



Combating Greenhouse Gas Emissions in All Major Industrial Nations

G20

Tanisha Phadke, Deputy Chair





Introduction

The effects of greenhouse gas emissions have long been a prominent issue on the United Nations agenda and one which has often been the underlying cause of heated debates amongst politicians.

Humans emit about 37 metric Gigatons of CO₂ per year. In other words, if you extracted all the carbon from that carbon dioxide gas and put it into the form of solid coal it would form a pile of carbon four miles across and over a mile high and that's just one kind of greenhouse gas, in one year. This statistic quite clearly highlights the massive volume of greenhouse gases we pump out every year and shows us the importance of reducing these greenhouse gas emissions globally, as soon as possible.

Out of the total global emissions, 73.2% of global greenhouse gas emissions come from the production of energy, out of this percentage, 24.2% of greenhouse gas emissions come from energy use in industry. It is essential member states come together to form a solution on how we can reduce greenhouse gas emissions in the industry while not limiting economic growth, particularly in newly emerging economies that have recently become industrial nations (NEEs). It is especially important that the solution made also considers the various economic struggles all nations are now experiencing due to the COVID-19 pandemic.

This issue comes under the UN sustainability goal 13; 'Take urgent action to combat climate change and its impacts'.

Definition of Key Terms

NEE (Newly Emerging Economy)

Countries that are classified as NEE's are countries that have begun to experience high rates of economic development, usually along with rapid industrialization.

United Nations Environment Programme (UNEP)

The United Nations Environment Programme oversees organizing the UN's responses to environmental threats.

Kyoto Protocol

The Kyoto Protocol was established in 1997 by the United Nations to address the issue of greenhouse gas (carbon) emissions. The Protocol focuses on industrialized countries as the principal emitters of carbon emissions, exempting underdeveloped countries from its responsibilities. In 2015, the Paris Climate Accord effectively



succeeded the Kyoto Protocol. The timeline section contains further information on how the Kyoto Protocol evolved.

Greenhouse gases (GHG)

Greenhouse gases are gases in the atmosphere which absorb heat energy and prevent it from escaping into space. This keeps the Earth warmer than it would be without these gases. Greenhouse gases are not a bad thing in themselves, but too much of them in the atmosphere leads to an increase in the greenhouse effect and global warming.

There are many greenhouse gases, but these are some of the most important: water vapour, carbon dioxide (CO₂), methane, nitrous oxide and CFCs (chlorofluorocarbons).

The enhanced greenhouse effect

The impact on the climate from the additional heat retained due to increased amounts of carbon dioxide and other greenhouse gases released into the earth's atmosphere by humans since the industrial revolution is known as the enhanced greenhouse effect, also known as climate change or global warming. The combustion of fossil fuels, as well as the degradation of carbon "sinks" like forests and peat bogs, is releasing greenhouse gases.

Industrial Nations

An industrial nation (also known as a developed country, high-income country (HIC) or More Economically Developed Country (MEDC)) is a nation that has a high quality of life, developed economy and advanced technological infrastructure relative to other less industrialized nations.

Industry

The industry regards the activity concerned with the processing of raw materials and the manufacture of goods in factories. Greenhouse gas emissions from industry primarily come from the burning of fossil fuels for energy, as well as this, greenhouse gas emissions come from certain chemical reactions which are necessary to produce goods from the raw materials.

Climate Change

Long-term changes in temperature and weather patterns are referred to as climate change. These variations might be due to natural causes, such as variations in the



solar cycle. However, human activities have been the primary cause of climate change since the 1800s, particularly due to the combustion of fossil fuels such as coal, oil, and gas.

General Overview

Since the Industrial Revolution, humans have released over 1.5 trillion tons of carbon dioxide or CO₂, into the Earth's atmosphere. In the year 2019, we were still pumping out around 37 billion more. That's 50 per cent more than the year 2000 and almost three times as much as 50 years ago. It's not just CO₂, we're also pumping outgrowing volumes of other greenhouse gases such as methane and nitrous oxide. Combining all of our greenhouse gases, we're emitting 51 billion tons of carbon dioxide equivalents each year and emissions keep rising.

In recent years, the consequences of greenhouse gas emissions have become more serious and visible. Almost every year we break some horrible new record: We've had more heatwaves than ever before, the most glaciers melting, and the lowest amount of ice ever recorded at the North Pole. The warmest years on record have occurred in 20 of the last 22 years. The only way to slow the pace of climate change is to reduce our collective emissions as soon as possible. However, while all countries agree on the aim, in theory, they disagree on who is accountable for it and who should take the burden. The industrialized nations highlight their efforts to cut emissions as well as the reality that large emerging countries on the rise, particularly China, are now emitting significantly more CO₂. Developing nations, on the other hand, claim that Western emissions are 'lifestyle emissions,' whereas developing countries' emissions are 'survival emissions.' Others call high-income countries hypocrites which were allowed to grow their economy by allowing factories to pollute without restraint and now expect NEEs not to industrialize further and thus improve their economy.

It is difficult to pinpoint which nations must be held responsible for our rapidly warming world and which nations are to be given leniency due to their only recent rapidly growing economies.

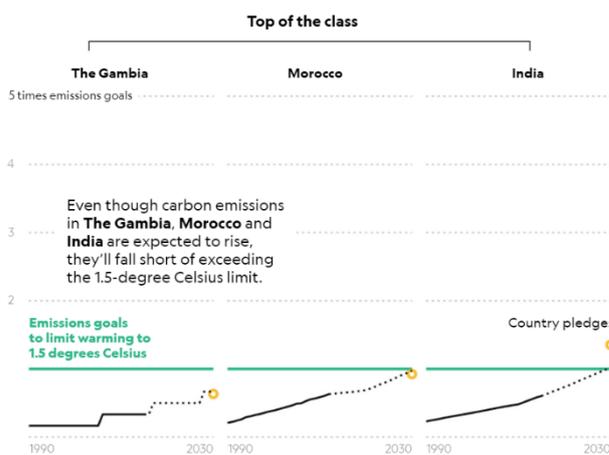
At the same time, the COVID-19 pandemic has caused a decline in the economy in all nations including industrial nations which are highly developed such as the USA and Germany and newly emerging economies such as China and India. This means that the issue of climate change has taken the back seat as nations are more concerned about restoring their economy. This is being done by investing more money in the industrial sector to increase exports and thus boost the economy instead of investing in technologies to combat climate change.

The Paris Agreement is the most recent and impactful climate agreement, under which countries agree to take efforts to keep the increase in global temperature this century well below 2 degrees Celsius over preindustrial levels, and eventually to 1.5 degrees Celsius. Each signatory to the agreement submits its national plan, which



includes emission reduction objectives and methods for achieving those targets. Unfortunately, despite the 2015 agreement, global carbon emissions rose by 1.7 per cent in 2017 and 2.7 per cent in 2018. Furthermore, under the Paris Agreement, many countries pledged carbon emissions caps that weren't ambitious enough to limit warming to 1.5 degrees Celsius or below. There were also great disparities in the pledges countries made for example Gambia's goal is 6 million metric tons of carbon and the U.S.'s is 1.8 trillion tons. The Climate Action Tracker has analyzed how different countries' carbon caps is going to affect the global 1.5 degree Celsius target.

The Climate Action Tracker (**CAT**) is an independent scientific analysis that measures government climate action against the globally agreed aim of holding warming well below 2°C and pursuing efforts to limit warming to 1.5°C. It is produced by two research organisations: Climate Analytics, and NewClimate Institute and is endorsed by National Geographic.



As shown in this infographic from the source 'National Geographic' which was made using the Climate Action Tracker, countries that have done the most to try and achieve their emission targets from the Paris Agreement are The Gambia, Morocco and India. On the other hand, Russia, the United States and Saudi Arabia have done the least to achieve this target.

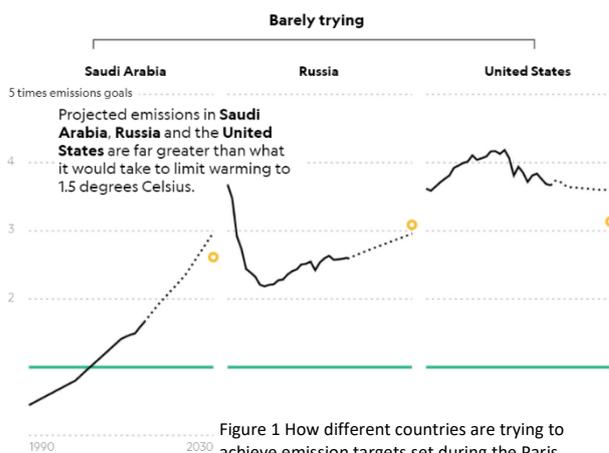


Figure 1 How different countries are trying to achieve emission targets set during the Paris Agreement. Source: National Geographic

KENNEDY ELLIOTT, NG STAFF
SOURCE: CLIMATE ACTION TRACKER

Morocco is one of just two nations, according to CAT, that has a strategy to cut CO2 emissions to a level that will keep global warming to 1.5 degrees Celsius. Morocco's National Energy Strategy (Mulvaney 2019) intends for renewables to account for 42 per cent of energy generation by 2020 and 52 per cent by 2030. It is already above 35%, thanks to

investments in projects such as the Noor Ouarzazate complex, which is the world's



biggest concentrated solar farm, which covers 3,500 football fields and provides enough electricity to light two cities the size of Marrakesh.

The Gambia is the other country with a plan to reduce emissions to decrease temperatures by 1.5 degrees Celsius. One of its main avenues to reduction, like Morocco's, is the use of renewables, as seen by a program that would boost the country's power capacity by one-fifth. One part of this program is the building of one of West Africa's largest solar facilities. A massive initiative to restore 10,000 hectares of forests, mangroves, and savannas has also been kickstarted by the government. To decrease the exploitation of forest resources, it is also replacing flooded rice paddies with dry upland rice fields and boosting the usage of efficient cooking stoves.

Furthermore, India has also risen to prominence as a global leader in renewable energy, investing more in renewable than it does in fossil fuels. India set a goal of generating 40% of its electricity from renewables by 2030, but its development has been so quick that it may meet that goal ahead of schedule. According to CAT, India's National Energy Plan is compatible with a 2°C increase, but it could be 1.5°C compatible if the government abandons plans to develop new coal-fired power plants.

In contrast, Russia will indeed fulfil its Paris objective, but only because its commitment is so weak. Russia's commitments have enabled the country's greenhouse gas emissions to rise by 6 - 24 per cent above 2016 levels by 2020, 15 - 22 per cent by 2030. The government has also not invested in low-carbon economic development strategies to meet the objectives set. Also, internal data on greenhouse gas emissions are limited, and out-of-date, making it impossible to analyze what Russia is doing to reduce greenhouse gas emissions

Similarly, Saudi Arabia's government's most recent "Vision 2030" strategy, which was released in 2016, is less ambitious than a 2013 plan that called for the country's energy industry to diversify away from its reliance on oil. Even though Saudi Arabia's Vision 2030 indicates that it intends to phase off fossil fuel subsidies, the government declared in December 2017 that it will slow down the subsidy phase-out to "enhance the economy." Furthermore, the kingdom has a get-out clause for its Paris targets if it determines that the deal imposes an "abnormal burden" on the economy by limiting its fossil-fuel revenue.

Lastly, as shown in Figure 1, the previous Trump Administration's hostility towards climate action and censorship of climate science had caused the CAT to classify the countries efforts as 'critically inefficient'. The previous Trump Administration also had withdrawn the US from the Paris Agreement. However, the recent Biden administration may improve US's poor efforts as it has pledged to work towards the



US having net-zero greenhouse gas emissions by 2050. It has also rejoined the Paris Agreement which is a step in the right direction

In conclusion, different countries have completed vastly different actions to combat climate change. These differences in actions have largely been due to the economic structure of nations, and how some economies largely rely on industries that profit from fossil fuels. It is also difficult to pinpoint who is responsible for climate change and which countries should bear the most economic burden relating to switching to carbon-neutral technologies and banning practices that release a lot of greenhouse gases. Lastly, COVID19 has already caused a huge decline in the economy leading to inflation and many more issues. This has caused a conflict between whether countries should focus on restarting their economies or battling climate change.

Major Parties Involved

USA

In 2019, the United States produced 6.6 billion metric tons of carbon dioxide greenhouse gas emissions, making it the world's second-largest after China. The United States has released more greenhouse gases than any other country, accounting for a quarter of global emissions. The United States emits more than 15 tonnes of greenhouse gases per person each year, making it the country with the most greenhouse gas emissions per person. President Biden has set a new goal for the US to achieve a 50-52 per cent reduction in economy-wide net greenhouse gas pollution by 2030, compared to 2005 levels.

India

After China and the United States, India is the third-largest CO₂ emitter. With a rapidly growing population and an economy heavily reliant on coal and oil, the country's emissions will continue to rise unless action is taken to reduce them. At the COP26 climate summit, India and China forced a last-minute revision to the agreement, easing a pledge to reduce emissions from coal combustion.

Prime Minister Narendra Modi has set a goal for India to achieve net-zero greenhouse gas emissions by 2070, a much later deadline than many other nations. India has resisted establishing total reduction targets, arguing that developed countries should shoulder a considerably larger part of the cost because they have contributed significantly more to global warming over time.



China

China has the world's largest industrial output. In 2016 it is estimated that the country produced \$4.566 trillion of industrial output. China has experienced huge economic success due to its growing industrial sector and has prospered greatly from it. China is also responsible for 28% of all Greenhouse Gas emissions in 2017 according to the International Energy Agency. This significant percentage of greenhouse gases is due to their massive industrial output and the hundreds of factories burning many tons of fossil fuels each day.

Germany

In 2016 Germany's industrial output totalled \$1.050 trillion, out of this total output, the automobile industry in Germany was the key driver behind the massive industrial output. In 2021 the "amended Federal Climate Protection Act" was passed. Due to this act, the quantity of sectoral emissions for the year 2030 is to be significantly reduced and the goal for when greenhouse gas neutrality is to be achieved has been brought forward from the year 2050 to the year 2045. Together with accompanying measures from the "Climate Protection Action Program 2020" and the "Climate Protection Plan 2050," the German government aims to achieve their climate protection targets.

Timeline of Key Events

June 3, 1992 – June 14, 1992

Rio Earth Summit- UN Framework Convention on Climate Change (UNFCCC) is agreed upon, requiring frequent meetings between the ratifying countries, known as the Conference of the Parties, or COP.

March 28, 1995 - 7 April, 1995

COP1- Groundworks of Kyoto Protocol is established

December 1, 1997 - December 10, 1997

COP3- The Kyoto Protocol is adopted, but the protocol does not compel developing countries, including high carbon emitters China and India, to take action. It also creates a carbon market for countries to trade emissions units and encourages



	sustainable development, a system known as “cap and trade.”
2007	Negotiations begin for Kyoto 2.0
September 2009	Three months ahead of the target date for a new agreement, several world leaders pledge actions during a UN summit on climate change hosted by Secretary-General Ban Ki-moon. However, no actual proposals are offered.
December 7, 2009 – December 18, 2009	COP15- The successor to the Kyoto Protocol was meant to be finalized at COP15 in Copenhagen, but the parties only come up with a nonbinding document called the Copenhagen Accord
November 29, 2010 – December 10, 2010	COP16- Temperature target set in COP16 after the failure in Copenhagen and NASA's announcement that 2000–2009 was the warmest decade ever recorded. Countries commit for the first time to keep global temperature increases below 2°C in the Cancun Agreements.
November 28, 2011 – December 11, 2011	COP17- The conference in Durban, South Africa, nearly collapses after the world's three biggest polluters—China, India, and the United States—reject an accord proposed by the European Union. The Kyoto Protocol is extended to 2017
November 26, 2012 – December 7, 2012	COP18- Kyoto protocol is extended to 2020
November 11, 2013 – November 23, 2013	COP19- During the first week of COP19 in Poland, a grouping of developing countries, known as the Group of Seventy-Seven (G77), and China propose a new funding mechanism to help vulnerable countries deal with “loss and damage” caused by climate change. Developed countries oppose the mechanism, so the G77's lead negotiators walk out of the



	<p>conference. It has been dubbed the “least consequential COP in several years”</p>
12 December 2015	<p>One hundred ninety-six countries agree to what experts call the most significant global climate agreement in history, known as the Paris Agreement. Unlike past accords, it requires nearly all countries—both developed and developing—to set emissions reduction goals. However, countries can choose their targets and there are no enforcement mechanisms to ensure they meet them.</p>
23 September 2019	<p>UN Secretary-General Antonio Guterres organizes the UN Climate Action Summit for world leaders in New York, however, leaders of the world’s top carbon-emitting countries, including the United States and China, do not attend</p>
April 2020	<p>The United Nations postpones COP26, originally scheduled for November 2020, until 2021 because of the COVID-19 pandemic. Amid the pandemic, emissions fall worldwide as many countries implement nationwide shutdowns that drastically slow economic activity. However, experts predict that the reductions won’t last, with governments under pressure to boost output and disregard the environment to save their struggling economies.</p>
October 31, 2021 – November 12, 2021	<p>COP26- Glasgow Climate Pact, calls for countries to reduce coal use and fossil fuel subsidies—both firsts for a UN climate agreement—and urges governments to submit more ambitious emissions-reduction targets by the end of 2022. In addition, delegates finally establish rules for a global carbon market.</p>



Previous attempts to resolve the issue

EU Emissions Trading System

The EU emissions trading system or ETS creates a financial incentive for companies to cut back their CO₂ emissions in the industry. This has been done by having the ETS set a cap on the total amount of greenhouse gases companies can emit each year while also requiring monitoring of these emissions. A fixed number of allowances, which can also be thought of as the currency of the carbon market, are issued each year. Companies must hold enough allowances to cover their emissions or face significant fines. If they don't have enough, they must cut their emissions or buy extra allowances from another company. If they have extra allowances, they can keep them for next year or sell them. This flexibility ensures that emissions are cut where it costs the least to do so. Over time the cap is reduced, so fewer allowances are issued, techniques to cut emissions are developed and total emissions drop.

Paris Agreement

The primary purpose of the Paris Agreement is to improve the global response to the threat of climate change by limiting global temperature rise this century to far below 2 degrees Celsius beyond pre-industrial levels, and even further to 1.5 degrees Celsius. It also establishes guidelines for how nations might financially and technologically help one another. In addition, governments adopted an enhanced transparent structure (ETF). Starting in 2024, nations will be required to report honestly on their activities and progress in climate change mitigation, adaptation, and support offered or received under the ETF. Despite this, nations are free to set their objectives, and there are no enforcement measures in place to guarantee that they adhere to the Paris Agreement's guidelines.

Glasgow climate pact

Three main pillars in the Glasgow Climate Pact give an overall political narrative for the Conference of the Parties (COP). There is a reference to "phasing down" coal power and "phasing down" wasteful fossil fuel subsidies for the first time in the UNFCCC. The Pact also sets an annual high-level ministerial roundtable on aims and ambitions for the years ahead of 2030. It also proposes the 'Glasgow Dialogue,' which would take place from 2022 to 2024 and will bring together parties to examine the loss and harm caused by climate change. Finally, it aims to talk about a new collective measurable target on climate finance, as well as an annual discussion between parties to improve ocean-based action.



Possible Solutions

Different nations have taken drastically different approaches to combat climate change thus it is essential delegates collaborate more to establish more universal actions for all member states to take.

Delegates can attempt to implement the EU Emissions Trading System more internationally, but they must consider ways to eliminate any corruption that can arise from companies selling their allowances and to ensure some companies don't release extra allowances due to government corruption and the like.

Delegates could also implement policies on the required use of renewable energy for a certain percentage of industrial activities. They must take into account if these policies will be implemented gradually or drastically and whether companies will have any say on the percentage of renewable energy they will use.

It is also possible to note that all previous agreements including the Paris Agreement, have not considered whether any goals and policies are enforced. Delegates may propose policies that enforce fines on countries that fail to complete climate goals.

Finally, delegates can strive to implement carbon-neutral technologies in all areas that release massive amounts of carbon dioxide to stop the influx of any more carbon dioxide in the atmosphere. Countries must endeavour to make the net greenhouse gas emissions 0.

Appendix/Appendices

- NRDC, *Greenhouse Effect 10*. <https://www.nrdc.org/stories/greenhouse-effect-101>
- UNEP, *Emissions Gap Report 2021*. <https://www.unep.org/resources/emissions-gap-report-2021>
- National Geographic, *Climate change report card: These countries are reaching targets*. <https://www.nationalgeographic.com/environment/article/climate-change-report-card-co2-emissions>



Bibliography

"10 Countries with the Highest Industrial Outputs in the World."

2018. *WorldAtlas* <https://www.worldatlas.com/articles/10-countries-with-the-highest-industrial-outputs-in-the-world.html>

"Climate Change: What Emission Cuts Has India Promised?" 2021. *BBC News*, section India [https://www.bbc.com/news/world-asia-india-58922398#:~:text=National%20carbon%20emissions%20\(million%20tonnes%20per%20year\)&text=By%202030%20Mr%20Modi%20says](https://www.bbc.com/news/world-asia-india-58922398#:~:text=National%20carbon%20emissions%20(million%20tonnes%20per%20year)&text=By%202030%20Mr%20Modi%20says)

"Greenhouse Gas Emissions by Country 2020."

2021. *Worldpopulationreview.com* <https://worldpopulationreview.com/country-rankings/greenhouse-gas-emissions-by-country>

"Greenhouse Gases - Acid Rain and Global Warming - GCSE Biology (Single Science) Revision." *BBC*

Bitesize <https://www.bbc.co.uk/bitesize/guides/znsk7ty/revision/2#:~:text=Greenhouse%20gases%20in%20the%20atmosphere>

Hub, IISD's SDG Knowledge "Governments Adopt Glasgow Climate Pact, Operationalize Paris Agreement | News | SDG Knowledge Hub | IISD"

<https://sdg.iisd.org/news/governments-adopt-glasgow-climate-pact-operationalize-paris-agreement/>

In. 2020. "Who Is Responsible for Climate Change? – Who Needs to Fix It?," *YouTube* <https://www.youtube.com/watch?v=ipVxxxqwBQw>

NOVA PBS Official. 2020. "Cutting Greenhouse Gas Emissions to Zero | NOVA | PBS," *YouTube* <https://www.youtube.com/watch?v=xcyTdryCRE>

"The Enhanced Greenhouse Effect (Global Warming)." *The Enhanced Greenhouse Effect (Global Warming) (OzCoasts)* <https://ozcoasts.org.au/indicators/coastal-issues/greenhouse-effect/#:~:text=The%20enhanced%20greenhouse%20effect%2C%20sometimes,atmosphere%20since%20the%20industrial%20revolution.>

"The EU Emissions Trading System Explained."

<https://www.youtube.com/watch?v=fJrFSLfaeeE>

The White House. 2021. "FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies," *The White House* (The White House)



<https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

"Timeline: UN Climate Talks since 1992." *Council on Foreign Relations* <https://www.cfr.org/timeline/un-climate-talks>

UNFCCC. 2015. "The Paris Agreement," UNFCCC (United Nations) <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

US EPA, OA. 2019. "Sources of Greenhouse Gas Emissions | US EPA," *US EPA* <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#industry>

Wikipedia Contributors. 2019. "Climate Change in the United States," *Wikipedia* (Wikimedia Foundation) https://en.wikipedia.org/wiki/Climate_change_in_the_United_States

Mulvaney, Kieran. 2019. "World Climate Change Report Card: These Countries Are Meeting Goals," *Environment* <https://www.nationalgeographic.com/environment/article/climate-change-report-card-co2-emissions>