

Carbon dioxide (CO2) Emission Around the World

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Analysis of the emission of CO2 around the world

Introduction :

Global warming is leading to a world crisis effect at global level. At world level the nation are coming together to find solution and alternative technology to reduce the pollution.

As this analysis give us a major idea from the 1990 -2020 about the emission for some dirt and town around the globe. The impact of carbon emissions on the economy has been increased various policymakers, researchers and public interest has been increasing day by day. By various media like digit media, online post ,blog and articles are grasp the attention of people for this topic.

Data set : view from dataset

(<https://www.kaggle.com/datasets/koustavghosh149/co2-emission-around-the-world>)

Data set is in public domain(Collaborators - Koustav Ghosh)

Initial observation—

Data consist of various Null value(assumption all Null are conveyed into zero for calculation)

Data has 216 rows and 35 columns

From the dataset we can see various column consist of country, country code, region and year 1990-2020

Compared to 1990, in 2020 there is an increased of 179% increase of emission in India . This value can be low as compared to developed countries and ,but highest among the developing countries category . In 2009, the world got more than 80 percent of its energy from fossil fuels. Sixteen countries got 99 percent or more of their energy from fossil fuels. this might be reason for higher emission in 2009.

Tools used — Excel is used for data initial observation ,manipulation and visualization

Step for data cleaning——

1. All the Null values are replaced by zero by assumption
2. Searching for duplicate value
3. Spelling mistake
4. Removing unwanted data

Now the data look clean now the further operation and tasks can be completed.

Analysis - Problem Statements-

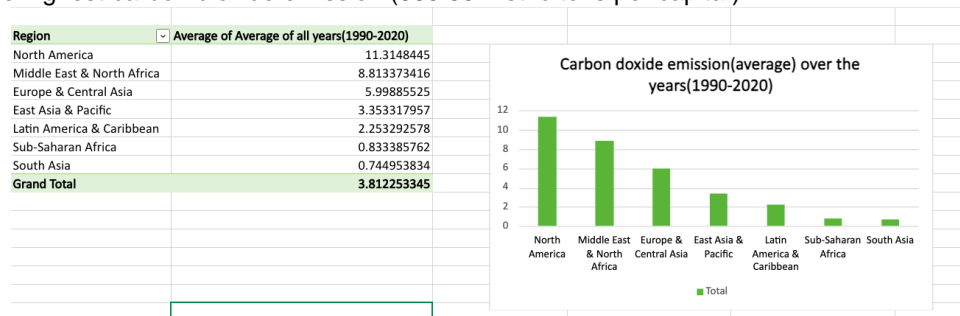
- 1) to find the average and sum of the total of the carbon dioxide emission contribution of that city
- 2) find the year the highest year the pollution has been recorded ?
- 3) which region(by average) is the highest emitter of co2 emitters?
- 4) Find the top 10 cities (by sum) emitter of the co2 emission?
- 5) Find the top 10 cities (by sum) emitter of the co2 emission?
- 6) Compare the 1990 co2 emission level with 2020 emission level.

1) To find the average and sum of the total of the carbon dioxide emission contribution of that city

Solution:

By using the sum and average function in excel the sum and average has been find (=SUM(E2:A12) and =AVERAGE(E2:A12))and after that using fill handle to repeat the same operation for all.

Qatar has the highest carbon dioxide emission (885.35 metric tons per capita)



2) which year has the highest year the pollution has been recorded ?

Solution:

After using the sum function for the each year in dataset =SUM(E2:E216) and repeat the same operation for other year from 1990 to 2020

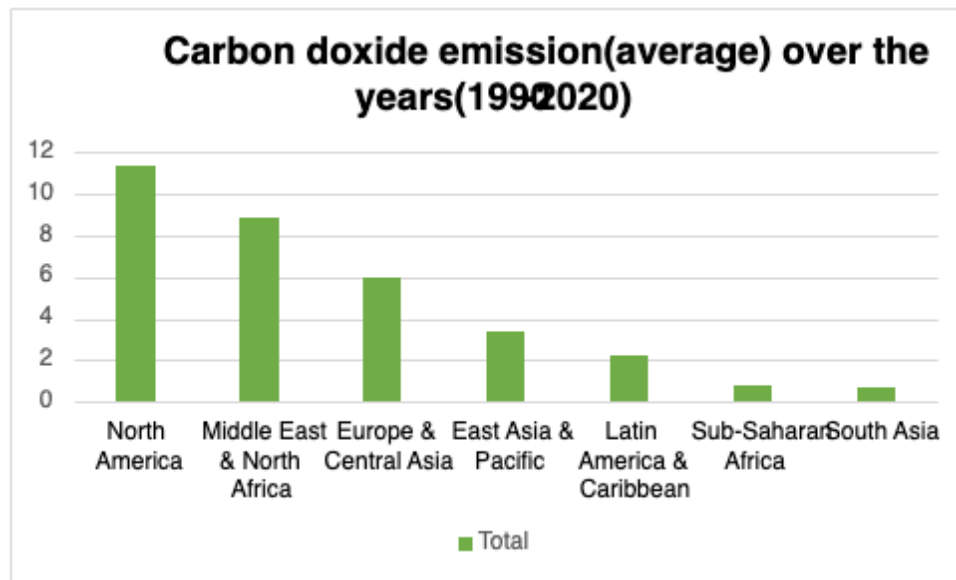
The largest emitter year recorded =2009 (1183.479665metric tons per capita)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
6138	0.152265871	0.156141834	0.159700111	0.162942027	0.152045425	0.154994881	0.157624801	0.153551253	0.155765084	0.151675192	0.159533648	0.16117826	0.1731
7358	0.1359024	0.147202921	0.152976088	0.145275175	0.145267073	0.137670596	0.155818269	0.179316146	0.209763309	0.222964152	0.214369082	0.227066833	0.21
3518	0.119653221	0.129153365	0.143145185	0.151632184	0.147375805	0.172136787	0.18472556	0.201100982	0.194624453	0.19574642	0.199595937	0.209303734	0.259
8723	0.095929046	0.083439354	0.088234843	0.102891487	0.100553963	0.108758711	0.113889571	0.138501288	0.14801305	0.164314407	0.184887949	0.204126905	0.26
3395	0.081347129	0.078975196	0.089665522	0.098933279	0.115727153	0.114258558	0.146745851	0.15296686	0.177415687	0.183332656	0.180825362	0.204300066	0.198
6711	0.131700176	0.120754825	0.126463707	0.140707119	0.141926252	0.141102992	0.137773316	0.130204423	0.140404329	0.14002857	0.144956615	0.18384314	0.11
3541	0.092681049	0.093255492	0.086863187	0.08850687	0.089015683	0.082162021	0.088409221	0.100717581	0.122613506	0.127606246	0.127596996	0.135346585	0.127
7392	0.097534129	0.07970768	0.101213876	0.083477457	0.084778933	0.082898446	0.087286748	0.112749227	0.128117541	0.151515698	0.163884125	0.126883934	0.126
5565	0.046226095	0.047540614	0.048770588	0.046219132	0.048285038	0.068338263	0.103747164	0.088989667	0.145485857	0.165652672	0.165403428	0.169371768	0.151
9831	0.060772595	0.072964779	0.083999867	0.097333218	0.097595491	0.106968566	0.102688512	0.111719254	0.109379114	0.103377218	0.111347325	0.123477949	0.12
7428	0.071794656	0.066145963	0.068799271	0.073877268	0.078271761	0.076612691	0.073824767	0.083647726	0.091451262	0.105676114	0.125797367	0.127832027	0.144
3662	0.064512294	0.062215648	0.060818225	0.062542059	0.05879554	0.060310114	0.059764899	0.066062179	0.071092285	0.074919961	0.077591916	0.086198815	0.099
8632	0.060186287	0.055781969	0.053026134	0.055837755	0.056399068	0.068168346	0.08321173	0.082384979	0.106208361	0.106461818	0.11174531	0.105491223	0.101
9047	0.062592276	0.06019349	0.060121661	0.062210458	0.069930583	0.069365009	0.061212099	0.062156976	0.061704298	0.061871473	0.052180694	0.055537956	0.065
0743	0.057254256	0.055519094	0.053883794	0.055956063	0.054399384	0.052058039	0.052308698	0.050903722	0.04954588	0.049756151	0.048422285	0.047110993	0.046
0253	0.058082525	0.05447729	0.055851339	0.057170025	0.039781269	0.039191973	0.038752931	0.042999665	0.045081487	0.02697875	0.029120747	0.042286394	0.046
1149	0.036556273	0.040338851	0.040298316	0.042255675	0.042210719	0.040032941	0.04104464	0.045239954	0.041002162	0.055494204	0.069678432	0.042363694	0.030
7659	0.02103289	0.020366995	0.023659773	0.02289428	0.022150837	0.021434541	0.034579718	0.040185722	0.04001734	0.040879208	0.038601013	0.039369948	0.0
6047	860.3403532	864.2271064	876.5328819	870.5199555	865.5160939	885.3345448	840.0759681	838.680758	847.8514345	825.996732	806.9004453	798.7340446	800.8

3) which region(by average) is the highest emitter of co2 emitters?

Solution -

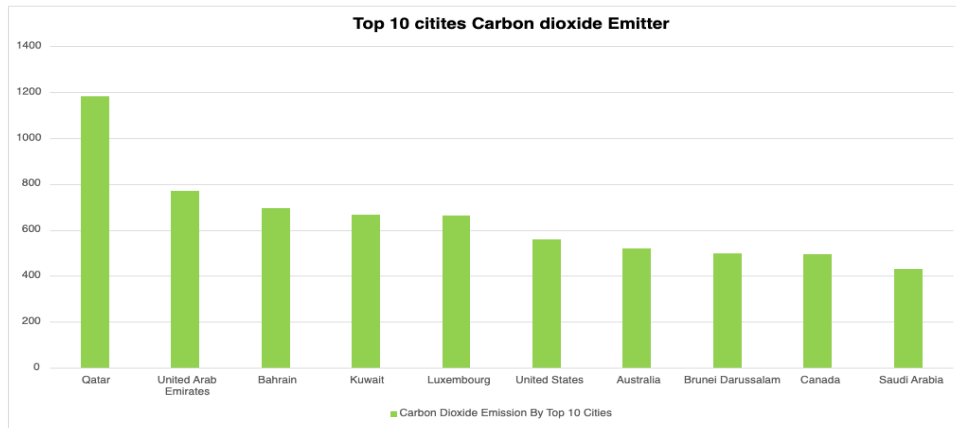
- 1)North America
- 2)Middle East & North Africa
- 3)Europe & Central Asia
- 4)East Asia & Pacific
- 5) Latin America & Caribbean
- 6)Sub-Saharan Africa
- 7)South Asia



4)Find the top 10 cities (by sum) emitter of the co2 emission?

Solution:

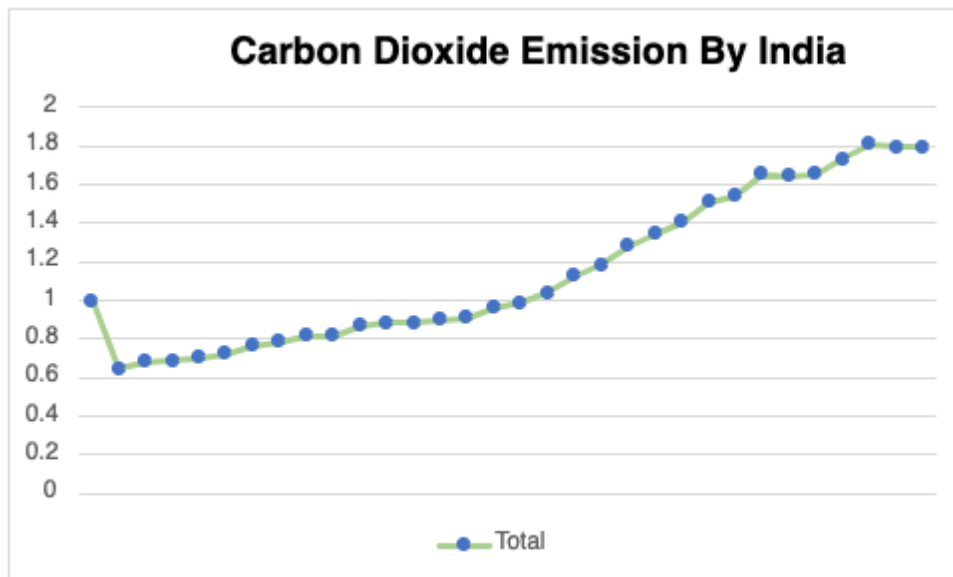
- 1)Qatar
- 2) United Arab Emirates
- 3)Bahrain
- 4)Kuwait
- 5) Luxembourg
- 6)United States
- 7)Australia
- 8)Brunei Darussalam
- 9)Canada
- 10)Saudi Arabia



5)how is India carbon dioxide level in this data set for c02 emission?

Solution:

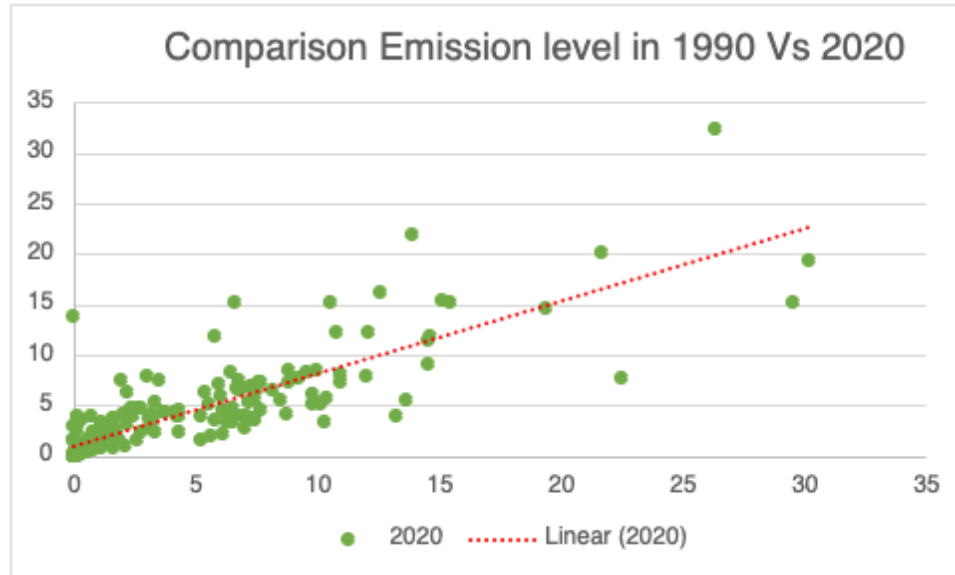
By observation it can be seen that India's emission has been increased in the past two decade at a certain pace.



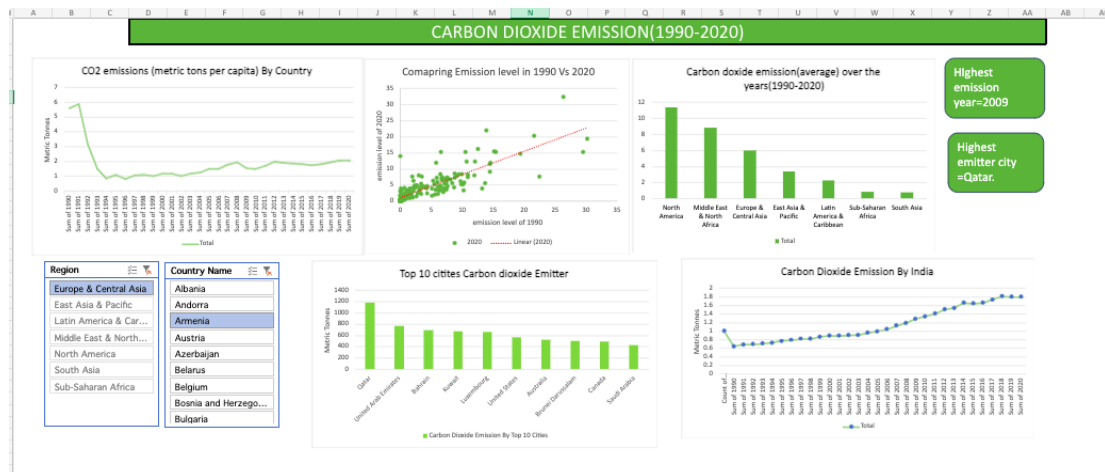
6) Compare the 1990 co2 emission level with 2020 emission level?

Solution:

Compared to 1990, in 2020 there is an increased of 179% increase of emission in India . This value can be low as compared to developed countries and ,but highest among the developing countries category . In 2009, the world got more than 80 percent of its energy from fossil fuels. Sixteen countries got 99 percent or more of their energy from fossil fuels. this might be reason for higher emission in 2009



DASHBOARD



Recommendation (According to the analysis)—

1) At first the north America and Middle East & North Africa has the largest emission on average more green technology and project should be implemented in this region and this region should take initial step for conducting meeting for funding green technology and helping other low GDP countries to start at green economy at earlier stage of economy .this region should taken in depth studies and research for there country and also take help from other country to tackle this problem.

2) Most pollutant cities like Qatar ,UAE ad Bahrain should go a step towards the reducing co2 by rules and regulation on factory cleaning air related by it, zero disposal system company and research for alternative technology and investment in green economy.

3) India should take a step forward as a leading developing country with one of the highest population and economy goals to start the talk for green economy and use various prototype of countries that are successful in other countries and region . India has taken various initiative like even-odd car system, carbon tree , electric vehicle ,afforestation reforestation to reduce the CO2 presence in the region.

4)As pollution is a global issue/crisis all country and various organization should take step to tackle it at earlier stage before situation is out of hand .

New technology recommendation——

Reducing carbon dioxide (CO2) emissions is crucial for mitigating climate change. Here are several recommendations, along with potential numeric reduction possibilities:

Transition to Renewable Energy Sources:

- Shift from fossil fuels to renewable energy sources such as solar, wind, hydro, and geothermal.
- Depending on the scale of implementation, this can lead to significant reductions. For example, a complete transition to renewable energy could result in a nearly 80-90% reduction in CO2 emissions from the energy sector.

Energy Efficiency Improvements:

- Implement energy efficiency measures in industries, buildings, and transportation.
- Energy efficiency improvements can vary, but a 20-30% reduction in energy consumption is often achievable with existing technologies.

Electrification of Transportation:

- Promote electric vehicles (EVs) and invest in charging infrastructure to reduce reliance on traditional internal combustion engine vehicles.
- A widespread adoption of electric vehicles could lead to a 30-50% reduction in CO2 emissions from the transportation sector.

Afforestation and Reforestation:

- Plant trees and restore ecosystems to absorb CO2 from the atmosphere.
- Reforestation efforts could sequester significant amounts of CO2, potentially leading to several gigatons of carbon dioxide removal annually.

Carbon Capture and Storage (CCS):

- Develop and implement technologies to capture and store CO2 emissions from industrial processes and power plants.
- CCS technologies have the potential to capture up to 90% of CO2 emissions from large point sources.

Circular Economy Practices:

- Encourage recycling, reuse, and reduction of waste to minimize the carbon footprint of manufacturing processes.
- Depending on the industry and practices, adopting a circular economy approach can result in significant CO2 savings.

Promote Sustainable Agriculture:

- Implement sustainable agricultural practices, such as precision farming and agroforestry, to reduce emissions from land use changes and agricultural activities.
- Sustainable agriculture practices can contribute to a 20-50% reduction in emissions from the agriculture sector.

Government Policies and Regulations:

- Enforce strict emission standards, provide incentives for clean technologies, and promote sustainable practices through policy and regulation.
- The impact of policies can vary, but strong regulations have the potential to drive significant emissions reductions.

Combining these strategies and tailoring them to specific regional and industrial contexts can lead to substantial overall reductions in CO2 emissions. It's essential to engage governments, businesses, and individuals in collaborative efforts to achieve meaningful and sustained results.