

THE ENVIRONMENTAL IMPACT OF HUMAN
ACTIVITY: A GLOBAL CO₂ EMISSION ANALYSIS

A PROJECT REPORT

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THE ENVIRONMENTAL IMPACT OF HUMAN ACTIVITY:

A GLOBAL CO₂ EMISSION ANALYSIS

1. Introduction:

The discovery of carbon dioxide by Joseph Black (1728-1799) marked a new era of research on the respiratory gases. It was first recognized as an element in the second half of the 18th century. Name A.L. Lavoisier proposed carbon in 1789 from the Latin carbon meaning “Charcoal” A.G. Werner proposed graphite from the Greek Graf meaning “to write” referring to pencils, which were introduced in 1594. Carbon dioxide has been present in the atmosphere since the earth condensed from a ball of hot gases following its formation from the explosion of a huge star about five billion years ago.

Carbon dioxide Emissions or Co₂ emissions are emissions stemming from the burning of fossil fuels and the manufacture of cement; they include carbon dioxide produced during consumption of solid, liquid, and gas fuels as well as gas flaring.

Carbon dioxide is earth’s most important greenhouse gas: a gas that absorbs and radiates heat. Unlike oxygen or nitrogen, greenhouse gases absorb heat radiating from the earth’s surface and re-release it in all directions including back toward earth’s surface.

1.1: Overview:

Carbon dioxide is a colourless and non-flammable gas at normal temperature and pressure. Although much less abundant than nitrogen and oxygen in earth’s atmosphere, carbon dioxide is an important constituent of our planet’s air. A molecule of carbon dioxide (Co₂) is made up of one carbon atom and two oxygen atoms.

Global warming is one of the biggest challenges currently being faced by the human race, although correlation is not causation, a likely cause of global warming is due to increased atmospheric

carbon dioxide from human activities. CO₂ emission refers to the carbon dioxide, emitted throughout the world. For this analysis we will be focussing on CO₂ emissions and its effect on the world we live in as well as some key factors and starts may play a role in the emission of CO₂ globally. Carbon is the chemical backbone of life on earth, Carbon compounds regulates the earth's temperature, make up the food that sustain us, and provide energy that fuels our stored in rocks and sediments. The sources of CO₂ are power generation, transportation, industrial sources, chemical production, petroleum production and agricultural practices. The current level of CO₂ is 417.83 ppm.

Fossil fuel is used in the primary source of CO₂. The data throws light on to how much fossil fuels are burnt, per year per nation, which amounts to an increase in CO₂ every year. This will help researchers and environment expects to predict global warming. So countries should set a goal to decrease this amount yearly.

Analysing Global CO₂ emission across countries from 1975-202. The dataset contains a record of CO₂ Emission by each country and region of earth, here we are going to analyse and visualise country wise, region wise and overall CO₂ emission on earth.

1.2: Purpose:

The carbon in CO₂ can be used to produce fuels that are in use today, including methane, methanol, gasoline and aviation fuels. The production of CO₂-based fuels and chemicals is energy intensive and requires large amounts of hydrogen. The carbon in CO₂ enables the conversion of hydrogen into a fuel that is easier to handle and use, for examples as an aviation fuel. CO₂ can also

replace fossil fuels as a raw material in chemicals and polymers.

Carbondioxide is used as a refrigerant, in fire extinguishers, for inflation life rafts and life jackets, blasting coal, foaming rubber and plastics, promoting the growth of plants in greenhouse, immobilizing animals before slaughter, and in carbonated beverages.

Gaseous carbon dioxide is mainly used in the beverage industry. When we open a cold drink bottle or can, a lot of bubbles are released. It prevents the growth of microorganisms in the drinks.

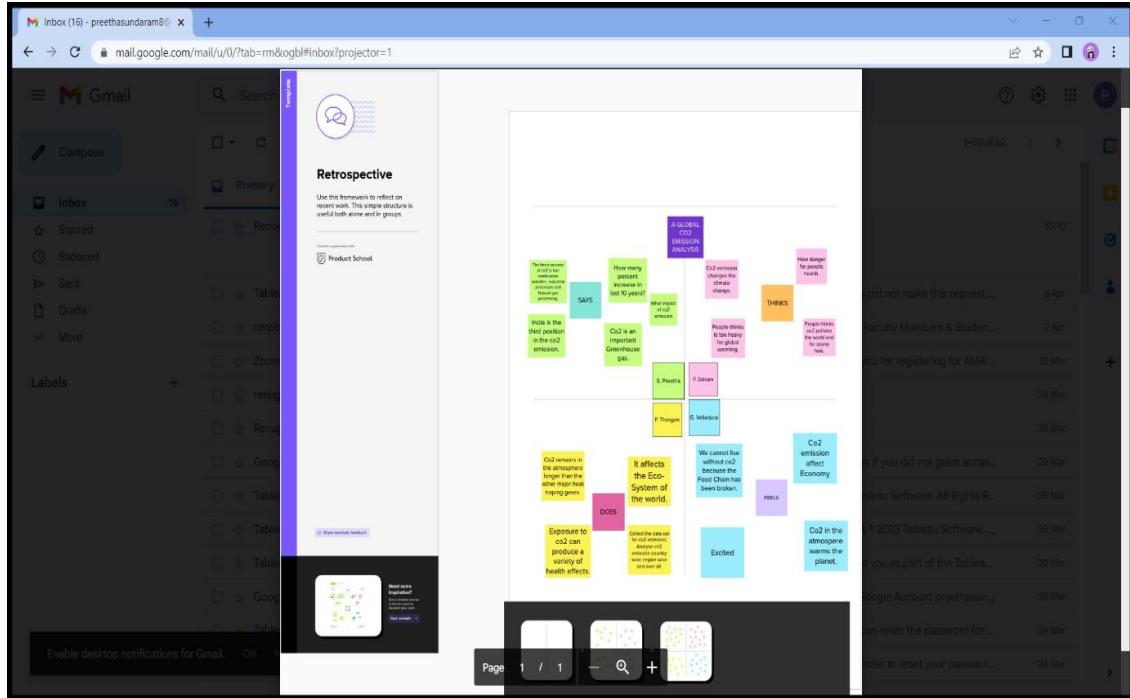
In an Animal Slaughter house: Animals are slaughtered for meat. Carbon dioxide is used to immobilise them before slaughtering, giving better-quality meat. This method is considered “humane” and merciful, allowing for the slaughter of animals in large groups. They are exposed to high concentrations of carbon of carbon dioxide gas and they are killed when they lose consciousness.

In the Textile Industry: CO₂, being acidic, is used to neutralise basic caustic During textiles manufacturing. It is not harsh on fabrics and easy to handle. It is also used to dye fabrics without water, thus saving tons of water. This technology is already employed by major global brands like Nike and IKEA.

2. Problem Definition & Design Thinking:

2.1: Empathy Map:

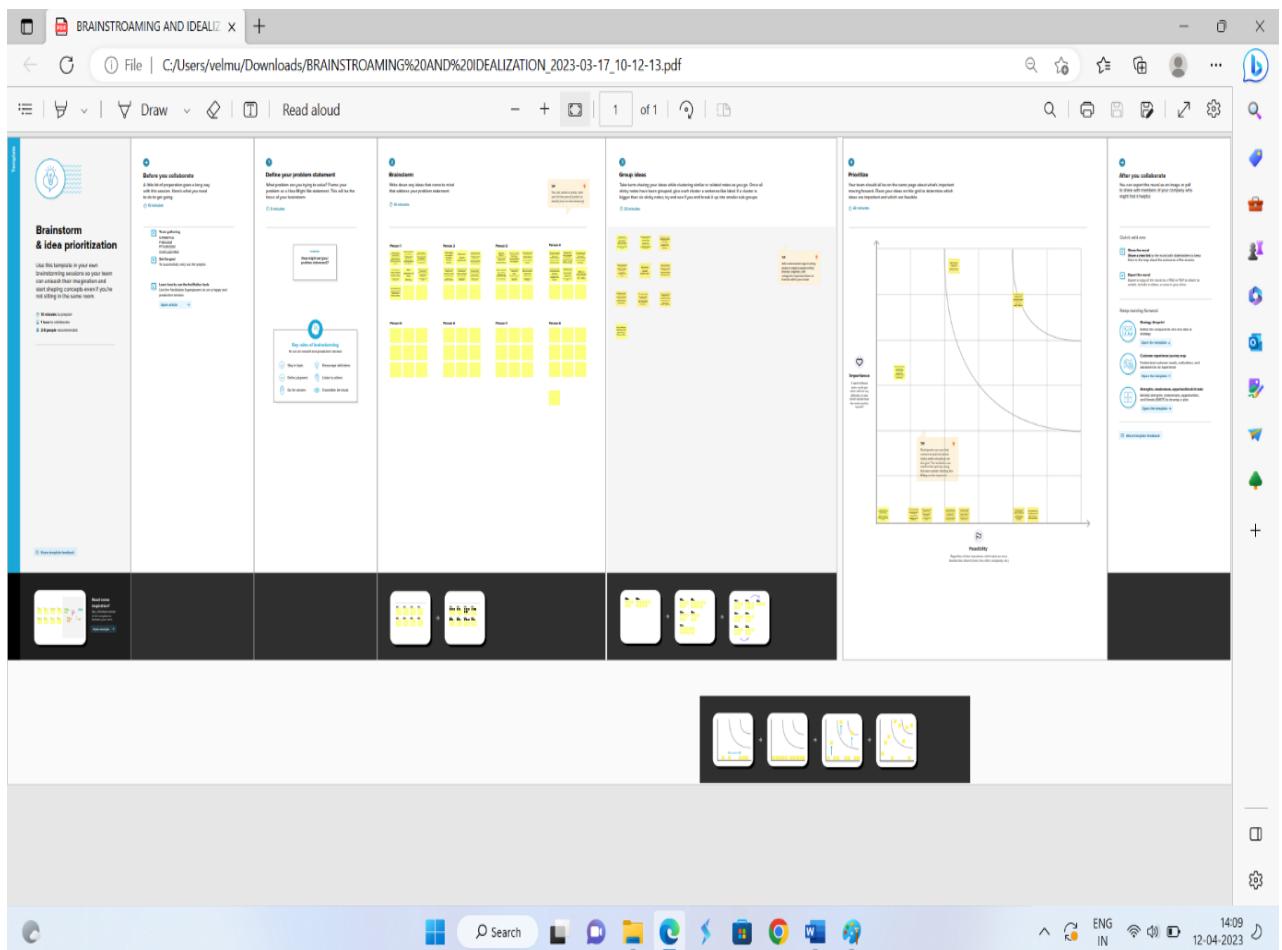
An empathy map is a Collaborative visualization used to articulate what we know about a particular type of user. It externalizes knowledge about users in order to 1) create a shared understanding of user needs, and 2) aid in decision making.



2.2 Ideation & Brainstorming Map:

Brainstorming is a group problem-solving method that involves the spontaneous contribution of creative ideas and solutions. This technique requires intensive, freewheeling discussion in which every member of the group is encouraged to think a loud and

suggest as many ideas as possible based on their diverse knowledge.



3. Result:

The all Visualization sheets, Dashboard, Story, MYSQL, and web integration screenshots have been attached.

Visualizations Sheets:

Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps.

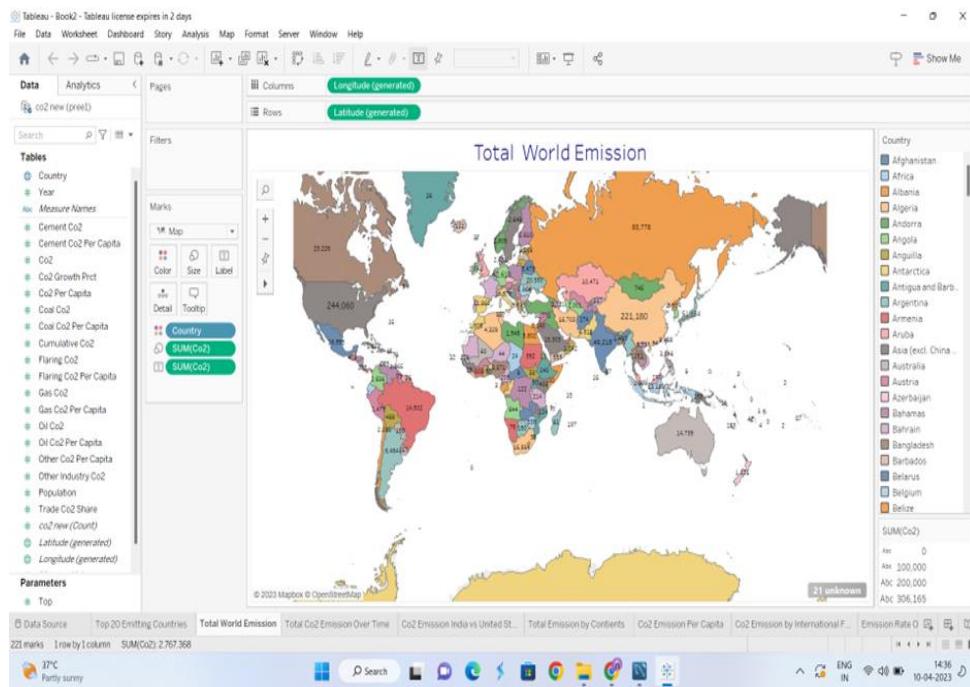


Fig (1): Total World Emission

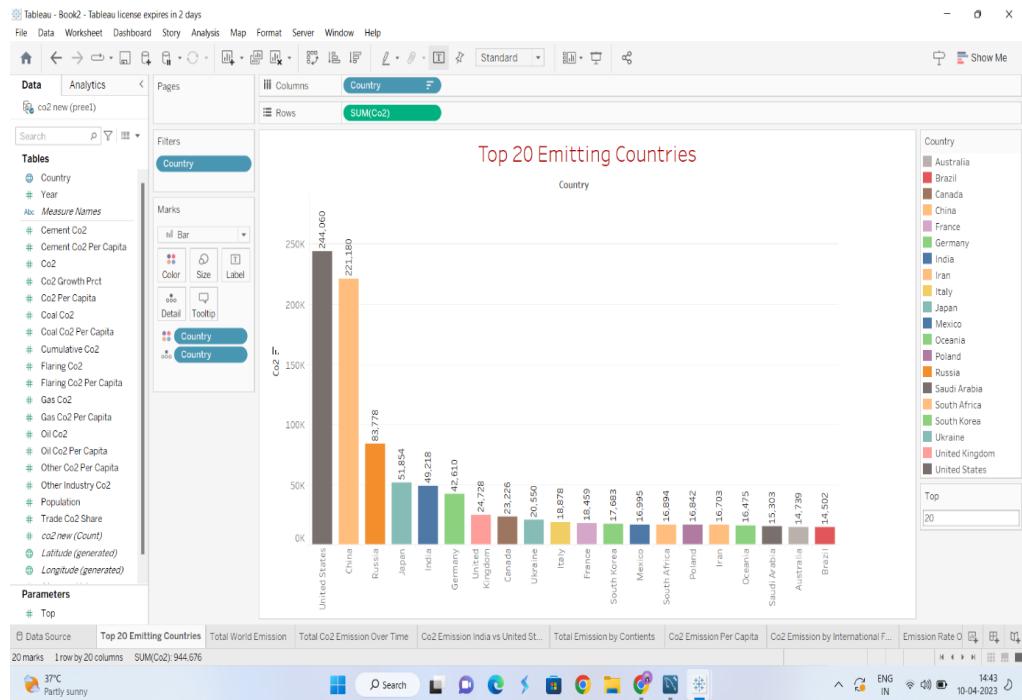
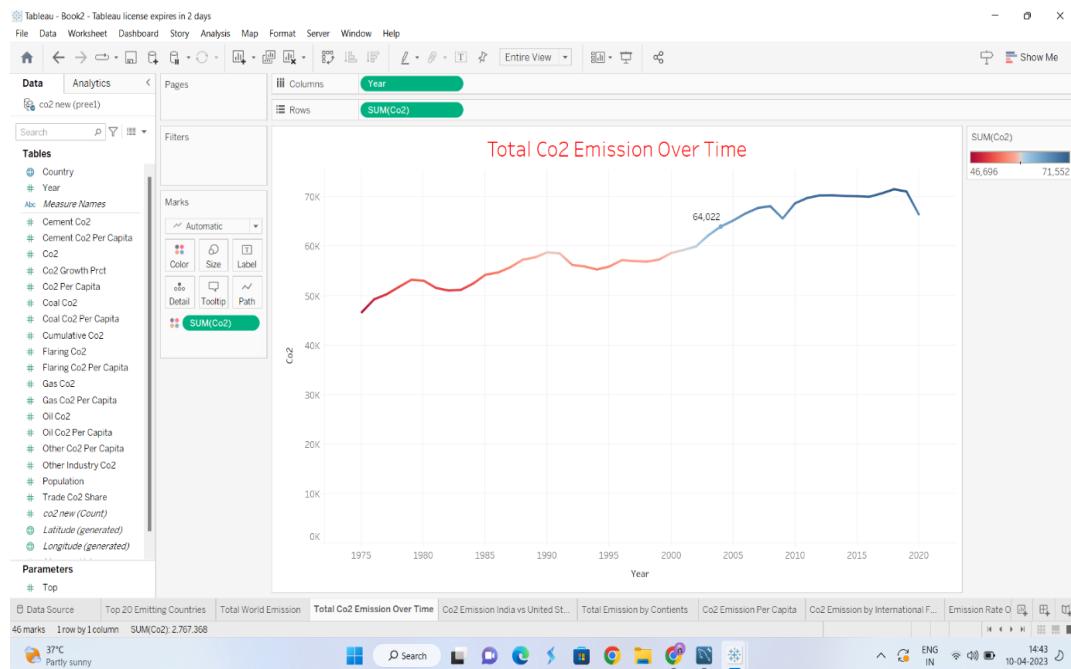


Fig (2): Top 20 Emitting Countries



Fig(3): Total Co2 Emission Over Time

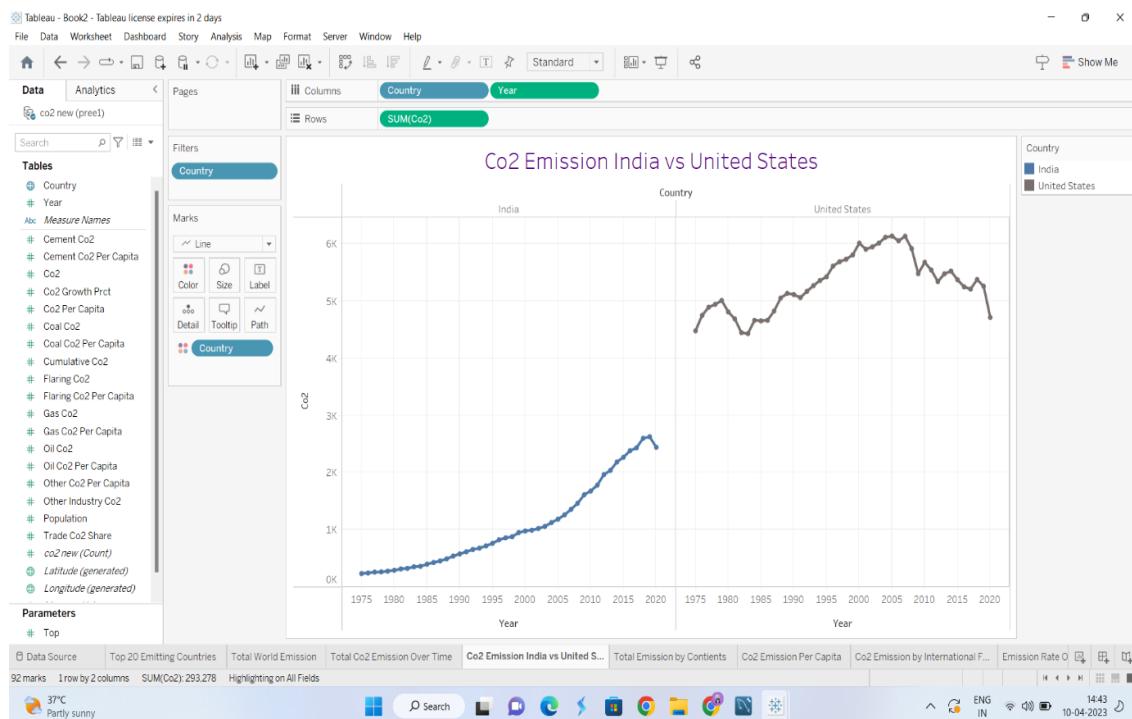


Fig (4): Co2 Emission India vs United States

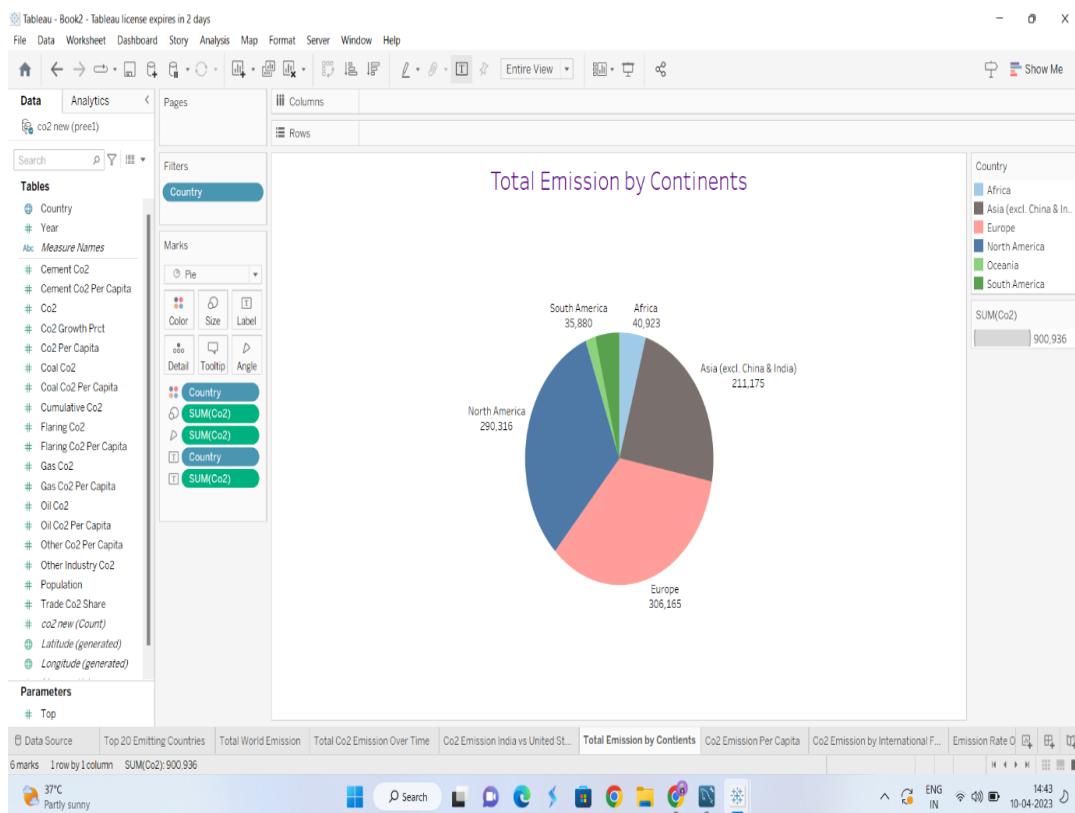
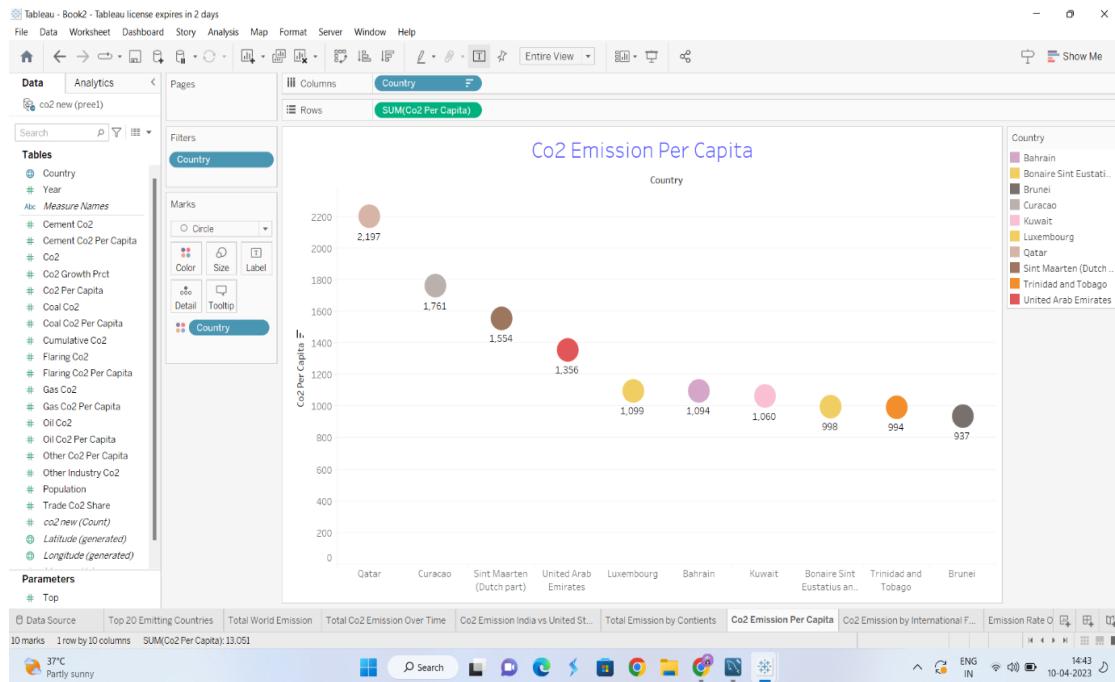


Fig (5): Total Emission by Countries



Fig(6): CO₂ Emission Per Capita



Fig(7): CO₂ Emission by International Factors

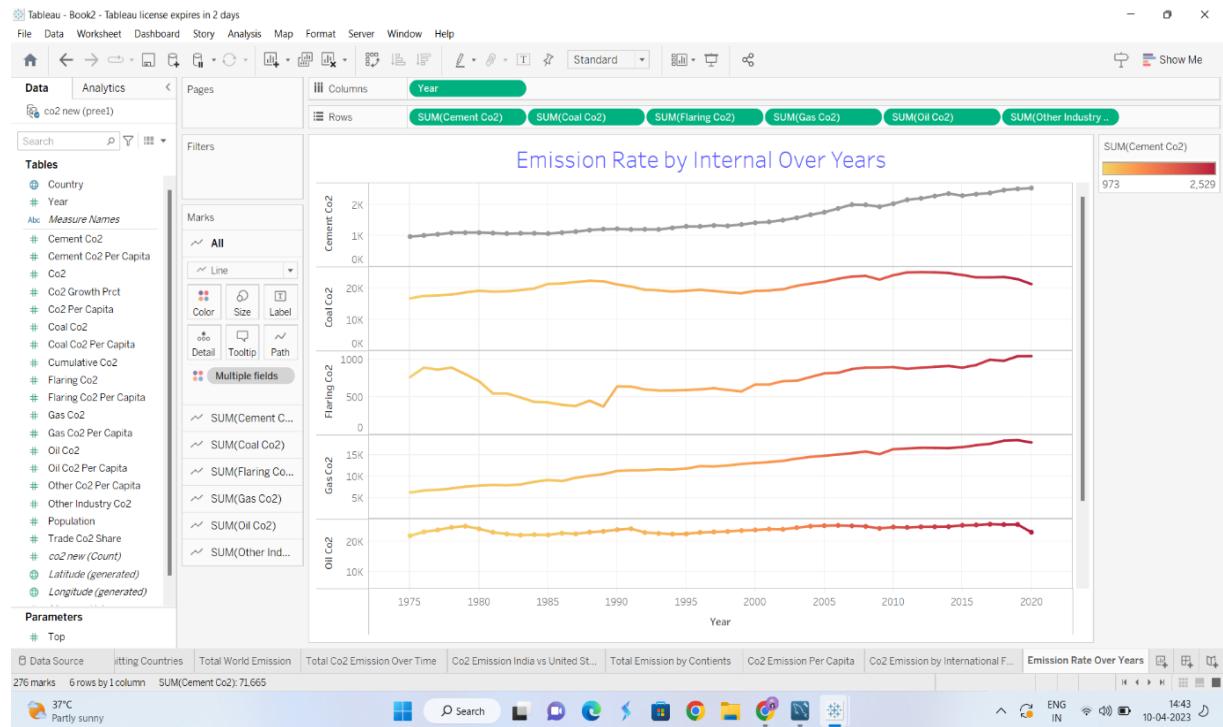


Fig (8): Emission Rate by Internal Over Years

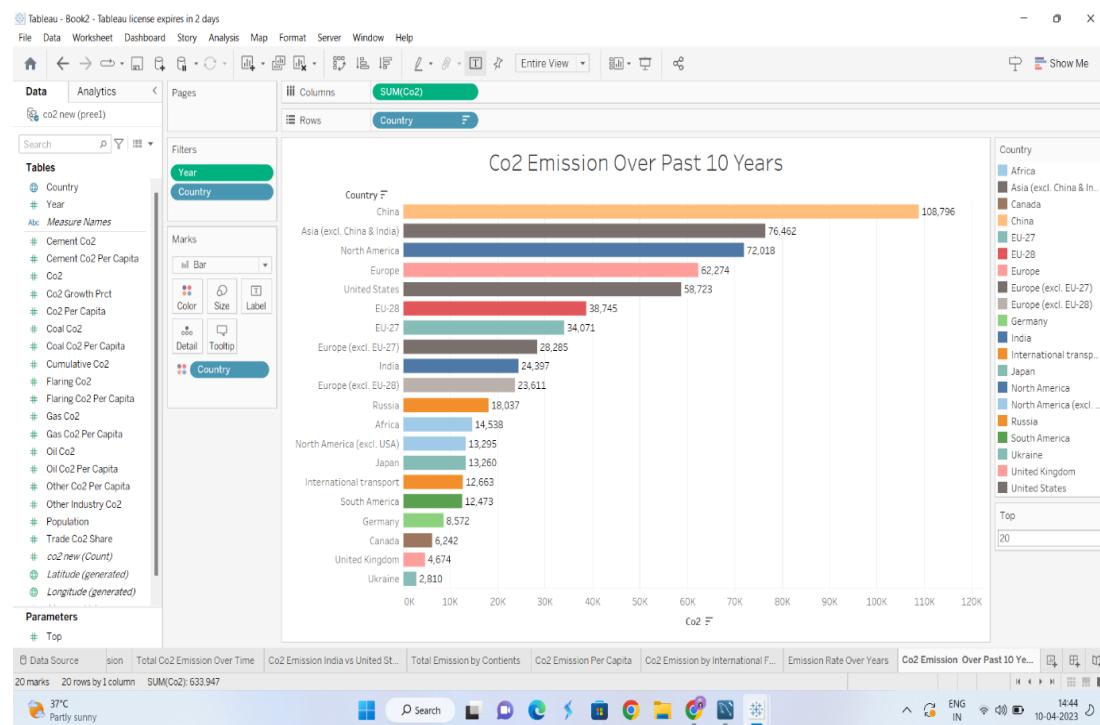


Fig (9): Co2 Emission Over Past 10

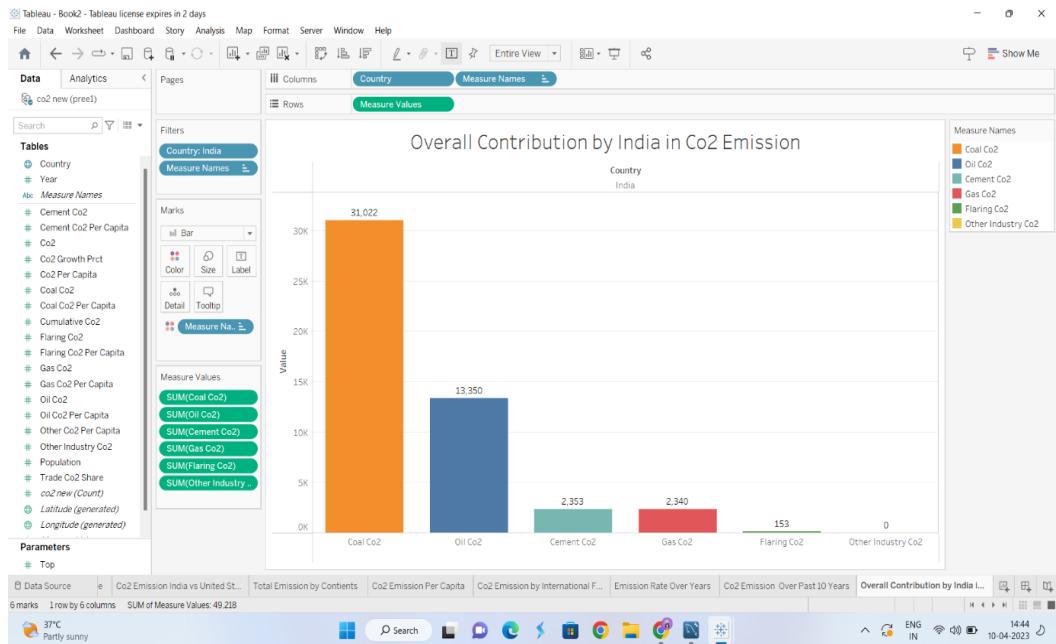


Fig (10): Overall Contribution by India in Co2 Emission

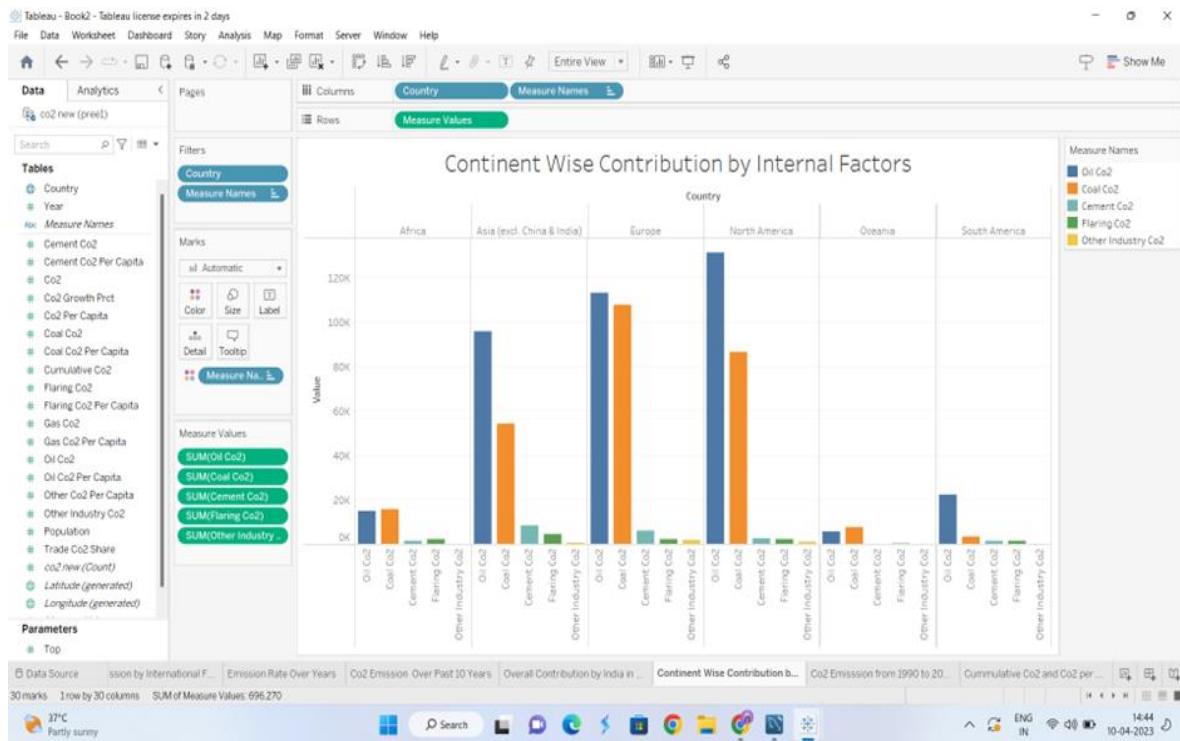
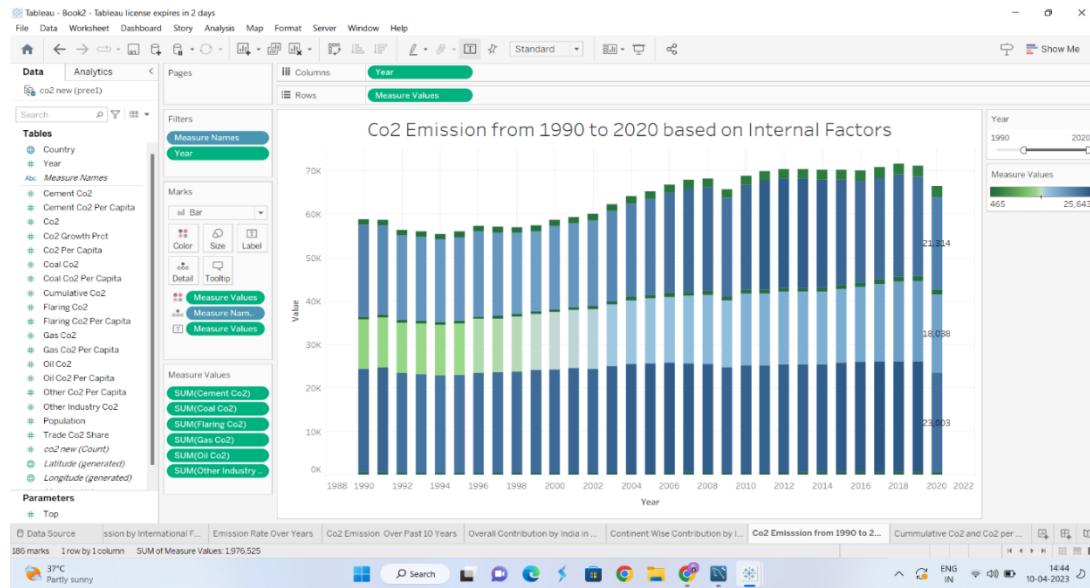


Fig (11): Continent Wise Contribution by Internal Factors



Fig(12): Co2 Emission from 1990 to 2020 based on Internal Factors

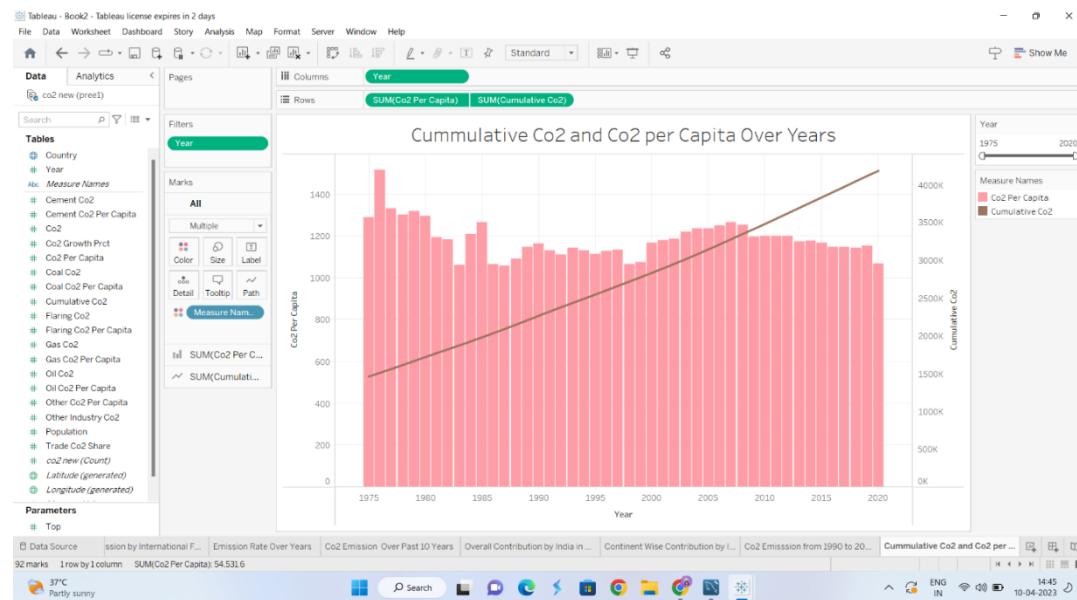
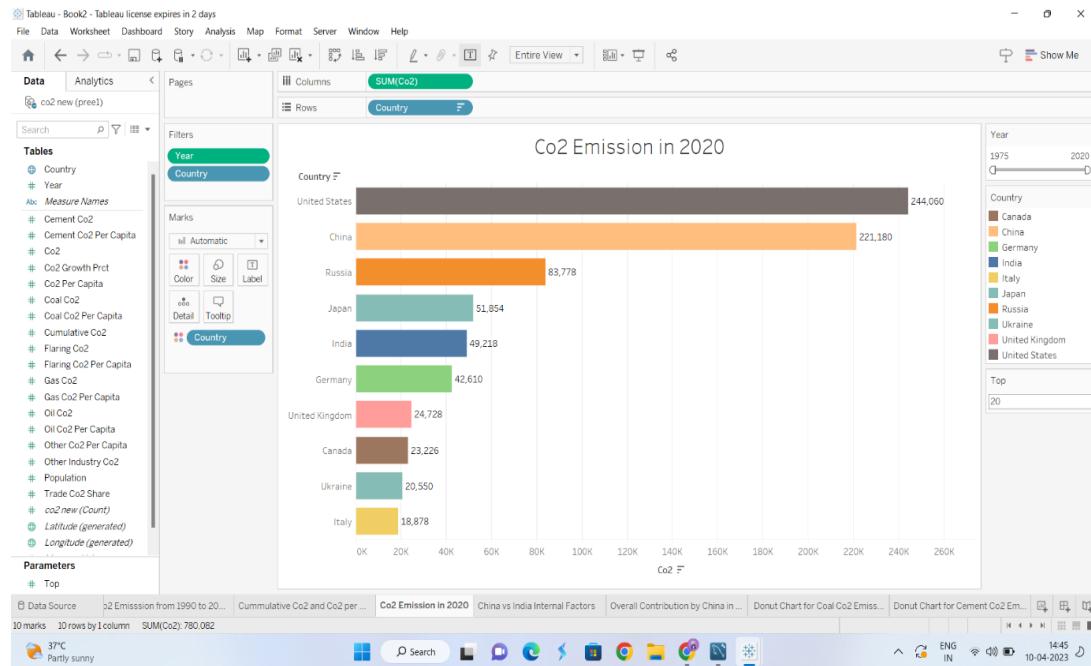


Fig (13): Cumulative Co2 and Co2 per capita Over Years



Fig(14): Co2 Emission in 2020

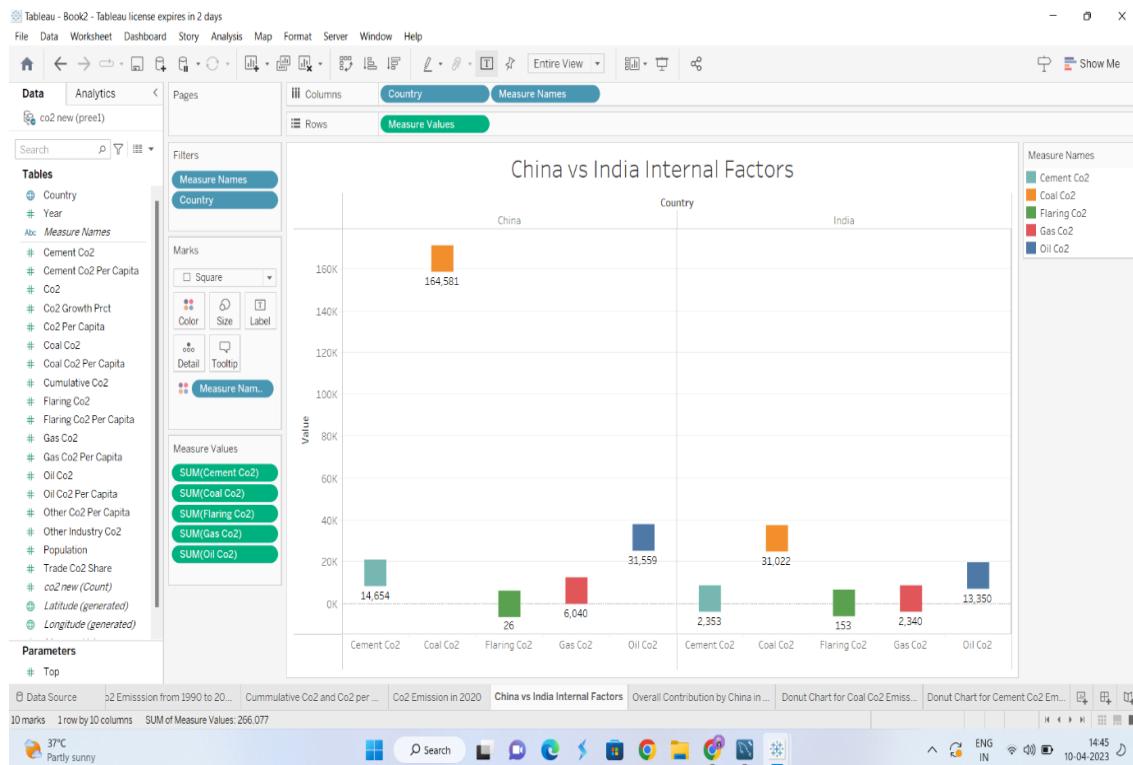
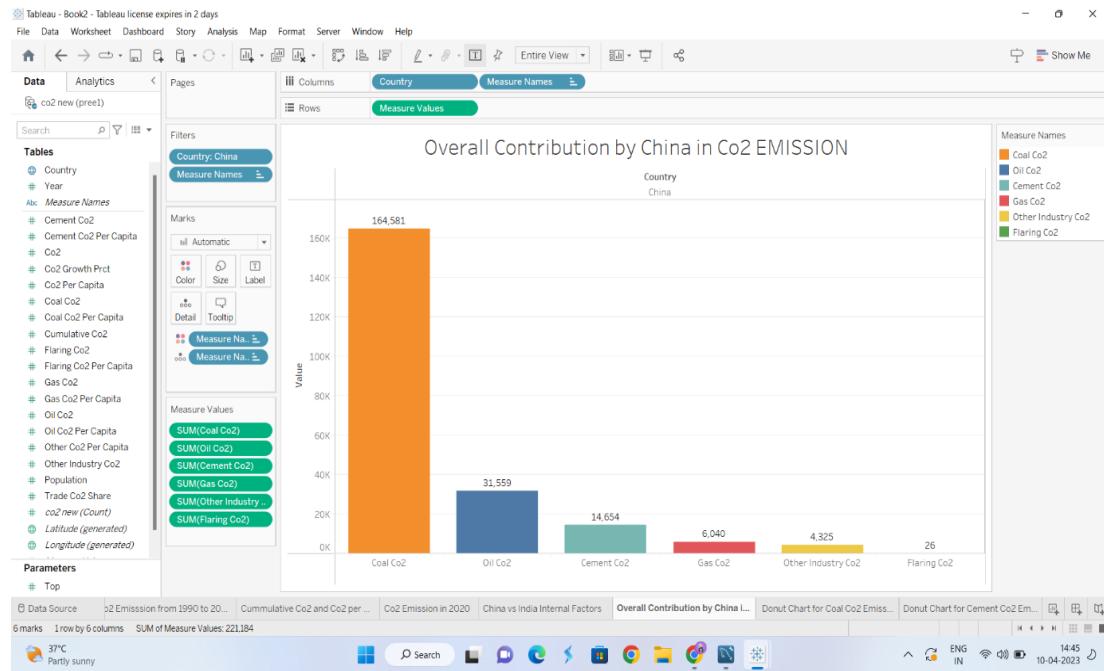
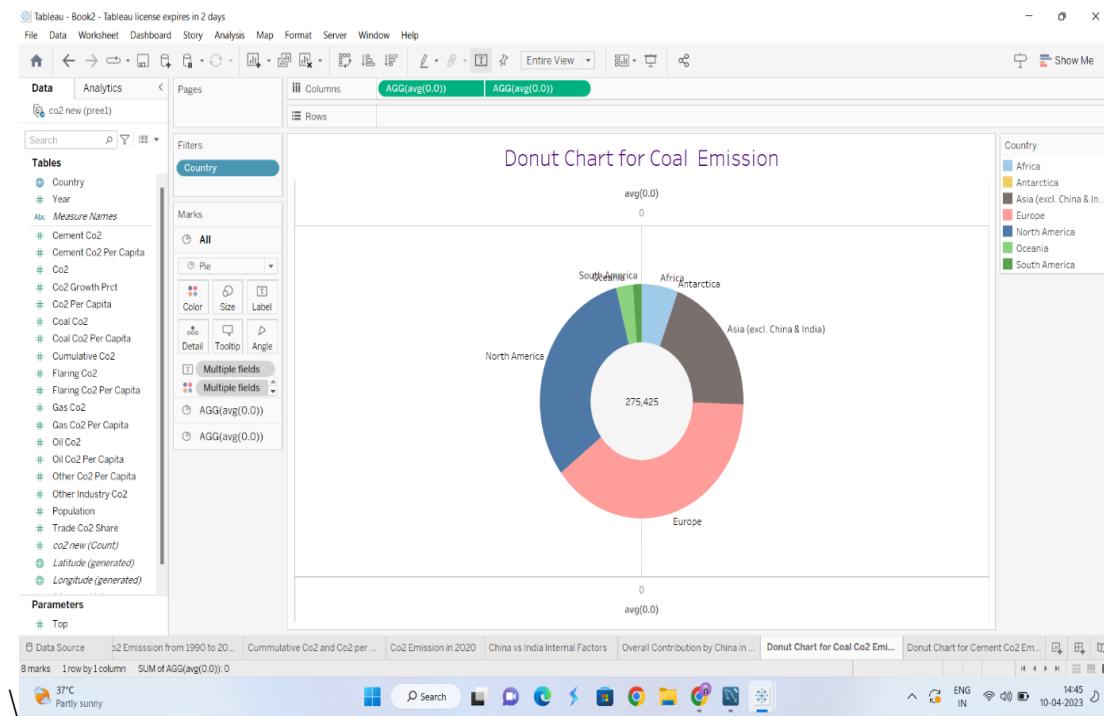


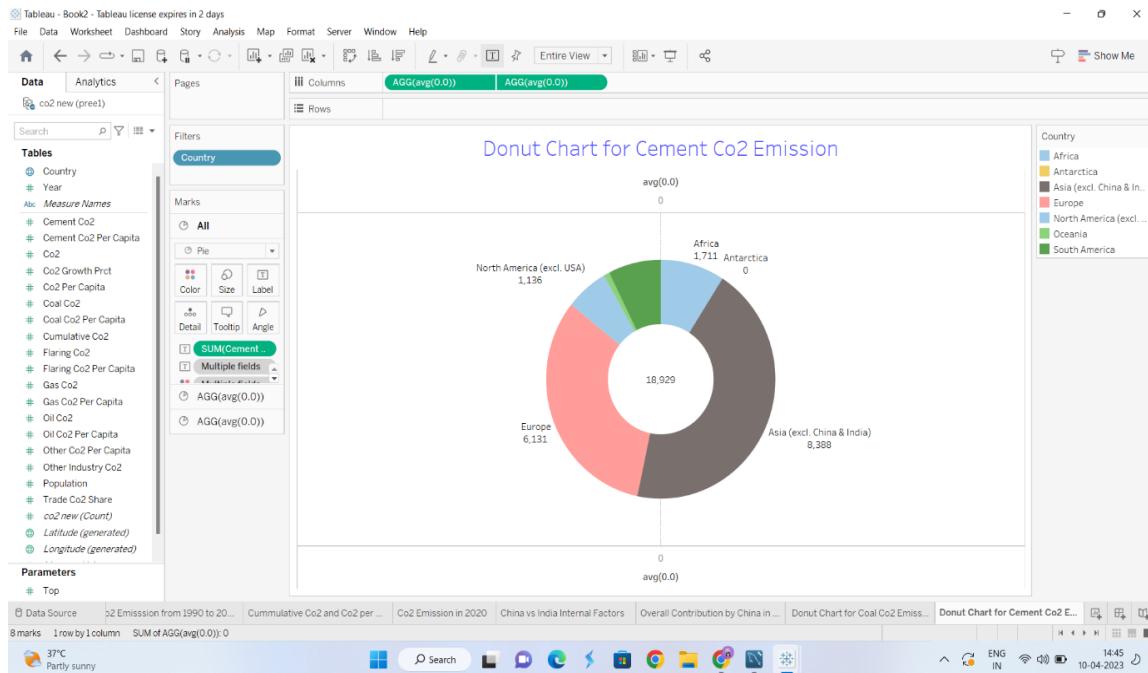
Fig (15): China vs India internal Factors



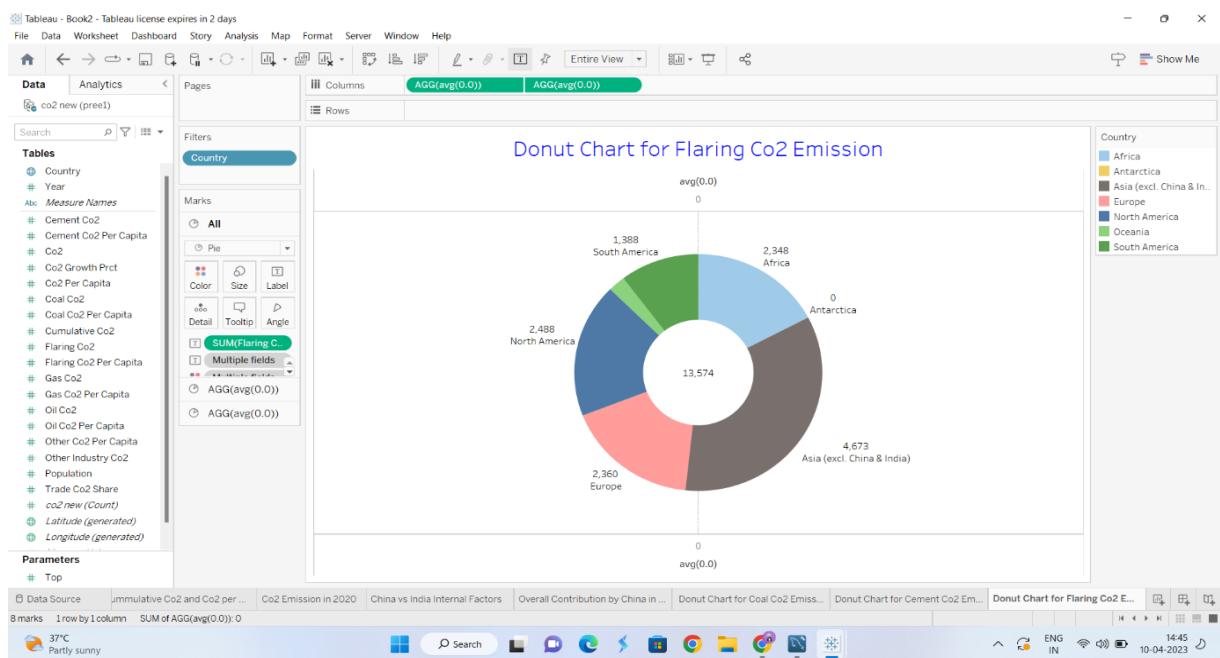
Fig(16): Overall Contribution by China in Co2 Emission



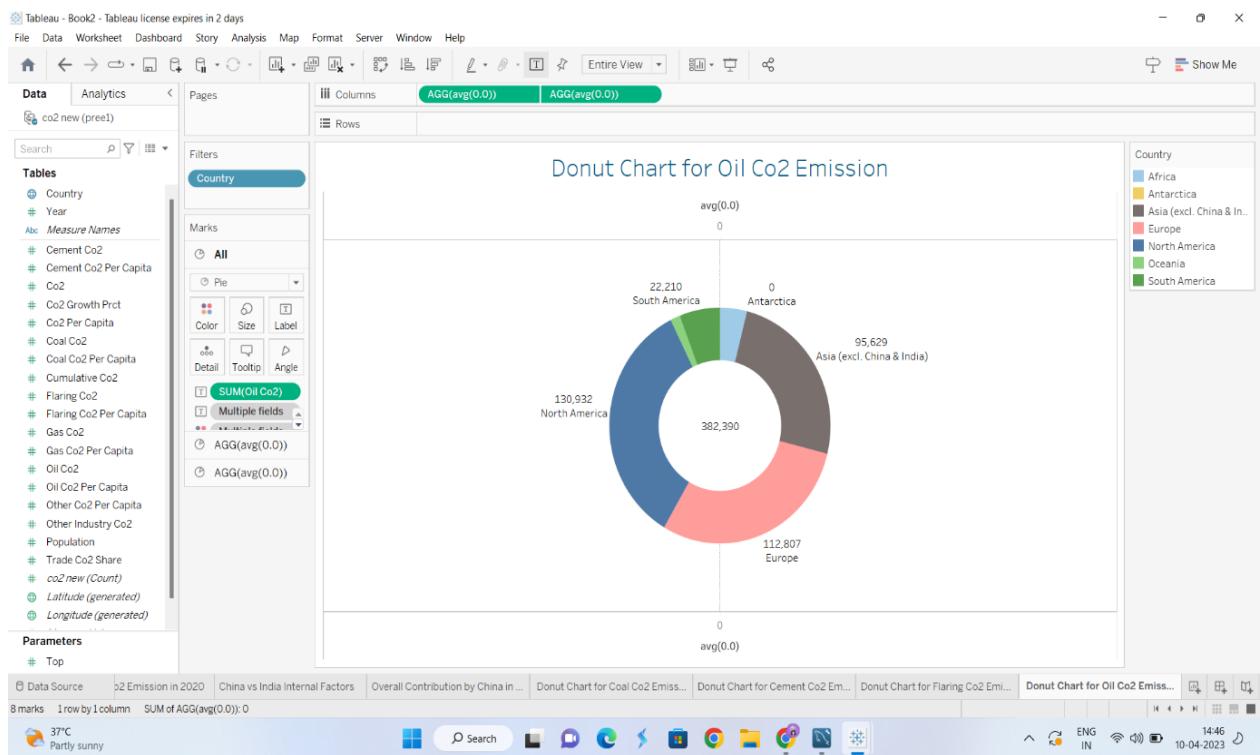
Fig(17): Donut Chart for Coal Emission



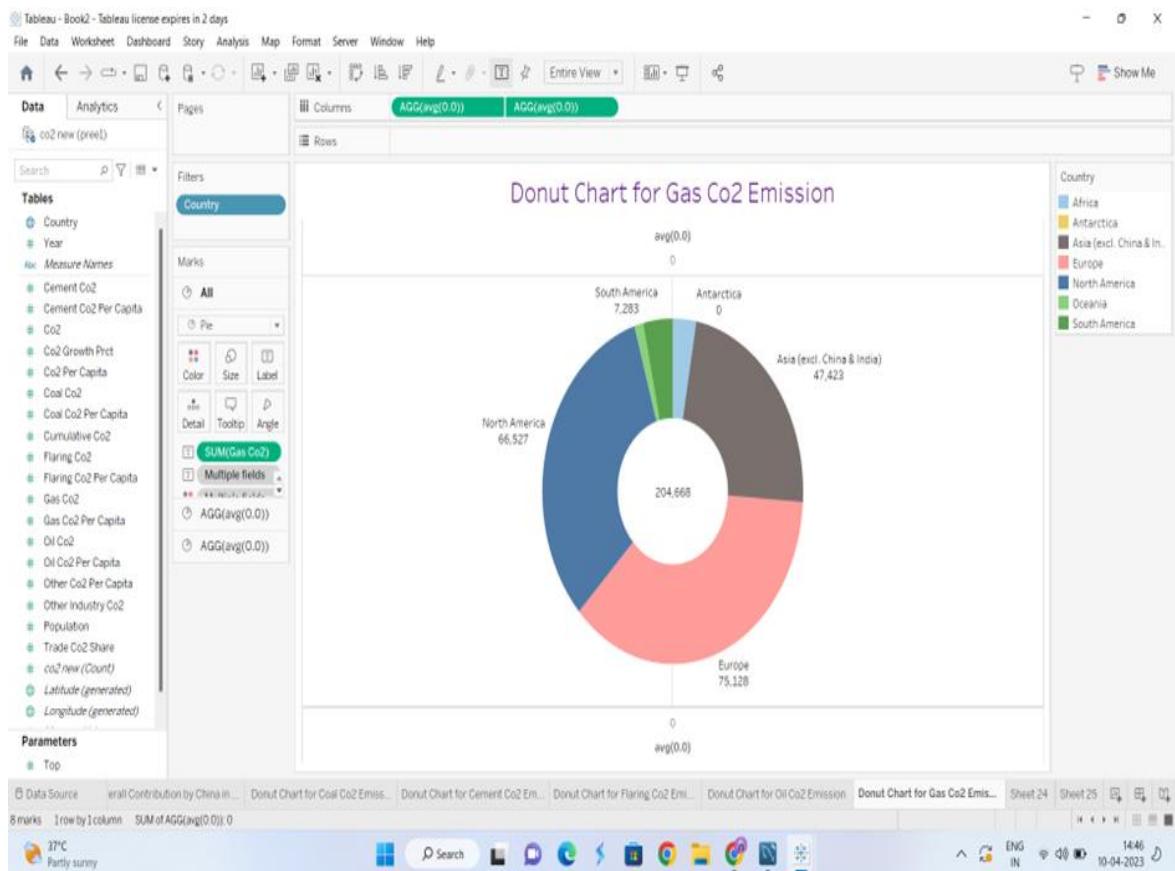
Fig(18): Donut Chart for Cement Co2 Emission



Fig(19): Donut chart for Flaring Co2 Emission



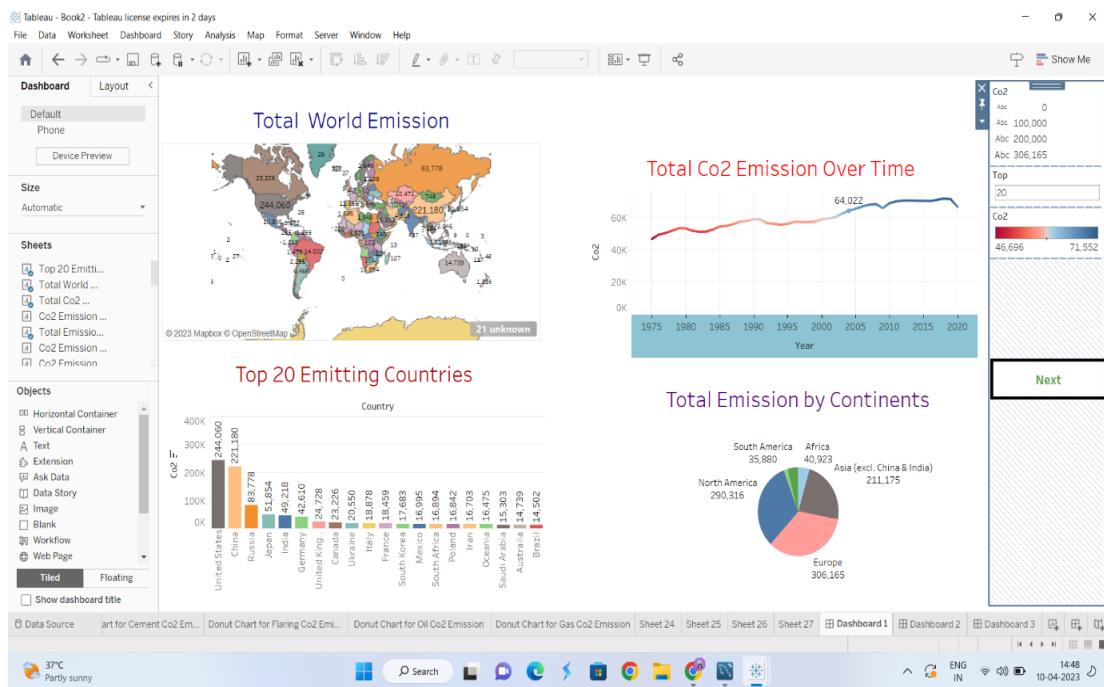
Fig(20): Donut Chart for Oil Co2 Emission



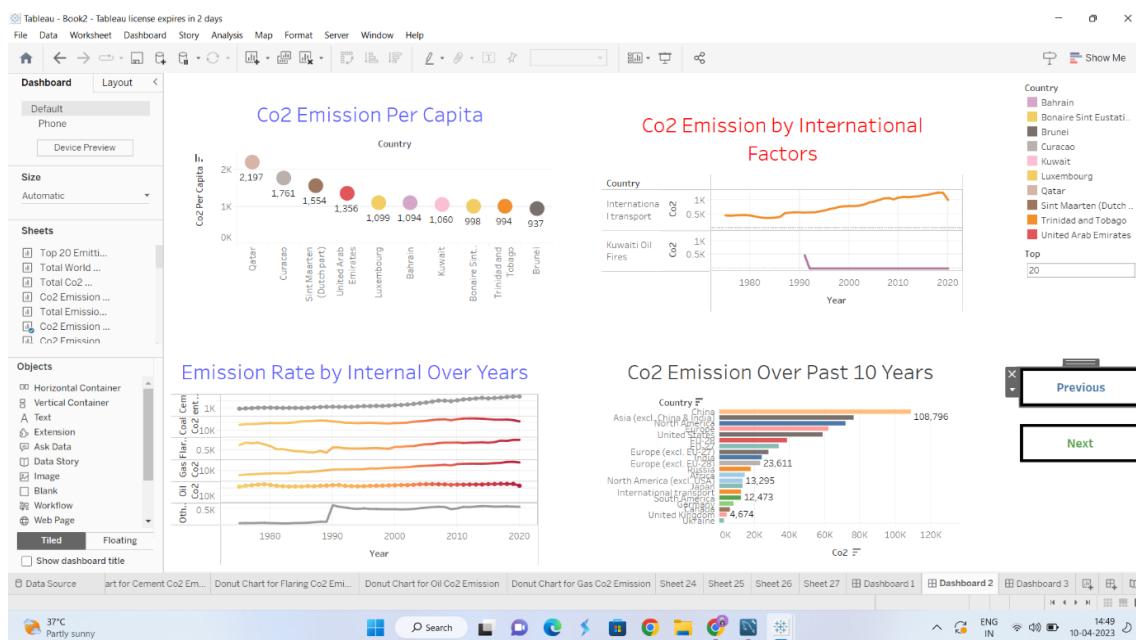
Fig(21): Donut Chart for Gas Co2 Emission

Dashboard:

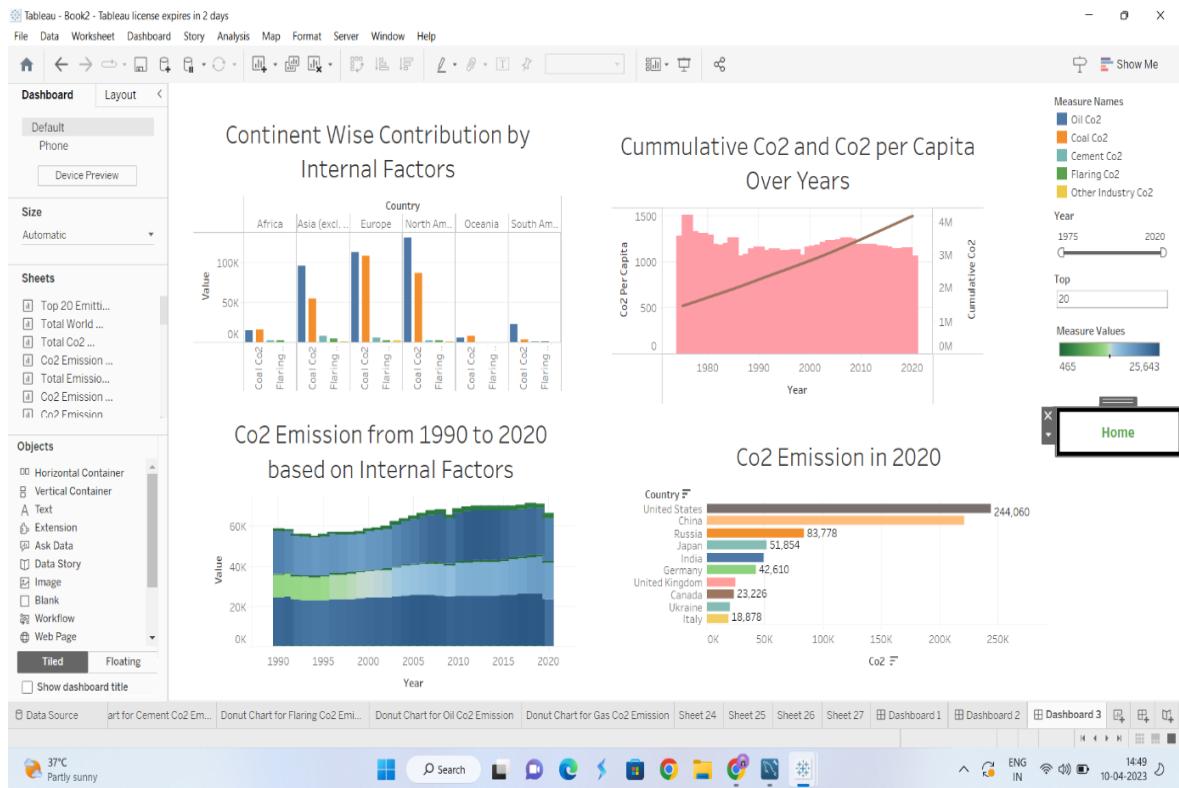
The Excel Dashboard provides an overview of metrics and other data points in one place. In simple terms, dashboards are visual representation of data.



Dashboard (1)



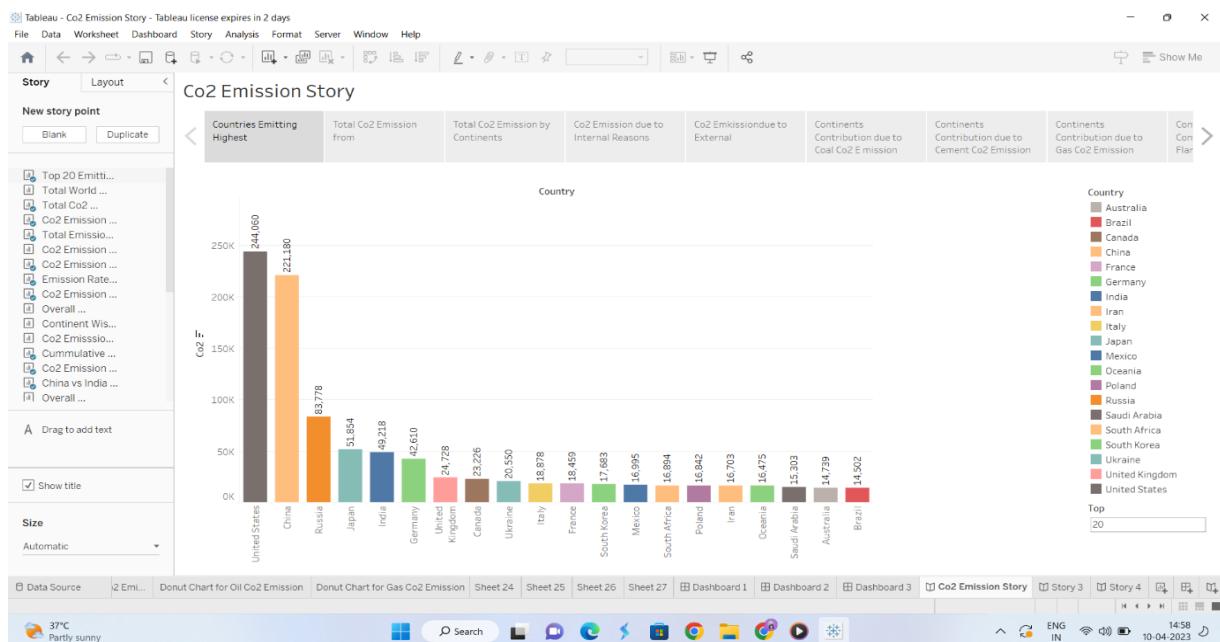
Dashboard (2)



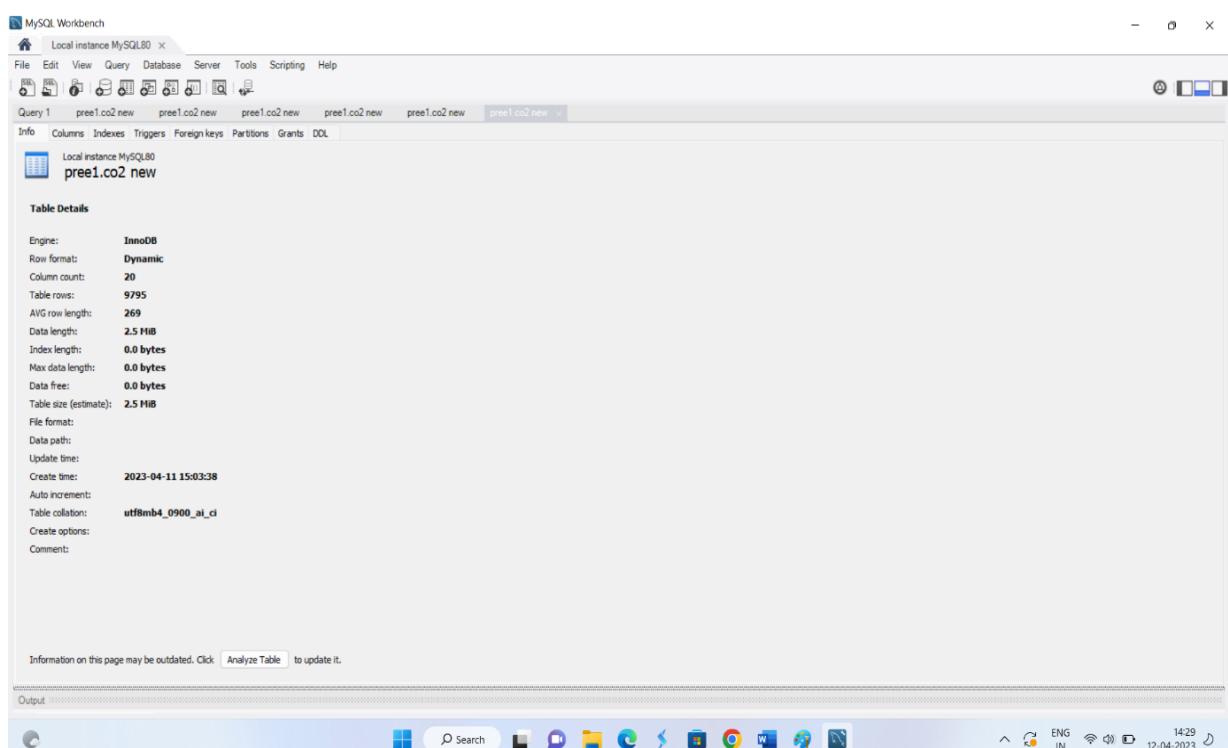
Dashboard (3)

STORY:

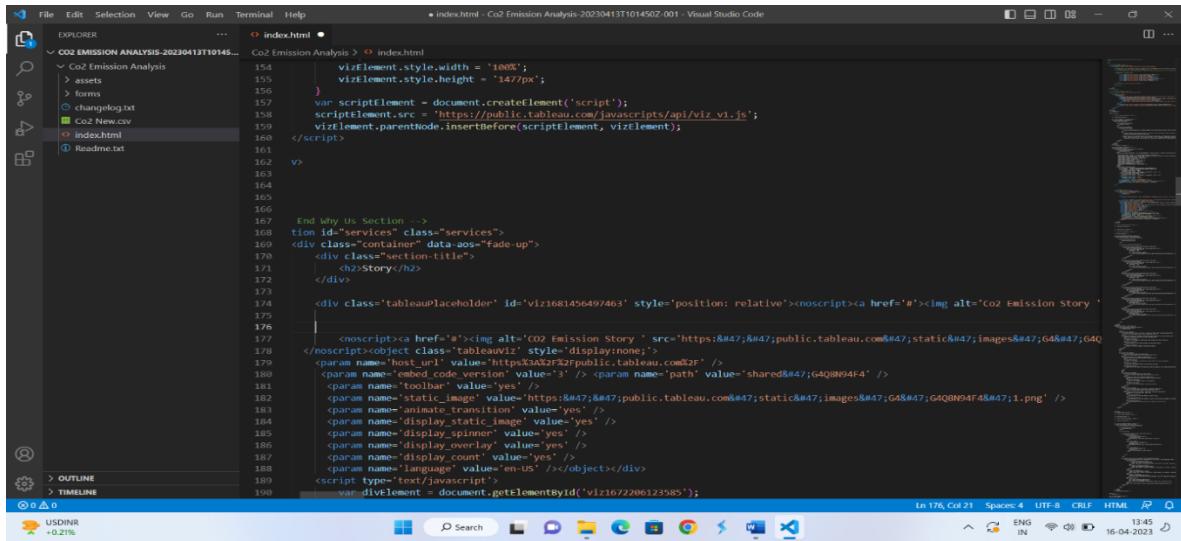
A story is a sequence of visualizations that work together to convey information.



MYSQL:



Web Integration:



```

File Edit Selection View Go Run Terminal Help index.html - Co2 Emission Analysis-20230414T031014Z-001 - Visual Studio Code
EXPLORER Co2 Emission Analysis > index.html
Co2 Emission Analysis
> assets
> forms
> changelog.txt
Co2 New.csv
index.html
Readme.txt

154     vizeElement.style.width = '100%';
155   }
156   var scriptElement = document.createElement('script');
157   scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
158   vizElement.parentNode.insertBefore(scriptElement, vizeElement);
159
160 
```

The screenshot shows the Visual Studio Code interface with the 'index.html' file open. The code includes a script element to embed a Tableau visualization.

Coding program



Welcome to Global Co2 Emission Analysis for Year 2020

Carbon dioxide emissions are the primary driver of global climate change. It's widely recognised that to avoid the worst impacts of climate change, the world needs to urgently reduce emissions.

[Get Started](#)

What to Know About CO2 Emissions

- A naturally occurring gas
- Humans started emitting CO₂ during the Industrial Revolution
- Human activity includes but not limited to transportation and electricity
- Today, 30 billion tons per year of CO₂ (or 84%) is related to human activity
- CO₂ drives climate crisis and also affects the oceans, making them 30% more acidic



[ABOUT US](#)

http://C:/Users/velmu/Downloads/Co2 Emission Analysis-20230414T031014Z-001/Co2 Emission Analysis/index.html#hero

38°C Sunny

The all output screenshots have been attached.

4. Advantages & Disadvantages:

Advantages:

- Green plants grow faster with more Co₂.
- 63.3% of global electricity relies on sources that emit Carbon dioxide and other Greenhouse gases.
- Competitive efficiencies, very high pressure ratio.
- Improves air quality and benefits human health.
- Co₂ plays various roles in the human body including regulation of blood pH, respiratory drive, and affinity of hemoglobin for oxygen(O₂).

Disadvantages:

- Co₂ is one of the toxic gas.
- Co₂ increase the earth temperature and global warming.
- Increase in percentage of Co₂ in air causes melting of snow and hence there are increase in sea water level.
- They do not invest in actions to avoid emissions because they are able to buy unlimited credits.
- High Carbon dioxide levels can cause poor air quality.
- Enhancing the unwanted change in ocean acidity due to atmospheric increases in co₂.

- It requires relatively high pressure compared to hydrocarbon solvent.

5. Applications:

Carbon dioxide is used as a refrigerant, in fire extinguishers, for inflating life rafts and life jackets, blasting coal, foaming rubber and plastics, promoting the growth of plants in greenhouses, immobilizing animals before slaughter, and in carbonated beverages.

Industrial diamonds are used to cut, polish and grind glass because of their extreme hardness. Nuclear power plants to help slow down the neutrons in a nuclear reaction.

6. Conclusion:

“The rising level of atmospheric CO₂ could be the one global natural resource that is progressively increasing food production and total biological output, in a world of otherwise diminishing natural resources of land, water, energy, minerals, and fertilizer.

Carbon capture and sequestration is an attractive option for reducing greenhouse gas emissions and could even help remove carbon dioxide from the atmosphere.

Nonetheless the conclusions that regional climate changes, especially temperature increases, are impacting natural systems across the world and that these temperature increases are most likely to be the result of anthropogenic greenhouse gas emissions.

8. Future Scope:

In the Annual energy outlook 2022 (AEO2022) reference case, which assumes no change to current laws or regulations, the U.S Energy Information Administration (EIA) projects that U.S energy related

carbon dioxide (CO₂) emissions will fall to 4.5 billion metric tons in 2037 or 6% below the energy related CO₂ emission in 2021, before rising to 4.7 billion metric tons in 2050 or 2% below 2021 levels.

APPENDIX:**Source code:**

https://drive.google.com/file/d/1e7_AzQKlubTZ4xii4gonQb-oL3dfssxK/view?usp=sharing