
4. Reference the “Growth (2010-2020)” column in your data set. Why might growth be negative for certain countries? What does this mean as an overall trend?
5. Look at your “Trend Comparison” chart. Is the line for the global average (World) trending up, down, or staying constant between 2010 and 2020?
6. In 2020, was the United States above or below the global average for renewable energy consumption? Approximately how many percentage points were between the United States and the global average?
7. Look at the data for India. Has their renewable percentage steadily increased, or has it fluctuated over the range of the data?