

The growth rate of the proportion of renewable energy in total energy usage.

Echidna Group - LI-HSUAN CHUNG

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Background

In today's world, we're facing climate change and environmental issues. That's why it's important to look at how much renewable energy each country uses. Understanding this helps us make better plans to protect the environment. By analyzing the increase in the use of renewable energy in different countries, we can learn what works best and encourage countries with lower usage rates to improve.

Introduction

This part of report analyzes the recent trends in renewable energy's share of primary energy consumption across various countries. Utilizing a dataset measuring the percentage of primary energy sourced from renewables, including hydropower, solar, wind, geothermal, bioenergy, wave, and tidal, and excluding traditional biofuels. The distribution of renewable energy use in various countries will be presented in this report. The five countries with the highest and lowest increases in the use of renewable energy will be presented in this report and used for GDP analysis at the end.

1. Research Question

Which five countries have made the greatest progress in the proportion of renewable energy, and roughly from which region do these countries come from? ## 2. Dataset Introduction The [dataset](#) includes information on the share of primary energy consumption from renewable sources. The ratio of renewable energy use in countries around the world from 1965 to 2022 is recorded. This report will use data from 1985-2021. The average data for each continent and the world will be shaved off during the data cleaning process because it will not be used in this analysis.

Table 1: Variable table

Variable_Names	Description
Entity	The name of the country
Code	Country Name Abbreviation
Year	The year of the data
Renewables%	The percentage of renewable energy to all energy used
difference	The renewables% changes between 1985 and 2021.

Methodology

The methodology employed in this study aimed to analyze the growth of renewable energy usage rates in various countries between 1985 and 2021. The following steps were undertaken to accomplish this:

1. Data Collection:

- Data on renewable energy usage rates for multiple countries from 1965 to 2022 were collected from Energy Institute.

2. Data Processing and Analysis:

- The data collected in this research report were selected from the period 1985 to 2021.
- Because this study focuses on countries, the data of each continent and region will be deleted during the data clean process.
- Using the `ggplot2` package in R, a line chart Figure 1 was generated to visualize the trends in renewable energy usage rates for the top five countries with the highest growth rates over the period from 1985 to 2021.

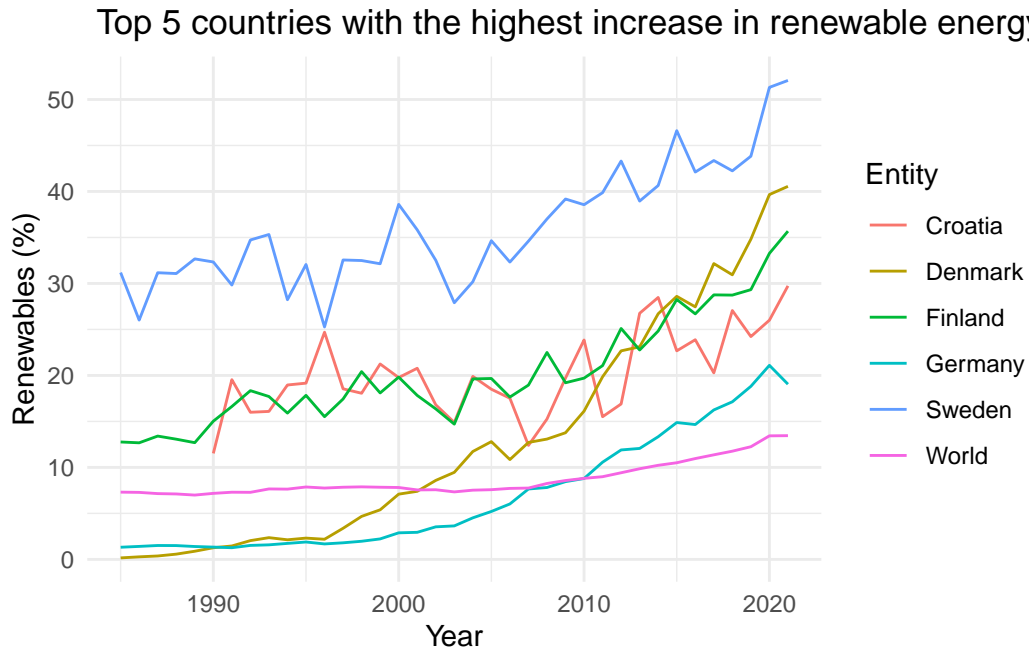


Figure 1: Top 5 countries renewable energy used increasing during the period

3. Identification of Top Five Countries:

- Through data analysis, the top five countries with the highest growth rates in renewable energy usage between 1985 and 2021 were identified.
- The following table presents the filtered data.

Table 2: Data of Renewable Energy Usage Rates for Top Five Countries

Entity	difference	Code	Year	Renewables (% equivalent primary energy)
Croatia	18.21315	HRV	1991	19.53725
Croatia	18.21315	HRV	1992	15.99459
Croatia	18.21315	HRV	1995	19.16081
Croatia	18.21315	HRV	1996	24.70118

Result

In this report, we examined the evolution of renewable energy adoption across various entities from 1985 to 2021. The analysis primarily focused on identifying the top five entities with the highest increase in renewable energy consumption and world's average over this period.

From Figure 1, we can observe that among the top five countries with the highest growth rates, Sweden has the highest utilization rate among all countries, having grown from approximately 30% to over 50%. Germany started with a renewable energy usage rate of less than 10%, but after years of effort, it surpassed the world average from year 2010, becoming the fifth-ranked country in terms of growth rate. Denmark had almost zero renewable energy usage rate in 1985, but it grew by over 40% in just over 30 years. Finland and Croatia had a similar trend, with an increase of around 20% during this period.

From the table below, you can get a clear understanding of how much these countries and the world average have grown.

Table 3: The growth rate during the period from 1985 to 2021.

Entity	difference
Denmark	40.391086
Finland	22.919699
Sweden	20.884522
Croatia	18.213148
Germany	17.727043
World	6.140639

1. Conclusion

The top five countries in terms of growth in renewable energy usage rates are Denmark, Finland, Sweden, Croatia, and Germany. All of these countries are from Europe, indicating significant progress in renewable energy usage in Europe.

2. Recommendations

The world average growth rate of renewable energy usage is only 6%. We can examine the five countries with the lowest growth rates from Figure 2 to identify reasons, enabling a substantial increase in the world average in the future.

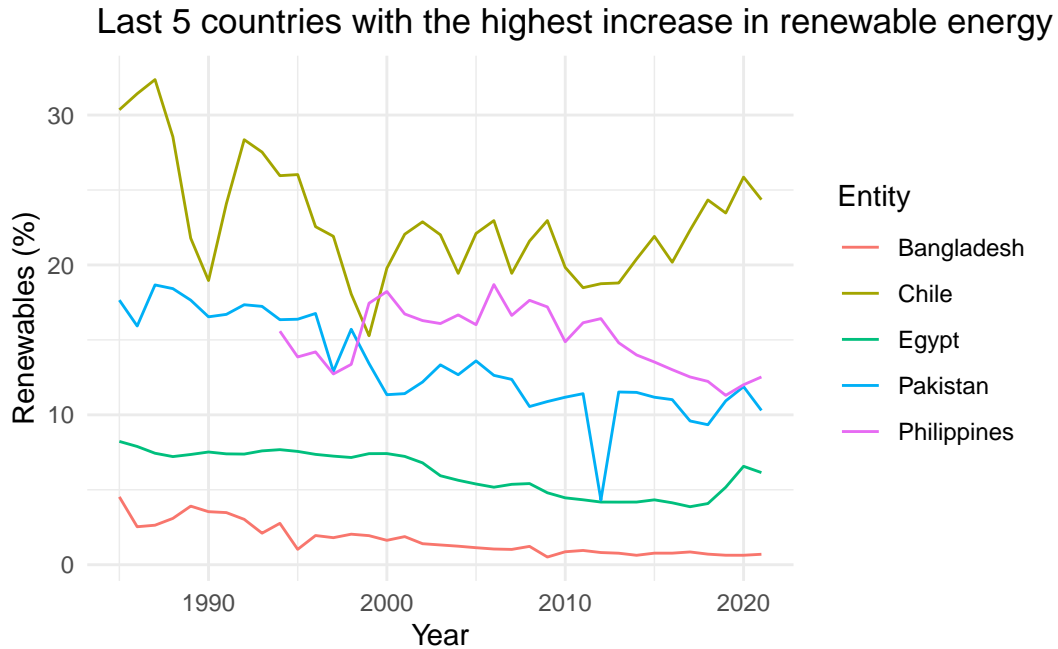


Figure 2: Last 5 countries renewable energy used increasing during the period

Reference

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