**Objective**

Our objective for this project is to highlight the global relationship between countries in the chosen dataset, and their financial dynamics surrounding the implementation of policies for a more energy sustainable world. We will consider extenuating factors outside our dataset.

**Our Dataset**

Global Data on Sustainable Energy from years 2000 to 2020

<https://www.kaggle.com/datasets/anshtanwar/global-data-on-sustainable-energy> Global Data on Sustainable Energy (2000-2020)

**Why we chose this dataset**

Sustainability and clean energy are very common terms nowadays, but they are more than buzz words.

According to the UN the rate of which the *world is advancing towards sustainable energy targets – is not fast enough. At the current pace, about 660 million people will still lack access to electricity and close to 2 billion will still rely on polluting fuels and technologies for cooking by 2030.”*

Therefore, we must make drastic changes globally, to reduce CO2 emissions and the negative impact towards climate change. We will expand furthermore on the 2030 agenda as we go along*. (UN, SDGs Agenda 2030)*

Unite Nations Sustainable Development Goals <https://www.un.org/sustainabledevelopment/energy/#:~:text=Goal%207%20is%20about%20ensuring,targets%20%E2%80%93%20but%20not%20fast%20enough>

**Are there any notable factors that promote the adoption in renewable energy year over year?**

An important driving factor in the adoption in renewable energy happened in 2015, when the UN General Assembly adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals known as the (SDGs), which includes a dedicated goal on energy, SDG 7, this is call for action to “ensure access to affordable, reliable, sustainable and modern energy for all".

SDG7 is key to the development of many human life center activities such as education, agriculture, business, communications, healthcare and transportation.

This graph provides an overview of the different sectors with the most incentives to achieve this goal.

A diagram of a sustainable development goals

Description automatically generated

**Government Policies and Incentives:** Supportive policies such as tax credits, rebates, grants, subsidies, and renewable energy targets can significantly boost the adoption of renewable energy sources.

* The Business Energy Investment Tax Credit (ITC)
* Qualified Plug-in Electric Drive Motor Vehicle Credit.
* Small Business Innovation Grants.
* Green Jobs Initiative.
* Emission Reduction Credits (ERCs)
* Green Community Grants.
* Capped Allowance Systems.

**Technological Advancements:** Advances in renewable energy technologies, such as improvements in solar panel efficiency or wind turbine design, can make these sources more cost-effective and attractive.

**Public Awareness and Demand:** Increasing awareness of climate change and environmental issues has led to a growing demand for cleaner energy sources, driving the adoption of renewables.

**Economic Factors:** As the costs of renewable energy technologies continue to decrease, they become more competitive with traditional fossil fuels, making them a more attractive option for investors and consumers.

**Corporate Sustainability Initiatives:** Many businesses are committing to using renewable energy as part of their sustainability goals, which can drive the adoption of renewables in the commercial sector.

For example, FAANG implemented Renewable Energy Milestones that many other organizations are following with major green jobs initiatives.

**Net metering**, this policy allows solar energy users to sell excess electricity back to the grid, which can lower energy prices and promote the use of solar energy.

**International Agreements:** Global agreements like the Paris Agreement have set targets for reducing greenhouse gas emissions, encouraging countries to invest in renewable energy to meet their commitments. Feed-in tariffs This scheme pays renewable energy producers a set rate per kilowatt-hour for electricity they feed into the grid. Research and development (R&D) This can help reduce costs and improve the viability of renewable energy.

**Access to Clean Fuels for Cooking vs. Access to Electricity**

A graph showing a diagram of gas prices

Description automatically generated with medium confidence

The dataset shows a **diversified or mixed progress,** for instance, the leader country in the scatter graph, Albania where 100% of its population has access to electricity, has roughly 40% access to renewables. In contrast the dataset shows Lesotho with less than 22% access to both categories. Other countries with high access percentages within the 20-year span had maintained it or even improved their access rates by 2020.

Facts around this data suggest that somecountries with consistent improved access rates may have implemented effective policies, had better infrastructure, and had success on their technology implementation and awareness campaigns efforts. In addition, the regional growth inconsistency calls for a significant need for improvement for the countries that still lagging. Efforts to address these disproportions are crucial for achieving global access towards clean energy goals.

**CO2 Emissions Distribution**

The doughnut charts show a comparison per continent. We selected the year 2000 as starting point and then compared against 2019, interesting enough our dataset did not provided data for the 2020 year (unfortunately).

A pie chart of the world

Description automatically generatedA pie chart of the country

Description automatically generated

As a result, you can see 19.89% increase in the 19-year span. Also, it is noticeable in contrast a significant increase in CO2 emissions for continents like Asia and Africa.

A white paper with black text

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[Bootcamp: DATA-PT-EAST-APRIL-041524-MTTH](https://bootcampspot.instructure.com/courses/6446), Xpert Learning Assistant

**Electricity Generated by Source**

This graph shows the progression of electricity generated by the 3 types of energy over 20 years in terawatt hours (unit of energy representing trillion-watt hours).

A graph showing the growth of the earth

Description automatically generated with medium confidence

Under the electricity from renewables our dataset did not make a distinction on the type of renewables, the mixed renewables include solar, wind, hydropower and bioenergy among others.

As you can see there is a progressive increase across the board, and is encouraging to see renewables gaining ground, but still ways to go.

A graph of energy consumption

Description automatically generated

There are two decrease points in our dataset:

* 1. In 2009 There was a significant decline in the global production and consumption of oil. which was impacted by a global recession. Also, you may recall the famous effects of the 2008–2010 automotive industry (bail out) US crisis.
  2. In 2020 Fossil fuels and nuclear electricity generation experience a direct impact due to the coronavirus pandemic. Lockdowns worldwide reduced the demand for gas needed for transportation and other daily activities. On the upside however the generation of renewables showed increase in that same year.

A graph of energy consumption

Description automatically generated with medium confidence

The emergence of solar energy as a viable and competitive energy source has played a significant role in the transition towards a more sustainable and renewable energy future. It has diversified the energy mix, reduced greenhouse gas emissions, and provided opportunities for individuals, businesses, and communities to generate their own clean energy.

Below is a detail bar graph with the top 10 countries higher energy producers and their participation.

A graph with different colored bars

Description automatically generated

A graph of electricity consumption

Description automatically generated with medium confidenceOverall, the data comparison for two decades highlights both progress and challenges in ensuring widespread access to clean fuels for cooking globally. Continued efforts and investments are needed to address the remaining gaps and ensure that all populations have access to clean and sustainable cooking options. indicating the need for further infrastructure development and investment.

Recession drove 2009 energy consumption lower. <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/recession-drove-2009-energy-consumption-lower.html>

Effects of the 2008–2010 automotive industry crisis on the United States. <https://en.wikipedia.org/wiki/Effects_of_the_2008%E2%80%932010_automotive_industry_crisis_on_the_United_States>

[Global Energy Review 2021](https://www.iea.org/reports/global-energy-review-2021) <https://www.iea.org/reports/global-energy-review-2021/renewables> Assessing the effects of economic recoveries on global energy demand and CO2 emissions in 2021.