Creating a Choropleth Map to Represent Total Renewable Energy Production and Consumption across the World

We will be working with the **Renewable Energy Consumption and Production** datasets from Our World in Data. These datasets are available on Moodle: **share-of-electricity-production-from-renewable-sources.csv** (the production dataset) and **renewable-energy-consumption-by-country.csv** (the consumption dataset). Your task is to create choropleth maps for the total renewable energy production and consumption across different countries in the world animated based on the production/consumption years between (excluding) 2007 and 2017.

High-level steps

1. Load the **renewable energy production** dataset.
2. Sort the **production** DataFrame based on the **Year** feature.
3. Generate a choropleth map for renewable energy production using the **plotly express** module animated based on **Year**.
4. Update the layout to include a suitable projection style and title text, then display the figure.
5. Load the **renewable energy consumption** dataset.
6. Convert the **consumption** DataFrame to a suitable format for visualization.
7. Sort the **consumption** DataFrame based on the **Year** feature.
8. Generate a choropleth map for renewable energy consumption using the **plotly express** module animated based on **Year**.
9. Update the layout to include a suitable projection style and title text, then display the figure.

The output should be:

After Step 1-

	Country	Code	Year	Renewable electricity (% electricity production)
0	Afghanistan	AFG	1990	67.730496
1	Afghanistan	AFG	1991	67.980296
2	Afghanistan	AFG	1992	67.994310
3	Afghanistan	AFG	1993	68.345324
4	Afghanistan	AFG	1994	68.704512

Figure 6.29: Renewable sources dataset

After Step 2:

	Country	Code	Year	Renewable electricity (% electricity production)
0	Afghanistan	AFG	1990	67.730496
1668	France	FRA	1990	13.369879
1643	Finland	FIN	1990	29.451790
1618	Fiji	FJI	1990	82.441113
1593	Faeroe Islands	FRO	1990	35.545024

Figure 6.30: Renewable sources dataset after sorting by year

After Step 4-

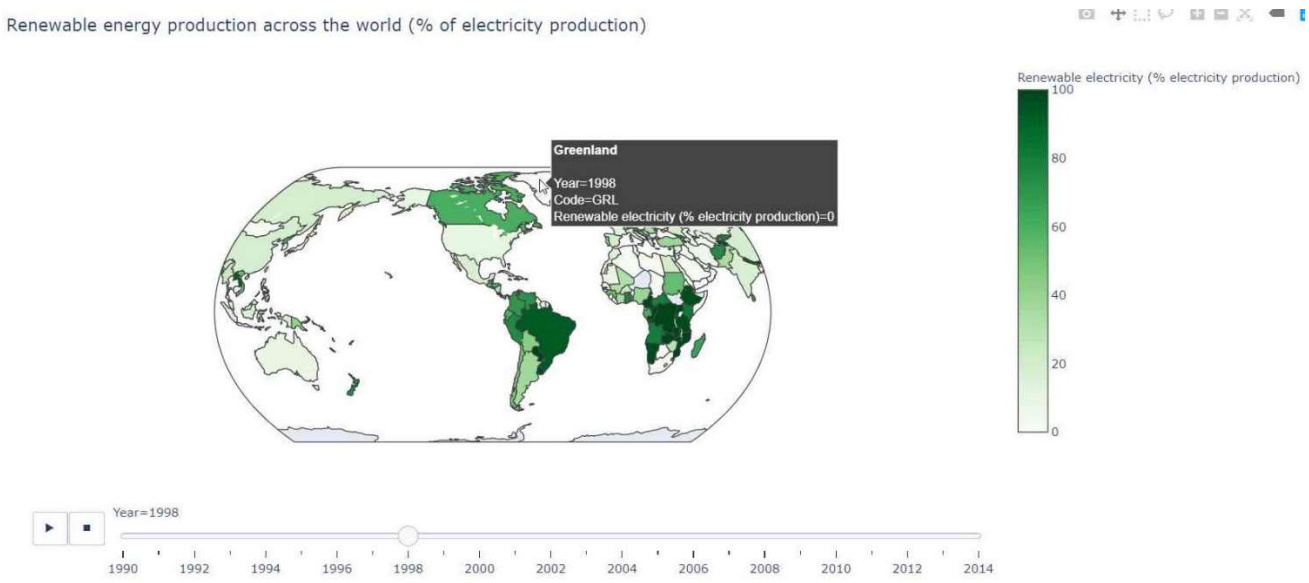

Figure 6.31a: Choropleth map showing the renewable energy production of Greenland in the year 1998

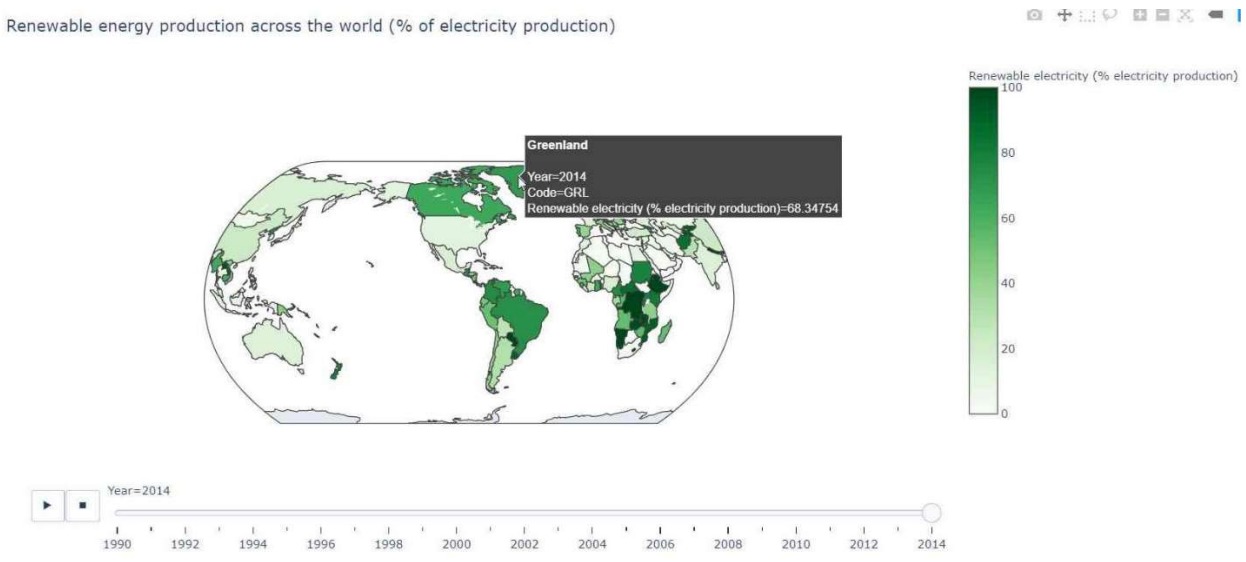

Figure 6.31b: Choropleth map showing the renewable energy production of Greenland in the year 2014

After Step 5-

	Country	Code	Year	Traditional biofuels	Other renewables (modern biofuels, geothermal, wave & tidal)	Wind	Solar PV	Hydropower	Total
0	Algeria	DZA	1965	NaN	0.0	0.0	0.0	NaN	0.0
1	Algeria	DZA	1966	NaN	0.0	0.0	0.0	NaN	0.0
2	Algeria	DZA	1967	NaN	0.0	0.0	0.0	NaN	0.0
3	Algeria	DZA	1968	NaN	0.0	0.0	0.0	NaN	0.0
4	Algeria	DZA	1969	NaN	0.0	0.0	0.0	NaN	0.0

Figure 6.32: Renewable energy consumption dataset

After Step 6-

	Country	Code	Year	Energy Source	Consumption (terrawatt-hours)
0	Algeria	DZA	1965	Energy Source	Traditional biofuels
1	Algeria	DZA	1966	Energy Source	Traditional biofuels
2	Algeria	DZA	1967	Energy Source	Traditional biofuels
3	Algeria	DZA	1968	Energy Source	Traditional biofuels
4	Algeria	DZA	1969	Energy Source	Traditional biofuels

Figure 6.33: The desired dataset after conversion

After Step 7-

	Country	Code	Year	Energy Source	Consumption (terrawatt-hours)
0	Algeria	DZA	1965	Traditional biofuels	NaN
4240	Finland	FIN	1965	Other renewables (modern biofuels, geothermal,...	0.0
17252	Chile	CHL	1965	Total	0.0
4292	France	FRA	1965	Other renewables (modern biofuels, geothermal,...	0.0
4344	Germany	DEU	1965	Other renewables (modern biofuels, geothermal,...	0.0

Figure 6.34: The dataset after sorting by year

After Step 8-

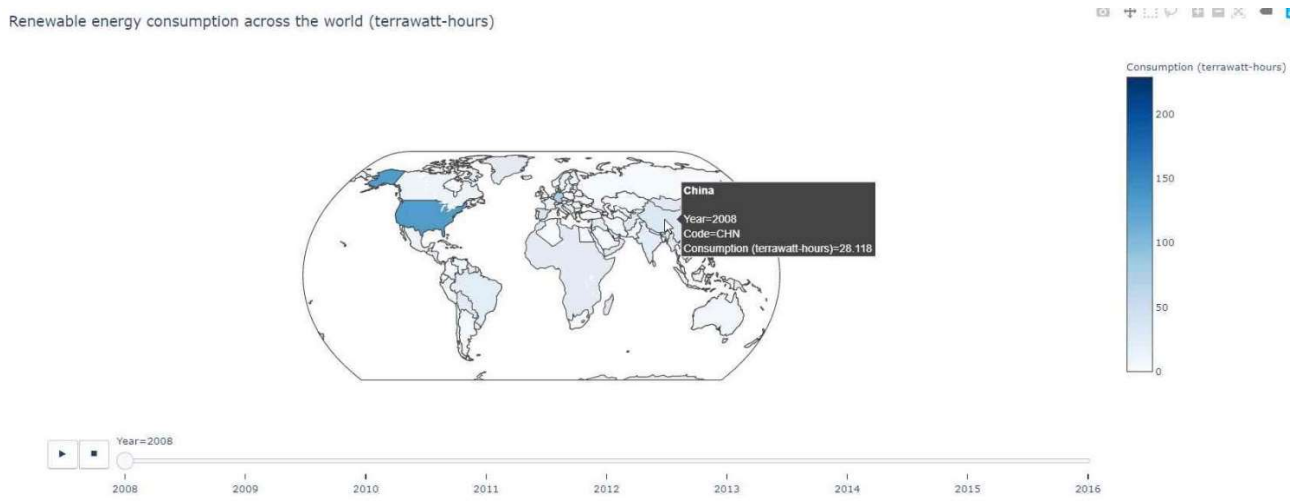

Figure 6.35a: Choropleth map showing renewable energy consumption across the world

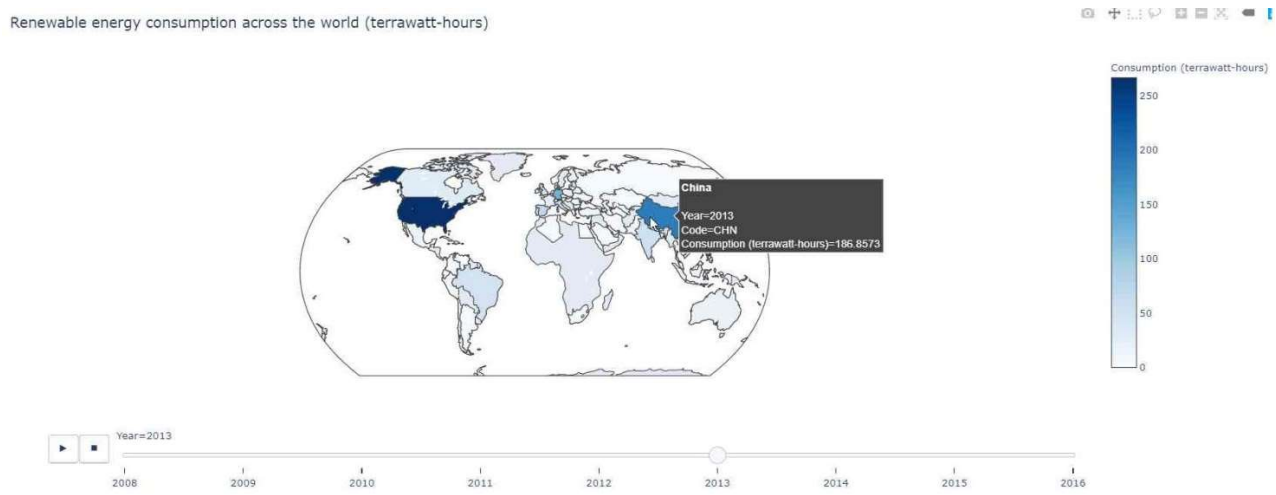

Figure 6.35b: Choropleth map showing renewable energy consumption across the world