HOW COUNTRIES USE ELECTRICITY

BY VERA EMEREUWA
HAMOYE ID: 120850d9b101f000

INTRODUCTION

Electricity is used most commonly in buildings for lighting and appliances, in industrial processes for producing goods, and in transportation for powering rail and light-duty vehicles. According to the Statista, The world's electricity consumption has continuously grown over the past half a century, reaching approximately 23,900 terawatt-hours in 2019. Between 1980 and 2019, electricity consumption more than tripled, while the global population increased by roughly 75 percent. Growth in industrialization and electricity access across the globe have further boosted electricity demand.

AIM AND OBJECTIVE

This project was carried out to analyze how countries use electricity and note the possible causes why countries have high energy consumption and why other countries use lesser electricity.

DATA

Data was obtained from Wikipedia.

METHODOLOGY

First, The data was scraped using the python library named BeautifulSoup

```
from urllib.request import urlopen
from bs4 import BeautifulSoup
```

In [3]:
```
url = 'https://en.wikipedia.org/wiki/List_of_countries_by_electricity_consumption'
html = urlopen(url)
```

The first 10 columns of the dataset were displayed

In [6]:
```
tables = pd.read_html(url)
print(len(tables))
tables[0].head()
```

2

Out[6]:

	Rank	Country/Region	Electricity consumption (GW·h/yr)	Year of data	Source	Population	As of	Average electrical energy per capita (kWh per person per year)	Average power per capita (watts per person)
0	—	World	23398000	2018 est.	EIA[4]	7800000000	2018	3081.0	350.0
1	1	China	8312800	2021	ENGLISH.GOV.CN[5]	1412600000	2021	5885.0	671.0
2	2	United States	3989566	2019 est.	EIA	328200000	2019	12154.0	1387.0
3	3	India	1547000	2018 est.	CSO[6]	1384660000	2019	935.0	107.0
4	4	Russia	965156	2019 est.	EIA	146700000	2019	6685.0	763.0

Data Cleaning was done by dropping some unimportant columns for the analysis and by renaming some column names.

DATA CLEANING

In [74]:
```
#renaming some columns
df.rename(columns= {'Country/Region': 'Country', 'Electricity consumption (GW·h/yr)' : 'Electricity consumption'}, inplace = True
```

In [75]:
```
#changing the data type of Electricity consumption from object to float
df['Electricity consumption'] = pd.to_numeric(df['Electricity consumption'],errors = 'coerce')
```

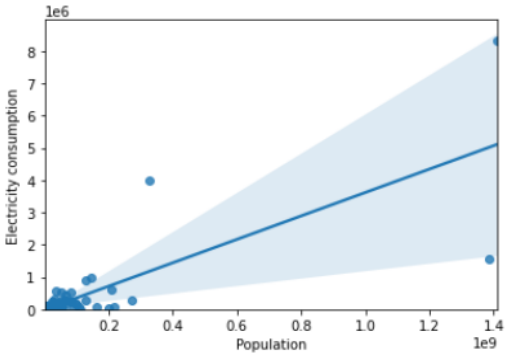
In [76]:
```
#dropping unimportant columns
df.drop(columns = ['As of','Year of data', 'Source'], inplace = True )
```

In [37]:
```
#dropping the first row
df.drop([0], axis = 0, inplace = True )
df
```

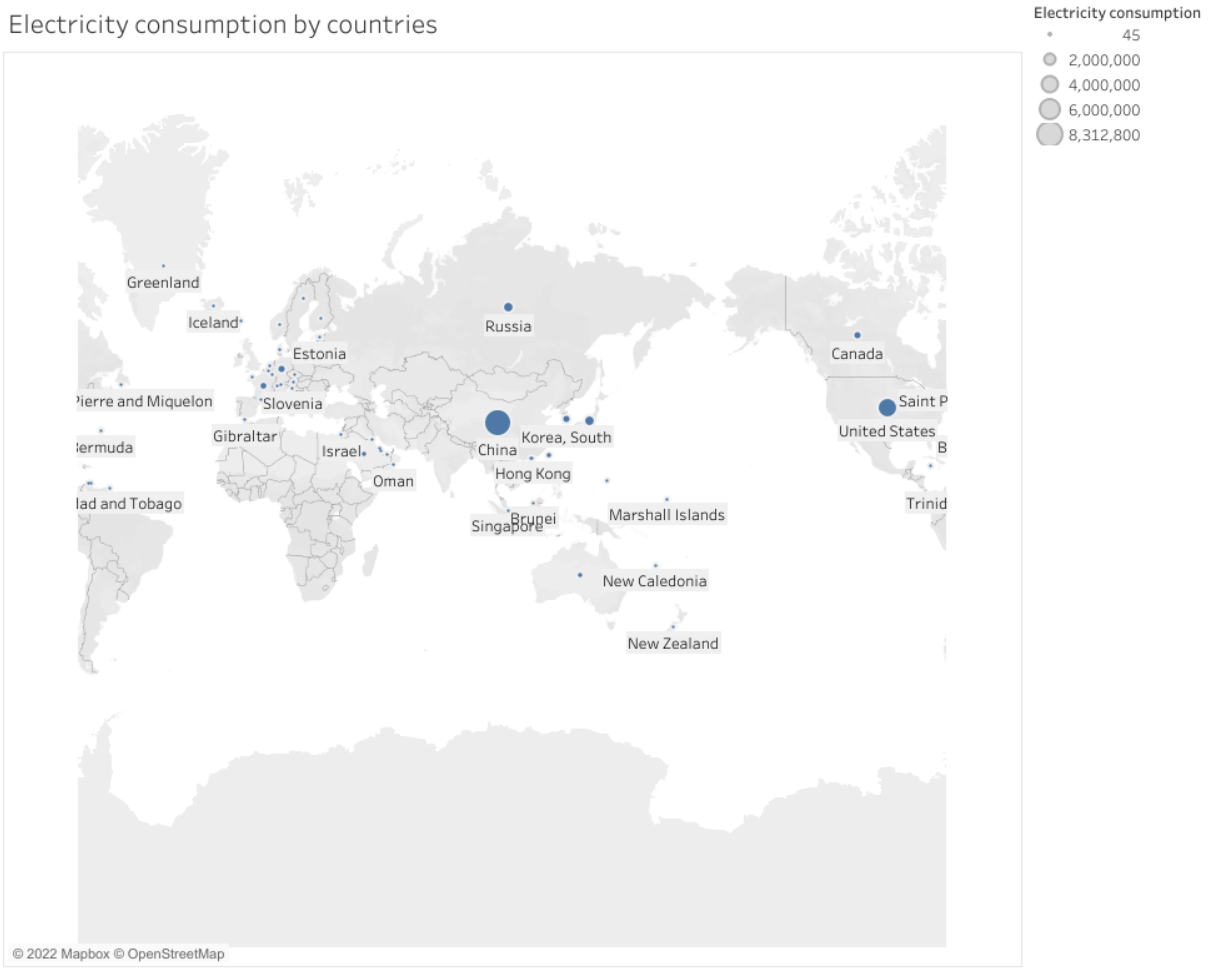
Scatter plots were drawn to determine the features that have a relationship with Electricity consumption. It was discovered that only the Population feature has a positive relationship with Electricity consumption with a high correlation value of **0.788**.

```
In [40]: sns.regplot(x= 'Population', y= 'Electricity consumption', data=df)
         plt.ylim(0,)

Out[40]: (0.0, 8974067.782414733)
```

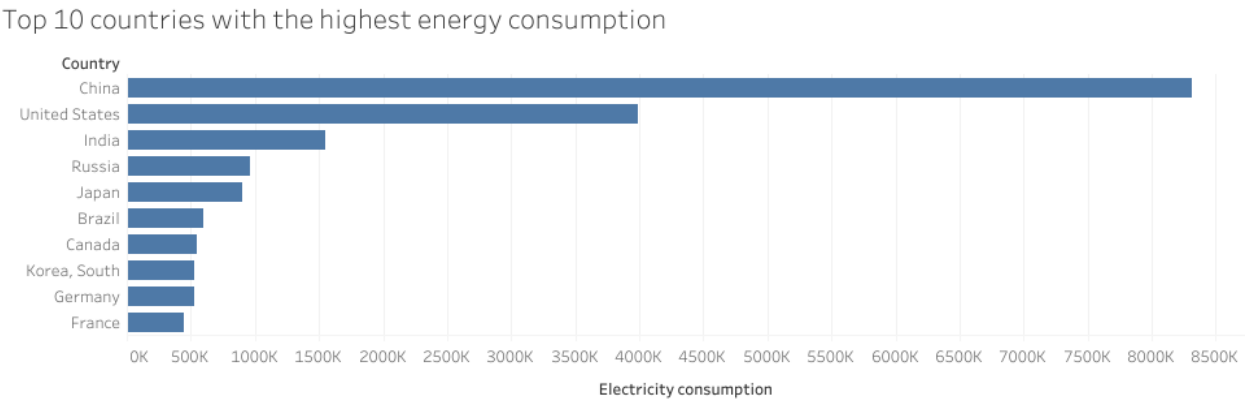


To visually show the country with the greatest energy consumption, let's look at the map below

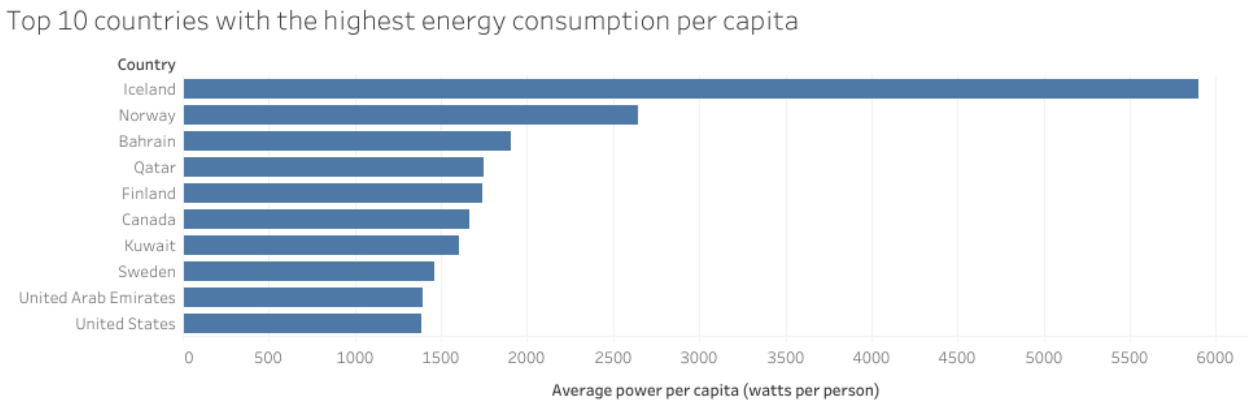


This map shows the top 20 countries in electricity consumption. No African country is seen, including those with a very high population.

The chart below shows the top 10 countries that consume the most electricity with China, leading by consuming about 8 million kilowatts, followed by the United States, consuming approximately 4 million kilowatts.



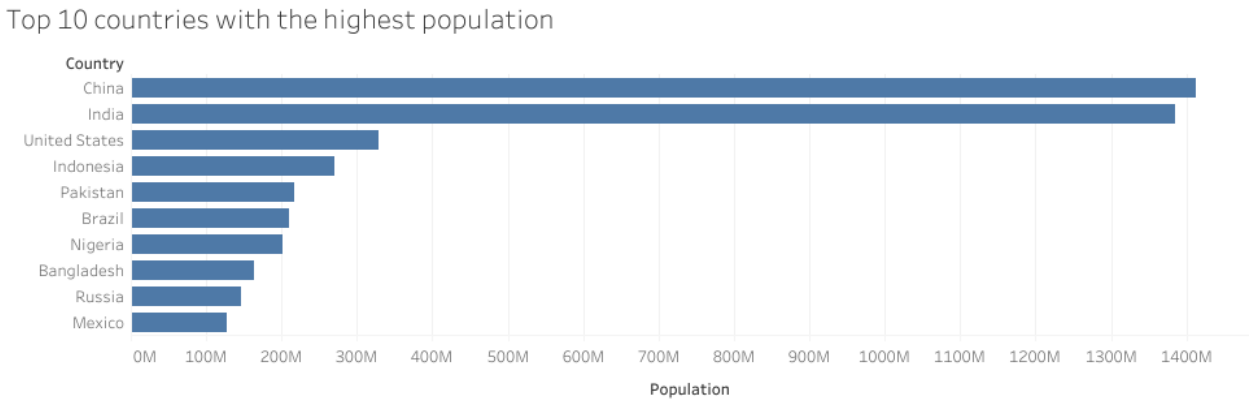
It is normal to assume that as China is the country with the highest electricity consumption, it would also be the same for energy use per person. Unfortunately, this is not the case. Iceland as seen in the figure below, is the country that consumes the most electricity per capita. This results from a combination of factors, such as low-cost electricity production, attributed to the abundance of renewable energy sources(hydropower and geothermal energy) and the presence of energy-intensive industries in the country.



Most of China's energy used is by industry. So that energy is embedded in products they export around the world.

Earlier, from the scatter plot, it was said that the population has a positive relationship with electricity consumption.

The plot below displays the top countries with the highest population. Some of the countries with high populations like Nigeria, Bangladesh, Pakistan did not rank among the top 10 electricity consumers.



It is true that as there is an increase in population, there is also an increase in Energy consumption, but this might not be true for underdeveloped and developing countries. The

reason why these poor countries with high populations use less electricity could be because they rely on traditional biomass – crop residues, wood and other organic matter that is difficult to quantify.

CONCLUSION

- China is the country with the highest energy consumption
- The country with the highest energy consumption per person is Iceland
- Despite having high population, countries like Nigeria and Pakistan still have very low electricity consumption
- African countries are still underdeveloped, as none of the countries are among the top 20 countries with the most electricity consumption

REFERENCES

Wikipedia- *https://en.wikipedia.org/wiki/List_of_countries_by_electricity_consumption*
Statista- *https://www.statista.com/statistics/267081/electricity-consumption-in-selected-countries-worldwide/*