

Good News and Bad News for the Climate

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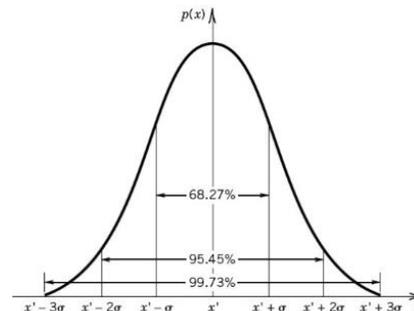
1. Introduction

The recent news is a mixture of good and bad news on the climate front-lines. Sections 2 and 3 paint, respectively, the good news resulting from the Pandemic lock downs, and the bad news coming out of those. Section 4 is a brief recap of COP26 (26th meeting of the Conference of the Parties) with a link to the full text of the Glasgow Climate Pact. Section 5 is a description of a program that was announced at COP26 by the Asian Development Bank that will hasten the replacement coal-fired electric generation with renewables in Asia.

2. Good News: Pandemic Effects on Climate Change

Government policies during the COVID-19 pandemic have drastically altered patterns of energy demand around the world. Many international borders were closed and populations were confined to their homes, which reduced transport and changed consumption patterns. Here we compile government policies and activity data to estimate the decrease in CO₂ emissions during forced confinements. Daily global CO₂ emissions decreased by -17% (-11 to -25% for $\pm 1\sigma$) by early April 2020 compared with the mean 2019 levels, just under half from changes in surface transport. At their peak, emissions in individual countries decreased by -26% on average. The impact on 2020 annual emissions depends on the duration of the confinement, with a low estimate of -4% (-2 to -7%) if pre-pandemic conditions return by mid-June, and a high estimate of -7% (-3 to -13%) if some restrictions remain worldwide until the end of 2020. Government actions and economic incentives post-crisis will likely influence the global CO₂ emissions path for decades.¹

Authors note: $\pm 1\sigma$ refers to the probability of a population of measurements being within one standard deviation of the mean, assuming a normal (a.k.a. Gaussian) distribution. $\pm 1\sigma$ of the mean is 68.27% of the population (see figure to the right).



3. Bad News: The Rebound

3.1. Fossil CO₂ emissions

Global fossil CO₂ emissions in 2021 are set to rebound close to their pre-COVID levels after an unprecedented drop in 2020. Emissions from coal and gas use are set to grow more in 2021 than they fell in 2020, but emissions from oil use remain below 2019 levels.²

¹ Authors: see linked page below, Global Carbon Project, “Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement” May 18, 2020,

<https://www.globalcarbonproject.org/news/TemporaryReductionInCO2EmissionsDuringCOVID-19.html>

² Authors: <https://www.globalcarbonproject.org/carbonbudget/21/publications.htm>, Global Carbon Project, “Global Carbon Budget 2021,” Nov 4, 2021, <https://www.globalcarbonproject.org/carbonbudget/index.htm>

The record decrease in 2020 emissions was 1.9 billion tonnes of CO₂ (GtCO₂) [-5.4%], from 36.7 GtCO₂ in 2019 to 34.8 GtCO₂ in 2020. Emissions are projected to grow 4.9% (4.1% to 5.7%) in 2021, to 36.4 GtCO₂. Global emissions in 2021 remain about 0.8% below their level in 2019. The 2021 growth of 1.6 GtCO₂ is similar to the growth observed in 2010 following the global financial crisis of 2008-2009 (1.7 GtCO₂; 5.5% above 2009 levels).

3.2. Regional fossil fuel emissions

For major emitters, fossil CO₂ emissions in 2021 appear to return to pre-COVID trends with a decreasing trend in CO₂ emissions for the USA and European Union (EU27) and an increasing trend in CO₂ emissions for India. For China, the response to the COVID-19 pandemic has sparked further growth in CO₂ emissions, pushed by the power and industry sectors.

Emissions from China have recovered faster than other countries. CO₂ emissions from China in 2021 are projected to be 5.5% above 2019 levels, reaching 11.1 billion tonnes. India's CO₂ emissions are projected to grow even faster than China's this year at 12.6%, after a 7.3% fall last year. Emissions from both the US and European Union are projected to rise 7.6% this year. U.S. and E.U., respectively, accounted for 14% and 7% of global emissions in 2020. Emissions in the rest of the world (including all international transport, particularly aviation) are projected to rise 2.9% this year, but remain 4.2% below 2019 levels. Together, these countries represent 59% of global emissions.

3.3. Emissions from land use change

Global gross emissions due to land-use change remain high at 14.1 GtCO₂ over the past decade. Global gross removals (eg, forest regrowth) have increased in the last two decades to 9.9 GtCO₂.

The revised estimates of net land-use change emissions (the difference between gross emissions and gross removals) suggest a decline in emissions from 4.5 GtCO₂ per year in the early 2000s (2000-2009) to 3.2 GtCO₂ in 2020, with a projection of 2.9 GtCO₂ in 2021. This trend remains to be confirmed.

3.4. CO₂ removals by land and ocean natural sinks

The land and ocean CO₂ sinks combined continued to take up around half (53% over the past decade) of the CO₂ emitted to the atmosphere.

The ocean CO₂ sink was 10.3 GtCO₂ per year (26% of total CO₂ emissions) during the decade 2011-2020 with a preliminary 2021 estimate of around 10.6 GtCO₂. The natural land CO₂ sink continued to increase during the 2011-2020 period in response to increased atmospheric CO₂, albeit with large interannual variability. The natural land CO₂ sink was 11.4 GtCO₂ per year on average during the 2011-2020 decade (28% of total CO₂ emissions), 1.8 GtCO₂ per year larger than during the previous decade (2000-2009), with a preliminary 2021 estimate of around 12.1 GtCO₂ per year.

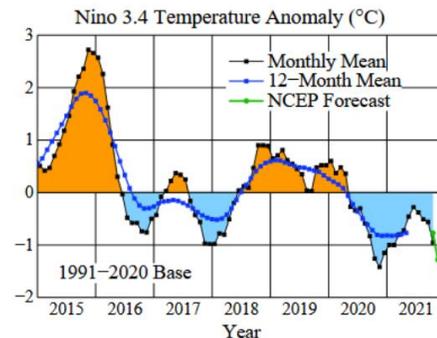
Globally during the decade 2011-2020, climate change reduced the land sink by about 15% and the ocean sink by about 5%.

3.5. Atmospheric CO₂

The level of CO₂ continued to increase in the atmosphere in both 2020 and 2021 following long-term trends because of continued emissions.

Atmospheric CO₂ concentration increased 2.4 parts per million in 2020 and is projected to increase by 2.0 parts per million in 2021 to reach 415 parts per million averaged over the year. The atmospheric CO₂ growth was 18.7 GtCO₂ (2.4 ppm) on average each year during the decade 2011-2020, indicating that 47% of total CO₂ emissions remained in the atmosphere. The 2020 decrease in total CO₂ emissions of about 2.5 GtCO₂ propagated to an atmospheric CO₂ growth, reduced by 1.4 GtCO₂ (0.18 ppm) relative to the 2019 growth rate. The 2021 growth rate is lower than in recent years due to La Niña conditions in 2021, a short-term natural climatic event that brings conditions favorable to an enhanced natural land carbon sink.

Author's Comment: 2020 through early 2022 were and will be strong “double-dip” La Niña years (see figure to the right, from National Weather Service Climate Prediction Center via Dr. James Hansen, <https://mailchi.mp/caa/october-temperature-update-berlin-rally/>)



3.6. Progress since the Paris Agreement

Decarbonization of energy showed a strong and growing signal in the decade 2010-2019 at the global level, pushing CO₂ emission down in the USA, EU27, and slowing their growth in China. Decarbonization of energy was not enough to compensate for the growing energy demand still largely met by fossil energy sources in many countries, despite the high deployment rate of renewables, resulting in continued growth in global emissions albeit at a slower rate.

The rapid rebound in fossil CO₂ emissions as economies recover from the COVID-19 pandemic reinforces the need for immediate action and global coherence in the world's response to climate change.

4. COP26, who knows?

The full text of the Glasgow Climate Pact is linked below. It has 97 short statements, that each frequently reference other documents. I would guess that if one included the referenced text this would end-up being hundred to thousands of pages of text with a very low content of actual hard (actionable) commitment and /or future actions.

<https://www.msn.com/en-us/news/world/the-full-text-of-the-glasgow-climate-pact/ar-AAQFBS4?ocid=BingNews>

A warning to those of you that might be tempted to click on the above and read (at least) the 97 statements, I found them a series of admonitions, meaningless statements and politically correct declarations, with little real value.

So I looked at my last issue of Science for its take on the commitments made at COP26.³

³ Cathleen O’Grady, Science, “Climate summit produces new pledges that could keep global warming below 2°C target”, Nov 3, 2021, (note – article apparently available to AAAS members only)

The above referenced article sent me to another source for the analysis of the commitments.⁴

But first I need to include some explanatory text from reference 4.

The pledges put forward in the lead up to and during COP26 could, if supported and achieved, result in projected best-estimate peak warming of 1.9°C and end-of-century warming of approximately 1.8° C (5% to 95% range from 1.3 to 2.7°C). If long-term and conditional targets are not implemented, either due to a lack of support or lack of domestic policies, the 2030 NDCs could well be on a trajectory that leads to 2.7°C median warming by the end of the century with a range from 2.1 to 3.5°C, as suggested in the United Nations Framework Convention on Climate Change Synthesis Report. These projections come with a wide uncertainty range, both in terms of the conditionality, precise definitions of the NDCs as well as the climate system uncertainties. We analyzed the previous and current NDCs for 196 countries. We also considered on a country-by-country basis the extent to which the NDCs and long-term targets of 130 countries that signed the Global Methane Pledge might already imply some reduction of methane. When avoiding double counting, we find that the temperature benefit of the Global Methane Pledge for peak warming might be an additional 0.02° C beyond what conditional NDCs and long-term targets might be able to achieve.

The following are additional key points of this briefing:

- *Implementing all conditional NDCs, and the long-term targets implies a best-estimate peak warming this century of 1.9°C, with end-of-century warming of 1.8°C. To make this a reality, the world needs domestic policies, implementation and adequate support, not just pledges.*
- *Considering only the unconditional NDCs up to 2030 these are more in line with an emission trajectory towards 2.7°C (2.1 to 3.5°C) warming.*
- *The main difference between 2.7°C and 1.9°C projections is due to whether long-term and net-zero targets are considered.*
- *Further progress towards 1.5°C warming is likely impossible without substantially enhanced ambition this decade.*
- *While the Global Methane Pledge on its own might yield 0.2°C temperature reductions, we find that in the context of NDCs and long-term targets, the reduction is more limited, by a factor of ten (i.e. only 0.02°C of median peak warming is shaved off).*

Further, from reference 3:

The pre-summit pledges would lead to between 1.5°C and 3.2°C of warming this century, the projections showed, with a 50% chance of staying below 2.1°C. But the new commitments offer a 50% chance of staying below 1.9°C. (The range of possible warming is 1.3°C to 2.7°C.)

⁴ Malte Meinshausen, Jared Lewis, Zebedee Nicholls, Rebecca Burdon, Climate Resource, “COP26 Briefing paper: Updated warming projections for NDCs, long-term targets and the methane pledge. Making sense of 1.8°C, 1.9°C and 2.7°C, Nov 9, 20211, https://data.climateresource.com.au/ndc/20211109-ClimateResource-1-9C_to2-7C.pdf

In the second analysis, released on 4 November, IEA found that if all current commitments “are met in full and on time,” warming could be limited to 1.8°C by 2100.

5. Good News: Asia eyes switch to renewables

The Asian Development Bank (ADB)'s plan to buy coal-fired power plants and accelerate their retirement from operation is expected to reduce an initial 200 tons of carbon annually. As the Manila-based multilateral lender exits from new coal financing, ADB is now working to form an energy transition mechanism (ETM) facility and this is being piloted in the Philippines, Indonesia and Vietnam.⁵

The facility in each country comprises public, private, and philanthropic financing that will be used to purchase coal-fired power plants to fast-track their retirement and help jumpstart reliable and affordable clean energy. Asia-Pacific accounts for nearly 40 percent of the world economy, but it is also responsible for around 80 percent of the world's coal consumption and up to 50 percent of carbon emissions.

The region is both a major contributor to global greenhouse gases and a casualty of climate change and weather-related calamities. With the three target pilot countries, ADB vice president Ahmed Saeed said the target is to reduce their coal-fired power by 50 percent.

"That's 200 million tons of carbon a year or the equivalent of 61 million passenger cars. Just the pilot alone can be one of the largest sources of foreign offsets in the world," Saeed said.

"But we think that much more is possible. We think that this is a structure that can be replicated and scaled, not just across our region, but also in other regions," he said.

In a recent briefing, ADB energy division director for Southeast Asia Toru Kubo said an exit from new coal financing is far from sufficient because existing coal plants are a quarter of total carbon emissions and they tend to last for more than four decades. "So if we don't address existing ones, there's no chance of actually hitting the Paris Agreement targets," he said The ETM will be made up of a carbon reduction fund and a clean energy fund.

The first aims to provide a blended finance mechanism to incentivize the early retirement of coal-fired power assets while the latter targets to invest in the growth and expansion of renewable power.

⁵ Louise Maureen Simeon, Philippine Star News via Energy Central, “ADB's coal buyout to cut 200 tons of carbon yearly,” Oct 25, 2021, <https://energycentral.com/news/adbs-coal-buyout-cut-200-tons-carbon-yearly>