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Reducing Greenhouse Gas Emissions Across G20 Countries

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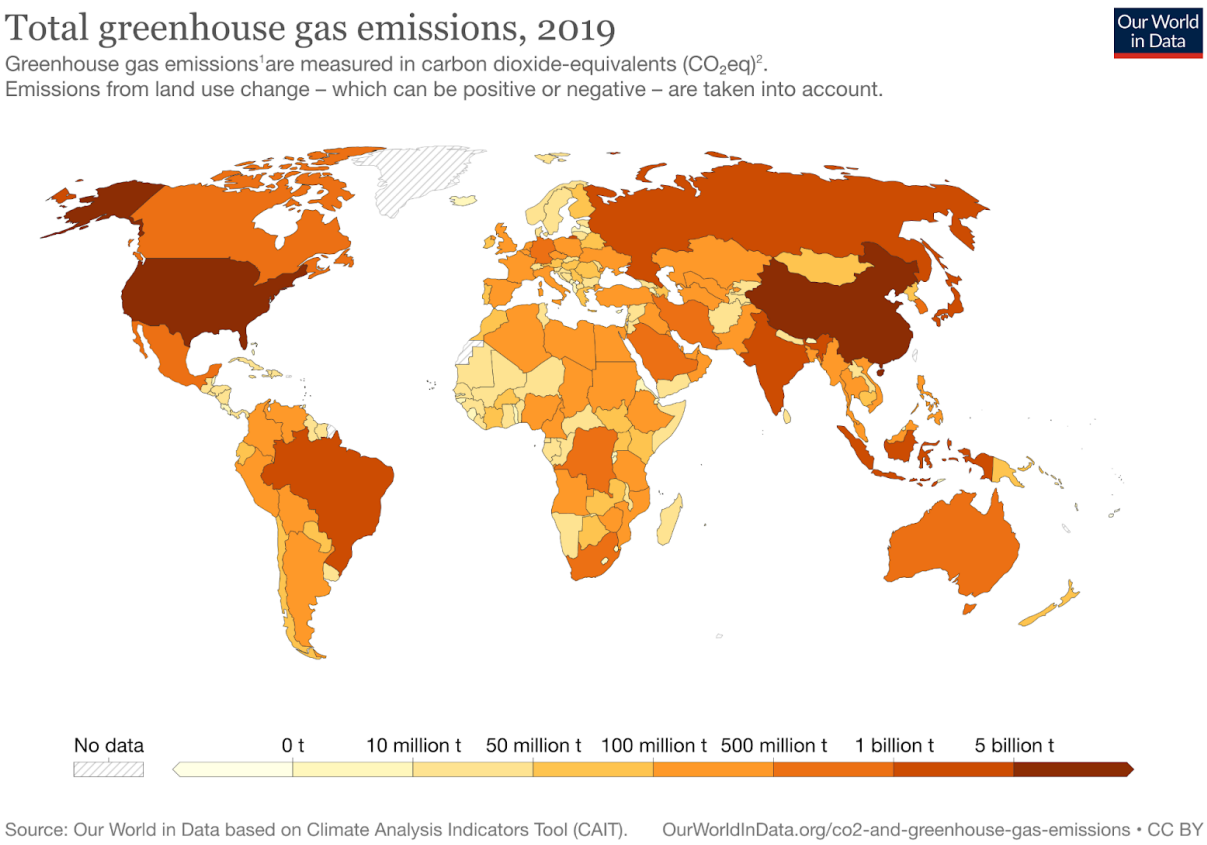
Introduction

Global warming and climate change are relevant problems in our world today. According to the European Environment Agency climate change is one of the biggest challenges of our time. There are already significant changes occurring such as rising temperatures and sea levels, an increase in droughts, wildfires, and even the shifting of rainfall patterns (EEA). If we do not take action it is predicted that by the end of the century, the global temperature will rise by 2-4 °C (3-7 °F). The result of this will most likely lead to catastrophic melting of ice causing sea levels rising which would flood major coastal cities all over the world. Wildlife and their habitats will be destroyed leading to the mass extinction of species. Food and water supplies are likely to take a hit as well. A major crucial part of global warming resulting in climate change is greenhouse gas emissions.

Greenhouse gas emissions are becoming a significant problem in the modern world. The gases act like glass walls of a greenhouse by trapping heat in the atmosphere. Greenhouse gases exist because without them temperatures would drop to as low as -18˚C or -0.4˚F which is an unsustainable temperature for human life. However, scientists now say that greenhouse gases cause both global warming and climate change due to the nature of greenhouse gases global temperatures have increased in the past 30 years and are now at record highs (National Grid). In 2021, G20 countries alone are responsible for 81% of global greenhouse gas emissions. The largest contributors are China, the USA, and the EU (Destatis). Thus, the problem of greenhouse gas emissions is one prominent among G20 countries, and in order to create a change these powerful nations need to work together and do something about it.



Definition of key terms

G20 Countries: The G20 is an intergovernmental organisation made up of 19 countries and the European Union (EU). The aim of the G20 is to address major issues within the world, however, G20 is not a part of the UN.

Greenhouse gases: Greenhouse gases are gases that trap heat in the Earth's atmosphere. They allow sunlight to pass through the atmosphere but prevent the heat from the sunlight from leaving the atmosphere. Greenhouse gases are essential to regulating the Earth's temperature. Without them, the Earth would be an unsuitable temperature for humans.

Emissions: Emissions are the production and release of something, especially gas or radiation.

Rural and Industrialised: Rural areas are those that consist of open country sides often with small populations. On the other hand, industrial areas are those with an economy based on mechanised manufacturing. They are developed areas and are often associated with higher income and living standards (Investopedia).

Greenhouse gas effect: The greenhouse effect is the process where gases trap heat close to Earth's surface. These gases, including carbon dioxide, methane, nitrous oxides, and water vapour, act like a blanket around the planet, maintaining more heat. Scientists have found that the warming effect of carbon dioxides is essential to stabilising Earth's atmosphere, and without it, the greenhouse effect would collapse.

Carbon footprint: The carbon footprint is the total amount of greenhouse gases that are generated by one's actions (Nature).

Unsustainable: Unsustainable is not to be able to last or continue for a long time. In terms of the environment, to be unsustainable is to use resources at a faster rate than they can regenerate. Therefore, defining the use of the resource as unsustainable.

NDCs: Nationally Determined Contributions

General Overview

Industrial revolution

The industrial revolution was a time period in the 18th century during which there was a large advancement in scientific and technological developments. It began in Britain in the 1830s and 1840s and quickly spread to the rest of the world. These advances

transformed large areas in the US and Europe that were rural into industrialised and urban ones. An important change was the increase in the use of machines to manufacture goods, transport, and in all aspects of daily life (History). Since this revolution, there has been a rapid increase in the number of greenhouse gases being released into the atmosphere significantly impacting the climate (National Grid).

History of Greenhouse Gases

Greenhouse gases have existed in the atmosphere for millions of years. They are a crucial aspect to regulate the earth's temperature. The greenhouse gas effect was discovered by humans in 1859. Eunice Foote was the scientist who discovered it, however most credit has been given to scientist John Tyndall who made the discovery 10 years later (Audubon). Furthermore, scientists only began connecting the burning of fossil fuels to rising carbon dioxide levels in the mid-20th century, and yet they only began worrying about climate change towards the end of the 1950s (Live Science). In the 1980s

communities started uniting to create action and since the warnings and worries have only escalated.

The Current Situation

Currently, the atmospheric levels of the main three greenhouse gases, carbon dioxide, methane, and nitrous oxide reached new record highs in 2021 (World Meteorological Organization). This is because humans use these gases in their everyday lives. Fossil fuels produce carbon dioxide and according to the International Energy Agency 36.3 billion tonnes of carbon dioxide were emitted rising by 6%. Furthermore, in 2021 atmospheric carbon dioxide reached 149% of the pre industrial level due to the emissions from the combustion of fossil fuels as well as cement production. The increase in the levels of carbon dioxide from 2020 to 2021 was greater than the average annual growth rate during the past decade. The increase in carbon dioxide levels from 2020 to 2021 was larger than the average annual growth rate over the last decade. Measurements from WMO's Global Atmosphere Watch network stations show that these levels continue to rise in 2022 over the whole globe (WMO)

Timeline of Events

1850-1900: The Industrial Revolution begins. Fossil fuels are being used for energy.

1859: Greenhouse gases were discovered

1910-1940: Global temperatures begin to accelerate by about 0.15°C per decade.

The 1950s: Scientists began to worry about climate change

1980-1990: The increase of global temperatures accelerates rising by about 0.2°C per decade.

The 1980s: People began to come together to take action

1990-2000: Warmest decade recorded at the time. Global temperatures rose by 0.3°C.

1995: The United Nations held its first Conference of Parties (COP) where countries agree to work together to address climate change.

2010-2020: The warmest decade recorded. Global temperatures rose by 0.4°C.

2015: The Paris Agreement is signed.

2020: 2020 ties with 2016 as the warmest year on record.

Major Parties Involved

China: China is the largest emitter of greenhouse gases. China emits 27% of the global carbon dioxide and a third of the world's total greenhouse gases. Therefore, the biggest contributor to climate change caused by greenhouse gases is China increasing the necessity for a reduction of greenhouse gas emissions to occur in China. According to the World Bank, if China is not able to transition to a low-carbon economy it will be impossible to achieve the global climate goals. However, the country is currently well-positioned to meet its climate goals (World Bank). China is also very vulnerable to climate change due to its location therefore it is even more crucial that they take action. So far Beijing has implemented policies with the aim of reducing emissions. China has signed the 2015 Climate Agreement as well as promised to be carbon neutral by 2060. President Xi Jinping has also recognized climate change as one of his administration's highest concerns (CFR).

The United States of America: The United States of America is also a major emitter of greenhouse gases. According to the Environmental and Energy Study Institute, the United States accounts for about five percent of the global population but is responsible for 30 percent of global energy use and 28 percent of carbon emissions (EESI). It is the second largest emitter after China. The US is very reliant on fossil fuels for energy and transportation. US's transportation sector is one of the largest contributors to U.S. greenhouse gas emissions. According to the Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2020 (the national inventory that the U.S. creates under the United Nations Framework Convention on Climate Change every year), in 2020 transportation accounted for 27% (the largest portion) of total US greenhouse gas

emissions. Cars and trucks are the primary contributors (EPA). In 2017 the Trump administration withdrew the US from the Paris agreement. With the US being such a large contributor to greenhouse gas emissions this was a major setback for the world to achieve its climate goals. However, since then the Biden administration has rejoined the Paris agreement and set a goal of achieving net-zero emissions by 2050. President Biden announced on April 22, 2021, the new target for the United States to achieve a 50-52% economy-wide net greenhouse gas pollution from 2005 levels in 2030.

European Union: The European Union is also one of the largest emitters of greenhouse gases. Thus, it is very crucial that they set and achieve goals for reducing greenhouse gases. The EU has set a target to reduce 55% net reduction in greenhouse gas emissions by 2030. The EU's net emissions in 2020 were 34% below 1990. So far emissions have decreased in almost all sectors, specifically in energy supply, industry, and the residential sector (Europa). However, emissions have not been dropping in the transport sector (WeForum).

2015 Paris Climate Agreement: The Paris Agreement is an international treaty signed by 196 countries. The goal of the Paris Agreement is to combat climate change by limiting global warming to less than 2° celsius (3.6° Fahrenheit) above pre-industrial levels and to pursue efforts to limit warming to 1.5° celsius (2.7° Fahrenheit). The Paris Agreement also acknowledges climate change as a global problem that requires a global solution. It also sets out a framework for countries to work together in order to reduce greenhouse gas emissions as well as to adapt to the impacts of climate change and provide support to countries that are developing. Each country submitted pledges to reduce its greenhouse gas emissions (NDCs). The pledges are to be updated every five years to reflect progress. On top of this, it also establishes a system for tracking and reporting on countries' progress on their goals.

Possible Solutions

There are several solutions to reducing greenhouse gas emissions. Many countries are already making efforts to reduce their own carbon emissions but there are global goals that should also be set. Some simpler solutions are increasing taxes on certain aspects that emit carbon dioxide and other greenhouse gases as well as carbon pricing. Furthermore, the energy sector is a large contributor to greenhouse gas emissions due to the global use of fossil fuels. Thus, implementing renewable energy sources is another relevant and impactful solution. In general possible solutions for reducing greenhouse gas emissions are to reduce our actions that are creating the greenhouse gases being emitted into the atmosphere and therefore increasing the global average temperature and causing climate change.

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