



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

Project Based Experimental Learning program



Unearthing The Environmental Impact Of Human Activity: A Global CO2 Emission Analysis

Milestone 1: Define Problem / Problem Understanding :

Activity 1: Specify the business problem.

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 focusing on CO2 Emissions and its effect on the world we live in as well as some key factors and stats that may play a role in the emission of CO2 globally. Fossil fuel use is the primary source of CO2. The data throws light onto 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 experts to predict global warming. So countries should set a goal to decrease this amount yearly.

Activity 2: Business requirements.

The business requirements for analysing the Co2 Emission Globally over time, identifying affecting factors, creating interactive dashboards and reports, identifying areas for improvement, making data-driven decisions, comparing to countries average and creating forecasting models for future performance. The ultimate goal is to gain insights and reduce the emission through data visualization techniques.

Activity 3: Literature Survey.

A literature survey is a method of researching existing literature and studies related to a specific topic. In the context of analyzing the Global Co2 Emission, a literature survey would involve reviewing studies and articles that have been published on the topic of Emission, as well as studies specific to Co2. The literature survey would include sources

such as academic journals, industry reports, and online articles. It would aim to identify different internal and external factors that are responsible and commonly used to determine Co2 Emission, as well as any best practices or strategies that have been identified for reducing emission. The literature survey would also explore any existing research on Co2 Emission specifically, and would aim to identify any challenges or opportunities that the Countries can opt to reduce emission.

The survey articles :

- CO₂ emissions: A quantitative analysis among the BRICS nations:**

Abstract ;

This study aims to examine the volume of carbon dioxide (CO₂) emissions by lag of the emissions and by the Gross Domestic Product (GDP) for the BRICS (Brazil, Russia, India, China, and South Africa) countries from 1980 to 2011. Due to the heterogeneity of CO₂ emission among the BRICS countries, we organized the countries into two groups. In Group 1 (Brazil and Russia), we identified that the main causes of the variation of CO₂ emission in time t are the emission of CO₂ in time t-1 and the annual GDP of the country. In Group 2 (China, India, and South Africa), the findings do not depend on the income level of individual countries, but only from the emission of CO₂ in the lag period. Therefore, the main contribution of this study is that the environmental consequences of growing economic activity may be very mixed and must be examined on a case-by-case basis.

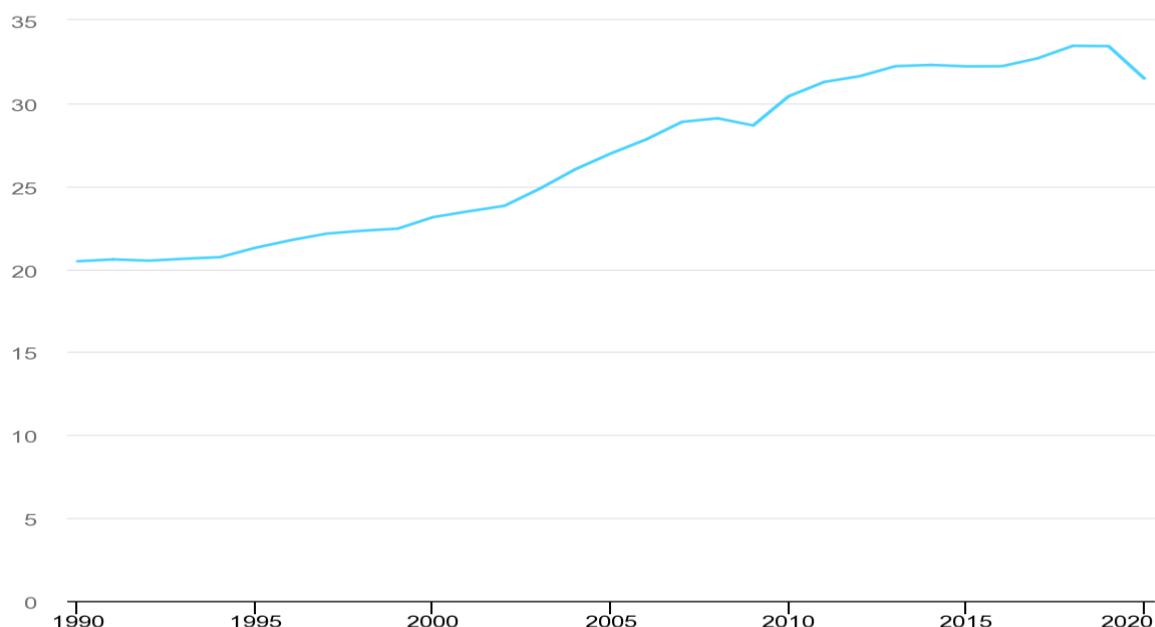
- Global Energy Review: CO2 Emissions in 2020
By IEA :**

The Covid-19 pandemic and resulting economic crisis had an impact on almost every aspect of how energy is produced, supplied, and

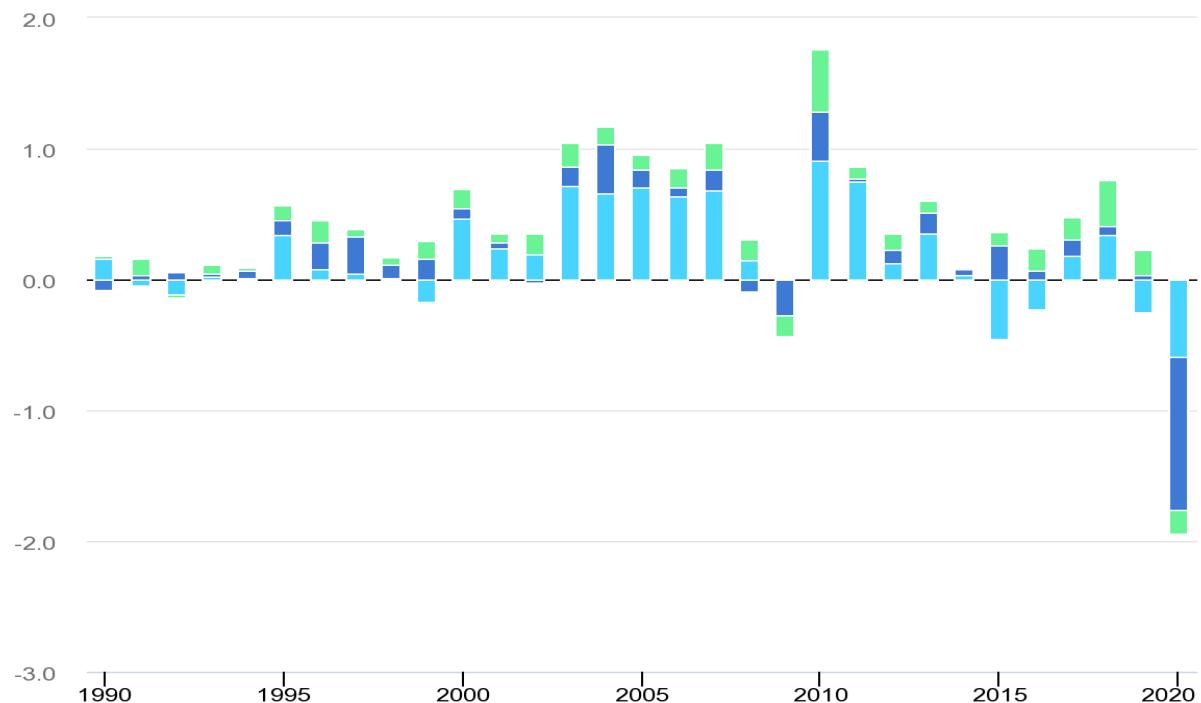
consumed around the world. The pandemic defined energy and emissions trends in 2020 – it drove down fossil fuel consumption for much of the year, whereas renewables and electric vehicles, two of the main building blocks of clean energy transitions, were largely immune.

As primary energy demand dropped nearly 4% in 2020, global energy-related CO₂ emissions fell by 5.8% according to the latest statistical data, the largest annual percentage decline since World War II. In absolute terms, the decline in emissions of almost 2000 million tonnes of CO₂ is without precedent in human history – broadly speaking, this is the equivalent of removing all of the European Union's emissions from the global total. Demand for fossil fuels was hardest hit in 2020 – especially oil, which plunged 8.6%, and coal, which dropped by 4%. Oil's annual decline was its largest ever, accounting for more than half of the drop in global emissions. Global emissions from oil use plummeted by well over 1100 Mt CO₂, down from around 11400 Mt in 2019. The drop in road transport activity accounted for 50% of the decline in global oil demand, and the slump in the aviation sector for around 35%. Meanwhile, low-carbon fuels and technologies, in particular, solar PV and wind, reached their highest ever annual share of the global energy mix, increasing it by more than one percentage point to over 20%.

Global energy-related CO₂ emissions, 1990-2020 :



Change in CO₂ emissions by fuel, 1990-2020 :



- Global Energy Review: CO₂ Emissions in 2021 By IEA :

Energy-related CO₂ emissions grew to 36.3 Gt in 2021, a record high

Global CO₂ emissions from energy combustion and industrial processes¹ rebounded in 2021 to reach their highest ever annual level. A 6% increase from 2020 pushed emissions to 36.3 gigatonnes (Gt), an estimate based on the IEA's detailed region-by-region and fuel-by-fuel analysis, drawing on the latest official national data and publicly available energy, economic and weather data.

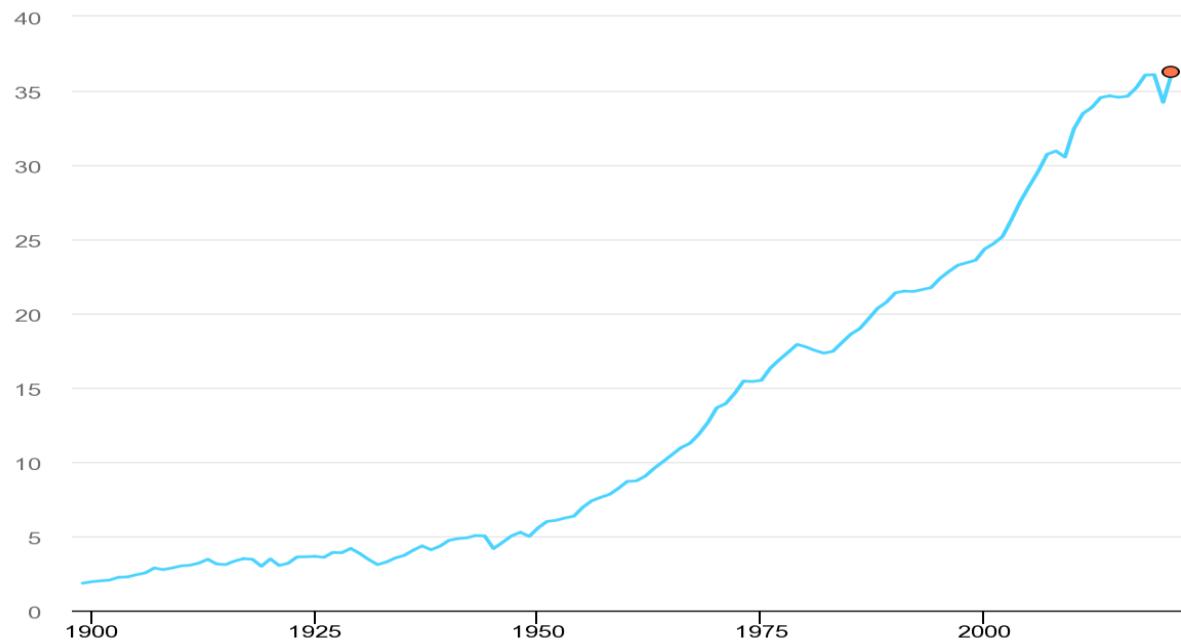
The Covid-19 pandemic had far-reaching impacts on energy demand in 2020, reducing global CO₂ emissions by 5.2%. However, the world has experienced an extremely rapid economic recovery since then, driven by unprecedented fiscal and monetary stimulus and a fast – although uneven – roll-out of vaccines. The recovery of energy demand in 2021 was compounded by adverse weather and energy market

conditions, which led to more coal being burnt despite renewable power generation registering its largest ever annual growth.

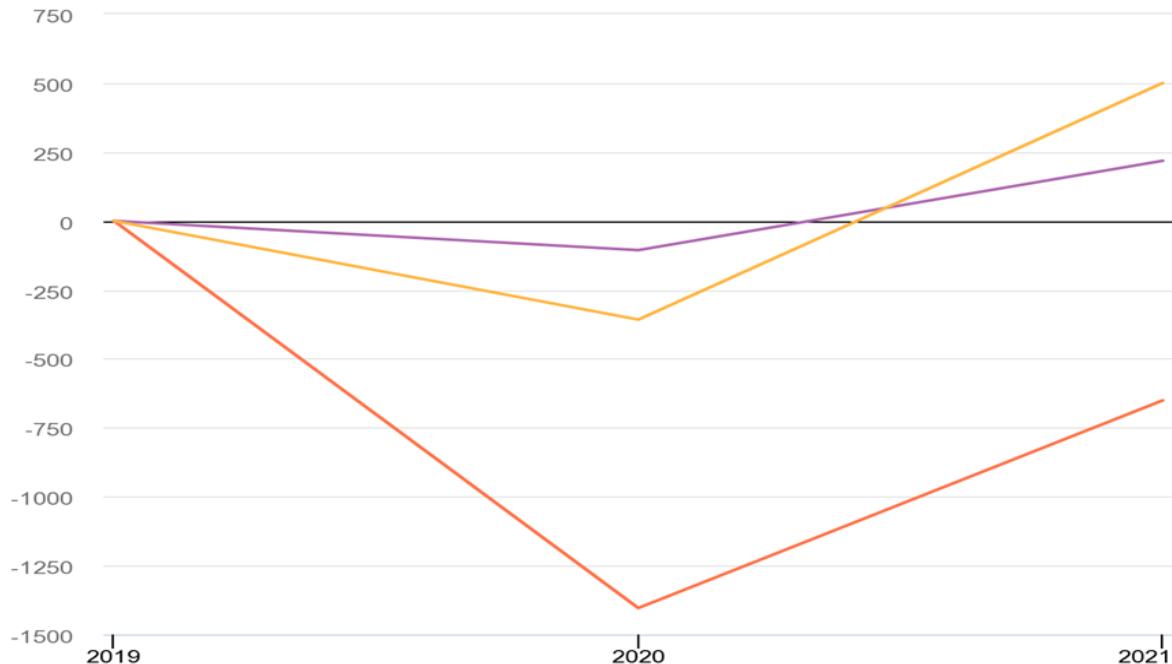
Emissions increased by almost 2.1 Gt from 2020 levels. This puts 2021 above 2010 as the largest ever year-on-year increase in energy-related CO₂ emissions in absolute terms. The rebound in 2021 more than reversed the pandemic-induced decline in emissions of 1.9 Gt experienced in 2020. CO₂ emissions in 2021 rose to around 180 megatonnes (Mt) above the pre-pandemic level of 2019.

The 6% increase in CO₂ emissions in 2021 was in line with the jump in global economic output of 5.9%. This marks the strongest coupling of CO₂ emissions with Gross domestic product (GDP) growth since 2010, when global emissions rebounded by 6.1% while economic output grew by 5.1% as the world emerged from the Global Financial Crisis.

CO₂ emissions from energy combustion and industrial processes, 1900-2021:



Change in CO₂ emissions by fossil fuel, relative to 2019 levels, 2019-2021:



• CO₂ Emissions in 2022 By IEA :

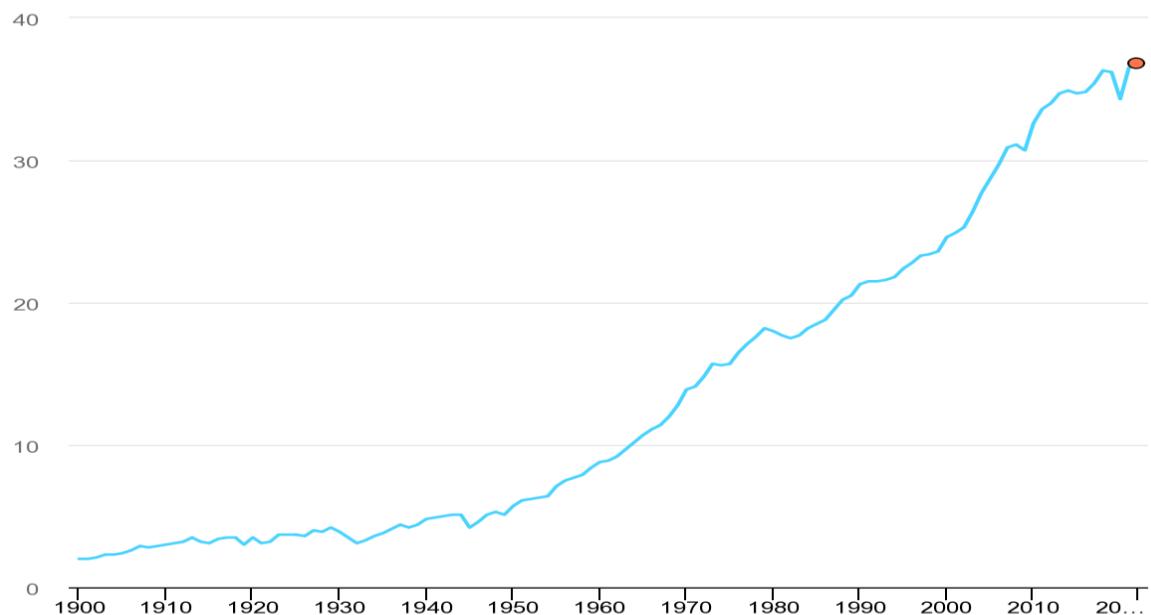
- Global energy-related CO₂ emissions grew by 0.9% or 321 Mt in 2022, reaching a new high of over 36.8 Gt. Following two years of exceptional oscillations in energy use and emissions, caused in part by the Covid-19 pandemic, last year's growth was much slower than 2021's rebound of more than 6%. Emissions from energy combustion increased by 423 Mt, while emissions from industrial processes decreased by 102 Mt.
- In a year marked by energy price shocks, rising inflation, and disruptions to traditional fuel trade flows, global growth in emissions was lower than feared, despite gas-to-coal switching in many countries. Increased deployment of clean energy technologies such as renewables, electric vehicles, and heat pumps helped prevent an additional 550 Mt in CO₂ emissions.

Industrial production curtailment, particularly in China and Europe, also averted additional emissions.

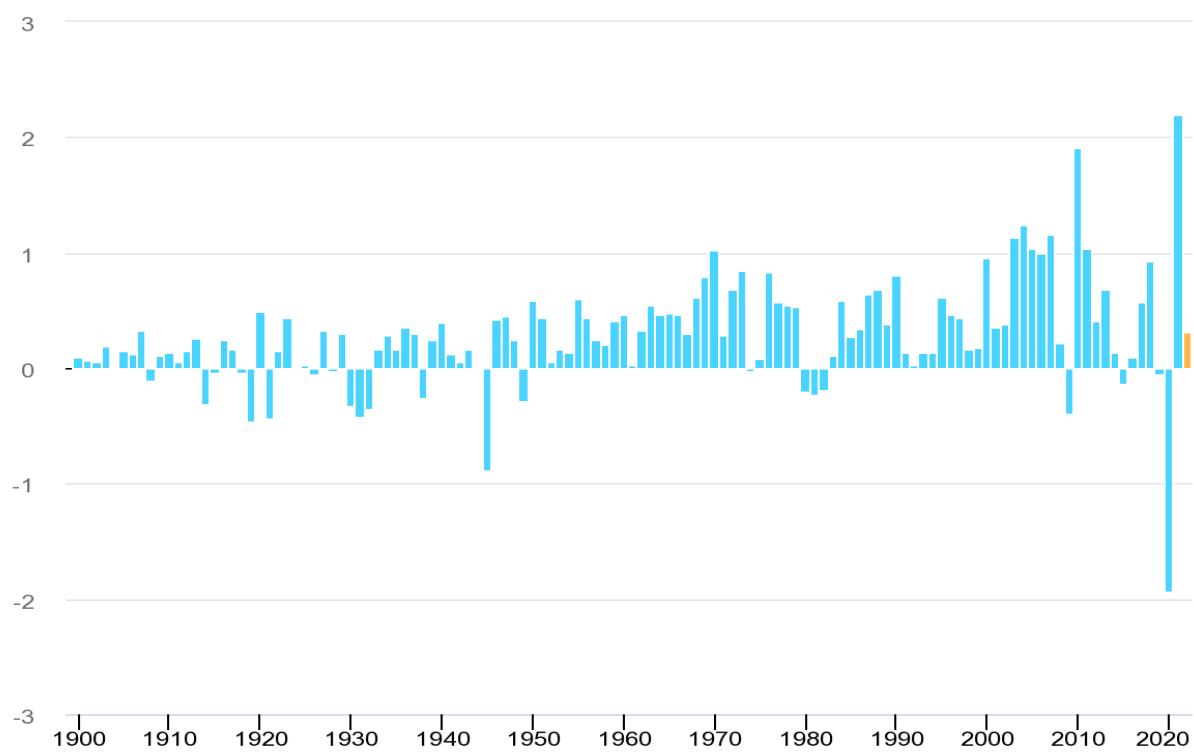
- **Specific challenges in 2022 contributed to the growth in emissions.** Of the 321 Mt CO₂ increase, 60 Mt CO₂ can be attributed to cooling and heating demand in extreme weather and another 55 Mt CO₂ to nuclear power plants being offline.
- **CO₂ growth in 2022 was well below global GDP growth of 3.2%,** reverting to a decade-long trend of decoupling emissions and economic growth that was broken by 2021's sharp rebound in emissions. Improvements in the CO₂ intensity of energy use were slightly slower than the past decade's average.
- **Emissions from natural gas fell by 1.6% or 118 Mt,** following continued tightening of supply exacerbated by Russia's invasion of Ukraine. Reductions in emissions from gas were particularly pronounced in Europe (-13.5%). The Asia Pacific region also saw unprecedented reductions (-1.8%).
- **Increased emissions from coal more than offset reductions from natural gas.** Amid a wave of gas-to-coal switching during the global energy crisis, CO₂ emissions from coal grew by 1.6% or 243 Mt, far exceeding the last decade's average growth rate, and reaching a new all-time high of almost 15.5 Gt.
- **Emissions from oil grew even more than emissions from coal, rising by 2.5% or 268 Mt to 11.2 Gt.** Around half of the increase came from aviation, as air travel continued to rebound from pandemic lows, nearing 80% of 2019 levels. Tempering this increase, electric vehicles continued to gain momentum in 2022, with over 10 million cars sold, exceeding 14% of global car sales.
- **The biggest sectoral increase in emissions in 2022 came from electricity and heat generation,** whose emissions were up by 1.8% or 261 Mt. In particular, global emissions from coal-fired electricity and heat generation grew by 224 Mt or 2.1%, led by emerging economies in Asia.
- **A strong expansion of renewables limited the rebound in coal power emissions.** Renewables met 90% of last year's global growth in electricity generation. Solar PV and wind generation each increased by around 275 TWh, a new annual record.
- **Emissions from industry declined by 1.7% to 9.2 Gt last year.** While several regions saw manufacturing curtailments, the global decline was largely driven by a 161 Mt CO₂ decrease in China's industry emissions, reflecting a 10% decline in cement production and a 2% decline in steel making.

- China's emissions were relatively flat in 2022, declining by 23 Mt or 0.2%. Growing emissions from combustion were offset by declines from industrial processes. Weaker economic growth, declining construction activity, and strict Covid-19 measures led to reductions in industrial and transport emissions. Power sector emissions growth slowed compared with the average of the past decade but still reached 2.6%.
- The European Union saw a 2.5% or 70 Mt reduction in CO₂ emissions despite oil and gas market disruptions, hydro shortfalls due to drought, and numerous nuclear plants going offline. Buildings sector emissions fell markedly, helped by a mild winter. Although power sector emissions increased by 3.4%, coal use was not as high as anticipated. For the first time, electricity generation from wind and solar PV combined exceeded that of gas or nuclear.
- US emissions grew by 0.8% or 36 Mt. The buildings sector saw the highest emissions growth, driven by extreme temperatures. The main emissions reductions came from electricity and heat generation, thanks to unprecedented increases in solar PV and wind, as well as coal-to-gas switching. While many other countries reduced their natural gas use, the United States saw an increase of 89 Mt in CO₂ emissions from gas, as it was called upon to meet peak electricity demand during summer heat waves.
- Emissions from Asia's emerging market and developing economies, excluding China, grew more than those from any other region in 2022, increasing by 4.2% or 206 Mt CO₂. Over half of the region's increase in emissions came from coal-fired power generation.

Global CO₂ emissions from energy combustion and industrial processes, 1900-2022 :



Annual change in global CO₂ emissions from energy combustion and industrial processes, 1900-2022 :



Activity 4: Social or Business Impact.

Social impact :

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. As the impacts of climate change mount, millions of vulnerable people face disproportionate challenges in terms of extreme events, health effects, food, water, and livelihood security, migration and forced displacement, loss of cultural identity, and other related risks.

Business Model/Impact :

By conducting an analysis the countries can identify areas for improvement and take steps to reduce factors that are responsible for Co2 Emission for environmental sustainability by improving the efficiency and transitioning to low carbon alternatives. **Higher carbon footprint is indicative of greater energy costs.** Expenditure on energy bills could be channeled to other areas of the business that require more attention.

Milestone 2: Data Collection & Extraction from Database:

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data

Activity 1: Collect the dataset:

The data is collected from the given datasheet in the project manual.

A screenshot of a Microsoft Excel spreadsheet titled "Co2 New - Excel". The spreadsheet contains data for Afghanistan from 1975 to 2020. The columns represent various CO2 emissions metrics per capita, such as co2, co2_grow, co2_per, cumulativ_coal_co2, cement_c, flaring_co_gas_co2, oil_co2, other_ind_cement_c, coal_co2, flaring_co_gas_co2, oil_co2_p, other_co2_trade_co2, and population. The data shows a general upward trend in CO2 emissions over time, with significant fluctuations and peaks around 1980 and 1990.

country	year	co2	co2_grow	co2_per	cumulativ_coal_co2	cement_c	flaring_co_gas_co2	oil_co2	other_ind_cement_c	coal_co2	flaring_co_gas_co2	oil_co2_p	other_co2_trade_co2	population					
Afghanist.	1975	2.121	10.88	0.167	21.287	0.399	0.069	0.304	0.476	0.874	0	0.006	0.031	0.024	0.038	0.069	0	0	1.3E+07
Afghanist.	1976	1.981	-6.62	0.153	23.267	0.425	0.079	0.293	0.3	0.883	0	0.006	0.033	0.023	0.023	0.068	0	0	1.3E+07
Afghanist.	1977	2.384	20.36	0.181	25.652	0.451	0.065	0.381	0.513	0.975	0	0.005	0.034	0.029	0.039	0.074	0	0	1.3E+07
Afghanist.	1978	2.153	-9.68	0.161	27.805	0.576	0.058	0.283	0.301	0.936	0	0.004	0.043	0.021	0.023	0.07	0	0	1.3E+07
Afghanist.	1979	2.233	3.69	0.166	30.038	0.352	0.064	0.267	0.385	1.165	0	0.005	0.026	0.02	0.029	0.087	0	0	1.3E+07
Afghanist.	1980	1.756	-21.34	0.132	31.794	0.316	0.023	0.305	0.187	0.925	0	0.002	0.024	0.023	0.014	0.069	0	0	1.3E+07
Afghanist.	1981	1.978	12.65	0.15	33.772	0.333	0.033	0.293	0.304	1.015	0	0.002	0.025	0.022	0.023	0.077	0	0	1.3E+07
Afghanist.	1982	2.095	5.87	0.163	35.867	0.385	0.039	0.282	0.396	0.993	0	0.003	0.03	0.022	0.031	0.077	0	0	1.3E+07
Afghanist.	1983	2.52	20.31	0.201	38.387	0.385	0.006	0.293	0.616	1.22	0	0	0.031	0.023	0.049	0.097	0	0	1.3E+07
Afghanist.	1984	2.822	11.97	0.231	41.209	0.393	0.046	0.316	0.932	1.134	0	0.004	0.032	0.026	0.076	0.093	0	0	1.2E+07
Afghanist.	1985	3.501	24.1	0.293	44.71	0.4	0.032	0.33	1.192	1.548	0	0.003	0.034	0.028	0.1	0.13	0	0	1.2E+07
Afghanist.	1986	3.134	-10.5	0.267	47.844	0.425	0.038	0.33	1.202	1.14	0	0.003	0.036	0.028	0.102	0.097	0	0	1.2E+07
Afghanist.	1987	3.114	-0.63	0.268	50.957	0.443	0.043	0.223	0.392	2.013	0	0.004	0.038	0.019	0.034	0.174	0	0	1.2E+07
Afghanist.	1988	2.857	-8.25	0.246	53.814	0.366	0.043	0.187	0.44	1.821	0	0.004	0.032	0.016	0.038	0.157	0	0	1.2E+07
Afghanist.	1989	2.765	-3.22	0.233	56.579	0.337	0.043	0.04	0.48	1.865	0	0.004	0.028	0.003	0.04	0.157	0	0	1.2E+07
Afghanist.	1990	2.603	-5.85	0.21	59.182	0.278	0.046	0.026	0.403	1.85	0	0.004	0.022	0.002	0.032	0.149	0	0	1.2E+07
Afghanist.	1991	2.427	-6.76	0.182	61.61	0.249	0.046	0.026	0.384	1.718	0	0.003	0.019	0.002	0.029	0.129	0	0	1.3E+07
Afghanist.	1992	1.379	-43.17	0.095	62.989	0.022	0.046	0.022	0.363	0.927	0	0.003	0.002	0.002	0.025	0.064	0	0	1.4E+07
Afghanist.	1993	1.333	-3.36	0.084	64.322	0.018	0.047	0.022	0.352	0.894	0	0.003	0.001	0.001	0.022	0.056	0	0	1.6E+07
Afghanist.	1994	1.282	-3.86	0.075	65.604	0.015	0.047	0.022	0.338	0.86	0	0.003	0.001	0.001	0.02	0.05	0	0	1.7E+07
Afghanist.	1995	1.23	-3.99	0.068	66.834	0.015	0.047	0.022	0.322	0.824	0	0.003	0.001	0.001	0.018	0.046	0	0	1.8E+07
Afghanist.	1996	1.165	-5.33	0.062	67.999	0.007	0.047	0.022	0.308	0.78	0	0.002	0	0.001	0.016	0.041	0	0	1.9E+07
Afghanist.	1997	1.084	-6.94	0.056	69.083	0.004	0.047	0.022	0.283	0.728	0	0.002	0	0.001	0.015	0.038	0	0	1.9E+07
Afghanist.	1998	1.029	-5.07	0.052	70.113	0.004	0.047	0.022	0.265	0.691	0	0.002	0	0.001	0.013	0.035	0	0	2E+07
Afghanist.	1999	0.881	-21.34	0.04	70.922	0.004	0.047	0.022	0.242	0.495	0	0.002	0	0.001	0.012	0.024	0	0	2E+07
Afghanist.	2000	0.769	-6.4	0.036	71.60	0.004	0.047	0.022	0.224	0.409	0	0	0	0.002	0.011	0.024	0	0	2.5E+07

Activity 1.1: Understand the data:

Dataset consists CO2 emissions in metric ton per capita of every country around the world. The data is collected from 1975 to 2020. In this dataset Countries and regions are included. Data is initially pre-processed using excel.

The dataset contains ,

- Country- Country for which Co2 is Recorded
- Year- Year the data was recorded
- Co2 Emission (In Million Metric Tons)
- Co2 Growth per Capita
- Co2 Per Capita
- Cumulative Co2
- Several Fossil Fuels rate of Emission

Activity 2: Storing Data in DB & Connect DB with Tableau :

The database is stored and connected in Tableau.

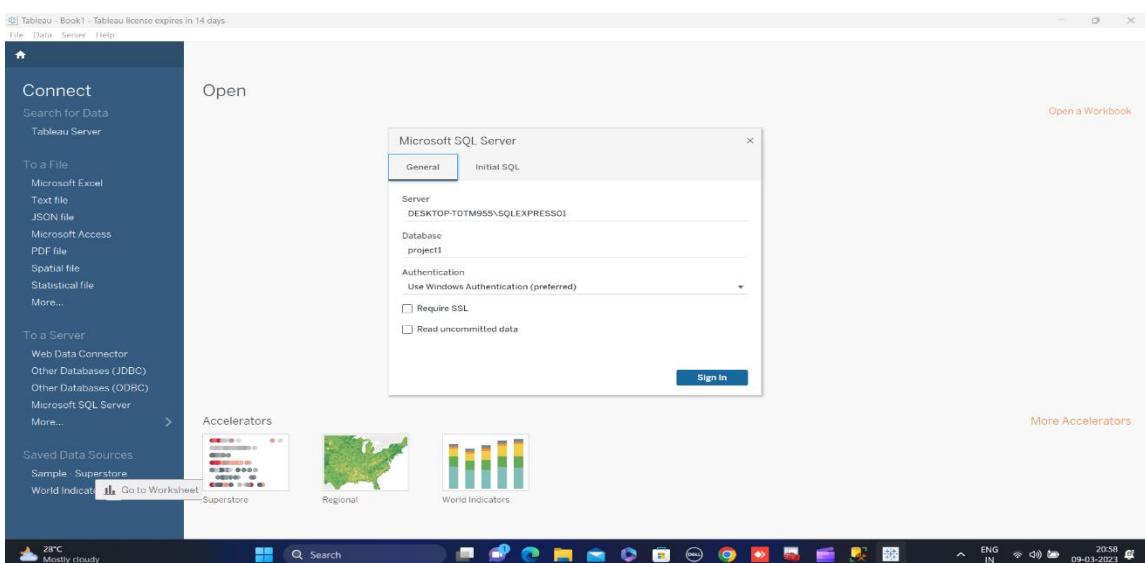
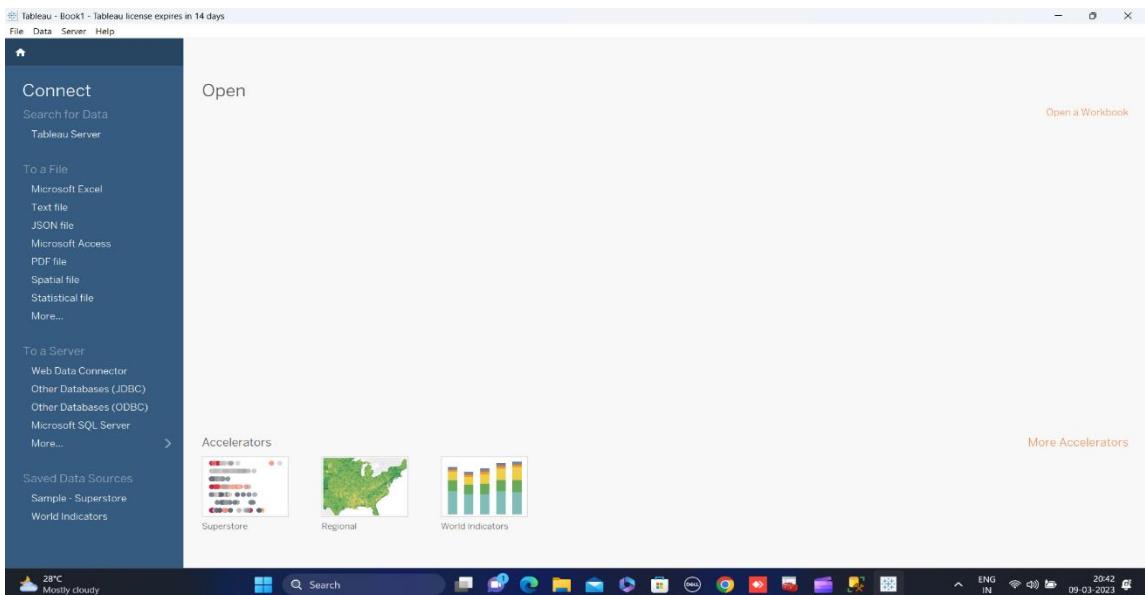
The screenshot shows the Microsoft SQL Server Management Studio interface. In the Object Explorer, a database named 'project1' is selected. A query window titled 'SQLQuery1.sql - DESKTOP-TOTM955\drjsa (53)*' displays the following SQL code:

```
select * from Co2
```

The results grid shows data for 15 rows, each representing a country and its CO2 emissions data. The columns include: country, year, co2, co2_growth_pct, co2_per_capita, cumulative_co2, coal_co2, cement_co2, flaring_co2, gas_co2, oil_co2, other_industry_co2, cement_co2_per_capita, coal_co2_per_capita, flaring_co2_per_capita, gas_co2_per_capita, and oil. The data spans from 1975 to 1999.

country	year	co2	co2_growth_pct	co2_per_capita	cumulative_co2	coal_co2	cement_co2	flaring_co2	gas_co2	oil_co2	other_industry_co2	cement_co2_per_capita	coal_co2_per_capita	flaring_co2_per_capita	gas_co2_per_capita	oil
Afghanistan	1975	2.121	10.88	0.167	21.287	0.399	0.069	0.304	0.476	0.874	0	0.006	0.031	0.024	0.038	0
Afghanistan	1976	1.961	-6.62	0.153	23.267	0.425	0.079	0.293	0.3	0.883	0	0.006	0.033	0.023	0.023	0
Afghanistan	1977	2.384	20.36	0.181	25.652	0.451	0.065	0.381	0.513	0.975	0	0.005	0.034	0.029	0.039	0
Afghanistan	1978	2.153	-9.68	0.161	27.805	0.576	0.058	0.283	0.301	0.936	0	0.004	0.043	0.021	0.023	0
Afghanistan	1979	2.233	3.69	0.166	30.038	0.352	0.064	0.267	0.385	1.165	0	0.005	0.026	0.02	0.029	0
Afghanistan	1980	1.756	-21.34	0.132	31.794	0.316	0.023	0.305	0.187	0.925	0	0.002	0.024	0.023	0.014	0
Afghanistan	1981	1.976	12.65	0.15	33.772	0.333	0.033	0.293	0.304	1.015	0	0.002	0.025	0.022	0.023	0
Afghanistan	1982	2.095	5.87	0.163	35.857	0.385	0.039	0.282	0.396	0.993	0	0.003	0.03	0.022	0.031	0
Afghanistan	1983	2.52	20.31	0.201	38.387	0.385	0.006	0.293	0.616	1.22	0	0	0.031	0.023	0.049	0
Afghanistan	1984	2.822	11.97	0.231	41.209	0.393	0.048	0.316	0.932	1.134	0	0.004	0.032	0.026	0.076	0
Afghanistan	1985	3.501	24.1	0.293	44.71	0.4	0.032	0.33	1.192	1.548	0	0.003	0.034	0.028	0.1	0
Afghanistan	1986	3.134	-10.5	0.267	47.844	0.425	0.038	0.33	1.202	1.14	0	0.003	0.036	0.028	0.102	0
Afghanistan	1987	3.114	-0.63	0.268	50.957	0.443	0.043	0.223	0.392	2.013	0	0.004	0.038	0.019	0.034	0
Afghanistan	1988	2.857	-8.25	0.24	53.614	0.366	0.043	0.187	0.44	1.821	0	0.004	0.032	0.016	0.038	0
Afghanistan	1989	2.765	-3.22	0.233	56.579	0.337	0.043	0.04	0.48	1.865	0	0.004	0.028	0.003	0.04	0

Query executed successfully.



This screenshot shows the Tableau desktop interface after connecting to the Microsoft SQL Server database. The left sidebar now lists the 'Connections' section with 'DESKTOP-TGTM955\SQLEXPRESS01' selected. The 'Database' dropdown shows 'project1' and the 'Table' dropdown shows 'Co2'. The main workspace displays a preview of the 'Co2' table with columns: Name (Co2), Country, Year, Co2 (Co2), Co2 Growth Prct, Co2 Per Capita, Co2 Cumulative Co2, and Coal Co2. A message 'Need more data? Drag tables here to relate them. Learn more' is visible. At the bottom, there are 'Update Now' and 'Update Automatically' buttons. The status bar at the bottom indicates the weather as 28°C Mostly cloudy, system icons, and the date/time as 09-03-2023 20:58.

Milestone 3: Data Preparation :

Activity: Prepare the Data for Visualization :

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. Since the Data is initially pre-processed we can skip this step. Basically this process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

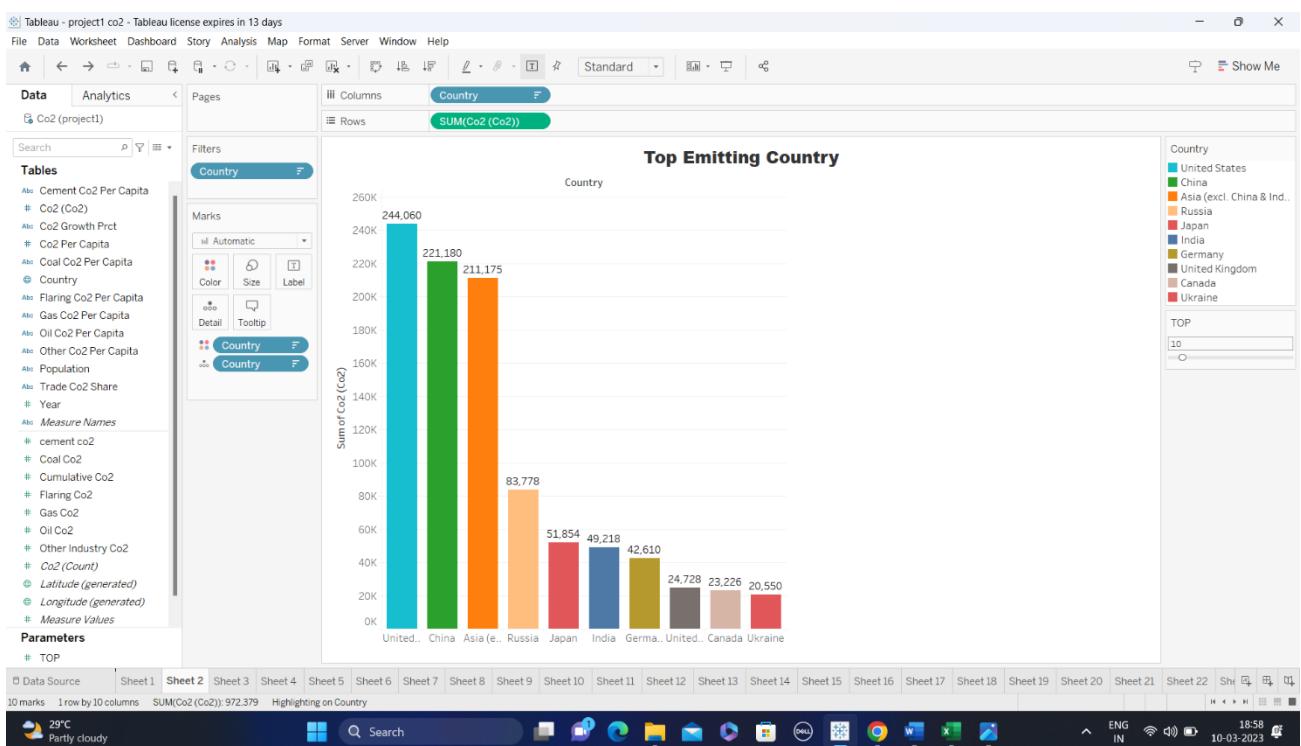
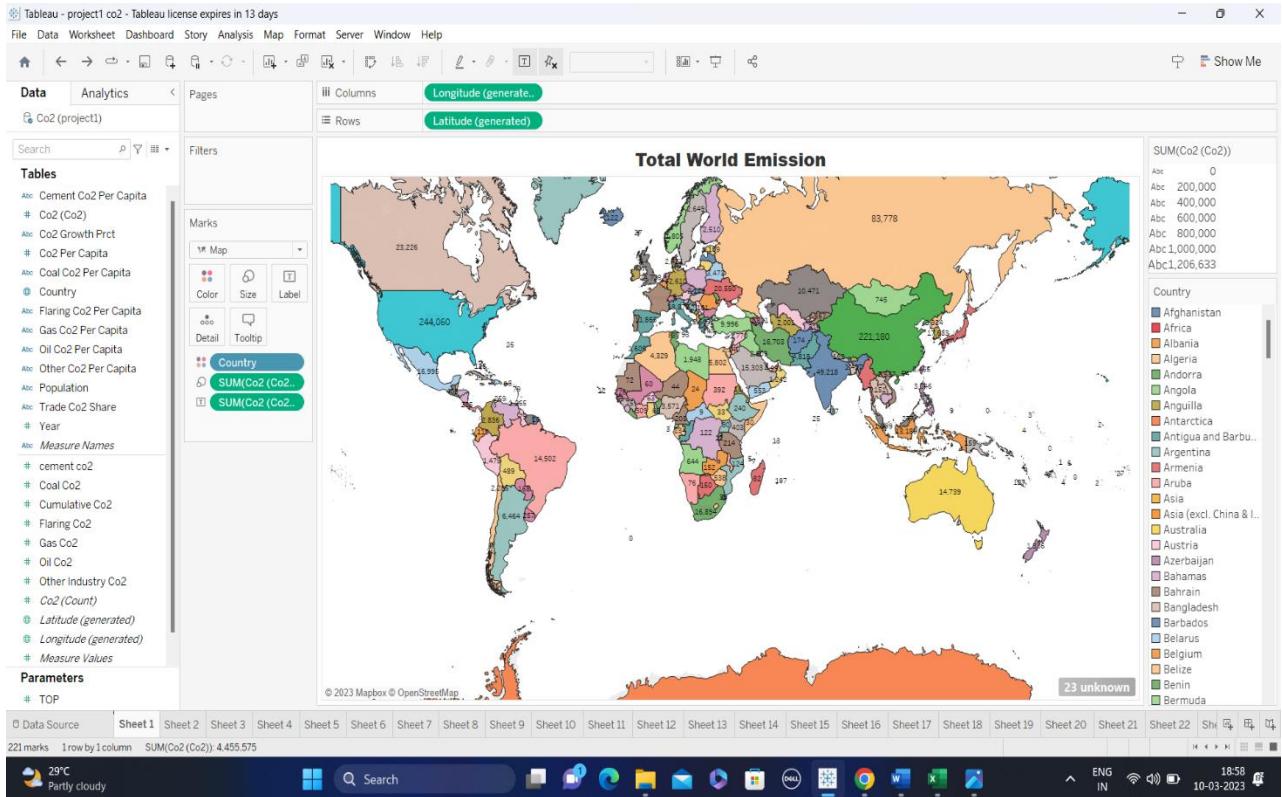
Milestone 4: Data Visualization :

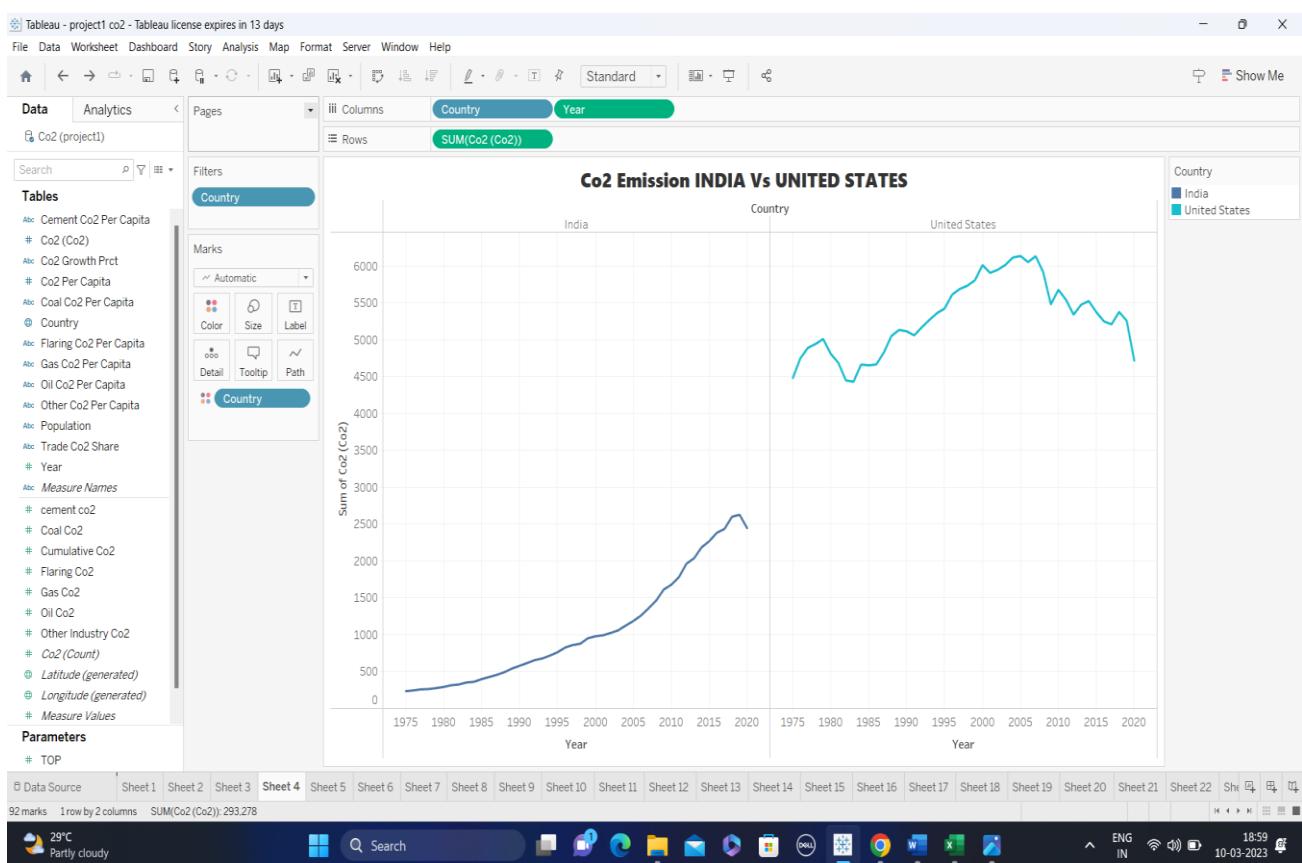
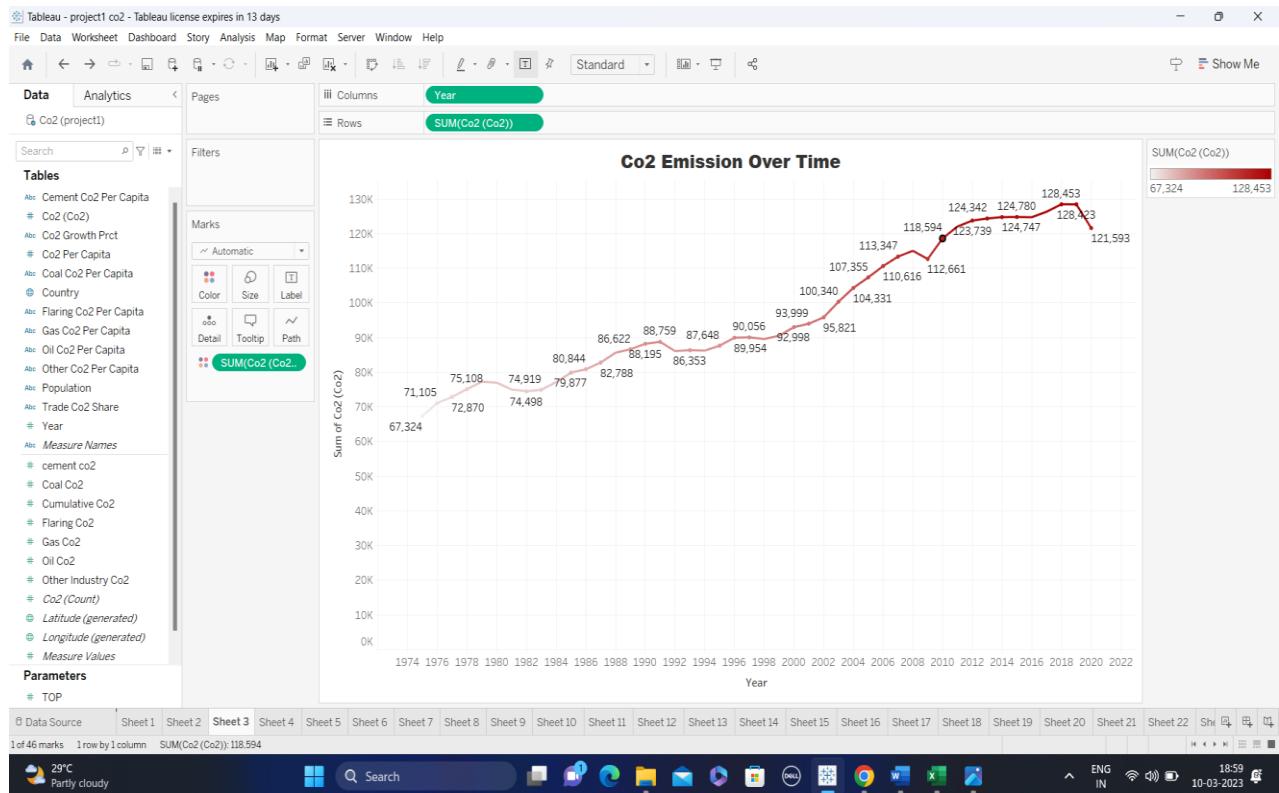
Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data. Activity 1: No of Unique Visualizations

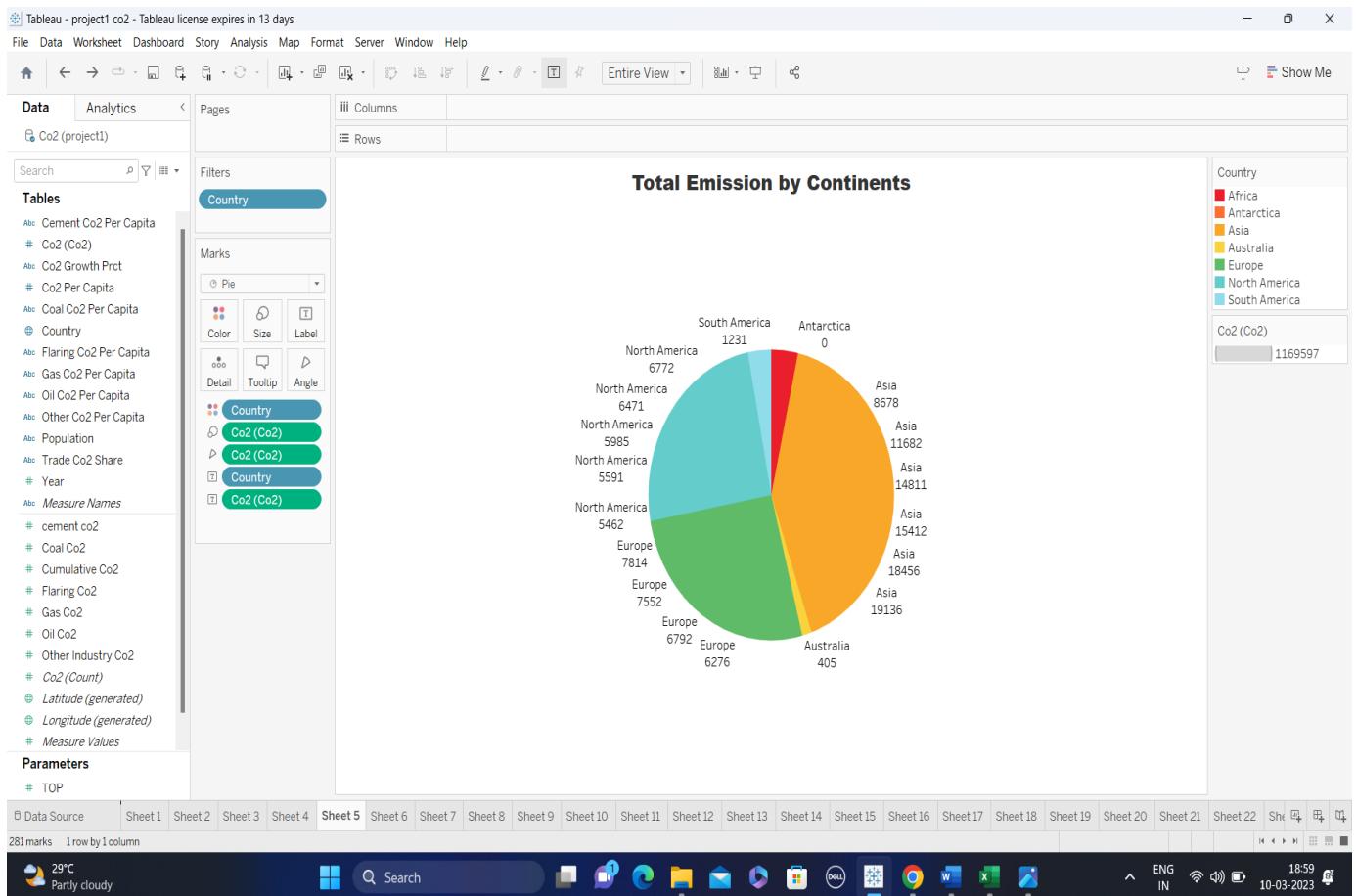
Activity 1: No of Unique Visualizations :

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the Co2 Emission include bar charts, line charts, Tree Map, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show Emission, and relationships between variables, breakdown of factors and emission by countries and continents.

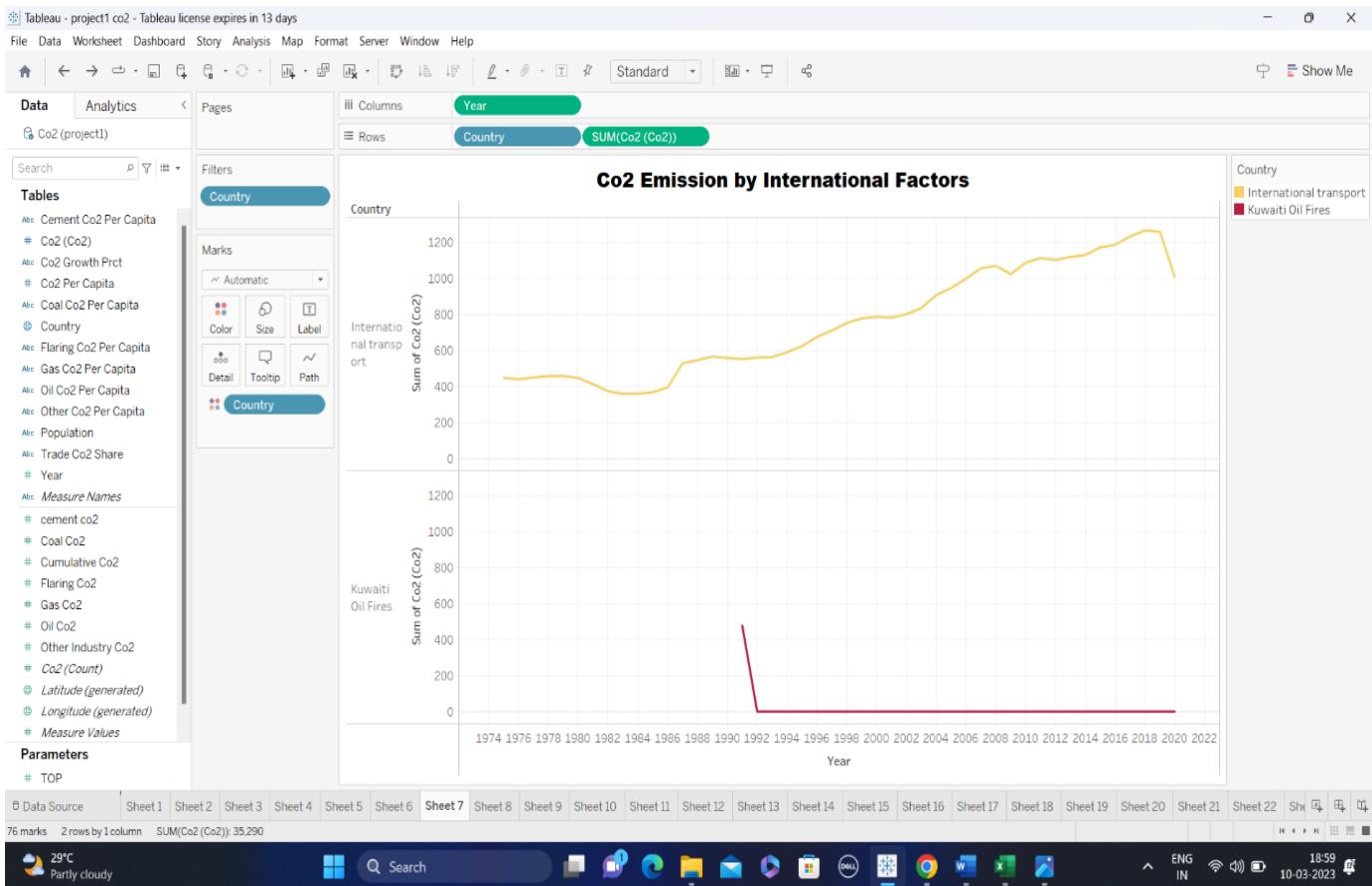
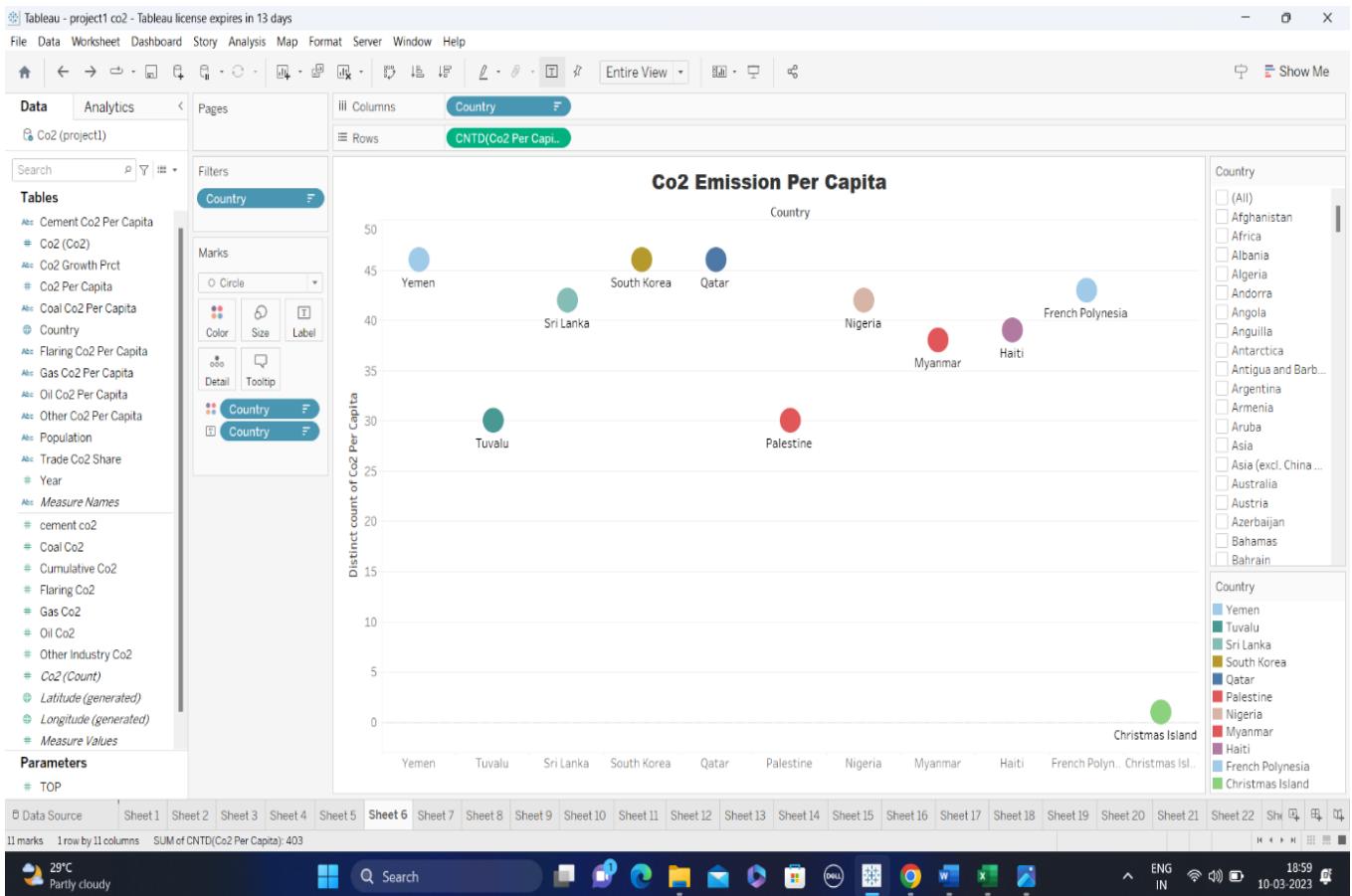
Activity 1.1 :To Understand- Total World Emission, Co2 Emission over Time, Total Emission by Continents :

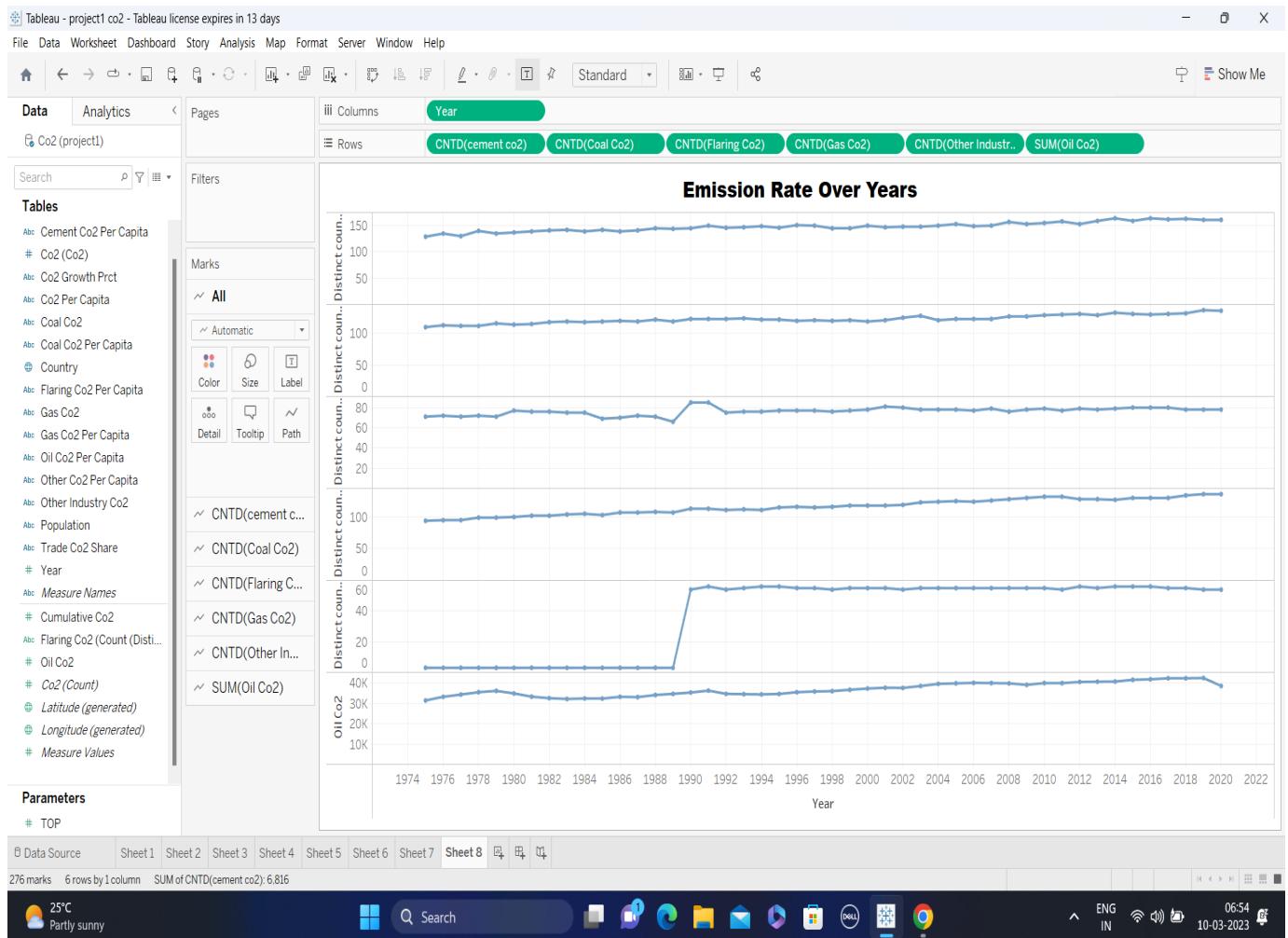




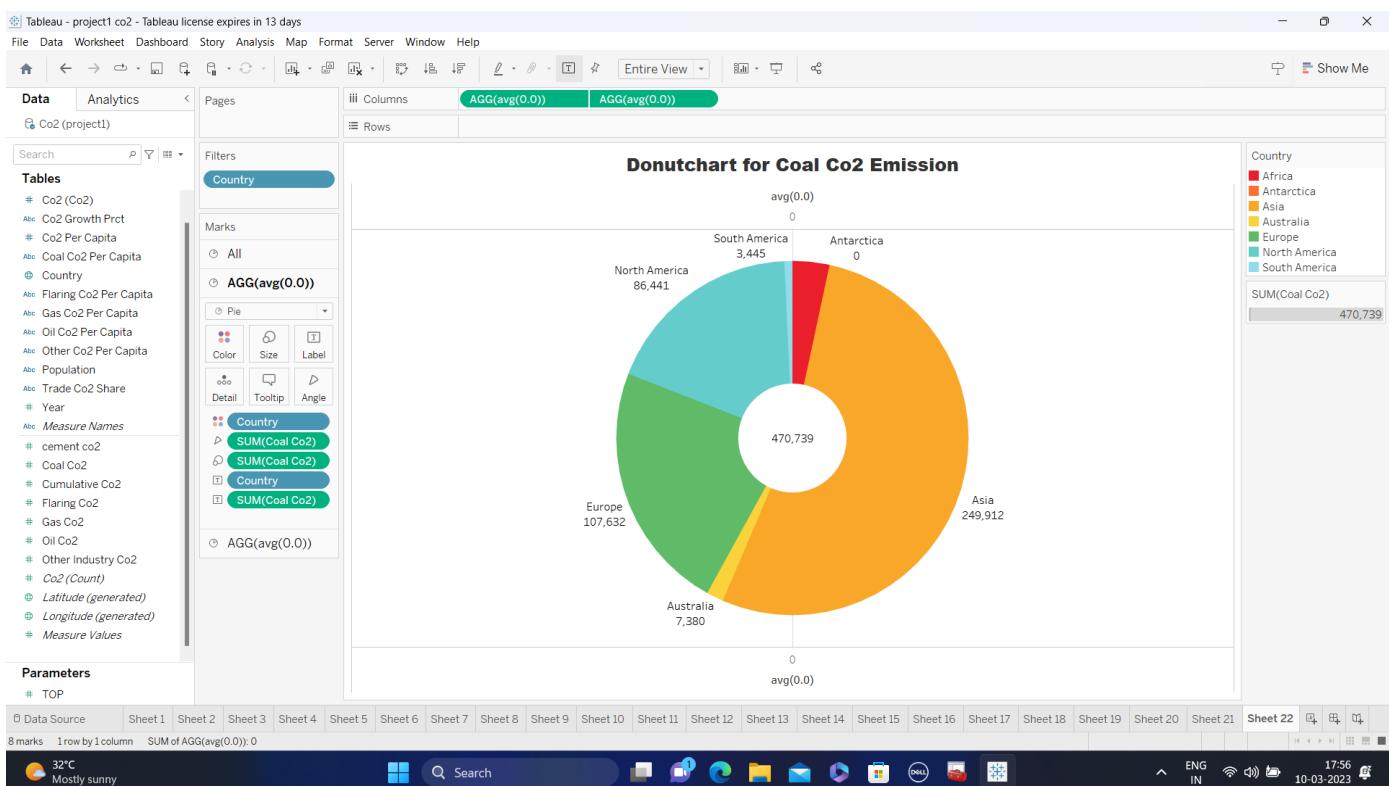
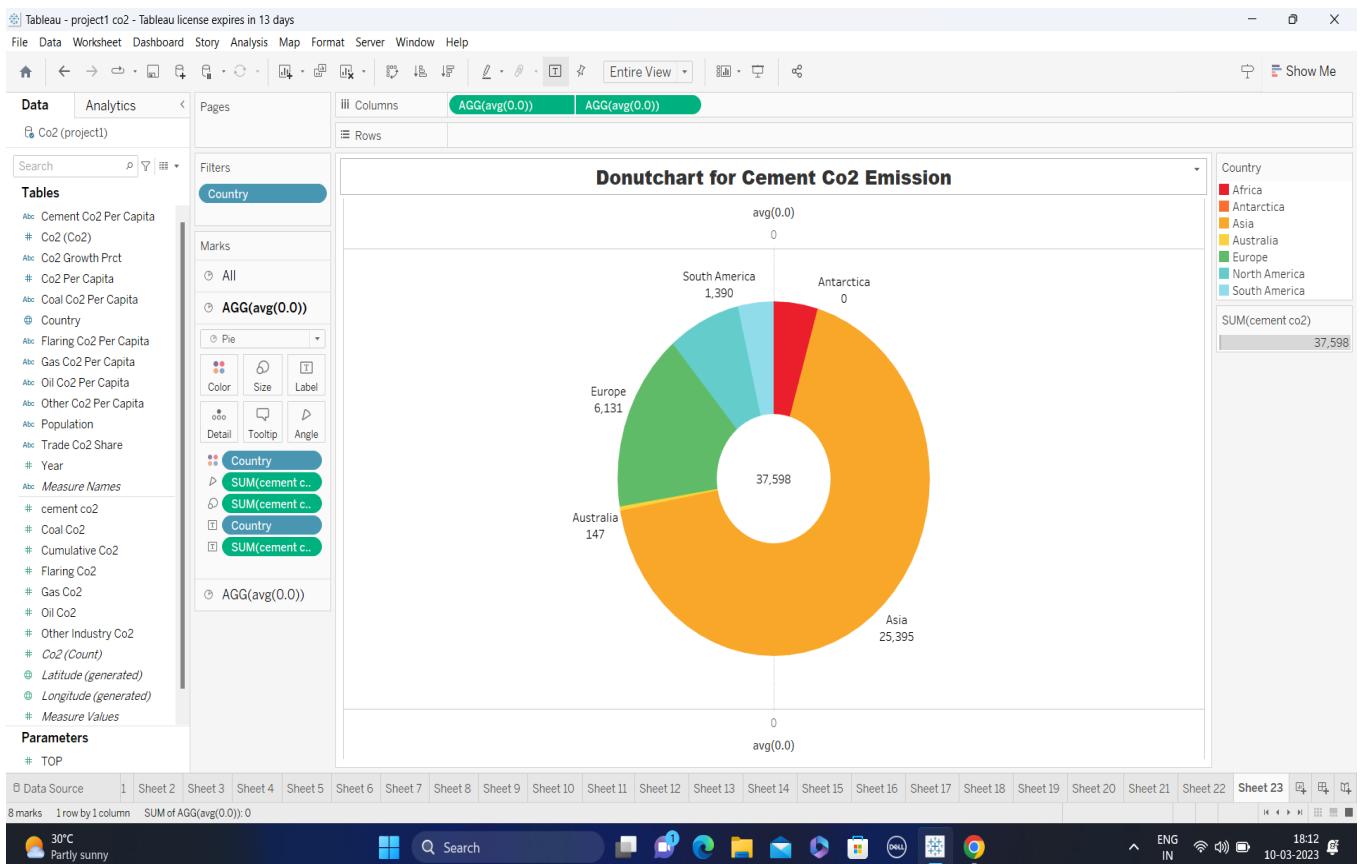


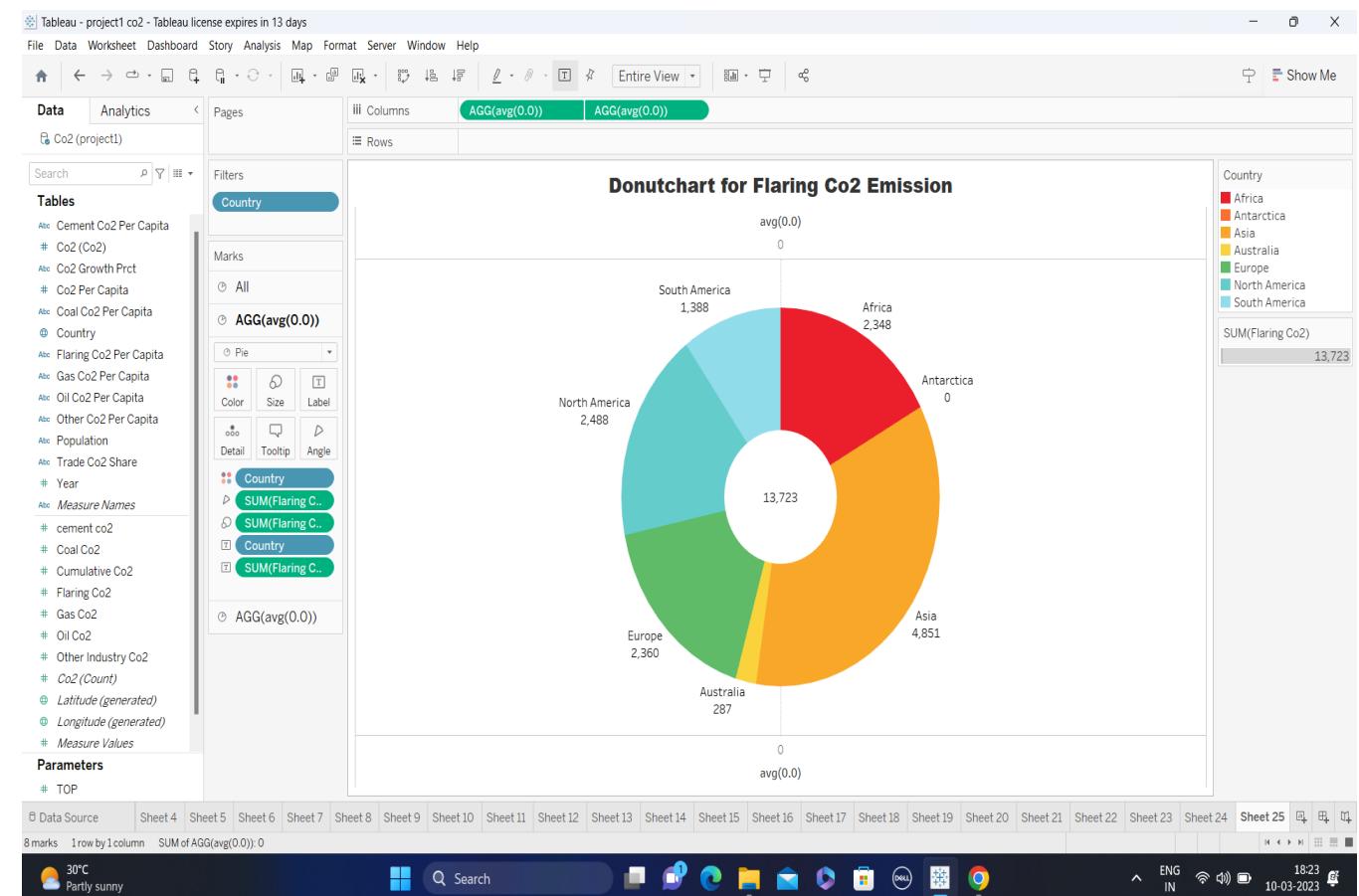
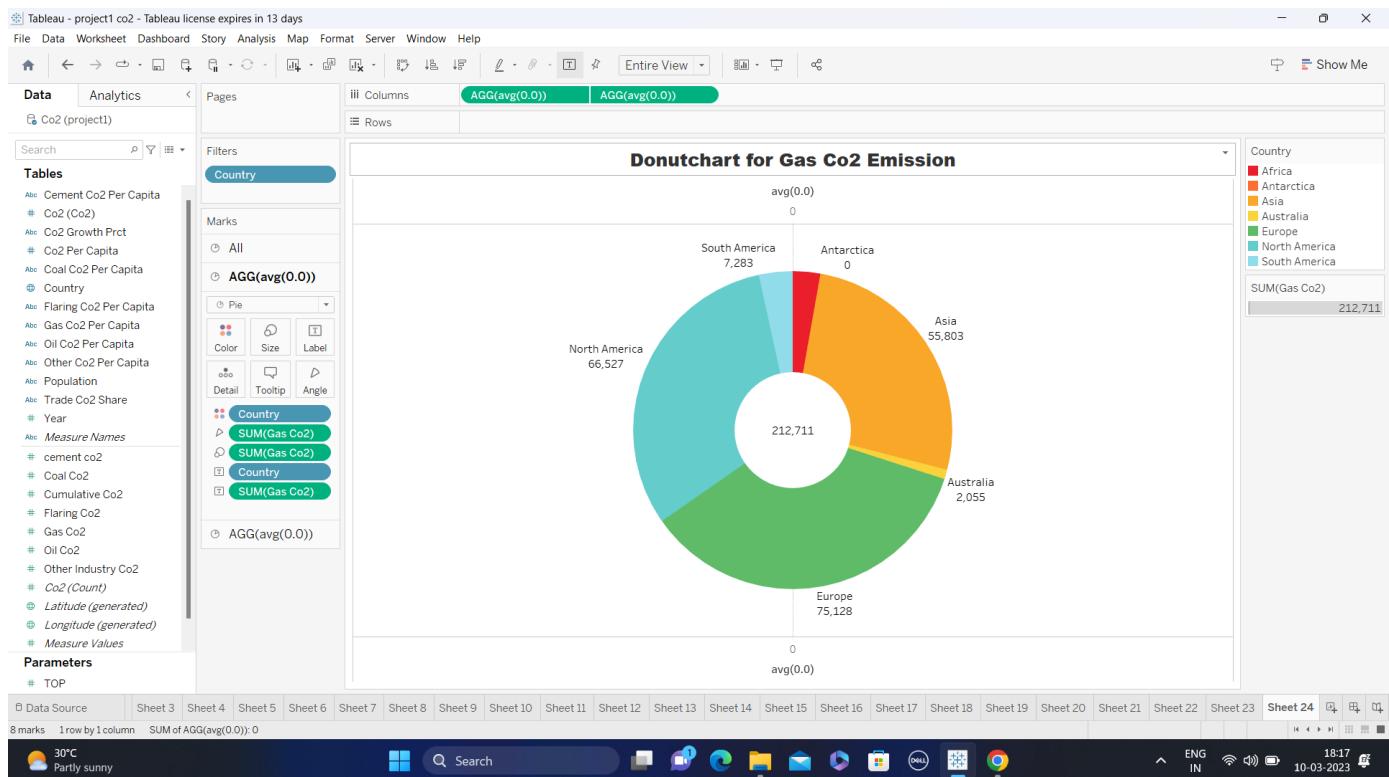
Activity 1.2 : To Understand- Co2 Emission per Capita, Co2 Emission by International Factors, Emission Rate Over Years :

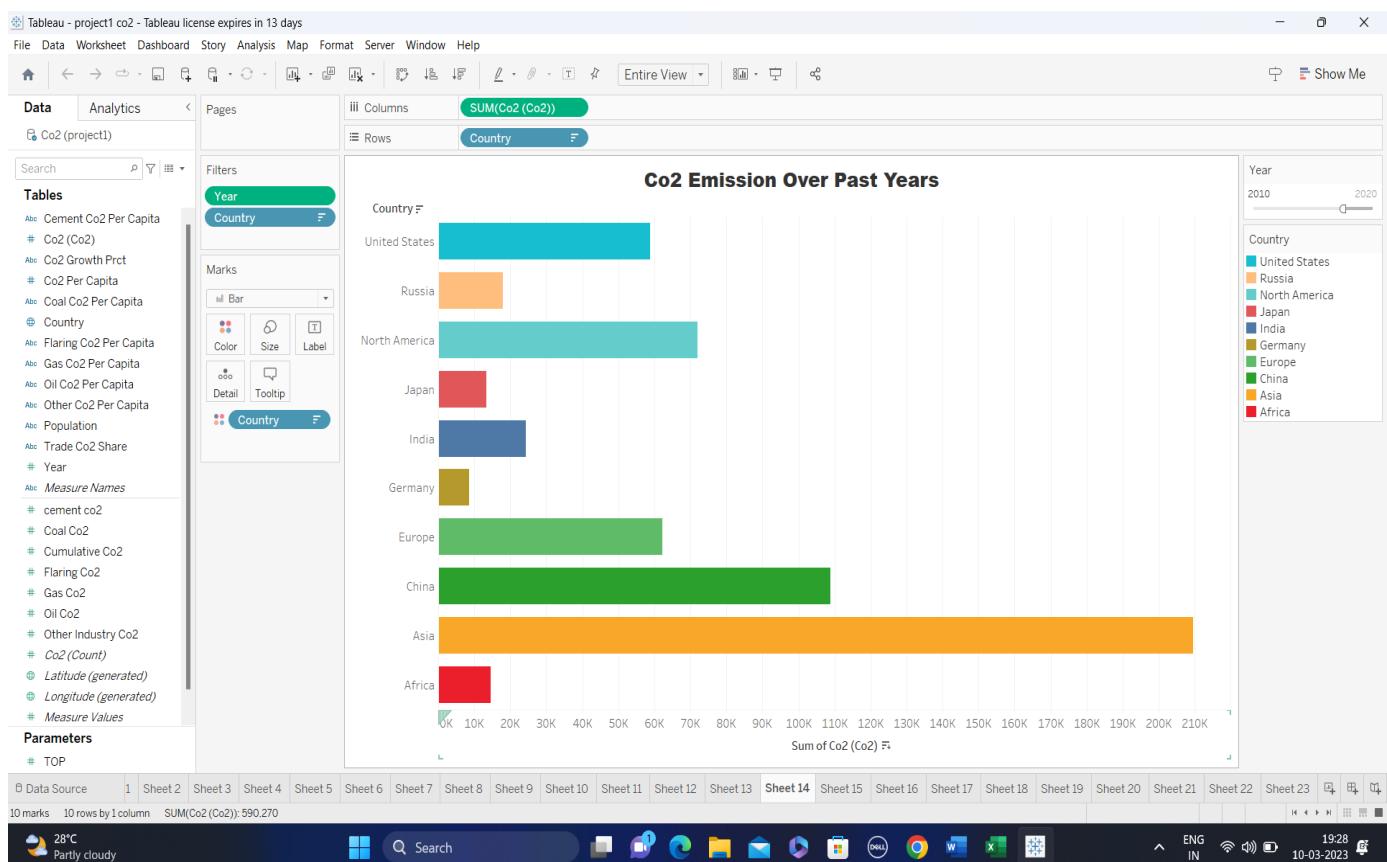
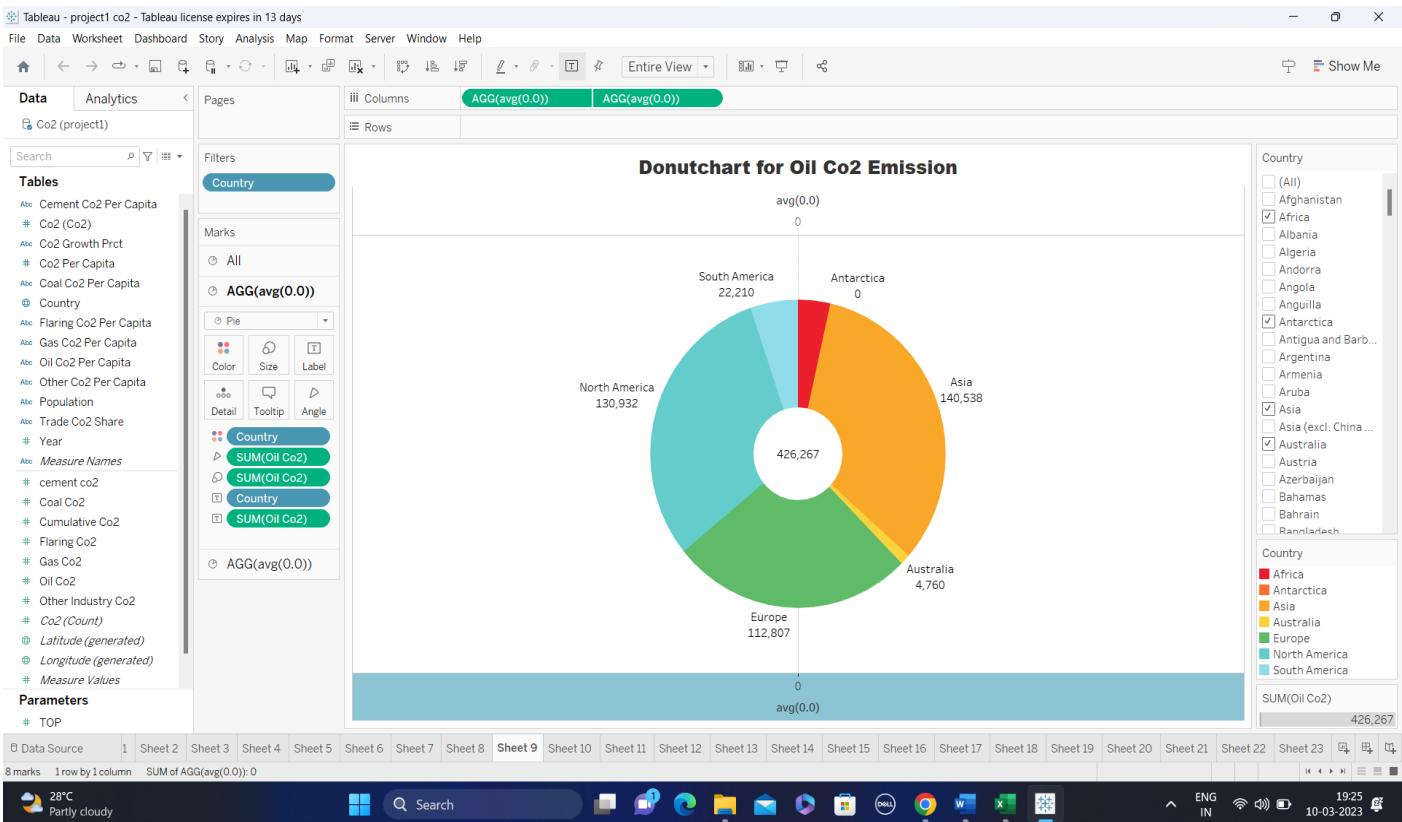


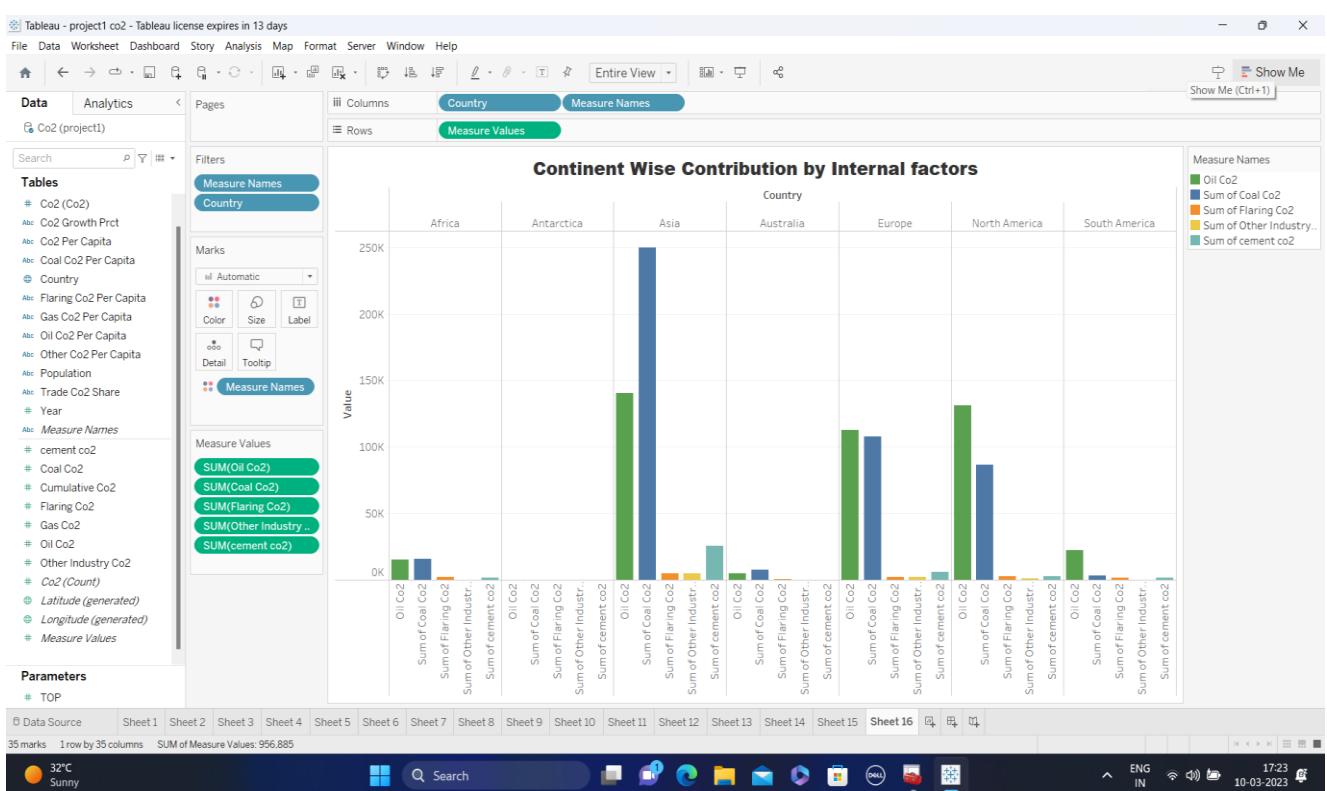
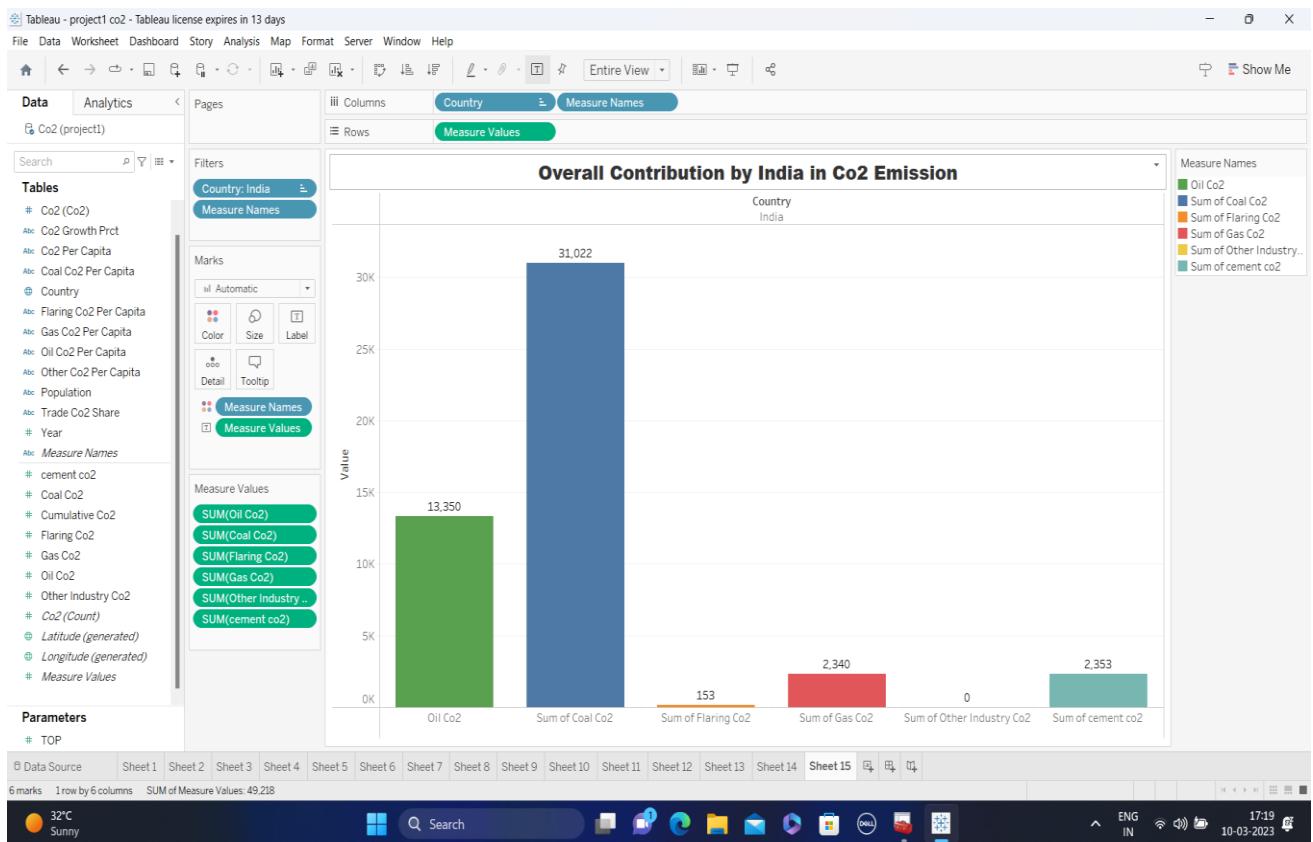


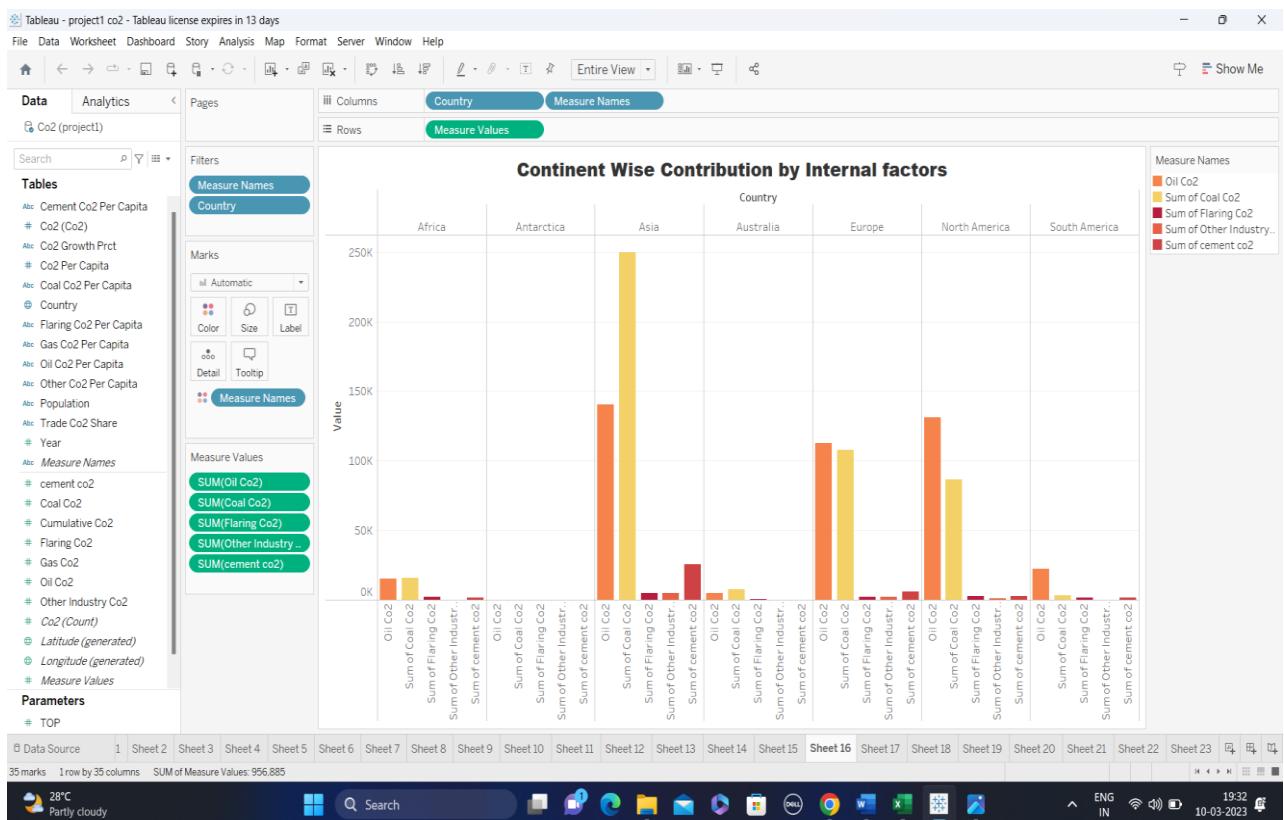
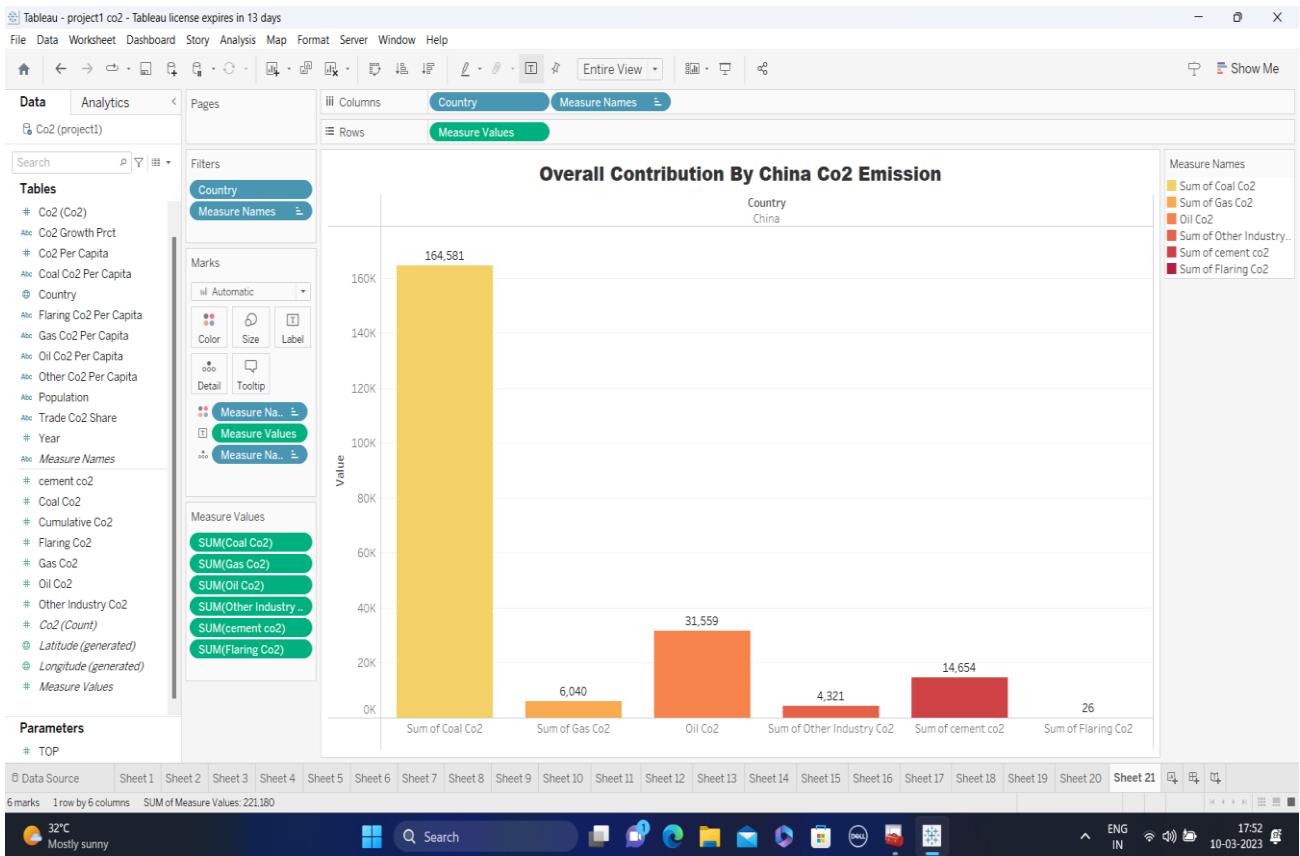
Activity 1.3 : To Understand- Co2 contribution by different fossil fuels, Co2 Emission over past 10 Years, Change in Co2 Emission and Co2 Emission in 2020 :

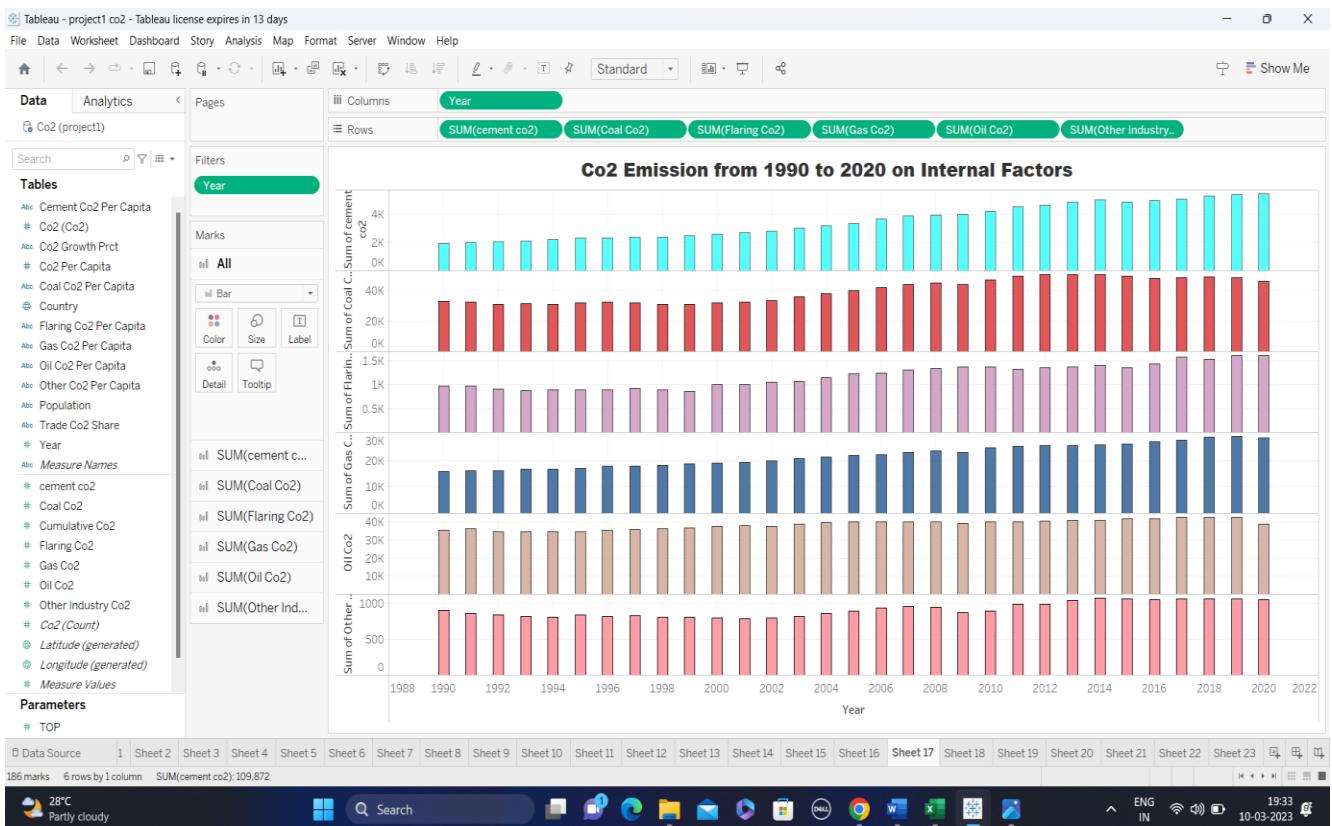




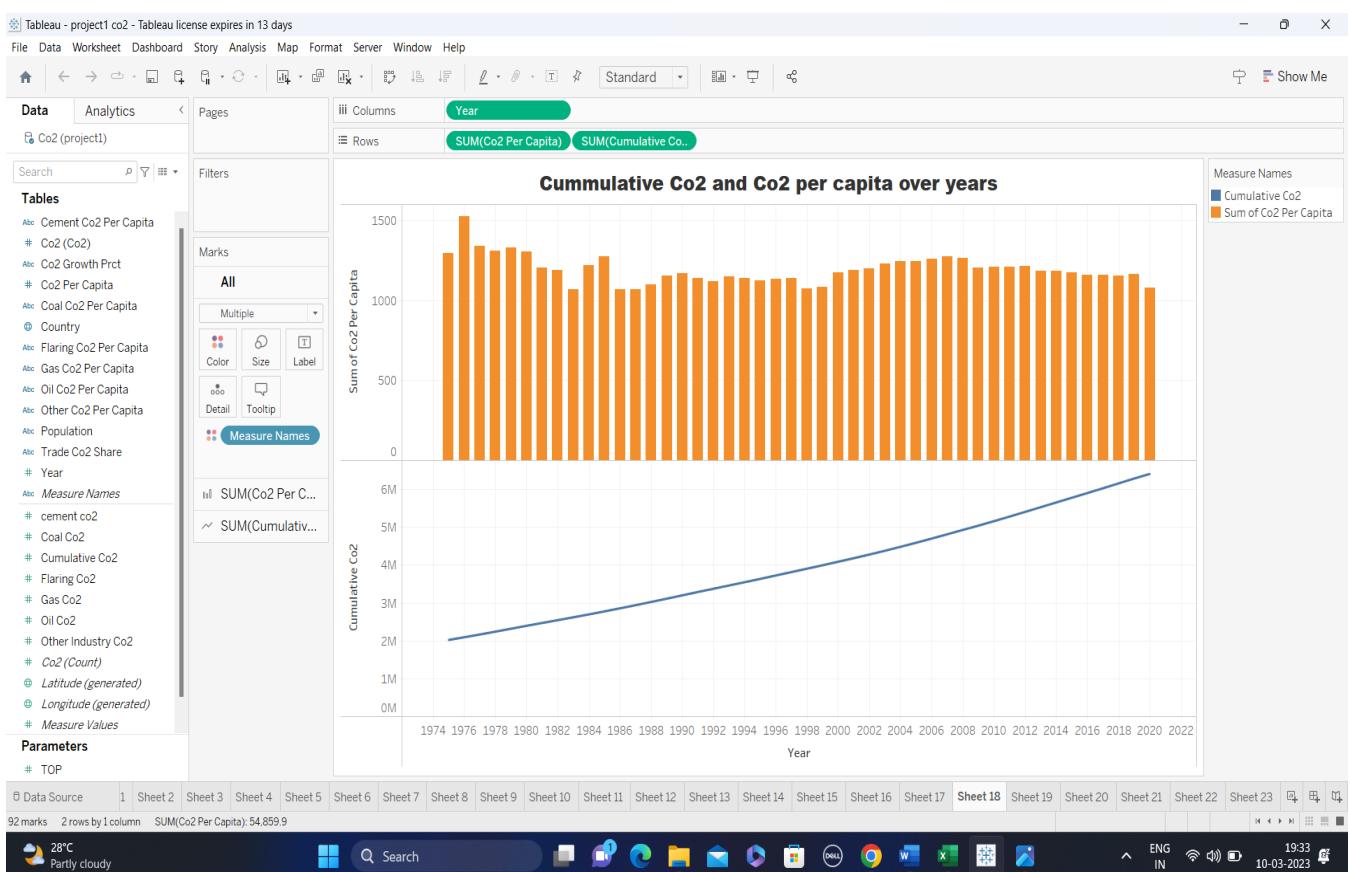


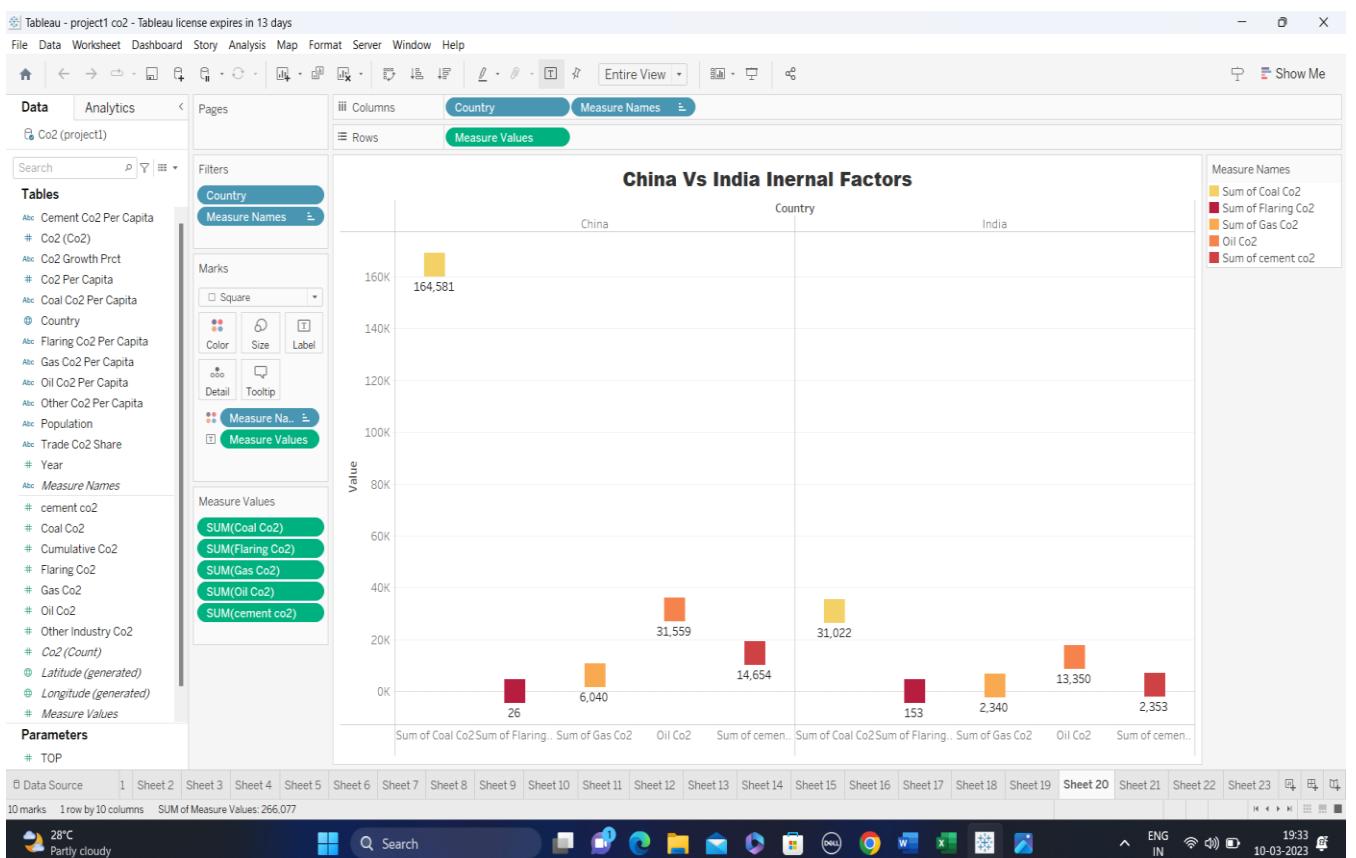
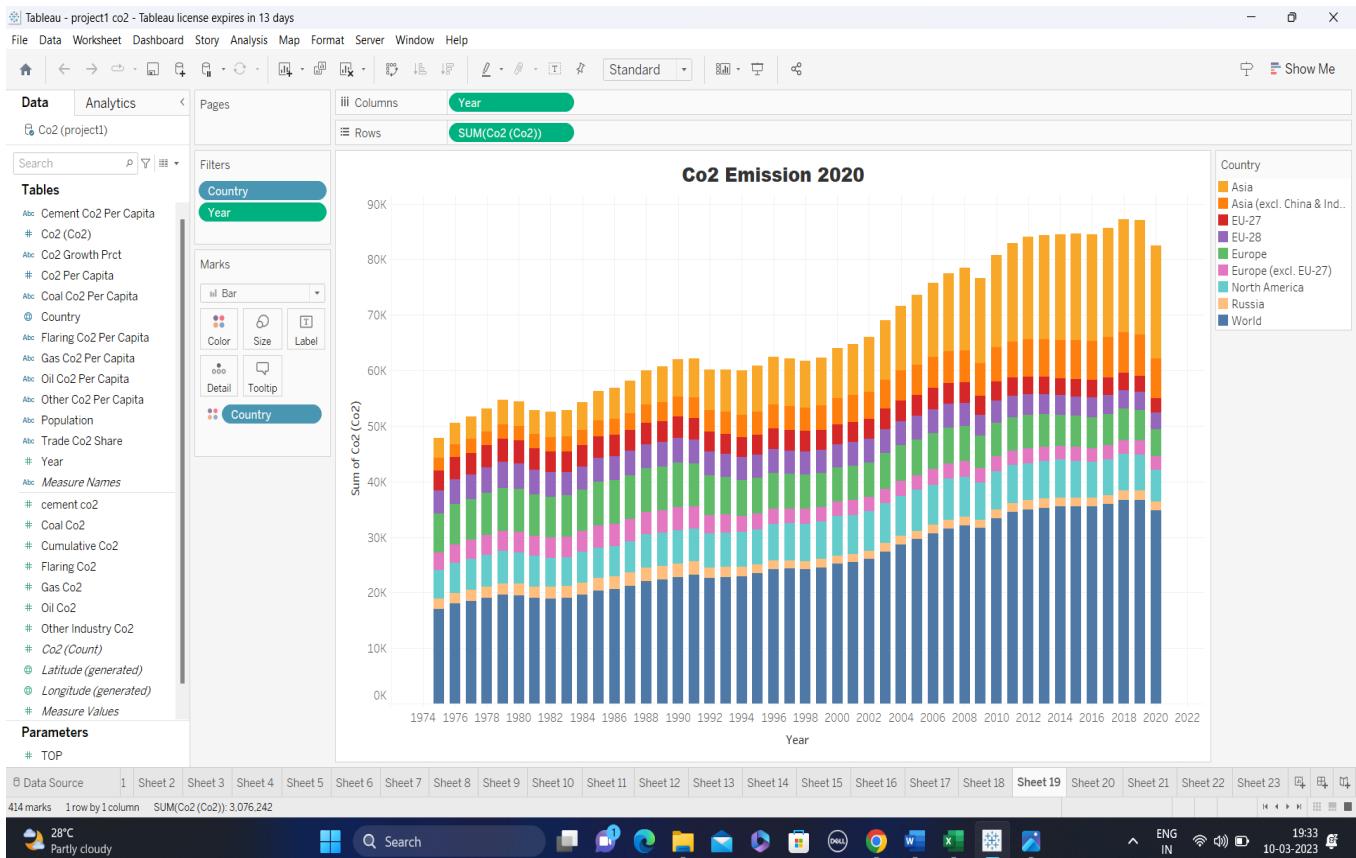


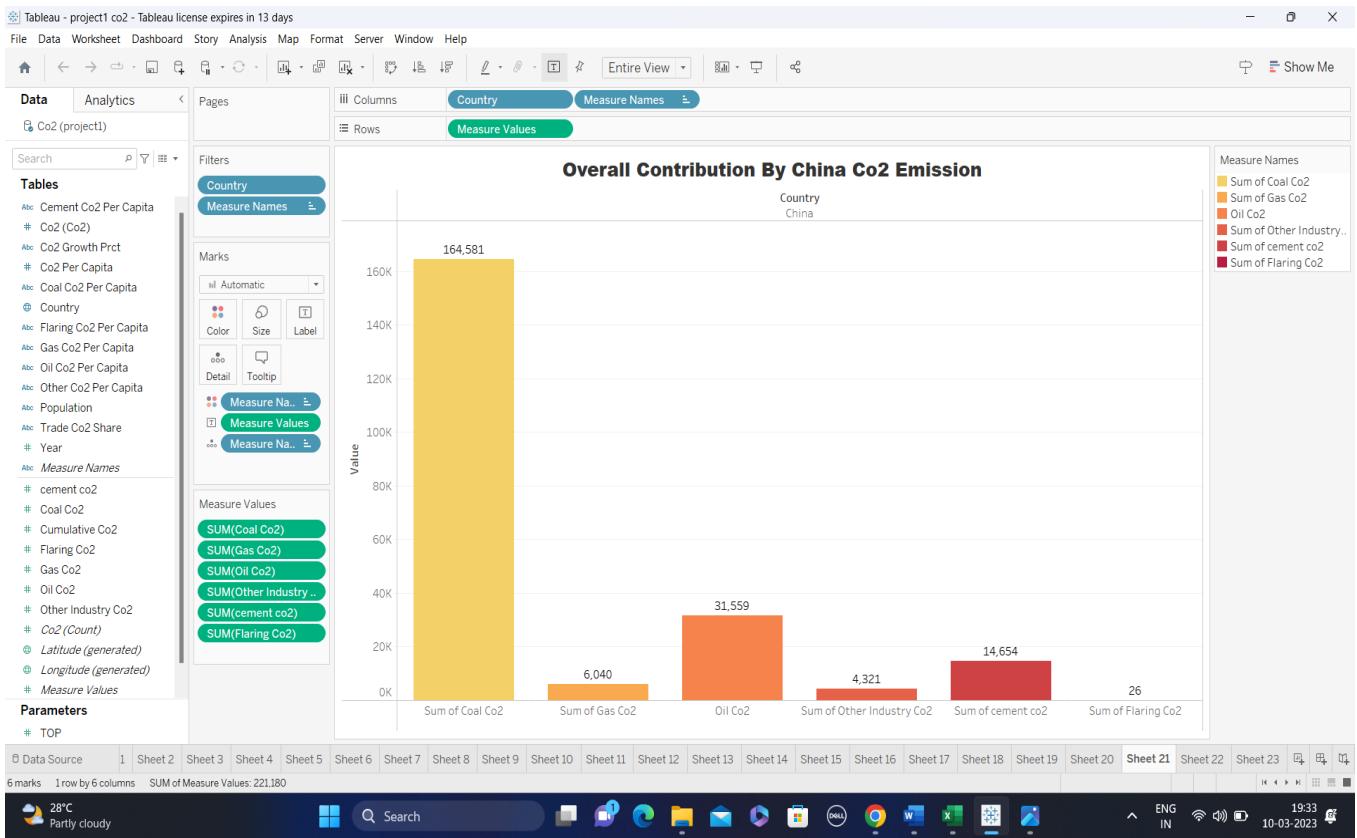




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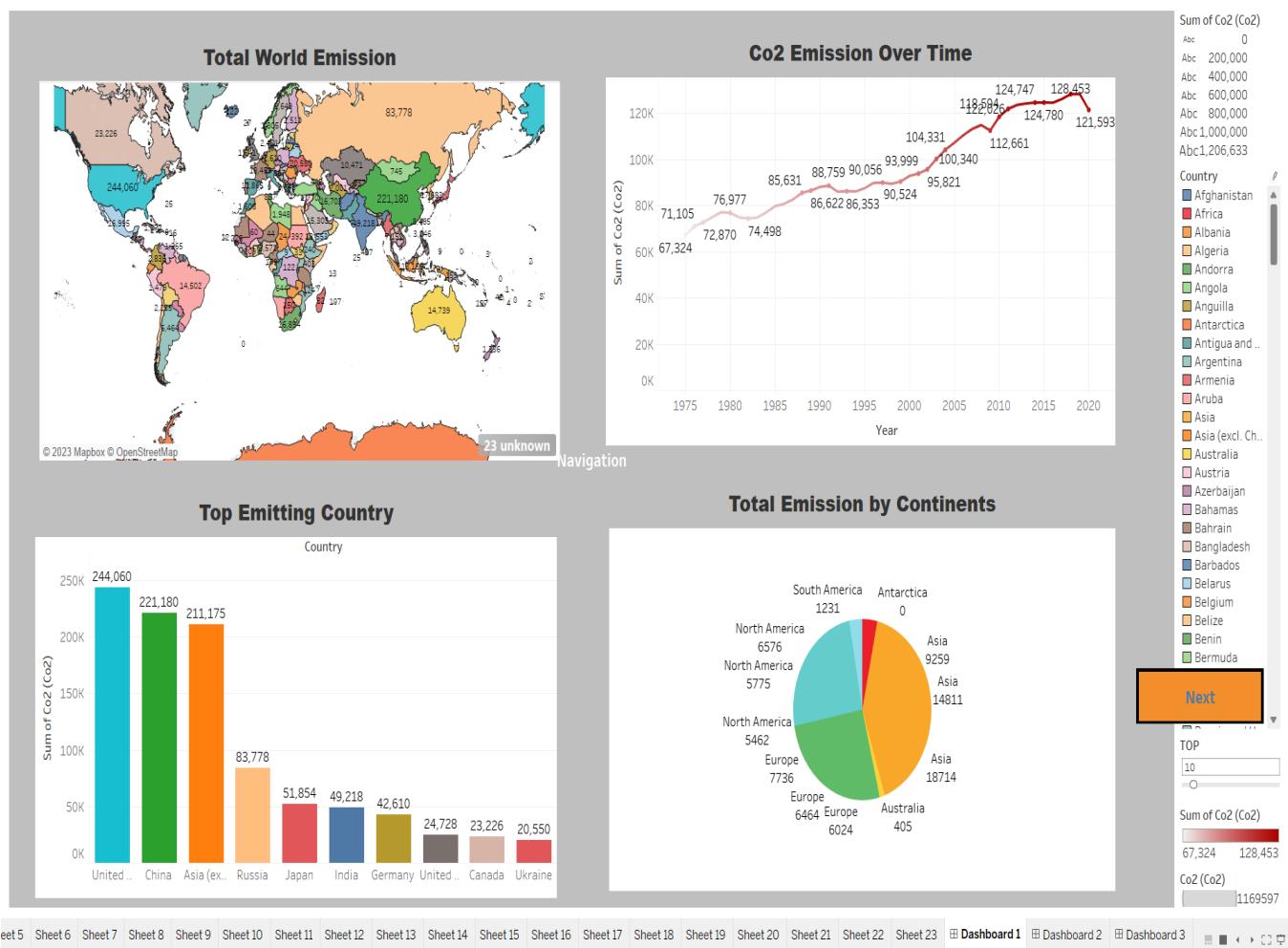


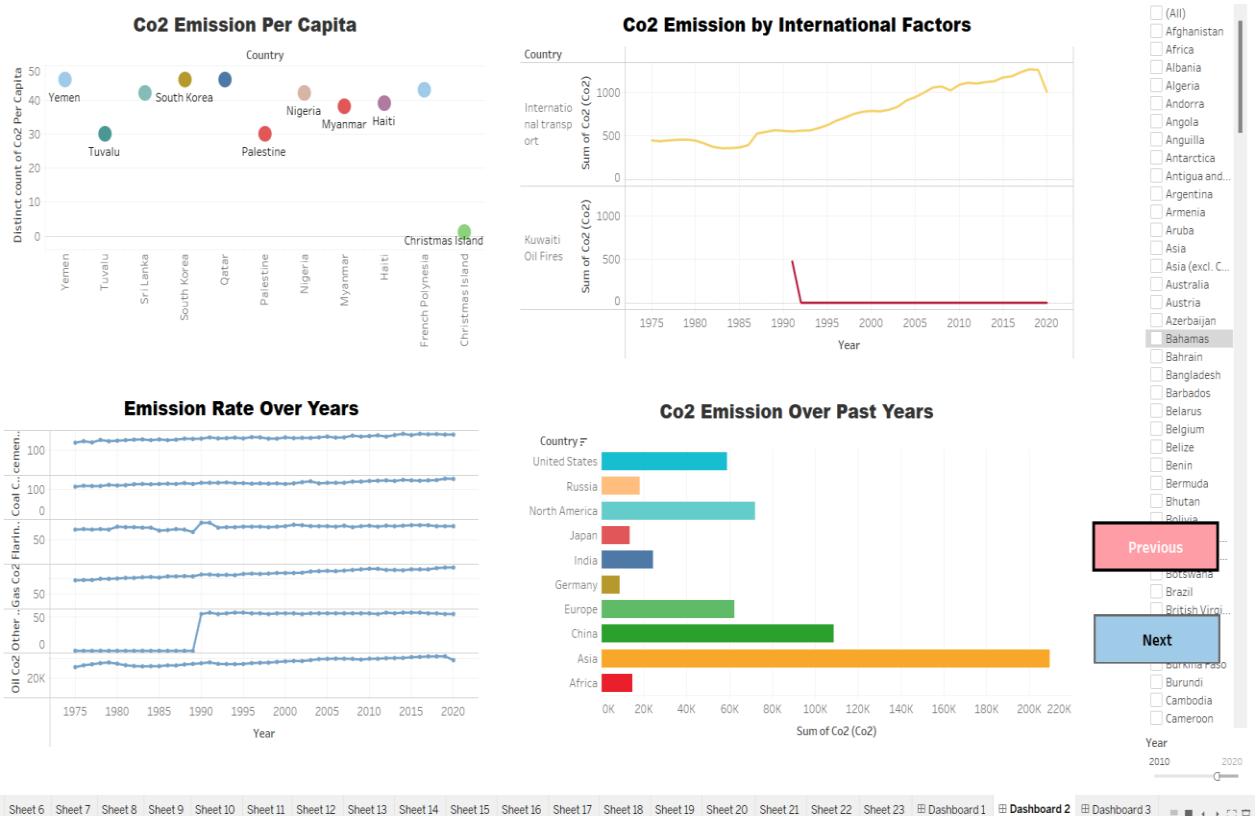
Milestone 5: Dashboard :

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

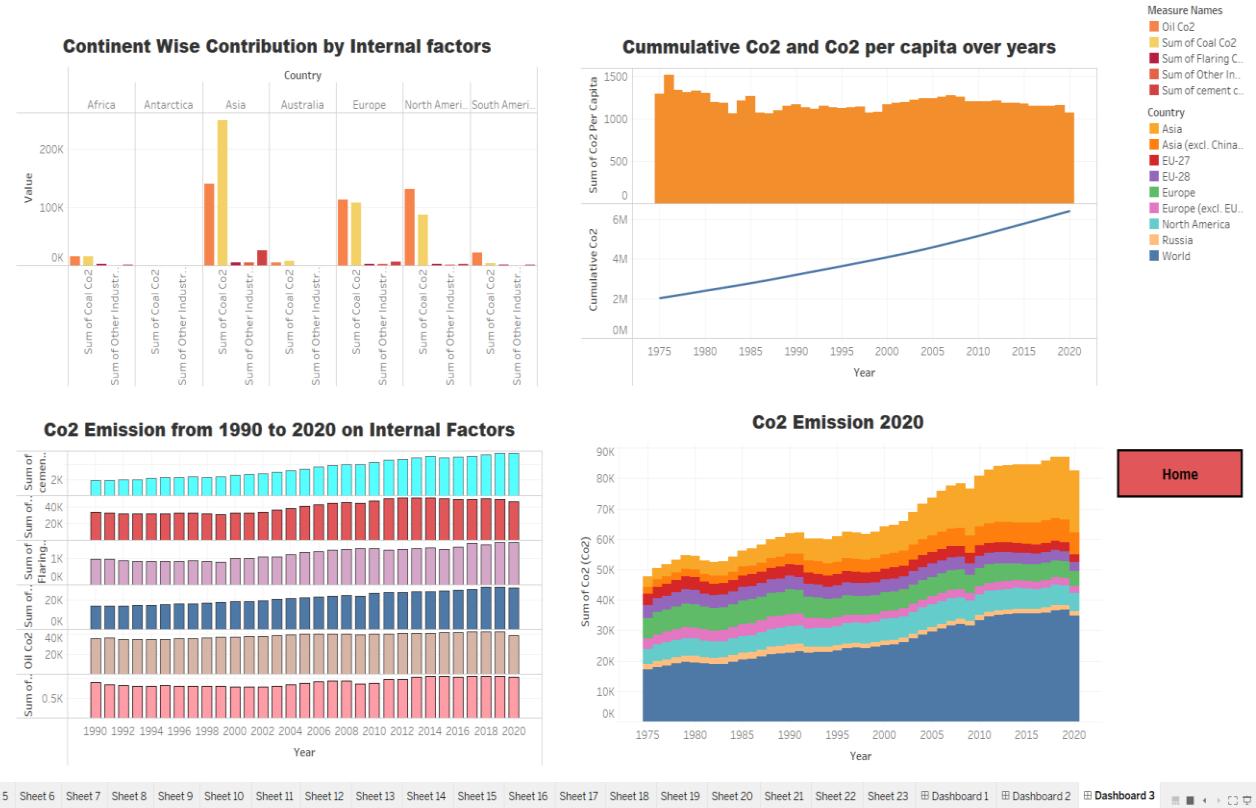
Activity :1- Responsive and Design of Dashboard

The responsiveness and design of a dashboard for analyzing the globally Co2 Emission. It is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centred design, clear and concise information, interactivity, data-driven approach, accessibility, customization. Once you have created views on different sheets in Tableau, you can pull them into a dashboard.





Sheet 5 Sheet 6 Sheet 7 Sheet 8 Sheet 9 Sheet 10 Sheet 11 Sheet 12 Sheet 13 Sheet 14 Sheet 15 Sheet 16 Sheet 17 Sheet 18 Sheet 19 Sheet 20 Sheet 21 Sheet 22 Sheet 23 Dashboard 1 Dashboard 2 Dashboard 3



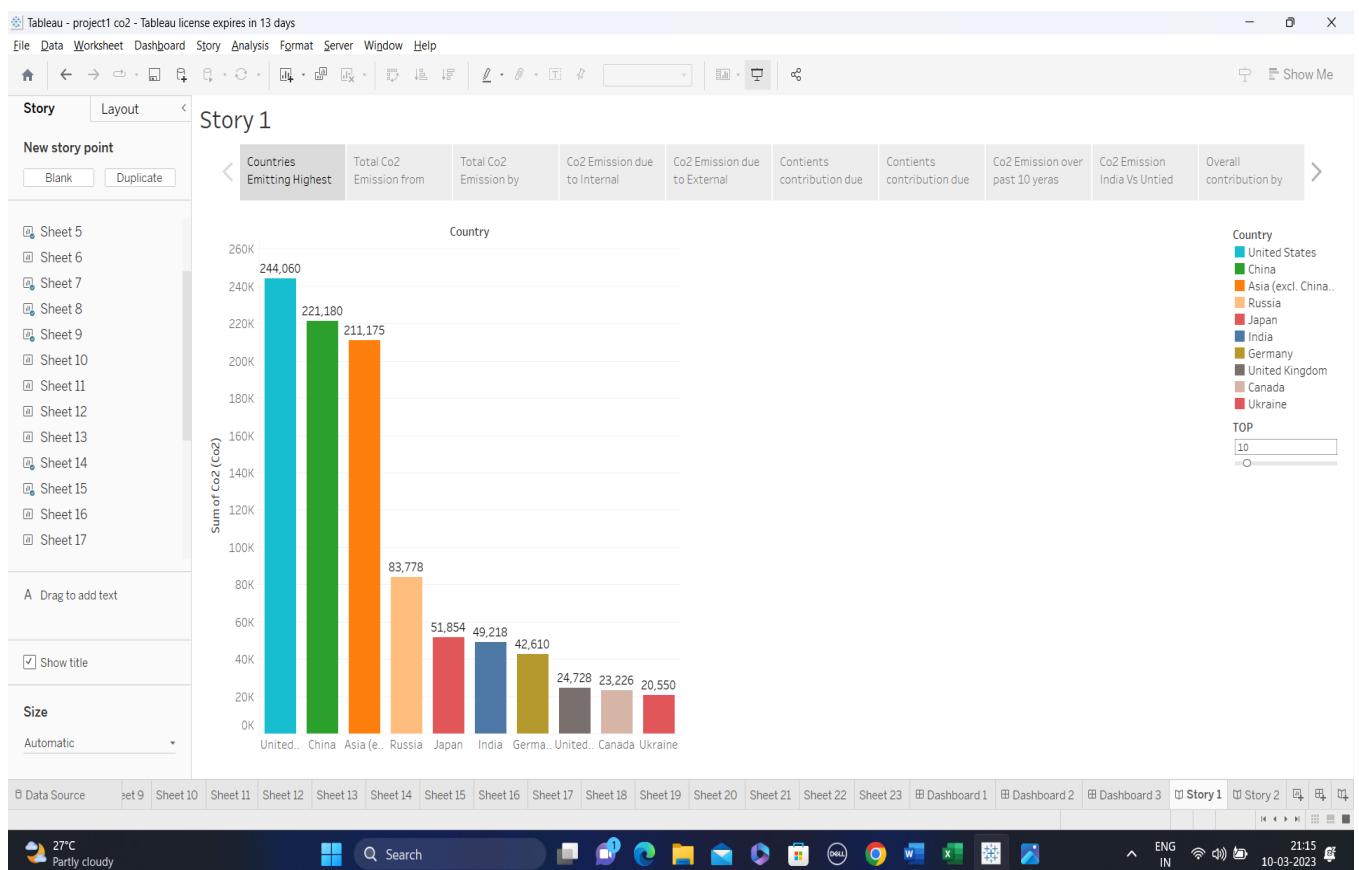
Sheet 5 Sheet 6 Sheet 7 Sheet 8 Sheet 9 Sheet 10 Sheet 11 Sheet 12 Sheet 13 Sheet 14 Sheet 15 Sheet 16 Sheet 17 Sheet 18 Sheet 19 Sheet 20 Sheet 21 Sheet 22 Sheet 23 Dashboard 1 Dashboard 2 Dashboard 3

Milestone 6: Story :

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

Activity: 1- No of Scenes of Story :

The number of scenes in a storyboard for a data visualization analysis of the Co2 Emission will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.



Milestone 7: Performance Testing:

Activity 1: Amount of Data Rendered to DB:

- The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.
- Open the SQL Server Management Studio, go to the database then click to expand the tables, select the table and Right click and select Properties

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left lists the database structure, including databases, tables, and other objects. The central Results pane displays the structure and data of a table named 'Co2'. The table has 13 columns: Column_name, Type, Computed, Length, Prec, Scale, Nullable, TrimTrailingBlanks, FixedLenNullSource, and Collation. The data rows show various industry names like 'cumulative_co2', 'coal_co2', etc., with their respective data types and lengths. Below the table structure, there are sections for Identity, RowGuidCol, and Data_located_on_filegroup, both of which are currently empty. At the bottom of the Results pane, a message states 'Query executed successfully.' and provides details about the execution: DESKTOP-T0TM955\SQLEXPRESS01, project1, 00:00:00, 24 rows. The status bar at the bottom shows the system tray with icons for weather, search, and various applications, along with the date and time (10-03-2023, 21:32).

Name	Owner	Type	Created_datetime
Co2	dbo	user table	2023-03-09 20:35:31.497

Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullSource	Collation
cumulative_co2	float	no	8	53	NULL	no	(n/a)	(n/a)	NULL
coal_co2	nvarchar	no	100			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
cement_co2	nvarchar	no	100			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
flaring_co2	nvarchar	no	100			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
gas_co2	nvarchar	no	100			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
oil_co2	float	no	8	53	NULL	no	(n/a)	(n/a)	NULL
other_industry_	nvarchar	no	100			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS
cement_co2_p_	nvarchar	no	100			no	(n/a)	(n/a)	SQL_Latin1_General_CI_AS

Identity	Seed	Increment	NotForReplication
No identity column defined.	NULL	NULL	NULL

RowGuidCol
No rowguidcol column defined.

Data_located_on_filegroup
PRIMARY

SQLQuery2.sql - DESKTOP-TOTM955\SQLEXPRESS01.project1 (DESKTOP-TOTM955\drjsa (54)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect to project1 | Execute | New Query | Open | Save | Print | Refresh | Home | Help | Quick Launch (Ctrl+Q)

SQLQuery2.sql - DE...0TM955\drjsa (54)* x SQLQuery1.sql - DE...0TM955\drjsa (62)*

USE project1 SELECT * FROM INFORMATION_SCHEMA.COLUMNS

Results Messages

	TABLE_CATALOG	TABLE_SCHEMA	TABLE_NAME	COLUMN_NAME	ORDINAL_POSITION	COLUMN_DEFAULT	IS_NULLABLE	DATA_TYPE	CHARACTER_MAXIMUM_LENGTH	CHARACTER_OCTET_LENGTH	Numeric_Precision	Numeric_Scale
1	project1	dbo	C02	county	1	NULL	NO	nvarchar	50	100	53	2
2	project1	dbo	C02	year	2	NULL	NO	int	NULL	NULL	10	10
3	project1	dbo	C02	co2	3	NULL	NO	float	NULL	NULL	53	2
4	project1	dbo	C02	co2_growth_pct	4	NULL	NO	nvarchar	50	100	NULL	NULL
5	project1	dbo	C02	co2_per_capita	5	NULL	NO	nvarchar	50	100	NULL	NULL
6	project1	dbo	C02	cumulative_c02	6	NULL	NO	float	NULL	NULL	53	2
7	project1	dbo	C02	coal_c02	7	NULL	NO	nvarchar	50	100	NULL	NULL
8	project1	dbo	C02	cement_c02	8	NULL	NO	nvarchar	50	100	NULL	NULL
9	project1	dbo	C02	flaring_c02	9	NULL	NO	nvarchar	50	100	NULL	NULL
10	project1	dbo	C02	gas_c02	10	NULL	NO	nvarchar	50	100	NULL	NULL
11	project1	dbo	C02	oil_c02	11	NULL	NO	float	NULL	NULL	53	2
12	project1	dbo	C02	other_industry_c02	12	NULL	NO	nvarchar	50	100	NULL	NULL
13	project1	dbo	C02	cement_c02_per_capita	13	NULL	NO	nvarchar	50	100	NULL	NULL
14	project1	dbo	C02	coal_c02_per_capita	14	NULL	NO	nvarchar	50	100	NULL	NULL
15	project1	dbo	C02	flaring_c02_per_capita	15	NULL	NO	nvarchar	50	100	NULL	NULL
16	project1	dbo	C02	gas_c02_per_capita	16	NULL	NO	nvarchar	50	100	NULL	NULL
17	project1	dbo	C02	oil_c02_per_capita	17	NULL	NO	nvarchar	50	100	NULL	NULL
18	project1	dbo	C02	other_c02_per_capita	18	NULL	NO	nvarchar	50	100	NULL	NULL
19	project1	dbo	C02	trade_c02_share	19	NULL	NO	nvarchar	50	100	NULL	NULL
20	project1	dbo	C02	population	20	NULL	NO	nvarchar	50	100	NULL	NULL

Query executed successfully.

Ln 1 Col 54 Ch 54 INS

DESKTOP-TOTM955\SQLEXPRESS01 DESKTOP-TOTM955\drjsa ... project1 00:00:00 20 rows

Ready

27°C Partly cloudy

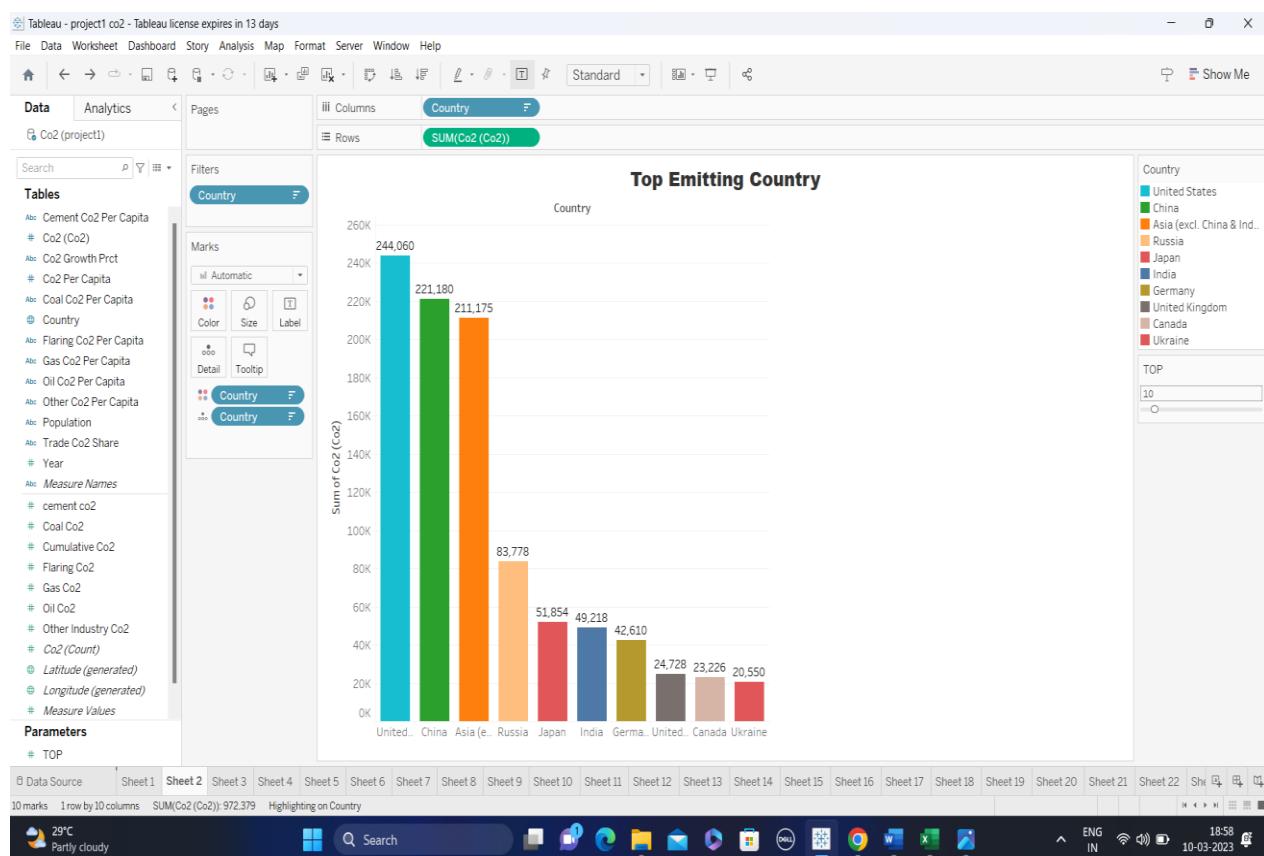
Search

21:33

ENG IN

10-03-2023

Activity 2: Utilization of Data Filters:



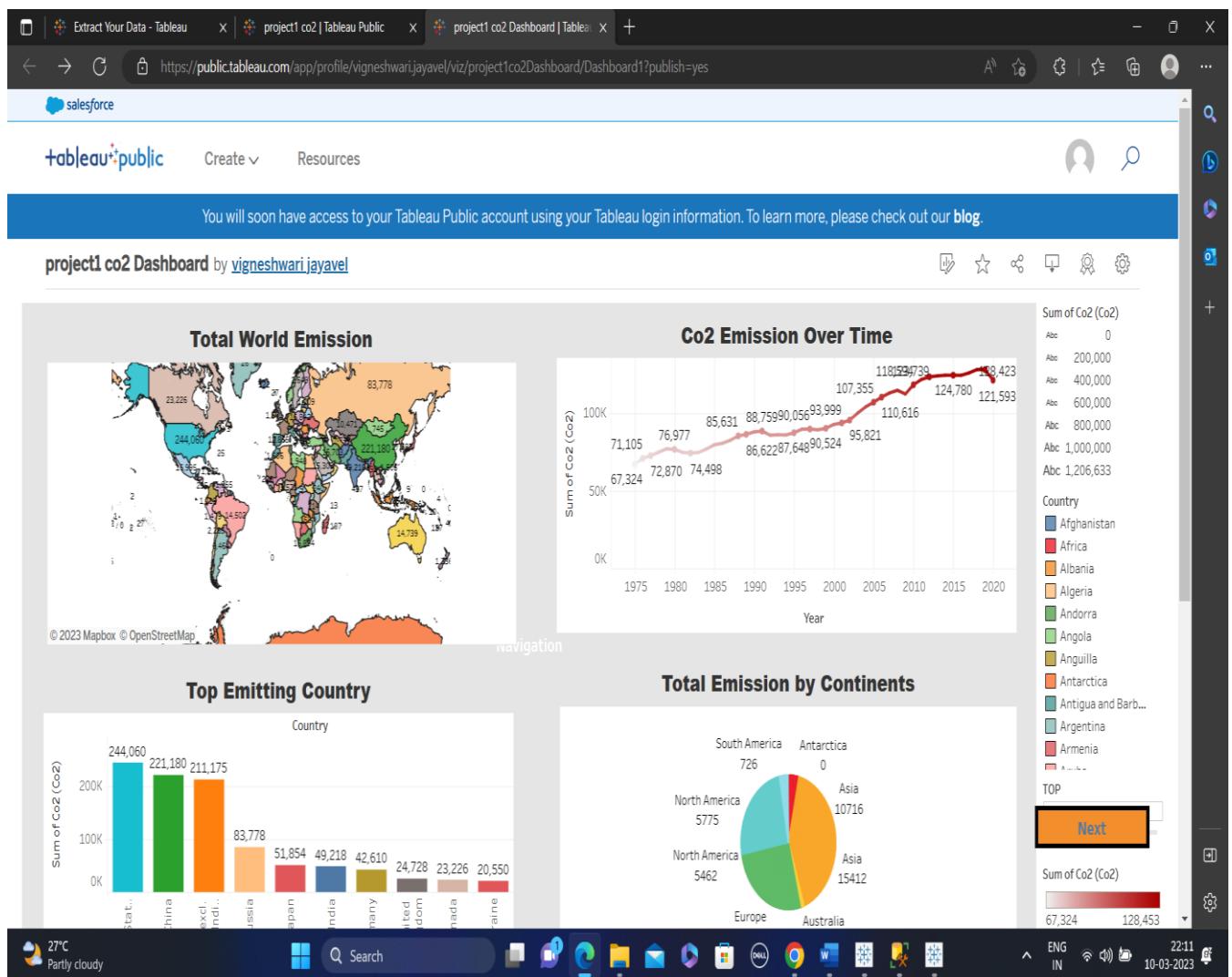
Activity 3: No of Visualizations/ Graphs :

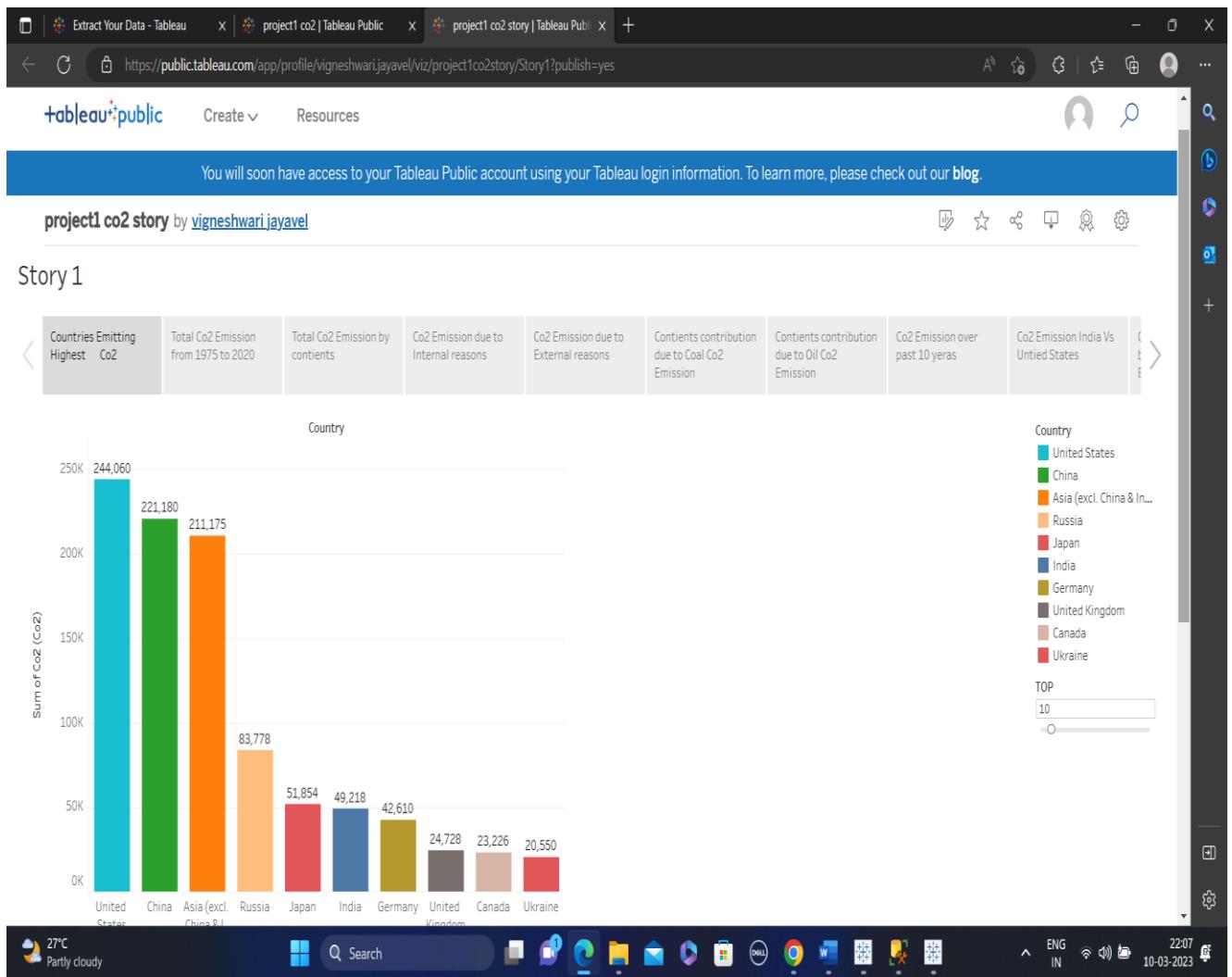
1. Top World Emission.
2. Top Emitting Countries.
3. Co2 Emission over Time.
4. Co2 Emission India vs USA.
5. Total Emission by Continents.
6. Co2 Emission per Capita.
7. Co2 Emission by International Factors.
8. Emission Rate over Years.
9. Donut Charts - Coal Co2, Cement Co2, Gas Co2, Oil Co2, Flaring Co2.
10. Co2 Emission over past 10 years.
11. Continent Contribution in Co2 Emission .
12. Cumulative Co2 and Co2 per Capita.
13. Co2 Emission in 2020.
14. China vs India Co2 emission due to internal factors.
15. Overall Contribution by China in Co2 Emission.

Milestone 8: Web integration :

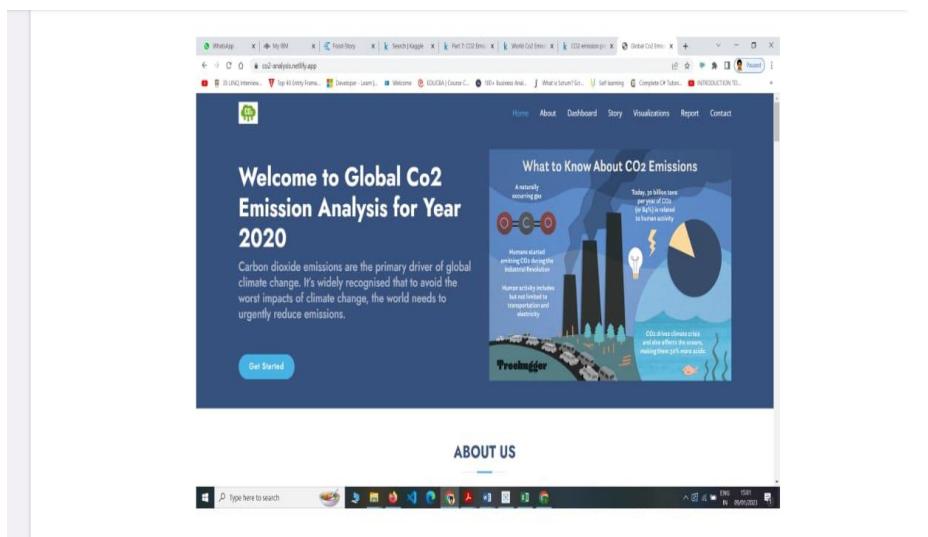
Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

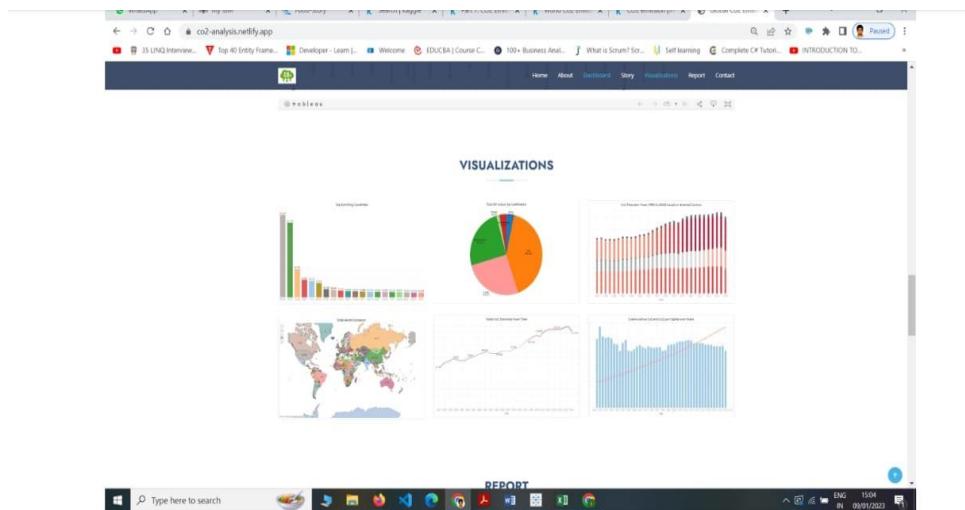
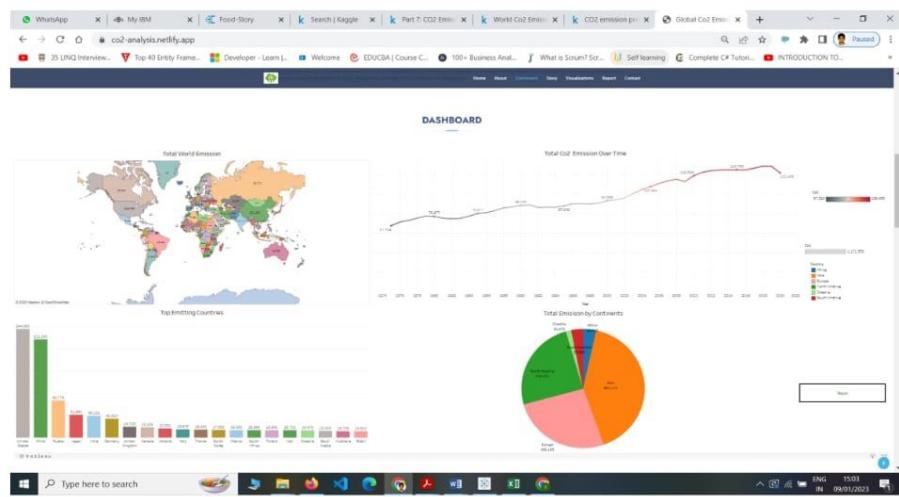
Publishing dashboard and reports to tableau public

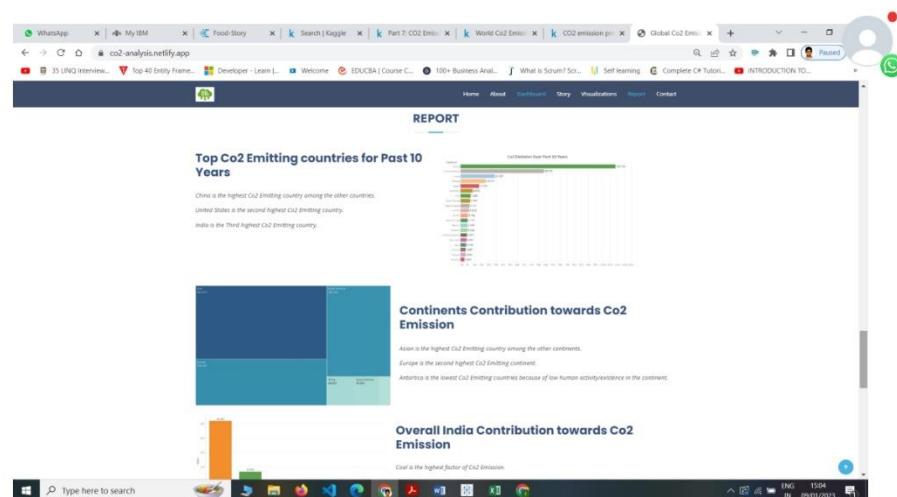
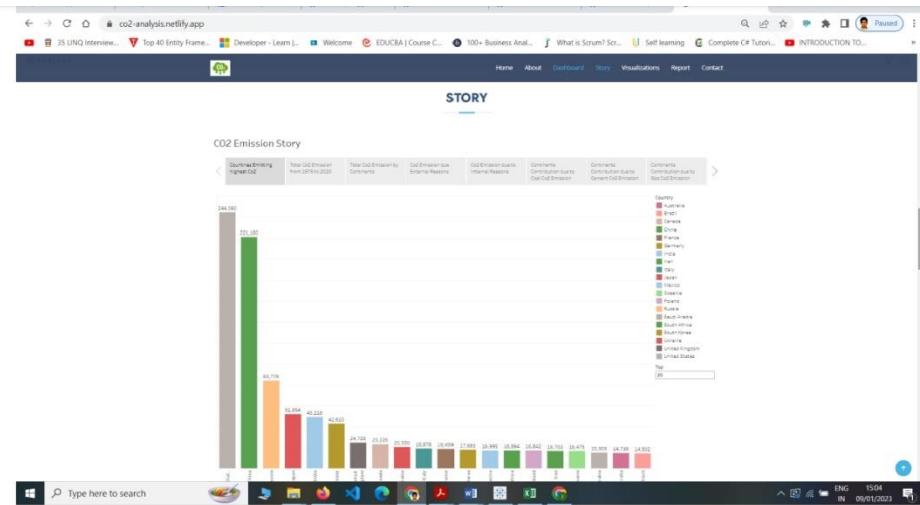




Activity 1: Dashboard and Story embed with UI :







Milestone 9: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables

Activity 1 :- Record explanation Video for project end to end solution

Activity 2 :- Project Documentation-Step by step project development procedure

