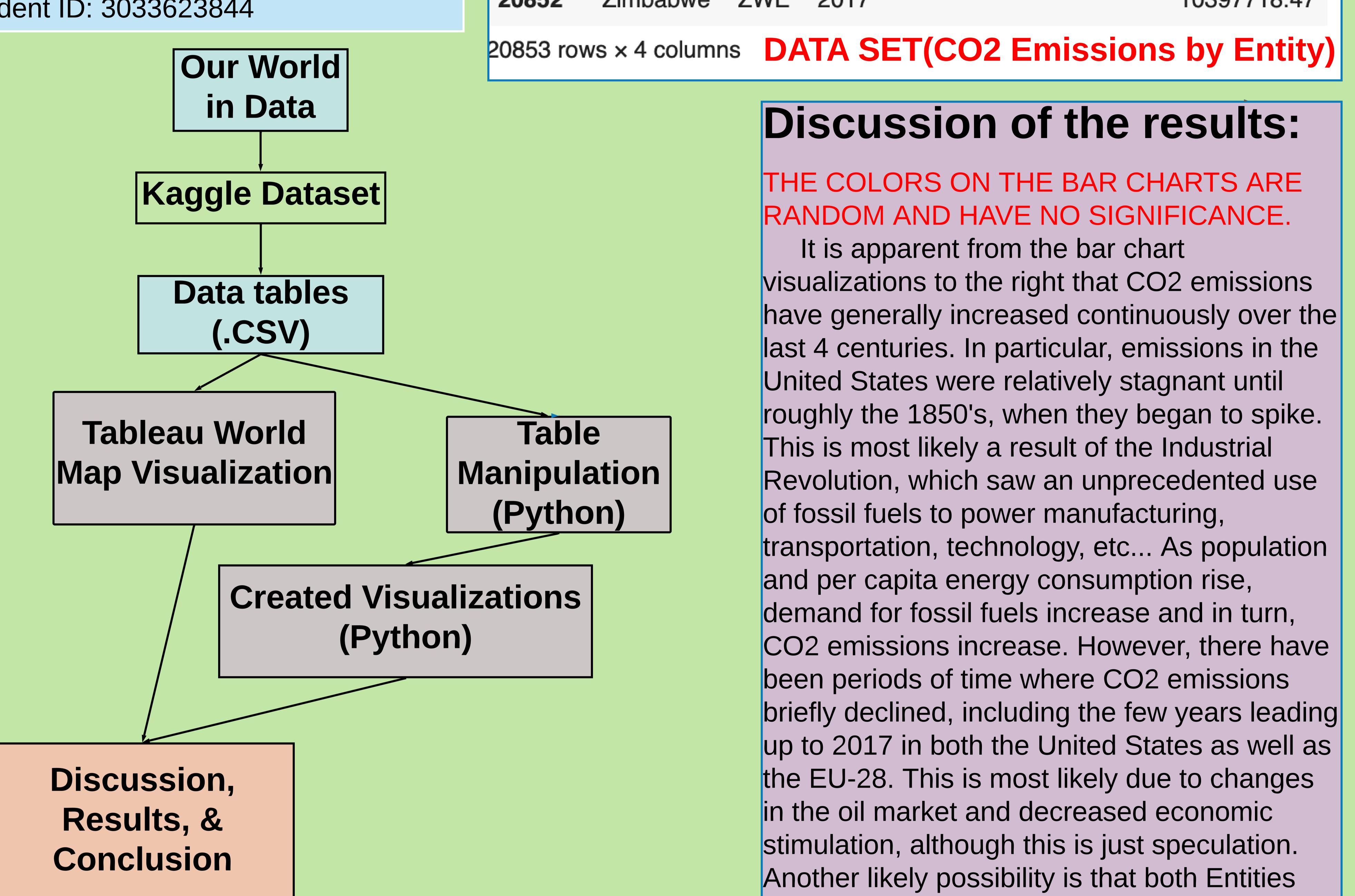
DH100 Data Storyboard

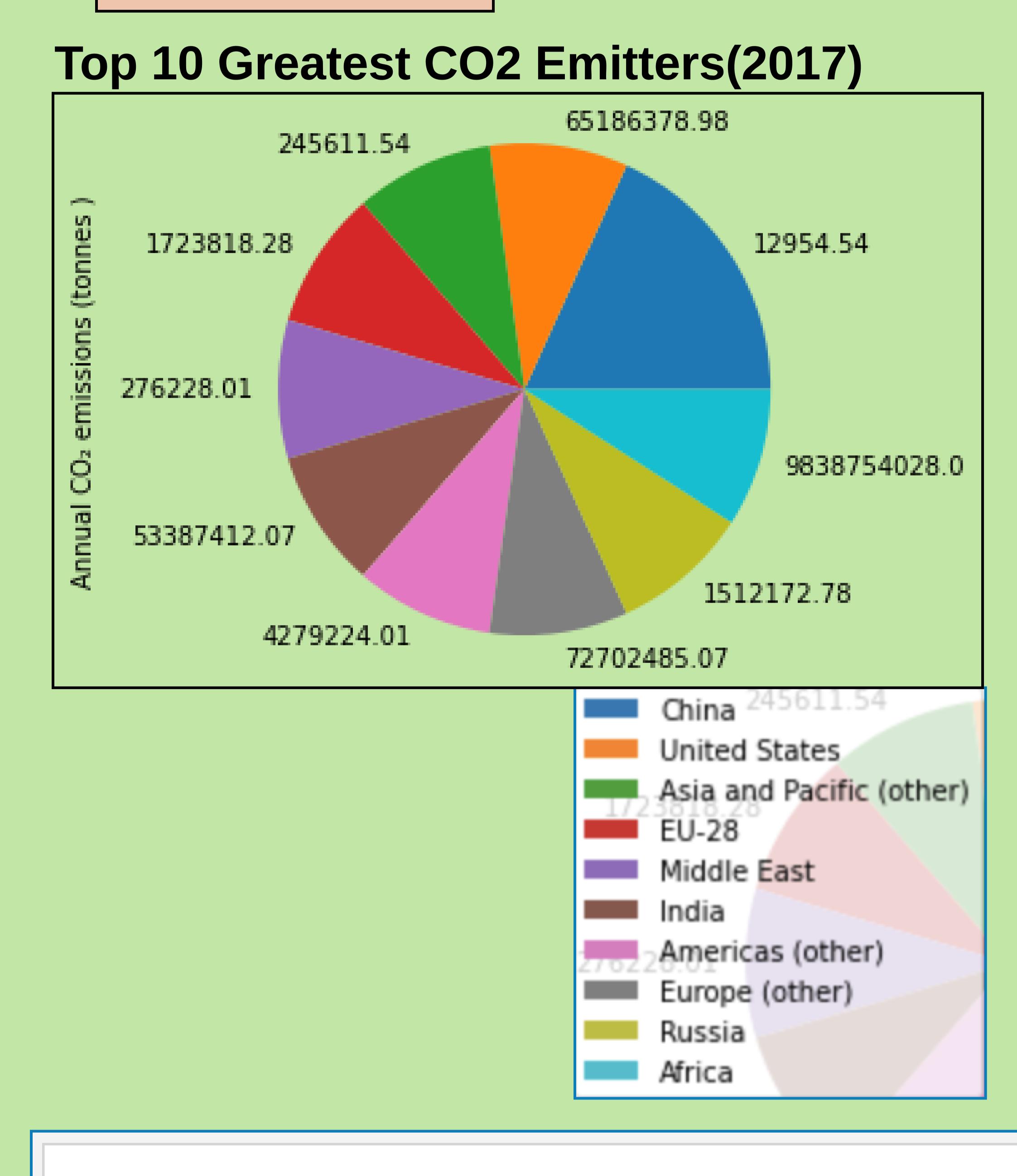
Greenhouse Gas Emissions | Student: Jacob Chow | 5/26/21

Introduction:

Carbon dioxide is the largest greenhouse gas(GHG) contributor to climate change, and the majority of the atmospheric carbon today is a result of anthropogenic sources. This project intends to track the annual carbon dioxide emissions by entity/regional location. As modern day society finds itself increasingly burdened by the impact of climate change, we must continue to substitute fossil fuels for renewable alternatives.

Course Name: Digital Humanities 100 Instructor: Dr Anderson Student: Jacob Chow Student ID: 3033623844





	Entity	Code	Year	Annual	CO ₂	emissions	(tonnes)
0	Afghanistan	AFG	1949				14656.0	0
1	Afghanistan	AFG	1950				84272.0	0
2	Afghanistan	AFG	1951				91600.0	0
3	Afghanistan	AFG	1952				91600.0	0
4	Afghanistan	AFG	1953				106256.0	0
		•••	•••				•	
20848	Zimbabwe	ZWE	2013				11536239.2	9
20849	Zimbabwe	ZWE	2014				11866348.4	·1
20850	Zimbabwe	ZWE	2015				10907603.9	4
20851	Zimbabwe	ZWE	2016				9932649.8	8
20852	Zimbabwe	ZWE	2017				10397718.4	7

Discussion of the results:

THE COLORS ON THE BAR CHARTS ARE RANDOM AND HAVE NO SIGNIFICANCE.

It is apparent from the bar chart visualizations to the right that CO2 emissions last 4 centuries. In particular, emissions in the United States were relatively stagnant until roughly the 1850's, when they began to spike. This is most likely a result of the Industrial Revolution, which saw an unprecedented use of fossil fuels to power manufacturing, transportation, technology, etc... As population and per capita energy consumption rise, demand for fossil fuels increase and in turn, CO2 emissions increase. However, there have been periods of time where CO2 emissions briefly declined, including the few years leading up to 2017 in both the United States as well as the EU-28. This is most likely due to changes in the oil market and decreased economic stimulation, although this is just speculation. Another likely possibility is that both Entities find themselves turning to more renewable solutions, resulting in a decline in CO2

The pie chart visualization to the left represents the ten largest CO2 emitters. It is important to note that not all 'Entities', or country/regions on the original data set and subsequently my visualizations, represent official countries but rather regions(ie. 'Asia and Pacific'). For this reason, some Entities such as "World" emissions data were omitted because they do not infer anything about the

Finally the world map visualization below is missing some data, in particular for the Democratic Republic of Congo. I must also acknowledge that because the majority of Entities emitted relatively low amounts of carbon dioxide(in tonnes), the color gradient is not ideally apparent.

Tools and Methods:

1) I used Kaggle/Jupyter Notebook to analyze the data. Panda was the main tool used to manipulate the

2) I began with a table sorted by country, which provides the CO2 emssions data for each country across various years. There are many countries, which is why it was difficult to visualize the emissions data per country for a given year. Instead I isolated the USA emissions data so that I could plot it over

3)Next, I isolated the CO2 emissions data for 2017 only, condensing the multiple entries for each entity into just one for each. I sorted the table by 'Annual CO2 emissions (tonnes)' in descending order. Because the Entities from the data include both countries and regions, the data was not representative of real emissions. For example, I had to emit the World Entity entry because it completely skewed the visualization. I also dropped the 'Year' and 'Code' columns to make a pie chart visualization of the ten largest CO2 emitters.

have generally increased continuously over the 4) I then used tableau to create an interactive visualization of a world map that color codes countries based off of their 2017 CO2 emissions. Darker shades of color(blue) indicate an entity with comparatively large carbon dioxide emissions in 2017, and vice versa for entities with lighter shades of

Descriptions:

1) Dataset - The data set I will work with is provided by Kaggle. It is Carbon Dioxide Emissions Data. Entries are organized by 'Entity', which represents a country/region for various years(1750-2017). The data is not available for all Entities, which will of course limit the analysis. I will only choose to work with comprehensive data and all omitted entries/data will be acknowledged.

2) This data analysis will only analyze the carbon emission sources, and not analyze the impact of said emissions. It does not take into account for emissions that can be transported to other countries/regions, and only accounts for where/when these emissions are actually being released.

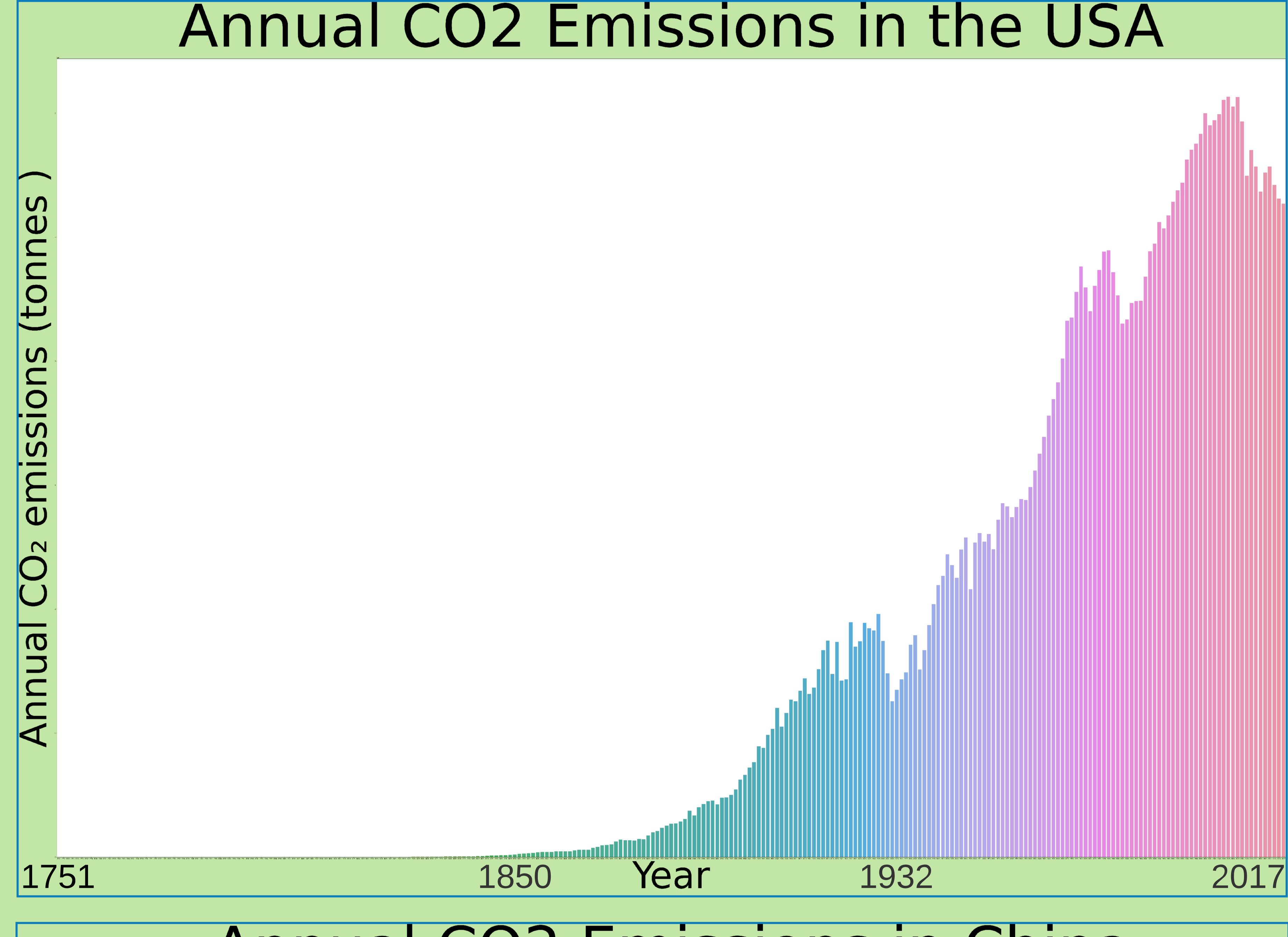
Central Research Questions:

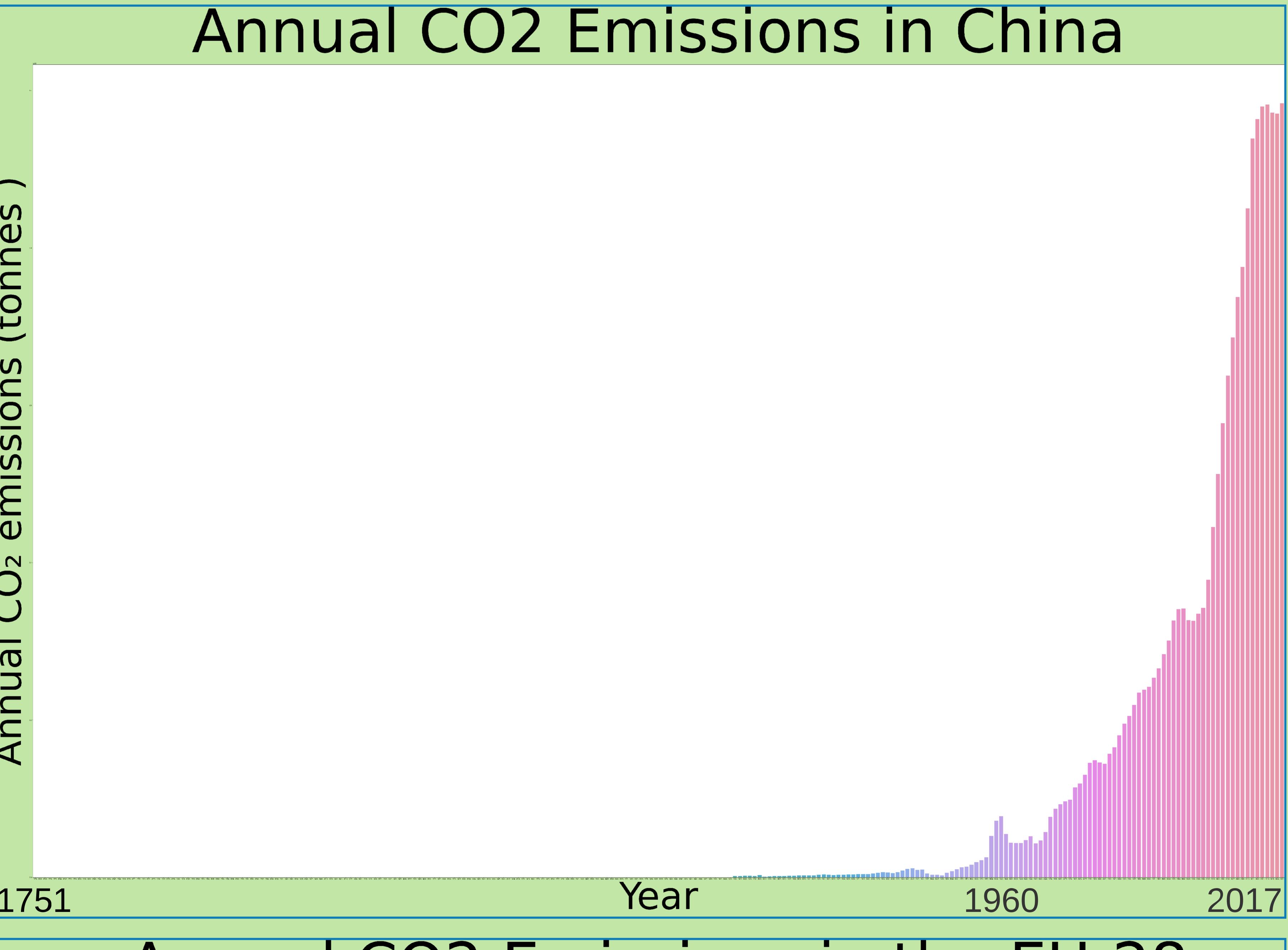
How have carbon dioxide emissions across the largest emitters changed over the past 4 centuries?

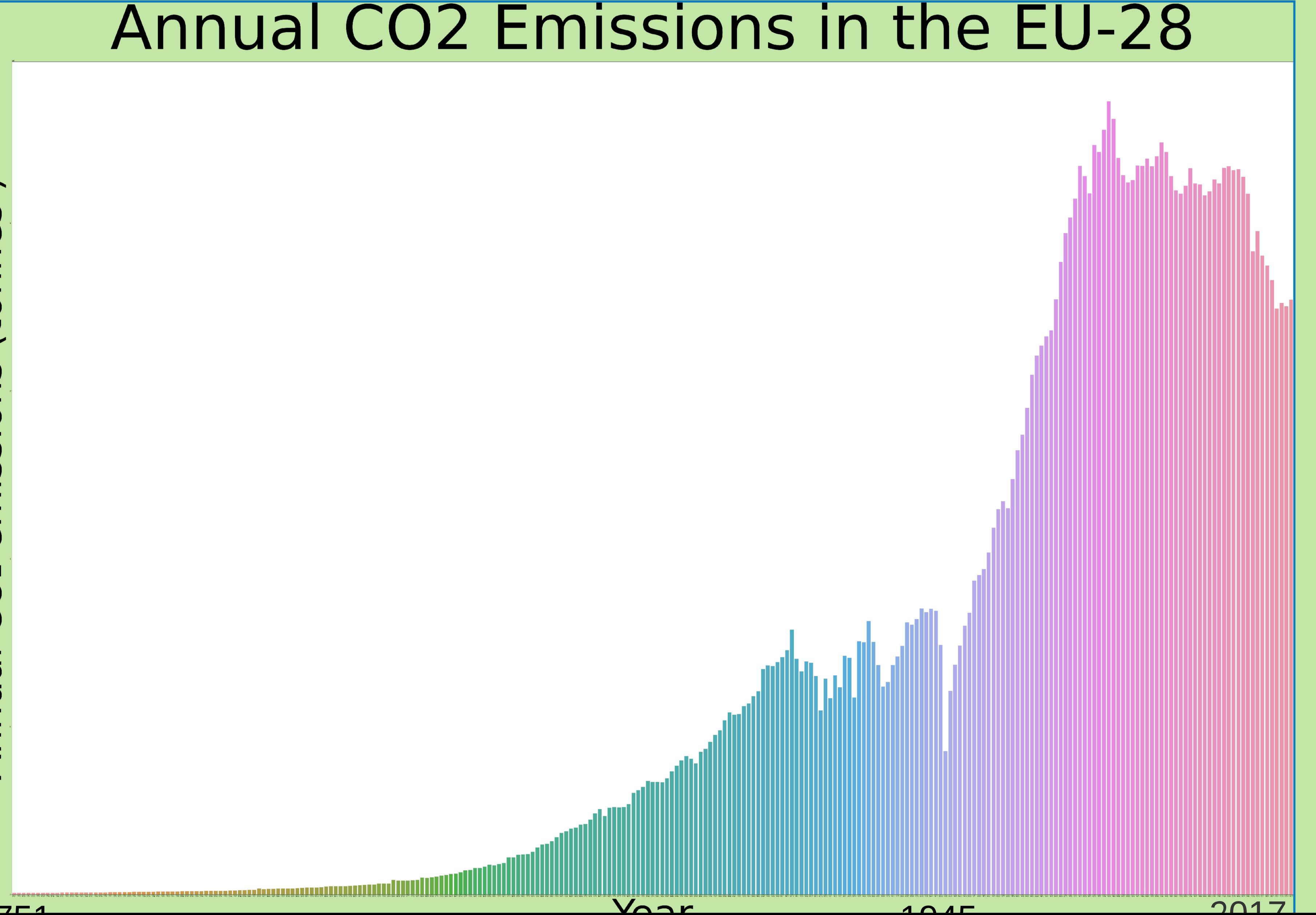
How do CO2 emissions compare between countries at a specific point in time? Overtime?

Interpreting the Results:

I have multiple visualizations for the data. To the left is a pie chart of the top 10 largest carbon emitters. To the right are a series of bar charts that represent how annual CO2 emissions have changed over time for the top 3 greatest emitters - China, the United States, and the EU-28(28 European countries that operate under an economic/political block). All of the bar chart visualizations are to the same scale. Below is the final visualization, a world map for 2017 that depicts Entities with higher CO2 emissions with a darker color gradient, and Entities with lower CO2 emissions are depicted with a lighter color gradient.

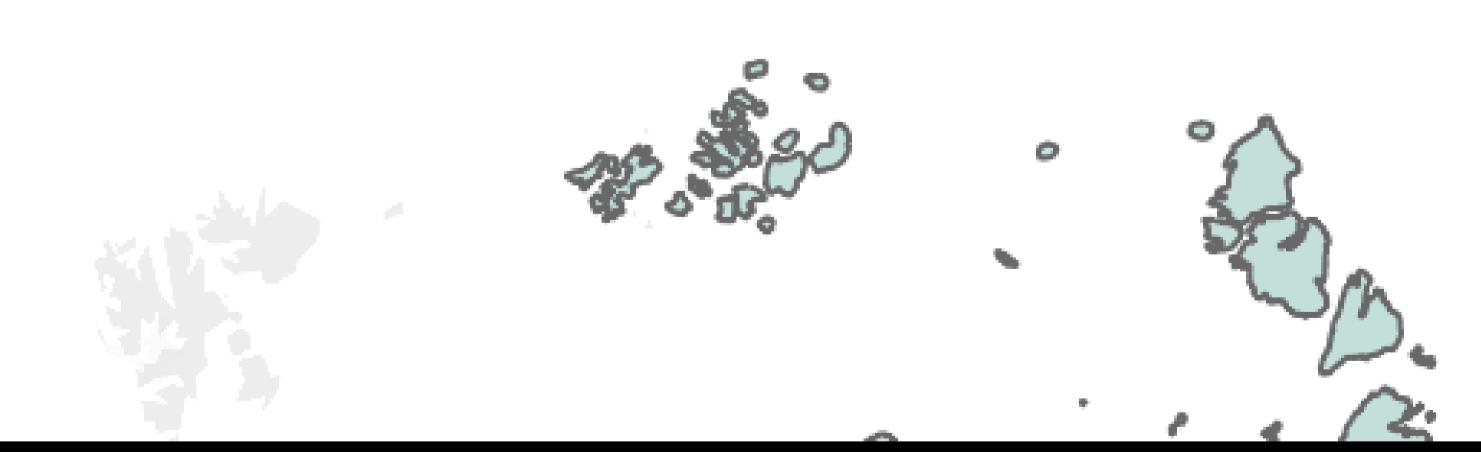












Annual CO₂ emissions (to... 36B 11,696