GLOBAL CO_2 EMISSION

I. INTRODUCTION :

Global carbon emissions from fossil fuels have significantly increased since 1900.

Since 1970, CO2 emissions have increased by about 90%, with emissions from fossil fuel combustion and industrial processes contributing about 78% of the total greenhouse gas emissions increase from 1970 to 2011.

A . CONTENT OF GLOBLE CO_2 EMISSION :

Causes of emission :

1.Carbon Dioxide (CO_2)

2.Climate Change

3. Green House Gas (GHG)

1. Carbon Dioxide (CO_2) :

Carbon dioxide (CO2) is a colourless, odourless and non-poisonous gas formed by combustion of carbon and in the respiration of living organisms and is considered a greenhouse gas. Emissions means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time. 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.

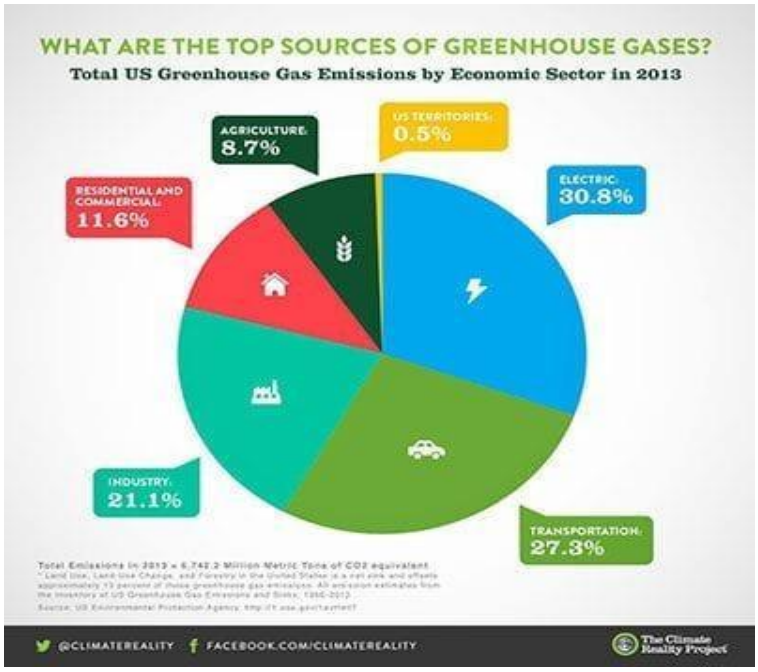
2.Climate Change :

Climate change refers to man-made (anthropogenic) climate change that is believed to be causing an increase in global temperatures driven by by emissions of gases such as carbon dioxide and methane, known as greenhouse gases.

3. Green House Gas (GHG) :

Greenhouse gases constitute a group of gases contributing to global warming and climate change.

The Kyoto Protocol, an environmental agreement adopted by many of the parties to the **United Nations Framework Convention on Climate Change (UNFCCC)** in 1997 to curb global warming, nowadays covers seven greenhouse gases.



The non-fluorinated gases:

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)

The fluorinated gases:

- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulphur hexafluoride (SF_6)
- nitrogen trifluoride (NF_3)

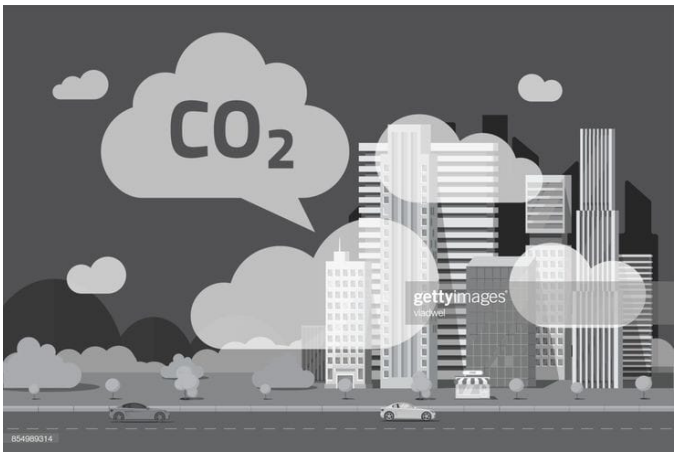
Converting them to carbon dioxide (or CO_2) equivalents makes it possible to compare them and to determine their individual and total contributions to global warming.

B. OVERVIEW OF GLOBLE CO_2 EMISSION :

Carbon dioxide (CO_2) emissions are the primary contributor to anthropogenic climate change. These emissions result from the burning of fossil fuels, such as coal, oil, and natural gas, for energy production, transportation, and

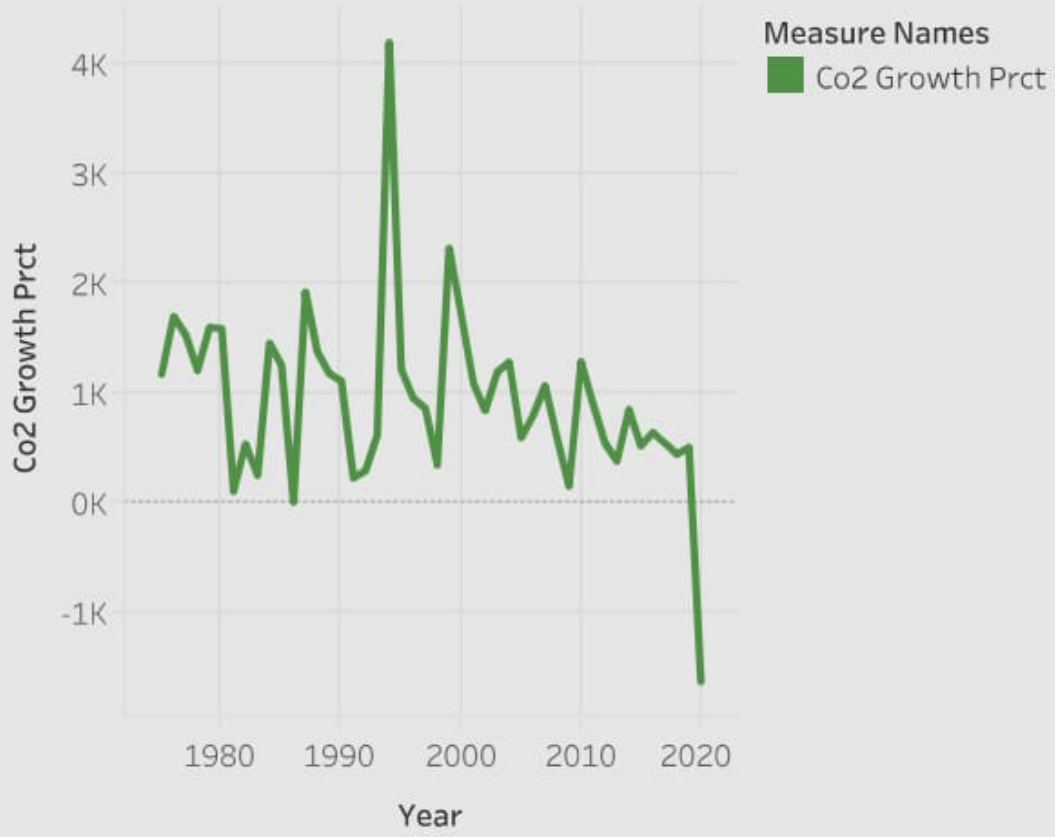
other human activities. CO2 emissions have been steadily increasing since the industrial revolution, and today, they are at their highest level in human history.

According to the Intergovernmental Panel on Climate Change (IPCC), global CO2 emissions in 2020 were estimated to be around 36 billion metric tons, with the energy sector being responsible for the largest share of emissions.



China is currently the world's largest emitter of CO2, followed by the United States, India, Russia, and Japan. CO2 emissions contribute to global warming by trapping heat in the Earth's atmosphere, causing the planet's temperature to rise. This warming effect leads to a variety of negative impacts, including sea-level rise, more frequent and intense heatwaves, and changes in precipitation patterns that can lead to more frequent and severe droughts and floods. To mitigate the impacts of climate change, countries around the world are working to reduce their CO2 emissions.

This involves transitioning to cleaner energy sources, such as renewable energy, and increasing energy efficiency to reduce overall energy demand. The Paris Agreement, adopted in 2015, is a global agreement aimed at limiting global warming to well below 2 degrees Celsius above pre-industrial levels, and pursuing efforts to limit warming to 1.5 degrees Celsius.



The trend of Co2 Growth Prct for Year. Color shows details about Co2 Growth Prct.

C. IMPORTENCE OF REDUCING CO_2 EMISSION :

Reducing CO2 emissions is crucial for mitigating the impacts of climate change and preserving a habitable planet for future generations.

Here are some of the key reasons why reducing CO_2 emissions is so important:

- **Save lives**:

The levels of pollutants in the air can detrimentally affect our health, leading to chronic health conditions and premature death. According to researchers, poor air quality caused by carbon emissions can lead to heart attacks, strokes, lung disease, high blood pressure, and even diabetes. According to scientists, reducing carbon emissions will positively impact air quality and prevent thousands of premature deaths.

- **Ease the burden of the healthcare system**:

Poor air quality exacerbates health issues for people with pre-existing chronic conditions, increasing the frequency of their healthcare visits, which can overburden the healthcare system. Taking steps to reduce these emissions makes it easier for healthcare providers to treat those in need.

- **Reduce wildfires**:

Wildfires and carbon emissions are part of a harmful cycle. Wildfires emit dangerous amounts of carbon emissions, and rising carbon emissions cause extreme weather conditions like heat waves, which often contribute to wildfires. Reducing our emissions can relieve some of the burdens from forest and land management, emergency responders, and fire departments worldwide.

Ways to Reduce Carbon Emissions

There are many ways humankind can pitch in to help reduce carbon emissions:

1.Reduce air travel.

As of 2017, the amount of transportation-related carbon dioxide emissions eclipsed the amount of electricity generation emissions. Transportation is now the number-one source of greenhouse gases. Eliminating just one roundtrip transatlantic flight will save you 1.6 metric tons of carbon dioxide equivalents per year.

2.Make your driving more efficient.

While living a car-free lifestyle may not be possible for everybody, try substituting car trips with bike rides, bus trips, train rides, or other forms of public transportation. When you drive, cut back on fossil fuel emissions by accelerating slowly and using the air conditioning sparingly. Check your tire pressure for better fuel economy, carpool when possible, and consider purchasing a hybrid or electric vehicle if you want a new car.

3. Plant trees.

Deforestation is one of the significant causes of carbon emissions. Trees absorb and store the carbon dioxide in the atmosphere, but they can no longer absorb carbon once they are cut down. Planting trees is among the most inexpensive, natural ways to take climate action and reduce our negative environmental impact.

4. Switch to clean energy.

Clean energy is another way to help reduce carbon emissions. Solar panels, wind turbines, and geothermal energy are all energy sources with a higher level of sustainability, produce low carbon emissions, and lower our dependence on natural gas and resource harvesting.

5. Eat less red meat.

Over 220 grams of carbon dioxide are produced for every gram of beef produced, resulting in almost four percent of the total GHG emissions. Eating vegetarian more often or consuming less beef can lower the amount of carbon present in our atmosphere.

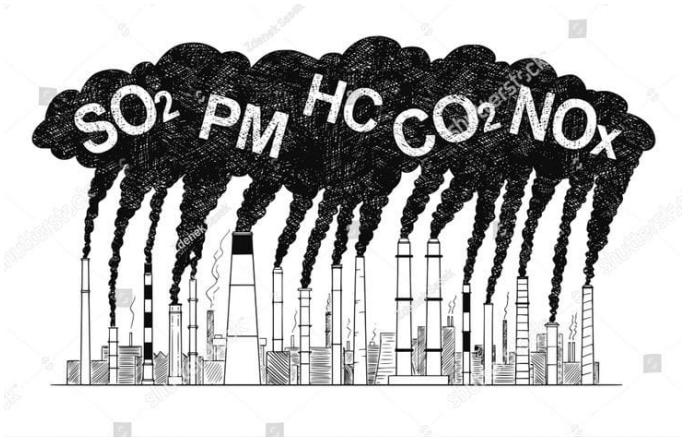
6.Make your home more energy-efficient.

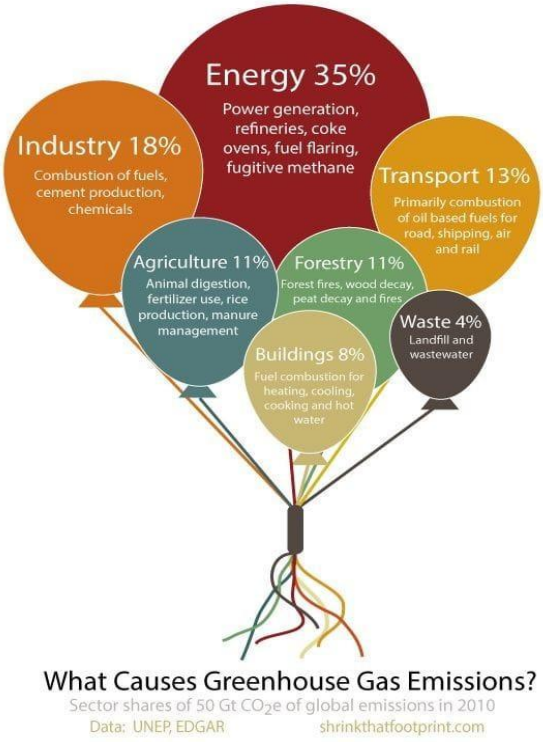
If you live in a state that allows you to choose your energy supplier, the first thing you should do is look for a supplier that uses renewable energy sources. For instance, a coal-fired power plant burns fossil fuel and is more harmful to the environment than wind power or solar power. Ensure your home is adequately insulated and that doors and windows are sealed with weather stripping to prevent cooled and heated air from escaping. Lastly, reduce energy use in your everyday life: Buy appliances that meet United States energy efficiency standards, use your thermostat to regulate temperatures and try to use your air conditioning infrequently, turn off all lights and appliances when you're not using them, and replace old lights with LED light bulbs that use less energy.

II.BACKGROUND :

A) CAUSES OF CO_2 EMISSION :

Carbon dioxide (CO2) emissions are primarily caused by human activities that involve the burning of fossil fuels, such as coal, oil, and gas, for energy production, transportation,and industrial processes.





Some of the major causes of CO2 emissions include:

- **Energy production:** The use of fossil fuels for electricity generation is one of the leading sources of CO2 emissions. Coal-fired power plants are particularly high emitters of CO2.
- **Transportation:** The burning of gasoline and diesel in vehicles is a significant source of CO2 emissions, accounting for around 25% of global CO2 emissions.
- **Industrial processes:** The production of cement, steel, and other industrial products involves high-temperature processes that release large amounts of CO2.
- **Deforestation:** Trees absorb CO2 from the atmosphere as part of photosynthesis. Deforestation and land-use changes that involve the clearing of forests for agriculture or urban development can lead to significant CO2 emissions.
- **Agriculture and livestock:** The use of fertilizers, tilling of soil, and livestock farming practices can all release CO2 into the atmosphere.

- **Residential and commercial buildings:** Heating and cooling buildings, as well as the use of appliances and lighting, can result in CO2 emissions from the burning of fossil fuels.

It's important to note that CO2 emissions are not solely caused by human activities. Natural sources, such as volcanic eruptions and decomposition of organic matter, also release CO2 into the atmosphere. However, human activities are the primary drivers of the increased CO2 concentrations in the atmosphere that are causing climate change.

B) EFFECTS OF CO_2 EMISSION :

Carbon dioxide (CO2) emissions have several significant effects on the environment and human health.

Some of the major effects include:

- **Climate change:** CO2 is a greenhouse gas that traps heat in the atmosphere and contributes to global warming. The increased levels of CO2 in the atmosphere are causing climate change, which is leading to rising temperatures, sea-level rise, and extreme weather events.
- **Ocean acidification:** When CO2 is absorbed by the ocean, it forms carbonic acid, which lowers the pH of the seawater. This process is known as ocean acidification, and it can have harmful effects on marine life, including the ability of shellfish and corals to form their shells and skeletons.
- **Air pollution:** CO2 emissions often occur alongside other pollutants, such as nitrogen oxides, sulfur dioxide, and particulate matter, which can cause smog and other forms of air pollution. This type of pollution can lead to respiratory and cardiovascular problems.
- **Reduced biodiversity:** Climate change caused by CO2 emissions is leading to the loss of habitats, which can threaten the survival of many plant and

animal species. It is also causing changes in migratory patterns and the timing of breeding and flowering.

- **Economic impacts:** The impacts of climate change caused by CO2 emissions can have significant economic consequences, including damage to infrastructure, reduced agricultural yields, and increased costs for businesses and governments to mitigate and adapt to the effects of climate change.

Overall, the effects of CO2 emissions on the environment and human health are widespread and far-reaching. Reducing CO2 emissions is essential to mitigate the impacts of climate change, protect the environment, and promote sustainable economic development.

C) CURRENT GLOBLE CO_2 EMISSION LEVAL :

Annual carbon dioxide (CO_2) emissions worldwide from **1940 to 2021**(in billion metric tons)

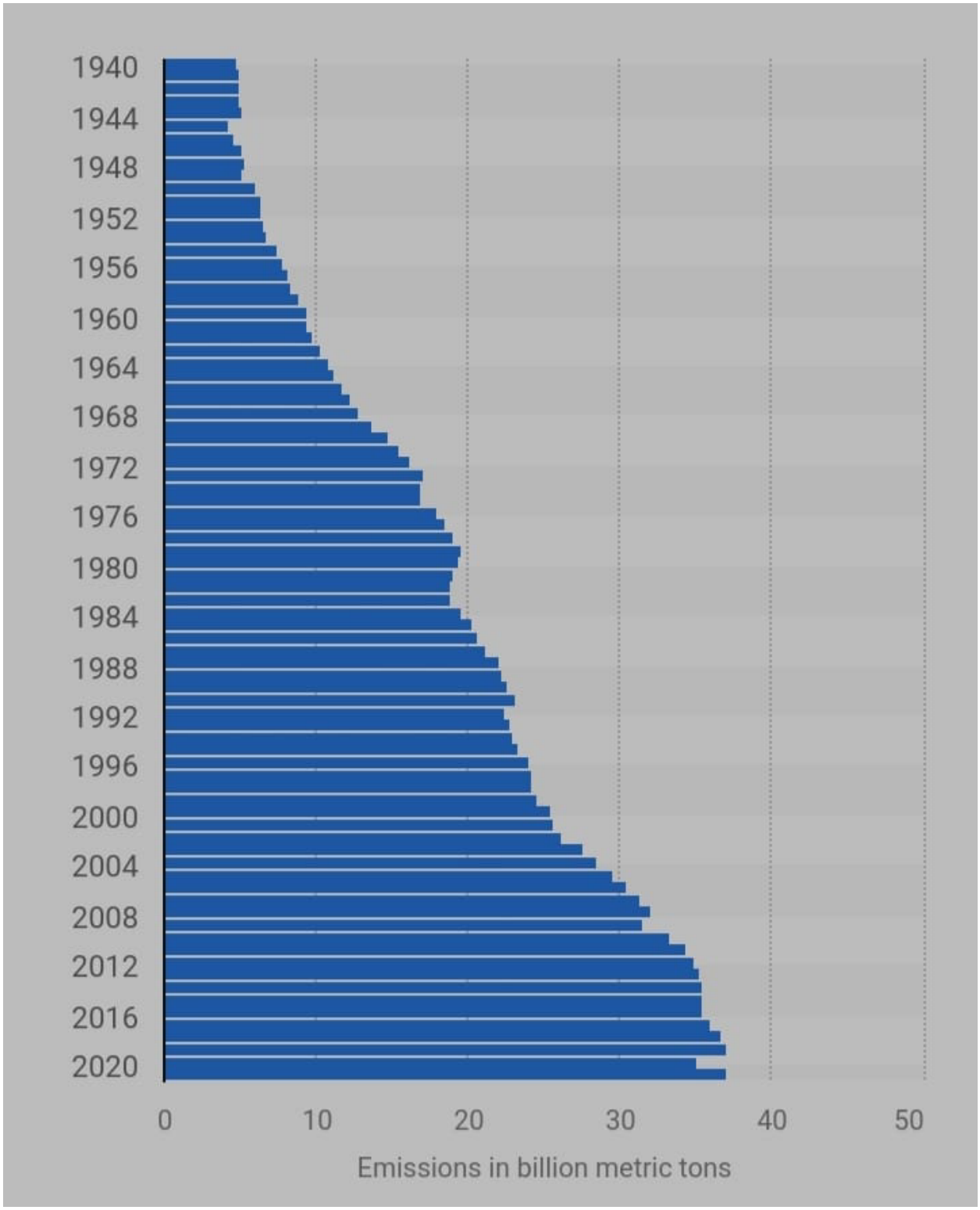
Characteristic	Emissions in billion metric tons
2021	37.12
2020	35.26
2019	37.08
2018	36.83
2017	36.1
2016	35.52
2015	35.56

2014	35.58
2013	35.32
2012	35.01
2011	34.49
2010	33.36
2009	31.56
2008	32.09
2007	31.51
2006	30.59
2005	29.61
2004	28.64
2003	27.65
2002	26.28
2001	25.67
2000	25.45
1999	24.73
1998	24.21
1997	24.3
1996	24.16
1995	23.46
1994	22.97

1993	22.81
1992	22.58
1991	23.24
1990	22.76
1989	22.41
1988	22.11
1987	21.27
1986	20.63
1985	20.33
1984	19.66
1983	19.01
1982	18.88
1981	19.04
1980	19.5
1979	19.62
1978	19.08
1977	18.5
1976	17.99
1975	17.05
1974	17.02
1973	17.09

1972	16.23
1971	15.51
1970	14.9
1969	13.77
1968	12.91
1967	12.24
1966	11.87
1965	11.32
1964	10.83
1963	10.27
1962	9.75
1961	9.42
1960	9.39
1959	8.86
1958	8.42
1957	8.19
1956	7.92
1955	7.44
1954	6.79
1953	6.65
1952	6.47

1951	6.38
1950	6
1949	5.25
1948	5.42
1947	5.14
1946	4.64
1945	4.25
1944	5.11
1943	5.04
1942	4.95
1941	4.97
1940	4.85


1940
1944
1948
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1984
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2020
0
10
20
30
40
50
Emissions in billion metric tons

Global carbon dioxide emissions from fossil fuels and industry increased 5.3 percent in 2021 to reach a record high of 37.12 billion metric tons ($GtCO_2$). The two biggest contributors to global emissions that year were China and the United States, who produced 11.47 and 5.01 $GtCO_2$, respectively. Since 1990, global CO_2 emissions have increased by more than 60 percent.

Where have emissions increased?

One of the biggest reasons for rising emissions has been the economic development of countries around the world, especially in Asia. For example, China wasn't always the world's biggest emitter, but rapid economic growth and industrialization in recent decades have seen emissions there soar. Between 1990 and 2021, CO_2 emissions in China increased more than 400 percent. Emissions in India saw a similar growth rate during this period. In comparison, CO_2 levels in the United States have fallen more than six percent since 1990.

Global events caused emissions to drop

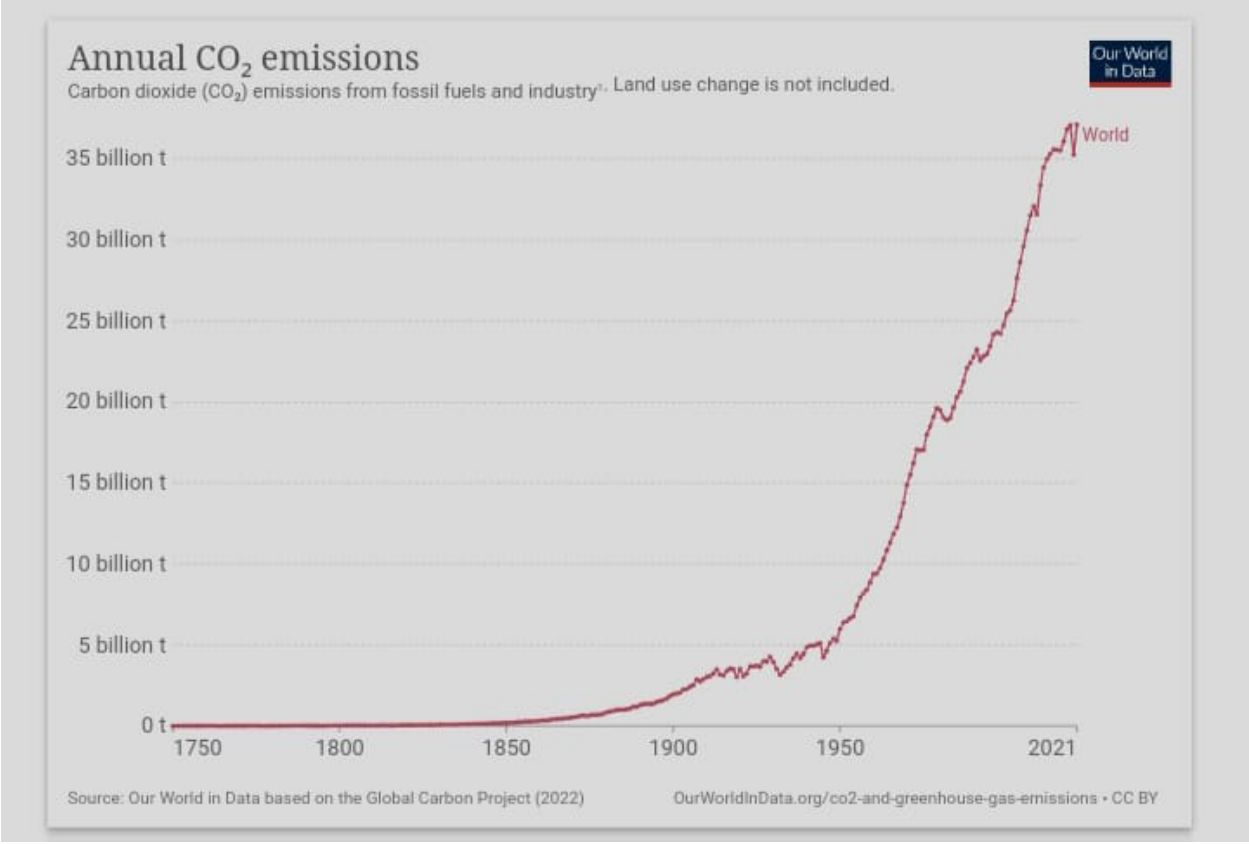
The outbreak of COVID-19 caused global emissions to plummet five percent in 2020 as a result of lockdowns and other restrictions. However, this wasn't the only time in history when a major global event decreased emissions. For example, the 2009 global recession resulted in CO_2 levels to fall two percent, while the recession in the early 1980s also had a notable impact on emissions. On a percentage basis, the largest reduction was at the end of the second world war in 1945, when emissions decreased by 17 percent .

D) Global CO2 emissions from fossil fuels :

How have global emissions of carbon dioxide (CO2) changed over time?

In this chart we see the growth of global emissions from the mid-18th century through to today. We see that prior to the Industrial Revolution, emissions were very low. Growth in emissions was still relatively slow until the mid-20th century. In 1950 the world emitted 6 billion tonnes of CO2.

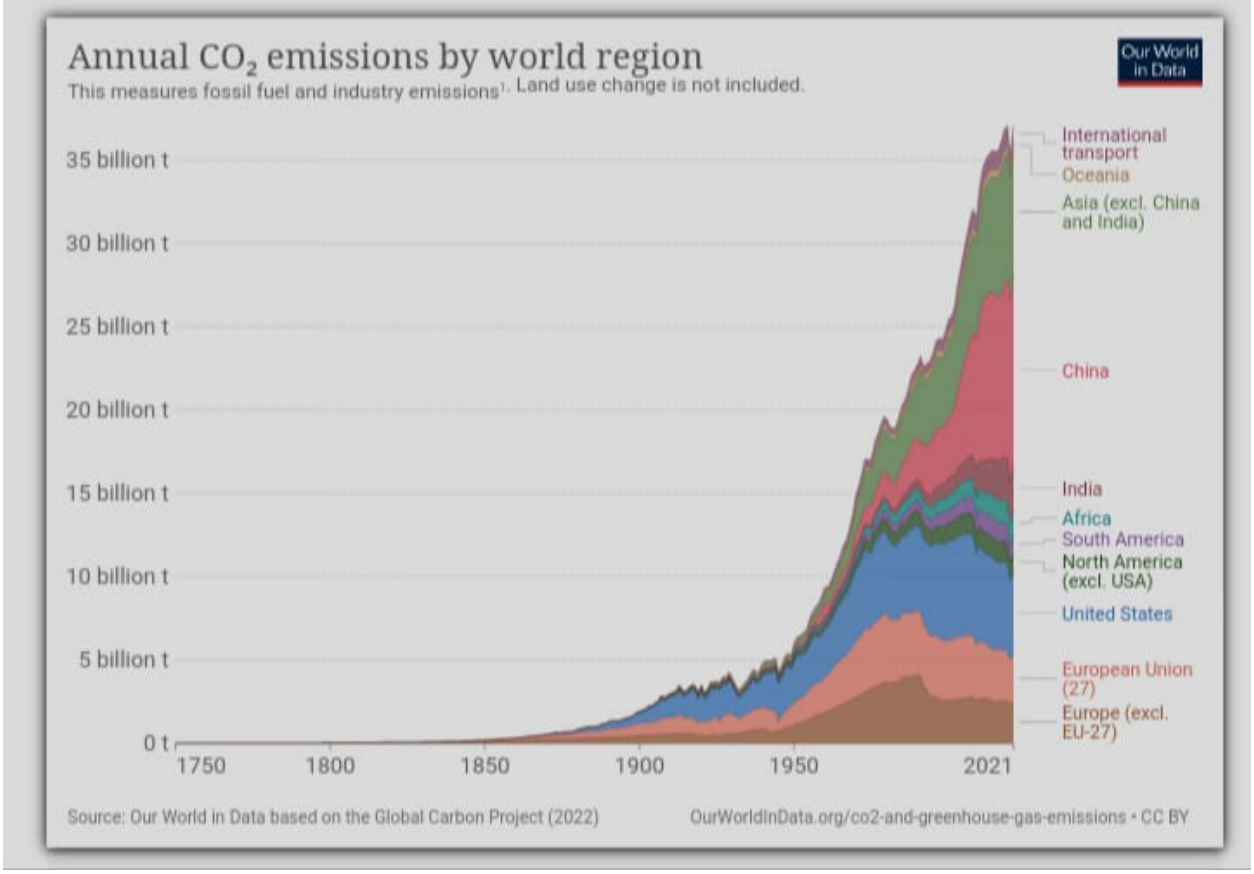
By 1990 this had almost quadrupled, reaching more than 22 billion tonnes. Emissions have continued to grow rapidly; we now emit over 34 billion tonnes each year. Emissions growth has slowed over the last few years, but they have yet to reach their peak.



E) CO2 emissions by region :

This interactive chart shows the breakdown of global CO2 emissions by region. We see that until well into the 20th century, global emissions were dominated by Europe and the United States. In 1900, more than 90% of emissions were produced in Europe or the US; even by 1950, they accounted for more than 85% of emissions each year. But in recent decades this has changed significantly.

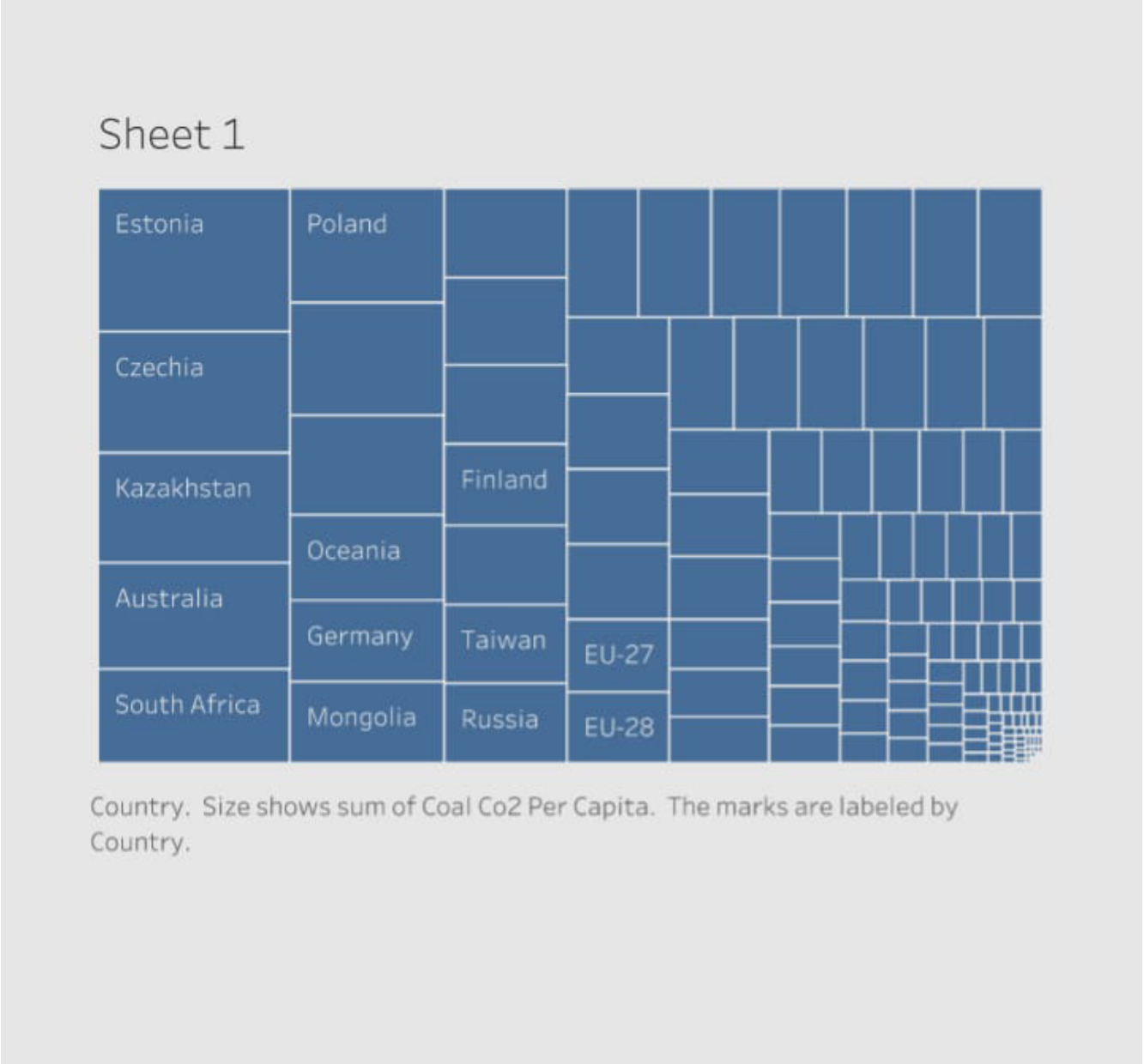
In the second half of the 20th century we see a significant rise in emissions in the rest of the world, particularly across Asia, and most notably, China. The US and Europe now account for just under one-third of emissions.



F) Per capita CO2 emissions :

Where in the world does the average person emit the most carbon dioxide (CO2) each year?

We can calculate the contribution of the average citizen of each country by dividing its total emissions by its population. This gives us CO2 emissions per capita. In the visualization we see the differences in per capita emissions across the world.



Here we look at production-based emissions – that is, emissions produced within a country's boundaries without accounting for how goods are traded across the world. In our post on consumption-based emissions we look at how these figures change when we account for trade. Production figures matter – these are the numbers that are taken into account for climate targets1 – and thanks to historical reconstructions they are available for the entire world since the mid 18th century. There are very large inequalities in per capita emissions across the world.

The world's largest per capita CO2 emitters are the major oil producing countries; this is particularly true for those with relatively low population size. Most are in the Middle East: In 2017 Qatar had the highest emissions at 49 tonnes (t) per person, followed by Trinidad and Tobago (30t); Kuwait (25t); United Arab Emirates (25t); Brunei (24t); Bahrain (23t) and Saudi Arabia (19t).

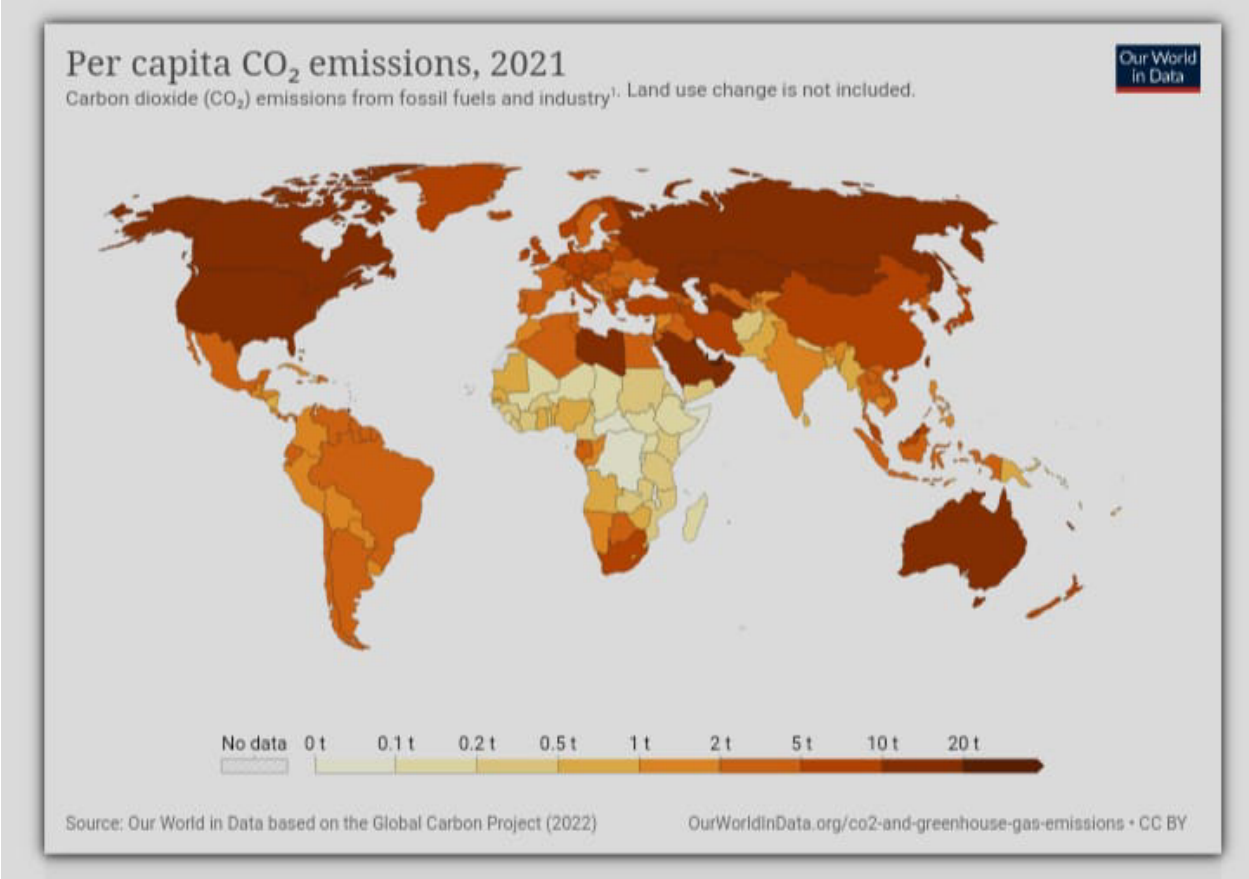
However, many of the major oil producers have a relatively small population meaning their total annual emissions are low. More populous countries with some of the highest per capita emissions – and therefore high total emissions – are the United States, Australia, and Canada. Australia has an average per capita footprint of 17 tonnes, followed by the US at 16.2 tonnes, and Canada at 15.6 tonnes. This is more than 3 times higher than the global average, which in 2017 was 4.8 tonnes per person.

Since there is such a strong relationship between income and per capita CO2 emissions, we'd expect this to be the case: that countries with high standards of living would have a high carbon footprint. But what becomes clear is that there can be large differences in per capita emissions, even between countries with similar standards of living. Many countries across Europe, for example, have much lower emissions than the US, Canada or Australia.

In fact, some European countries have emissions not far from the global average: In 2017 emissions in Portugal are 5.3 tonnes; 5.5t in France; and 5.8t per person in the UK. This is also much lower than some of their neighbours with similar standards of living, such as Germany, the Netherlands, or Belgium. The choice of energy sources plays a key role here: in the UK, Portugal and France, a much higher share of electricity is produced from nuclear and renewable sources – you can explore this electricity mix by country here. This means a much lower share of electricity is produced from fossil fuels: in 2015, only 6% of France's electricity came from fossil fuels, compared to 55% in Germany.

Prosperity is a primary driver of CO2 emissions, but clearly policy and technological choices make a difference.

Many countries in the world still have very low per capita CO2 emissions. In many of the poorest countries in Sub-Saharan Africa – such as Chad, Niger and the Central African Republic – the average footprint is around 0.1 tonnes per year. That's more than 160 times lower than the USA, Australia and Canada. In just 2.3 days the average American or Australian emits as much as the average Malian or Nigerien in a year.



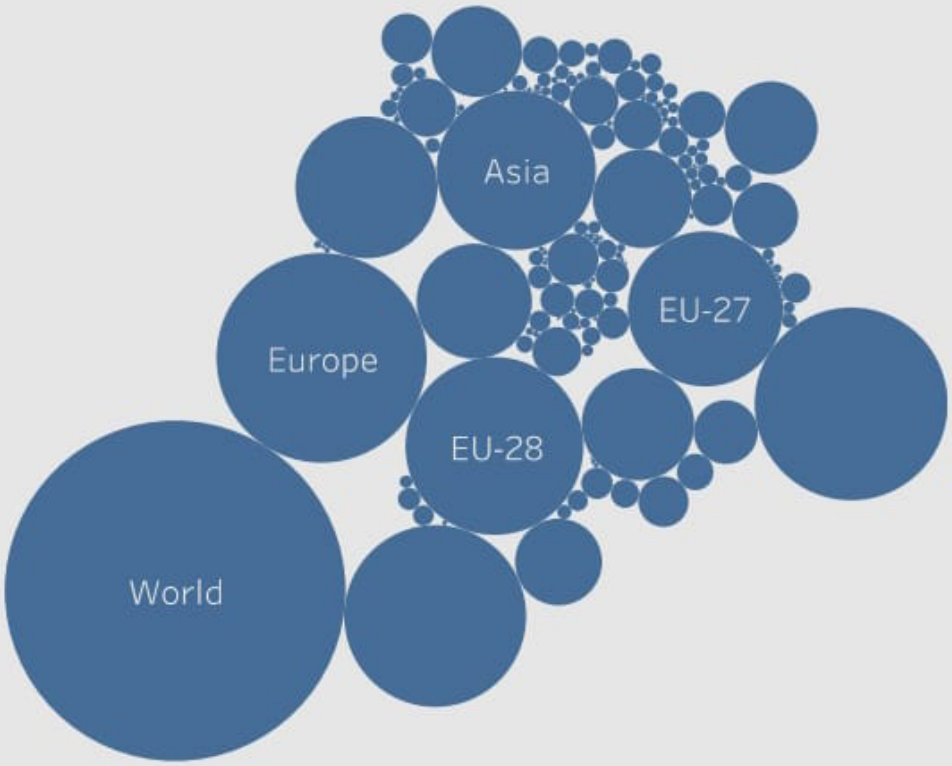
G) Cumulative CO2 emissions :

Since 1751 the world has emitted over 1.5 trillion tonnes of CO2.2 To reach our climate goal of limiting average temperature rise to 2°C, the world needs to urgently reduce emissions. One common argument is that those countries which

have added most to the CO2 in our atmosphere – contributing most to the problem today – should take on the greatest responsibility in tackling it.

We can compare each country's total contribution to global emissions by looking at cumulative CO2. We can calculate cumulative emissions by adding up each country's annual CO2 emissions over time. We did this calculation for each country and region over the period from 1751 through to 2017.

The distribution of cumulative emissions around the world is shown in the treemap. Treemaps are used to compare entities (such as countries or regions) in relation to others, and relative to the total. Here countries are presented as rectangles and colored by region. The size of each rectangle corresponds to the sum of CO2 emissions from a country between 1751 and 2017. Combined, all rectangles represent the global total.



Country. Size shows sum of Cumulative Co2. The marks are labeled by Country.

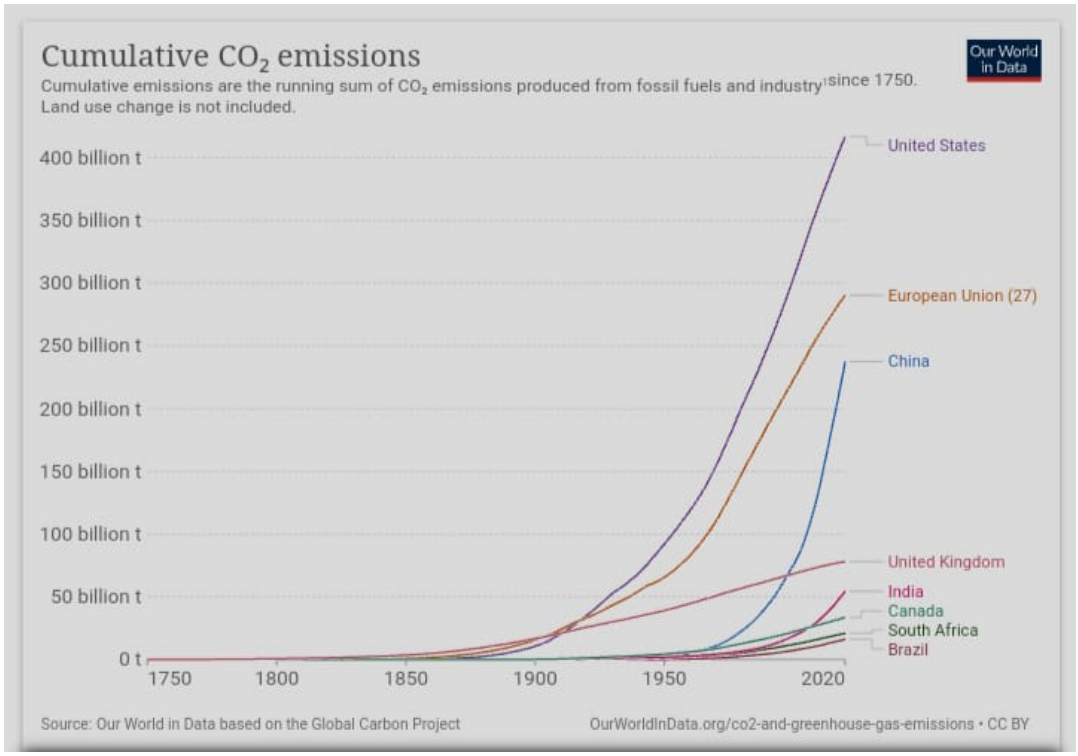
There are some key points we can learn from this perspective:

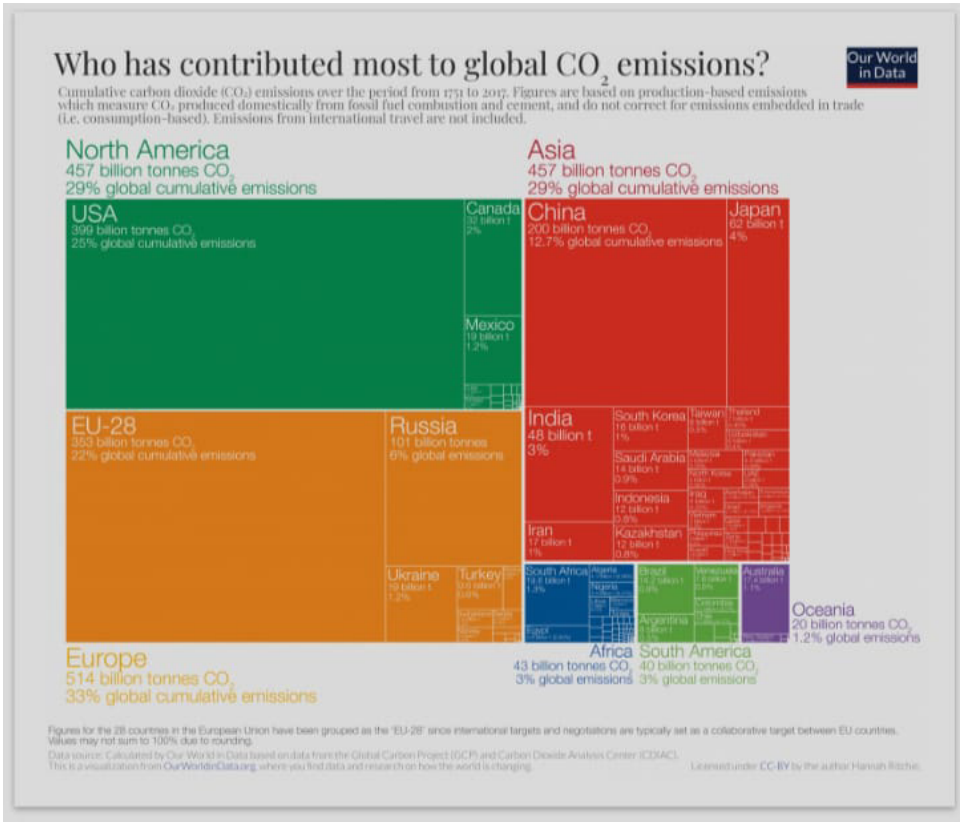
The United States has emitted more CO2 than any other country to date: at around 400 billion tonnes since 1751, it is responsible for 25% of historical emissions. This is twice more than China – the world's second largest national contributor;

The 28 countries of the European Union (EU-28) – which are grouped together here as they typically negotiate and set targets on a collaborative basis – is also a large historical contributor at 22%. Many of the large annual emitters today – such as India and Brazil – are not large contributors in a historical context;

Africa's regional contribution – relative to its population size – has been very small. This is the result of very low per capita emissions – both historically and currently.

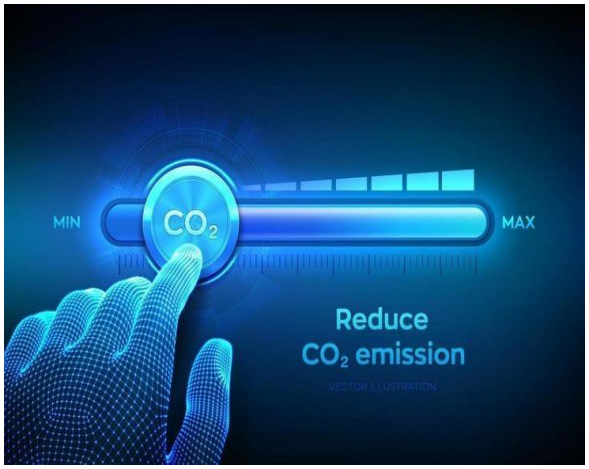
All of this data is also explorable by country and over time in the interactive map. By clicking on any country you can see the country's cumulative emissions over time, and compare it with other countries.


Cumulative CO_2 emissions
Cumulative emissions are the running sum of CO_2 emissions produced from fossil fuels and industry since 1750.
Land use change is not included.
Our World in Data
400 billion t
350 billion t
300 billion t
250 billion t
200 billion t
150 billion t
100 billion t
50 billion t
0 t
1750
1800
1850
1900
1950
2020
United States
European Union (27)
China
United Kingdom
India
Canada
South Africa
Brazil
Source: Our World in Data based on the Global Carbon Project
OurWorldInData.org/co2-and-greenhouse-gas-emissions • CC BY


Who has contributed most to global CO_2 emissions?
Our World in Data
Cumulative carbon dioxide (CO_2) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO_2 produced domestically from fossil fuel combustion and cement, and do not correct for emissions embedded in trade (i.e. consumption-based). Emissions from international travel are not included.
North America
457 billion tonnes CO_2
29% global cumulative emissions
USA
399 billion tonnes CO_2
25% global cumulative emissions
Canada
32 billion t
2%
Mexico
19 billion t
1.2%
Asia
457 billion tonnes CO_2
29% global cumulative emissions
China
200 billion tonnes CO_2
12.7% global cumulative emissions
Japan
62 billion t
4%
India
48 billion t
3%
South Korea
16 billion t
1%
Taiwan
Thailand
Saudi Arabia
14 billion t
0.9%
Indonesia
12 billion t
0.8%
Iran
17 billion t
1%
Kazakhstan
12 billion t
0.8%
EU-28
353 billion tonnes CO_2
22% global cumulative emissions
Russia
101 billion tonnes
6% global emissions
Ukraine
Turkey
South Africa
Nigeria
Brazil
Argentina
Venezuela
Australia
Oceania
20 billion tonnes CO_2
1.2% global emissions
Europe
514 billion tonnes CO_2
33% global cumulative emissions
Africa
43 billion tonnes CO_2
3% global emissions
South America
40 billion tonnes CO_2
3% global emissions
Figures for the 28 countries in the European Union have been grouped as the 'EU-28' since international targets and negotiations are typically set as a collaborative target between EU countries.
Values may not sum to 100% due to rounding.
Data source: Calculated by Our World in Data based on data from the Global Carbon Project (GCP) and Carbon Dioxide Analysis Center (CDIAC).
This is a visualization from OurWorldInData.org, where you find data and research on how the world is changing.
Licensed under CC-BY by the author Hannah Ritchie.

H) Ways to Reduce Your Carbon Footprint :

- Driving
- Air Travel
- Home Energy
- Food
- Other
- Offsetting



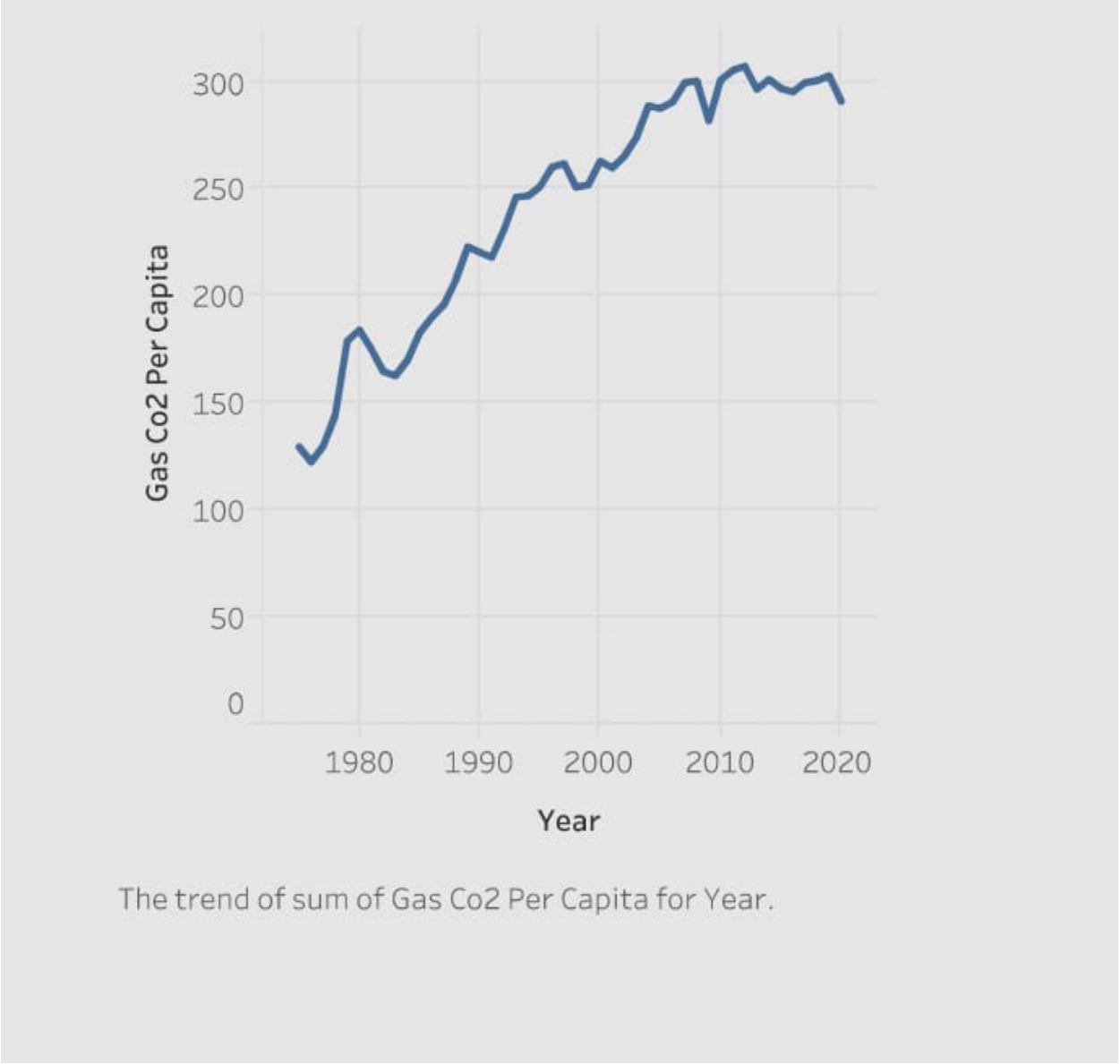
i) Reduce Your Carbon Footprint From Driving :

Alternatives to driving

When possible, walk or ride your bike in order to avoid carbon emissions completely. Carpooling and public transportation drastically reduce CO2 emissions by spreading them out over many riders.

Drive a low carbon vehicle

High mileage doesn't always mean low CO2 emissions. All vehicles have an estimated miles-per-gallon rating. Electric cars emit no CO2 if they're charged with clean electricity. If you don't charge it with your home's solar panels AND live somewhere like WY, MO, MO, WV, or KY you're BETTER OFF with a hybrid or high-mileage gas/diesel car. Here's why. After incentives and gas savings, it essentially costs nothing to switch to an electric car like the the Nissan Leaf.



Get a hitch-mounted cargo rack

Don’t buy a minivan or SUV if you don’t need 4WD and/or will only occasionally need the extra space. A receiver hitch and a rack like this one only cost a few hundred bucks. Avoid roof-top boxes, which cost much more, increase aerodynamic drag, and decrease fuel economy.

Driving style

Speeding and unnecessary acceleration reduce mileage by up to 33%, waste gas and money, and increase your carbon footprint.

Tire inflation and other tuning

Properly inflated tires improve your gas mileage by up to 3%. It also helps to use the correct grade of motor oil, and to keep your engine tuned, because some maintenance fixes, like fixing faulty oxygen sensors, can increase fuel efficiency by up to 40%.

Avoid traffic

Being stuck in traffic wastes gas and unneccessarily creates CO2. Use traffic websites and apps and go a different way or wait.

Misc.

Combine errands to make fewer trips. Remove excess weight from your car. Use cruise control.

ii) Reduce Your Carbon Footprint From Air Travel :

General

Until petroleum-based aviation fuel is replaced, you should avoid flying when possible, fly less frequently, fly shorter distances, and fly economy class.

Leisure Air Travel

Take fewer and longer vacations that are far away, and more frequent and driveable “staycations” closer to home.

Fly Fewer Round Trips

Consider renting a car or taking a train for half of your journey, and only fly the other half.

Work Air Travel

Increase your use of video-conferencing tools like Skype and Facetime.

What Class?

Economy class is best, for the same reasons as carpooling and public transportation. Each flyer's share of a flight's carbon emissions is relatively less because it's spread out over more people.

That's Economy class

When Prince William flies economy class, he's leading by example. Then there's Prince Alwaleed bin Talal al-Saud, or the Sultan of Brunei, who buys entire economy-size planes and convert them into flying palaces.

Don't fly on Private Jets

In a sense, private jet travel is simply economy/first/business writ large: it should be minimized if not avoided. In terms of CO2 emissions per passenger mile flown, private jets result in the highest emissions by far. If you must fly on private jets, at least select a provider like Paramount Business Jets, which enables you to calculate and offset your emissions.

Don't buy a Honda

HondaJet, that is. Their cars are fine, though.

Don't be a space tourist

Watch NOVΛ on PBS instead. Richard Branson's "spaceline" Virgin Galactic seeks to right the injustice that "most of our planet's seven billion people have had no opportunity to experience space" and Jeff Bezos' Blue Origin promises "life-changing views" of what's left of our planet.

iii) Reduce Your Home Energy Carbon Footprint :

Insulate and seal your home

Reduce drafts and air leaks with caulk, insulation, and weather stripping. Many states offer programs and incentives to facilitate this, and a great example is Energy Upgrade California.

Appliances

Make energy efficiency a primary consideration when choosing a new furnace, air conditioning unit, dishwasher, or refrigerator. Products bearing the ENERGY STAR label are recognized for having superior efficiency.

Lighting

Turn off lights you're not using and when you leave the room. Replace incandescent light bulbs with compact flourescent or LED ones.

Thermostat

Don't set it too high or low. Install a programmable model to turn off the heat/air conditioning when you're not home.

Solar

Add solar panels to the roof of your home. This costs a little more than the above options, but many providers offer financing options which minimize upfront costs. Two examples are SolarCity and SunRun. If you live in a state with a Net Metering law, you could eliminate your electricity bill or even earn money by selling electricity back to the grid.

iv) Reduce Your Carbon Footprint From Food :

Eat locally-produced and organic food

It has been estimated that 13% of U.S. greenhouse gas emissions result from the production and transport of food. Transporting food requires petroleum-based fuels, and many fertilizers are also fossil fuel-based. Cut the beef and dairy

It takes a lot of resources to raise cows, and it's especially bad if you buy beef from somewhere like Brazil, where it was grazed on land that used to be tropical forest but was cleared for agricultural use. Deforestation is a top contributor to carbon emissions and thus climate change.

v) Other Ways to Reduce Your Carbon Footprint

Water usage

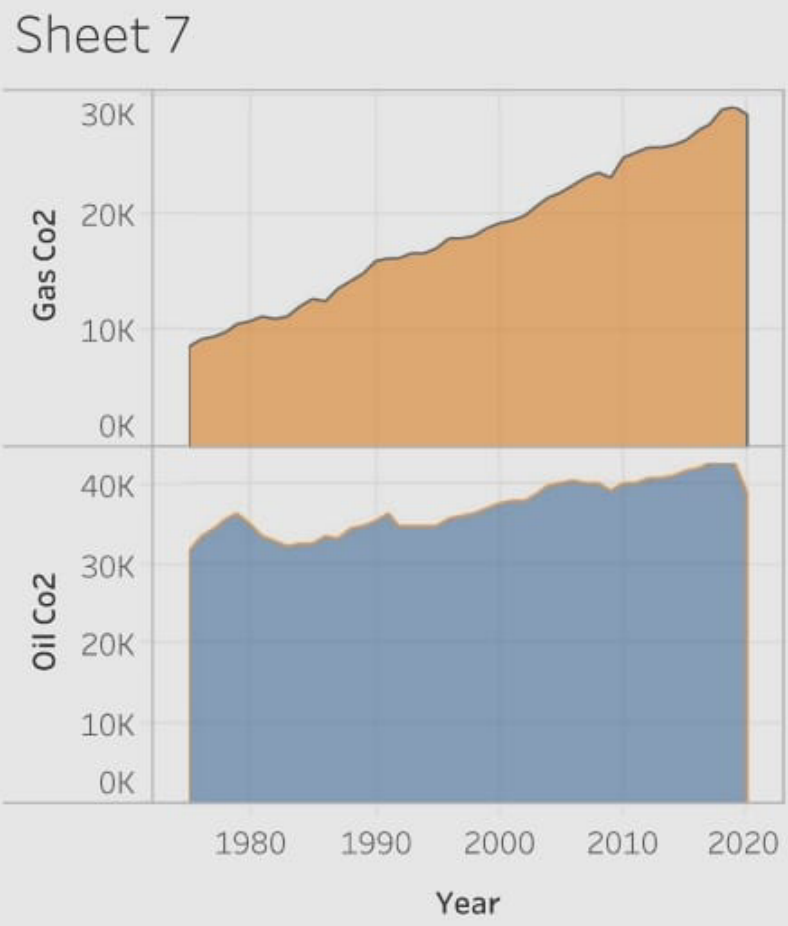
Lower the amount of energy used to pump, treat, and heat water by washing your car less often, using climate-appropriate plants in your garden, installing drip irrigation so that plants receive only what they need, and making water-efficient choices when purchasing shower heads, faucet heads, toilets, dishwashers and washing machines.

Reuse and recycle

It has been estimated that 29% of U.S. greenhouse gas emissions result from the "provision of goods," which means the extraction of resources, manufacturing, transport, and final disposal of "goods" which include consumer products and packaging, building components, and passenger vehicles, but excluding food. By buying used products and reselling or recyling items you no longer use, you dramatically reduce your carbon footprint from the "provision of goods."

Support clean energy sources

Whenever you can, advocate for clean alternatives to fossil fuels, such as wind, solar, geothermal, and appropriately designed hydroelectric and biomass energy projects.



The plots of sum of Gas Co2 and sum of Oil Co2 for Year.

vi) Offsetting Your Carbon Footprint :

Carbon offsetting should not be done in place of taking steps to reduce one's carbon footprint. Carbon offsetting and carbon footprint reduction should be done in tandem. Measuring your carbon footprint not only reveals where you're

currently at, but also helps to identify areas for improvement and track your progress.

Offsetting the amount which you are not able to avoid empowers you to take full responsibility for your carbon pollution, which is your contribution to climate change. In this context, COTAP offers a unique and meaningful solution in that we focus on certified forestry projects in least-developed regions that create life-changing income for the world's poorest people.

III.CONCLUSION :

The knowledge relating to climate sensitivity reported in AR4 (IPCC 2007a) still is timely. New research into how natural carbon sinks and carbon sources are influenced by climate change indicates, however, that the future net carbon uptake terrestrial systems could be less than formerly estimated.

There are now far more studies and information about emission pathways compared to when AR4 was published. The studies inform primarily about the two-degree target, rather than even lower temperature targets.

Measures to reduce emissions of short-lived climate forcers such as tropospheric ozone and soot may help in limiting global warming in the near term, but such measures are not sufficient to curb the warming.

The later global emissions culminate, the lower the probability of the two-degree target being met. In order to meet the two-degree target with a relatively high probability (around 70%), global greenhouse gas emissions must peak over the next 5-10 years, and by 2050 they must have decreased by approximately 50-60% compared to 2000.

There are different models for how global emission reductions can be distributed between different regions and countries. Such models depend on political and other standpoints.

Projections based on a convergence of the per capita emissions in different countries to the same level by 2050 and for the two-degree target to be achieved with a probability of around 70% indicate that Swedish emissions need to

decrease by approximately 20% by 2020 and by 70% by 2050 compared to 2005. The corresponding figures for the EU are approximately 25% and 80% respectively. Net emissions of carbon dioxide from deforestation and international aviation and shipping are not included in these figures.

A lower temperature target, such as 1.5 degrees, requires far more comprehensive emission reductions and could be unachievable without a temporary overshooting of the required long-term stabilisation of greenhouse gas levels in the atmosphere.

For a 1.5-degree target to be achieved without such an overshoot and with a probability of approximately 50%, global emissions need to start decreasing within the next few years. By the year 2050, global emissions must have decreased by 80% compared to 2000. A probability of approximately 70% involves that global emissions are around zero by 2050.

Projections based on a convergence of the per capita emissions in different countries to the same level by 2050 and for a 1.5-degree target to be achieved with a probability of around 50%, indicate that Swedish emissions need to decrease by approximately 25% by 2020 and by over 90% by 2050 compared to 2005. The corresponding figures for the EU are approximately 30% and just over 90% respectively. Net emissions of carbon dioxide from deforestation and international aviation and shipping are not included in these figures.

There is uncertainty regarding the climate effects under different temperature targets, but it is well-established that climate effects in certain regions, such as the Arctic, could be extensive even if the two-degree target is reached. Reducing global warming reduces the risk of climate effects, but even if the two-degree target is met the sea level will rise, ocean acidification will increase and important impacts on biological diversity can be expected.