Introduction

Introduction

Global consumption of renewable energy has increased significantly over the last two decades. Consumption levels nearly reached 45.18 exajoules in 2022. Despite its rapid growth, renewable energy consumption still remains far below that of coal, natural gas, oil and other energy technologies(source: statista.com[1]).Green energy plays a major role because it helps limit the deterioration of the earth and improves people's lives. Therefore, renewable energy sources are adopted by many countries as a sustainable and eco-friendly way to produce electricity and decrease the amount of harmful substances released to the environment. Modern developed countries with high income per citizen are establishing a large number of new green energy sources. Despite an increasing trend toward switching from fossil-fuel based energy to alternative energy, a lot of underdeveloped countries do not have access to these technologies. According to the World bank source information, Haiti remains the poorest country in the Latin America and the Caribbean (LAC) region and among the poorest countries in the world. In 2021, Haiti had a GNI per capita of US$1,420, the lowest in the LAC region, which averaged US$15,092. On the UN's Human Development Index, Haiti ranked 163 out of 191 countries in 2021(source: Wordlbank.org[2]). Moreover, it is stated that Haiti has substantial renewable energy potential. Nonetheless, the country faces significant challenges to gaining access to clean and renewable energy. On average, 80 percent of electricity is produced from imported fossil fuels.(source: Privacyshield.gov[3]) The problem this study addresses is the lack of green energy sources in low-income countries.

Research Question(s)

- What is the relationship between low-income Haiti country and the usage of renewable energy sources? What is the correlation, and how does the data relate to each other?

References

[1]-https://www.statista.com/aboutus/our-research-commitment

Target
7.2

EDA

Discussion

Findings

Conclusion

countries_gdp.csv = YUSUF GÜLCAN 2023 September World Bank Data on Countries
8.82 version . Retrieved 03.10.2023 from https://www.kaggle.com/datasets/yusufglcan/country-data/data

countries_general_information.csv = ANSH TANWAR 2023 August Global Data on Sustainable Energy (2000-2020)
10.00 version. Retrieved 13.10.2023 from https://www.kaggle.com/datasets/anshtanwar/global-data-on-sustainable-energy

countries_electricity.csv = World Bank 2023 Universal access to modern energy: https://datacatalog.worldbank.org/search/dataset/0037712/World-Development-Indicators [Dataset]. In *share-of-the-population-with-access-to-electricity*. https://ourworldindata.org. https://ourworldindata.org/sdgs/affordable-clean-energy

Exploratory Data Analysis

Data Selection:

Demonstrate your understanding by answering the following questions:

- Which data is exist in the world?
- Which data is needed?
- How the data can be acquired?

1.There are a numerous sources of information regarding investments in green energy in Haiti. The most reliable and significant source is SDG website with SDG indicators

2.The universal access to the electricity in Haiti and other countries, investments in green energy over the years, the total wealth of other countries, and their growth in gaining the access to the power.

3.We need to import the csv files from SDG website and also get the csv or excel workbooks from other websites with necessary information. Also a lot of data was acquired from Kaggle Database

Data Cleaning & Transformation:

Demonstrate you can apply your understanding by answering the following questions:

- Which data needs to be cleaned an why?

1. Gathering Data from Kaggle Datasets or SDG csv files require to properly assess what information should be included and which form should it have in the final presentation
2. I cleaned it using the built-in Power BI formatting tools and also by excluding some data using Pandas and Numpy in Python
3. In order to have certainty that my data is robust and solid I have taken several steps. In Power Bi I used Power Query's options to find any errors like columns data distribution, minimum values, maximum values, medians, means. Moreover I paid attention to find any missing values or blank cells in Power Bi's imported dataset. Furthermore, in Python I tried to merge some tables to be sure that there is a concise and continuous list of consecutive values in dataset

Data Analysis:

Evaluate your data by answering the following questions:

- What does the data distribution tell you for each variable of interest?
- What do the summary statistics tell for

1.The data distribution clearly indicates that there is significant shortage of universal's access of energy is some underdeveloped countries like Haiti. Underdevelopment could be an effect of very low GDP per Capita in Haiti. Especially compared to other North America countries.

2.The access of energy is very low and most of the electricity comes from fossil fuels imported and not from renewable energy sources. Moreover, the charts present not that substantial increase of that indicator over many years. On top of that, the GDP per Capita still is one of the lowest compared to the whole word. That provides the general overview of the Haiti's financial situation.

Discussion

Considerations in interpreting the data:

The problem I have taken into consideration requires going through thorough analysis from various perspectives. The conundrum of trying to find all the factors causing the lack of proper renewable energy infrastructure is complex and complicated. Undeniably, GDP per capita and universal energy access could provide some idea of the causation of the issue. Also, associating the investments in green energy in Haiti with the change in renewable energy generation capacity per capita could be helpful to draw conclusions. Nonetheless, there are multiple factors causing this phenomenon that cannot be measured, such as substantial inequality in Haiti. On the other hand, not all data is reliable or even exists publicly at all, like Haiti's government money distribution data. Thus, the conclusion is not a statement, but a possible reason why this problem exists. Moreover, gathering the data is a crucial step in starting to find an approach to minimize the issue. It is essential to find any inappropriate data or outliers that could distort the perspective. Also, it is necessary to properly assess the data's distribution and create a clear way of visualizing it.

Recommendations for future analyses & data-driven decisions:

Based on the facts and thorough analysis, I believe that there is a correlation between the wealth of Haiti and their energy access. Moreover, as the GDP per capita increases, the same applies to access to electricity among citizens. On the other hand, other calculated relationships show different perspectives. Haiti has received some substantial investments in alternative energy, for instance 50 million dollars in 2015. Despite that, the correlation is almost neutral, which indicates that investments did not rise the green energy generation capacity. Moreover, the correlation between GDP per capita and renewable energy sources is near

MY RESEARCH PROJECT

What is the relationship between low-income Haiti country and the usage of renewable energy sources? What is the correlation, and how does the data relate to each other?

Most important questions to ask:

1.What is current electricity situation globally and in Haiti?
2. Is Haiti wealth and have potential resources to invest in green energy?
3.How strong is the relationship between Haiti's access and their GDP Per Capita?
4.What is Haiti usage of renewable energy sources?
5.What is the relationship between renewable energy production and GDP Per Capita?
6.How investments in green energy in Haiti affect their energy production from renewables?

ANSWERS

1.QUESTION

2.QUESTION

3.QUESTION

4.QUESTION

5.QUESTION

6.QUESTION

Conclusion

Create a clear summary of your research leading up to your conclusion:

1. A summary of the problem and research question
The problem I discussed in my presentation was related to low-income Haiti and its access to renewable energy sources. The main goal was to determine whether there is some connection between GDP per capita and the usage of renewable energy sources.

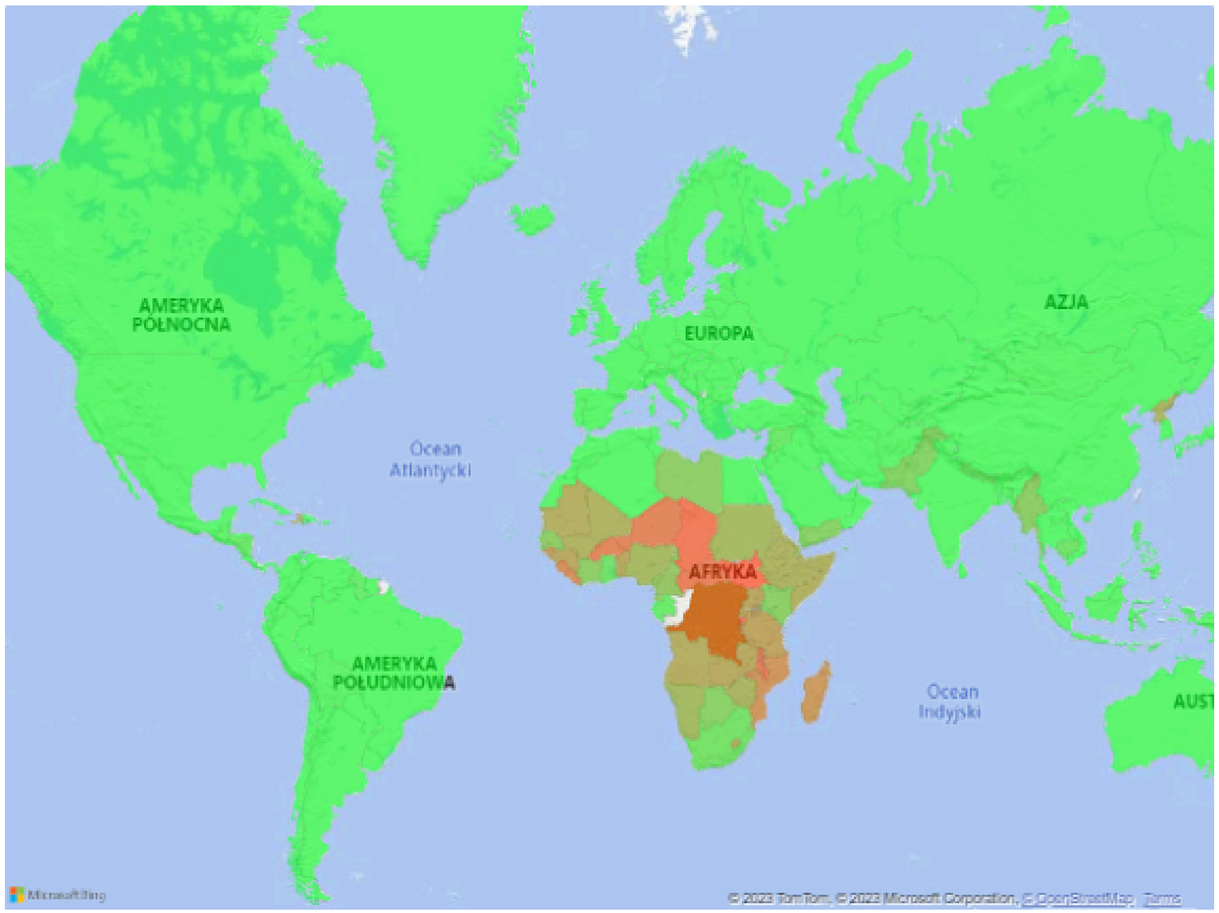
2. The findings of the EDA
The data about electricity access and production was abundant. There were various resources, like SDGTracker or many Kaggle datasets. The data indicated how the values were changing over the years and how it affected other areas of my research question

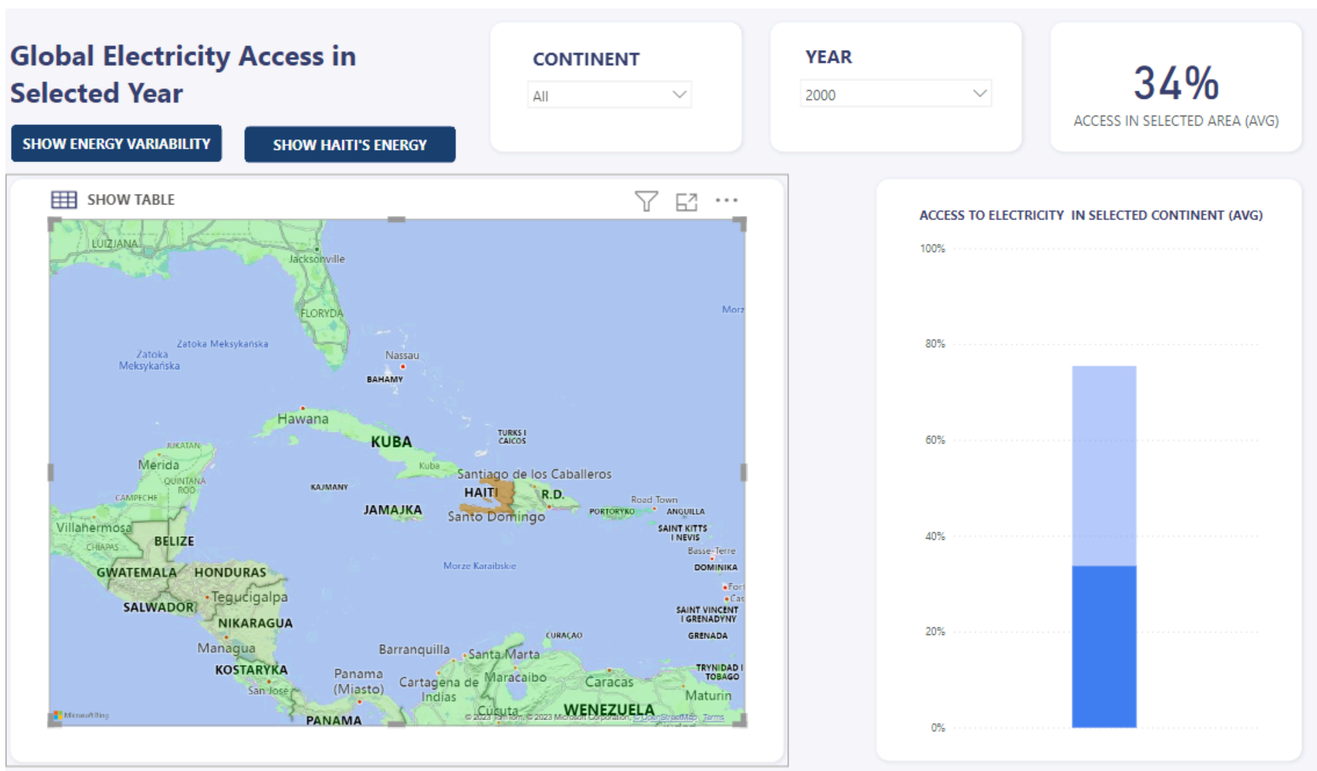
3. Your interpretation of the EDA
I personally think that there is a strong connection between GDP per capita and universal electricity access in Haiti, but no relationship between GDP per capita and the production or usage of green energy. The data states that there are other countries where the GDP per capita subsequently leads to the creation of new solar panels, wind turbines or other alternative energy machinery. Also, the amount of investment in green energy in Haiti did not substantially affect the renewable energy generation capacity per capita, which proves that this phenomenon is varied and complex

1.What is current electricity situation globally and in Haiti?

NEXT QUESTION

In order to explore this question, I provided both a map and a table version of universal access to electricity
Both visuals clearly indicate the lack of that access in Haiti. The data range is from 2000-2020
Data states that in 2020, only 47% of Haitians actually had access to energy, which is significantly low compared to Europe, where almost every country has a 100% rate of access

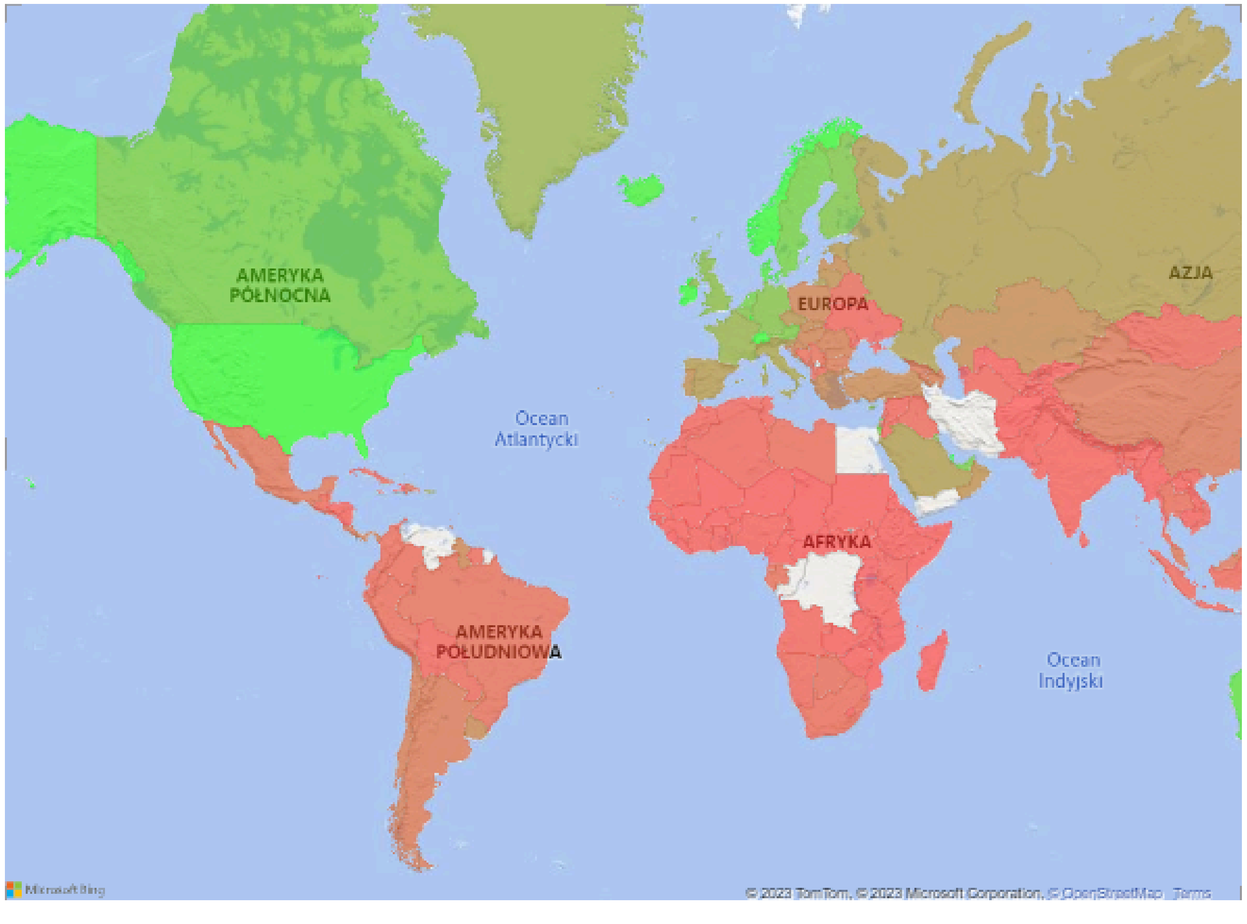


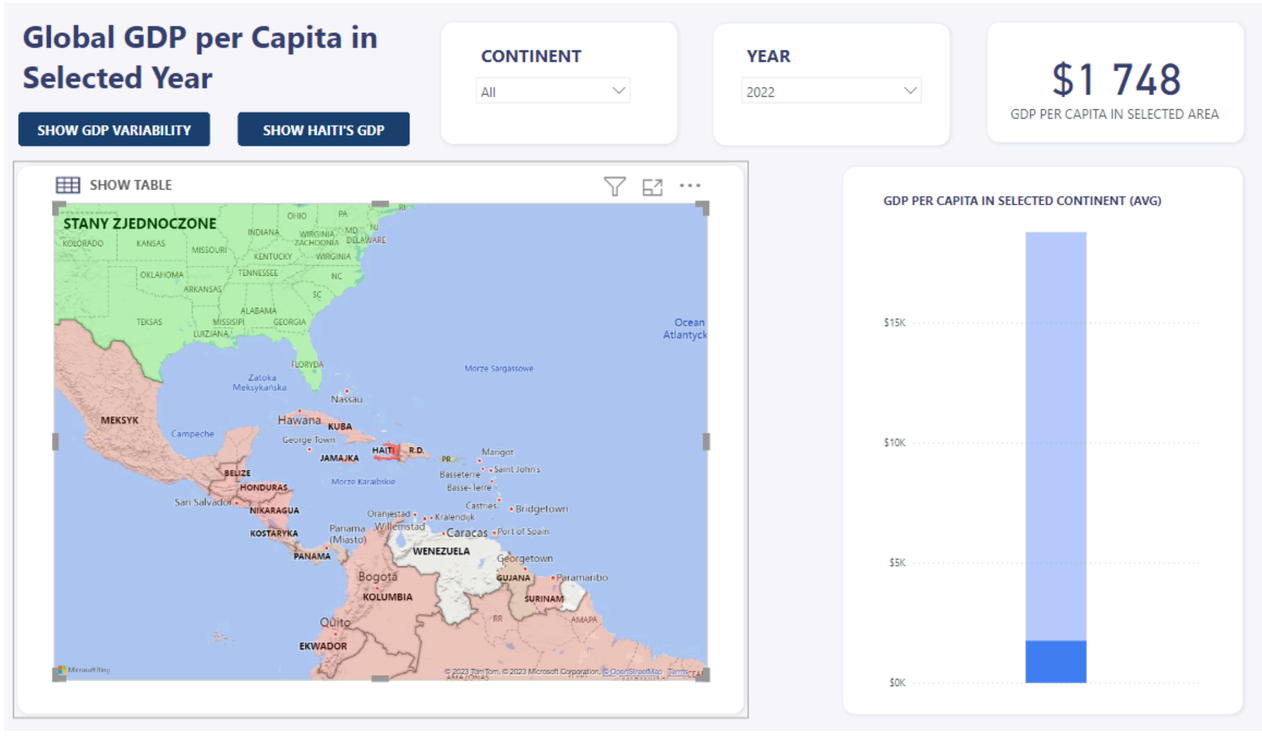


NEXT QUESTION

2. Is Haiti wealth and have potential resources to invest in green energy?

A similar situation and conclusion are made in this section, where Haiti stands out by having one of the lowest GDP per capita in the whole world. The data range is from 2000-2022. It is also noticeable that the countries in Africa and South America struggle to reach the upper levels of GDP per capita.
Haiti in 2022 had only 1748 dollars of GDP per capita, whereas the average for the whole North American continent is 24 000 dollars GDP per capita, and in Europe this value is 39 000 dollars GDP per capita. That is why the Haiti is often called one of the poorest countries, which definitely is not helping with the issue of increasing renewable energy sources

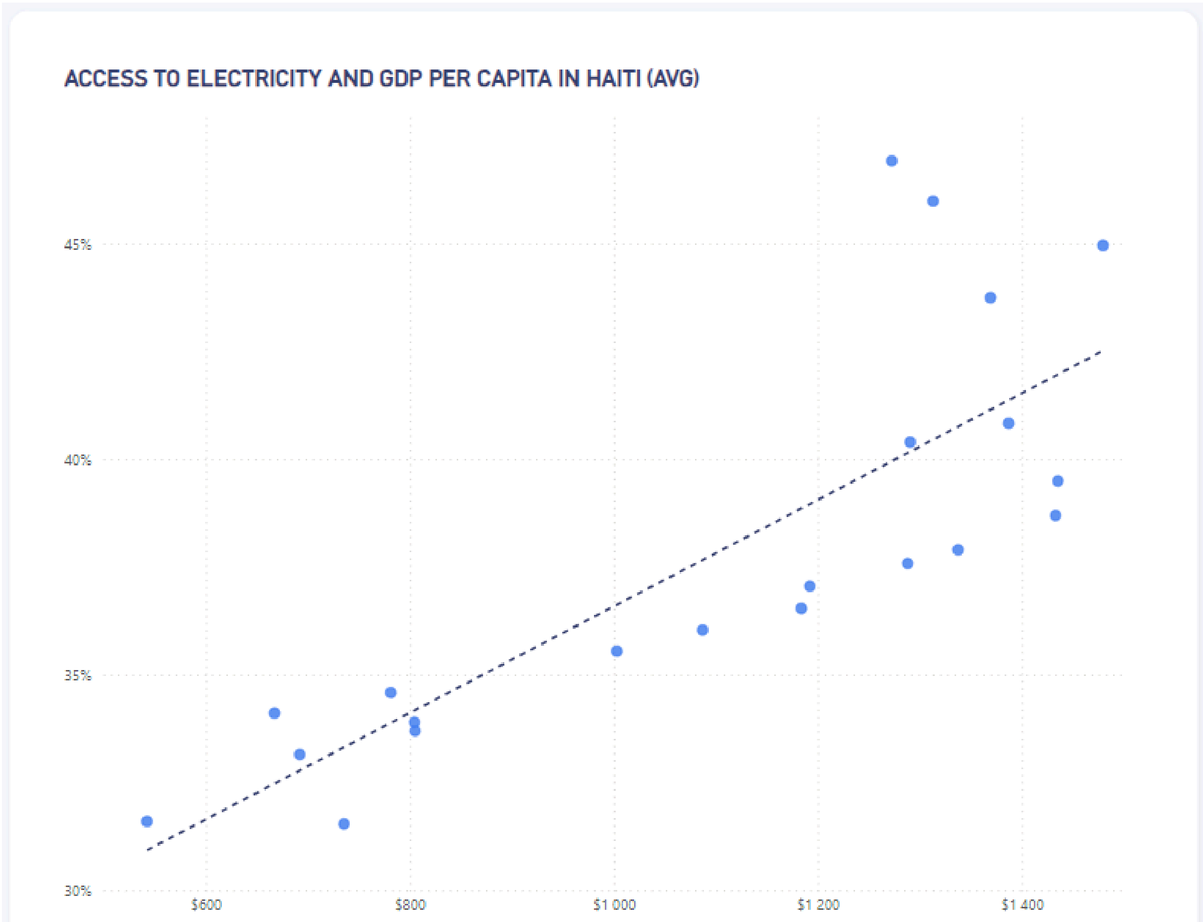




NEXT QUESTION

3.How strong is the relationship between Haiti's access and their GDP Per Capita?

The correlation coefficient allows us to check whether there is a strong relationship between Haiti's low access to electricity and their low level of GDP per capita. The mathematical formula gives a valuable insight: the higher the GDP per capita, the better the access to electricity. The data range is 2001-2019



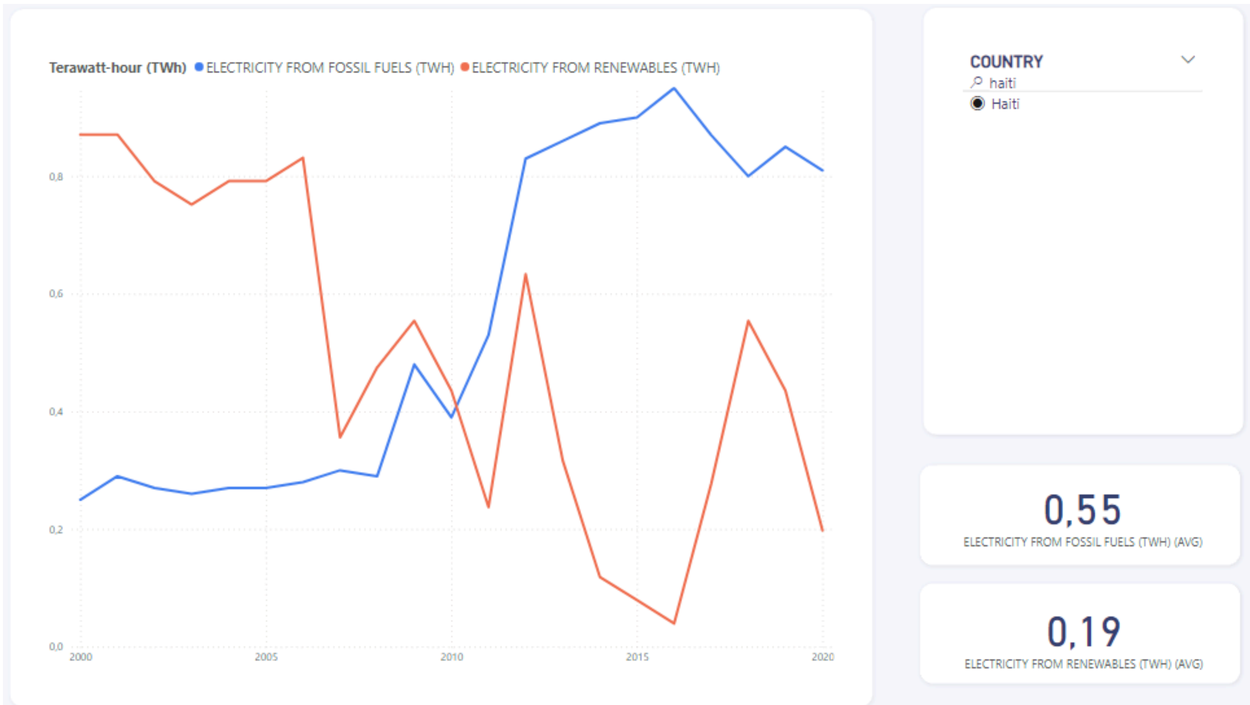
0,81

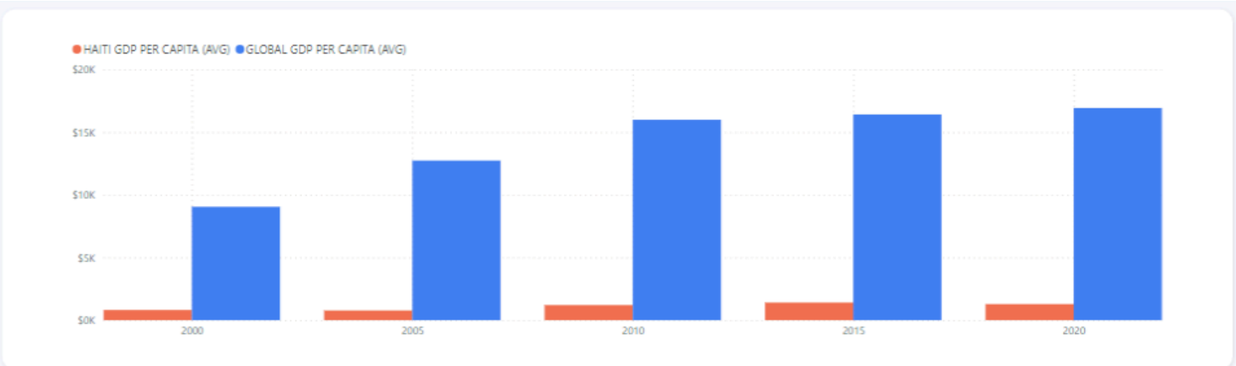
CORRELATION COEFFICIENT ELECTRICITY VS GDP PER CAPITA

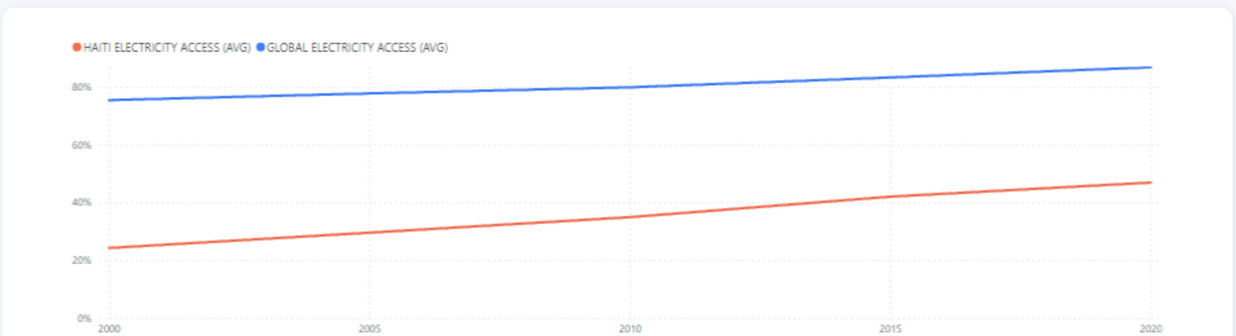
NEXT QUESTION

4.What is Haiti usage of renewable energy sources?

As the left chart presents, the usage of renewable energy alternatives is not increasing, but the importation of energy from fossil fuels is a popular phenomenon. This proves how many investments and proper management Haiti requires. On the other hand, the right slide states that Haiti is extremely low on electricity compared to the average of the world over the years. This is the country that definitely needs help so that people living there can start to thrive and live at a decent level. The data range 2001-2019 on the left slide and 2000-2020 on the right slide

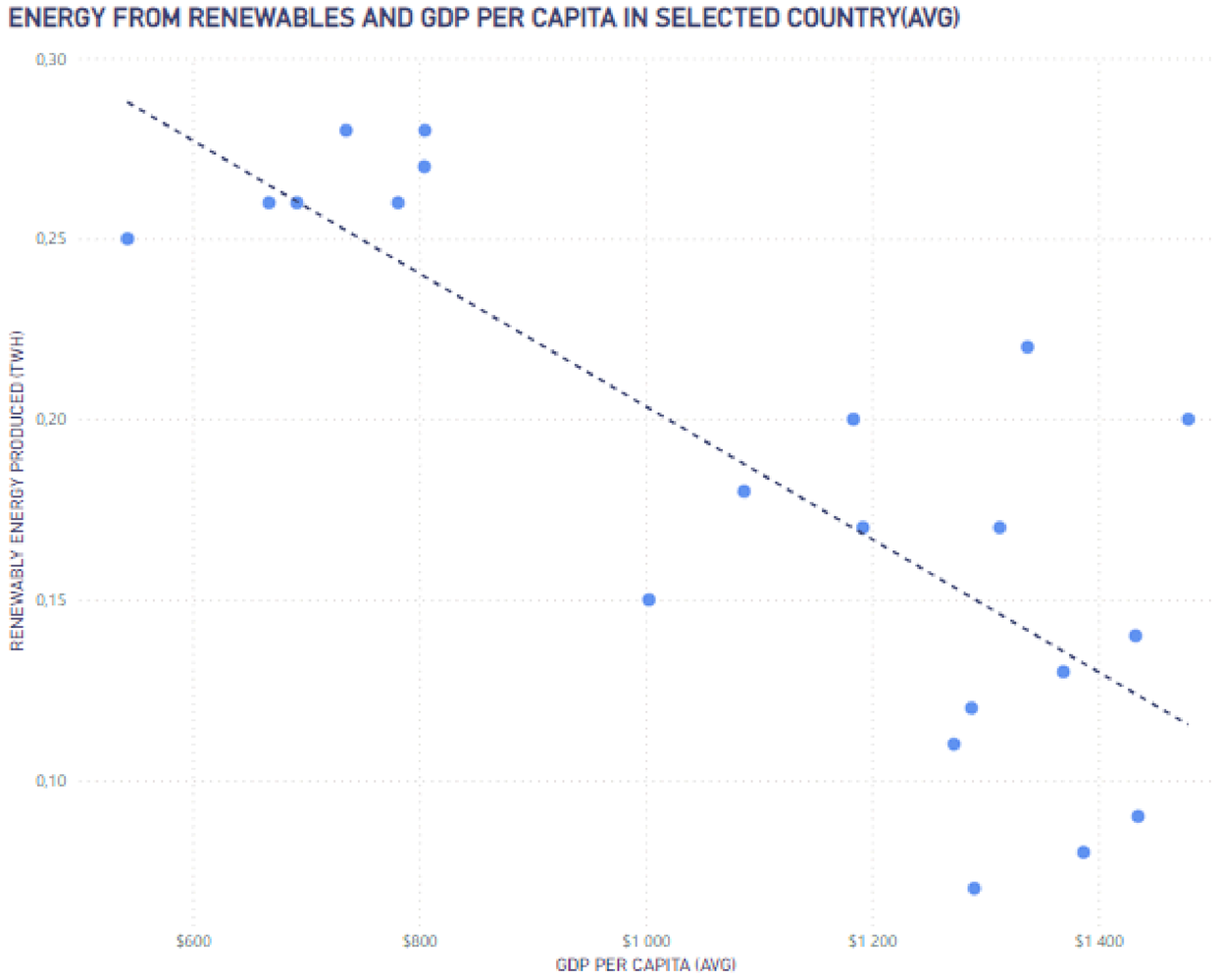


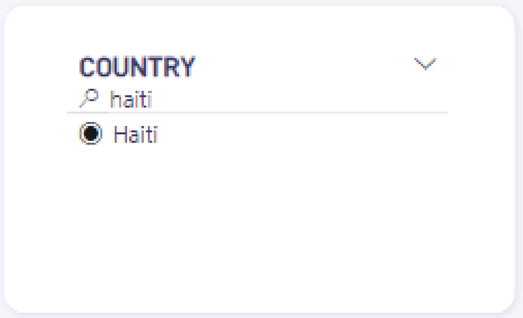


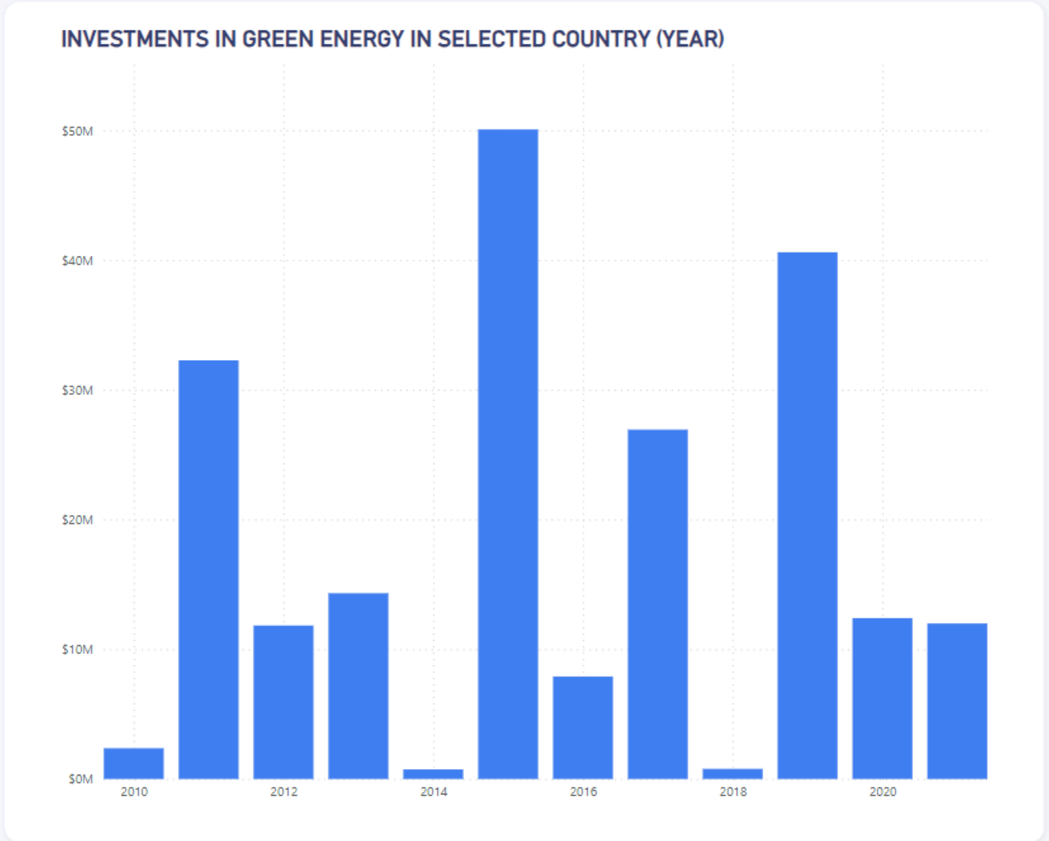
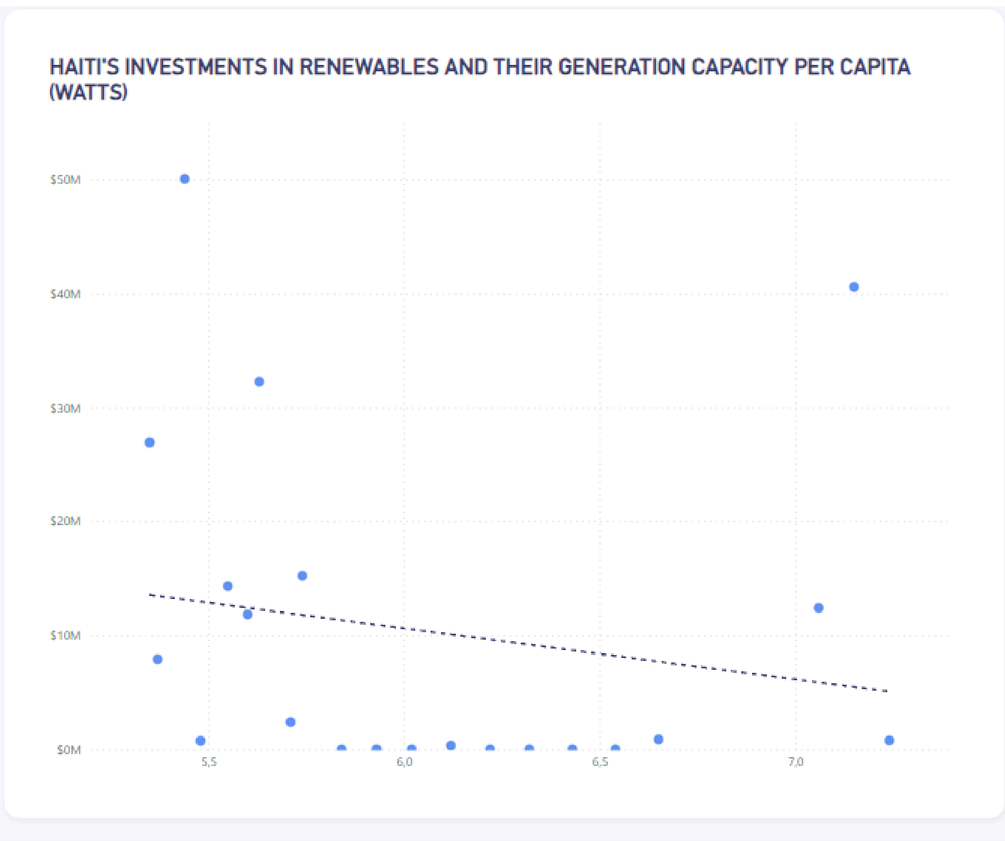


5.What is the relationship between renewable energy production and GDP Per Capita?

As the data shows, in Haiti, the increase in GDP per capita is not associated with an increase in renewable energy production. This conclusion could be quite untypical due to the correlation coefficient chart presented earlier, where the GDP per capita was going up at the same rate as universal electricity access in Haiti. This could lead to the conclusion that it could be a matter of the government's money distribution. The supporting argument for that thesis is in the answer to question 6. The data range is 2001–2021.





6.How investments in green energy in Haiti affect their energy production from renewables?

The data below states that Haiti has received some major investments toward increasing the use of green energy alternatives. Especially in 2015, when Haiti gained over 50 million dollars. Nonetheless, as the right charts suggest, this correlation is not strong, and there is no clear connection between the investments in renewable energy sources and green energy generation capacity per capita in watts. This is the supporting argument for future analyses of the government's money distribution and other related factors