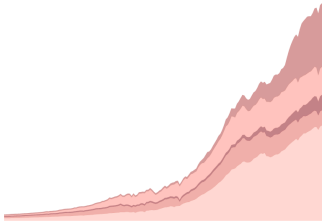


As climate chaos accelerates, which countries are polluting the most?

By Laura Paddison and Annette Choi, CNN

Updated January 2, 2024

The world is way off track for preventing "climate catastrophe," and scientists are sounding the alarm that time is running out to slash fossil fuels.

Data from Climate Action Tracker, an independent research group, reveals how much planet-heating pollution was spewed out in 2022, who were the biggest polluters and how much progress still needs to be made.

Per capita greenhouse gas
emissions for the top 20 emitters

The world pumped out around **50 billion metric tons** of planet-heating gases in 2022, according to this data. China was the largest climate polluter, making up nearly 30% of global emissions.

Most of the world's planet-heating pollution comes from just a few countries. The **top 20 global climate polluters** — dominated by China, India, the United States and the European Union — were responsible for 83% of emissions in 2022. What these countries do to respond to the climate crisis has an outsized impact on the rest of the world.

A different picture emerges when we look at per capita emissions, which represent the climate pollution produced by the average person in each country, and are calculated as total emissions divided by population.

China may be the biggest emitter overall, but the average **American** is responsible for nearly twice as much climate pollution as the average person in China. And in densely populated **India**, one of the world's biggest climate polluters, per capita emissions are significantly below the global average.

The world is heading toward nearly 3 degrees of global warming, even if current climate policies are met, the United Nations has warned.

As the pressure increases on countries — especially those in the rich world — to rapidly scale up their climate ambitions, here's a look at where we are now and how we got here.

Years of international climate action have put the world on the right path. Projected global warming is much lower than it was a decade ago.

But the pace is still far too slow. “It's not a little bit off. It's really, totally off,” said Niklas Höhne, a climate scientist at the non-profit the NewClimate Institute who works on the Climate Action Tracker.

A growing chorus of scientists has warned the 1.5 target may now be dead, but that doesn’t mean there’s less urgency, they say. “Every fraction of a degree makes a very big difference in impacts on the ground,” said Taryn Fransen, director of science, research, and data for the World Resources Institute's Global Climate Program.

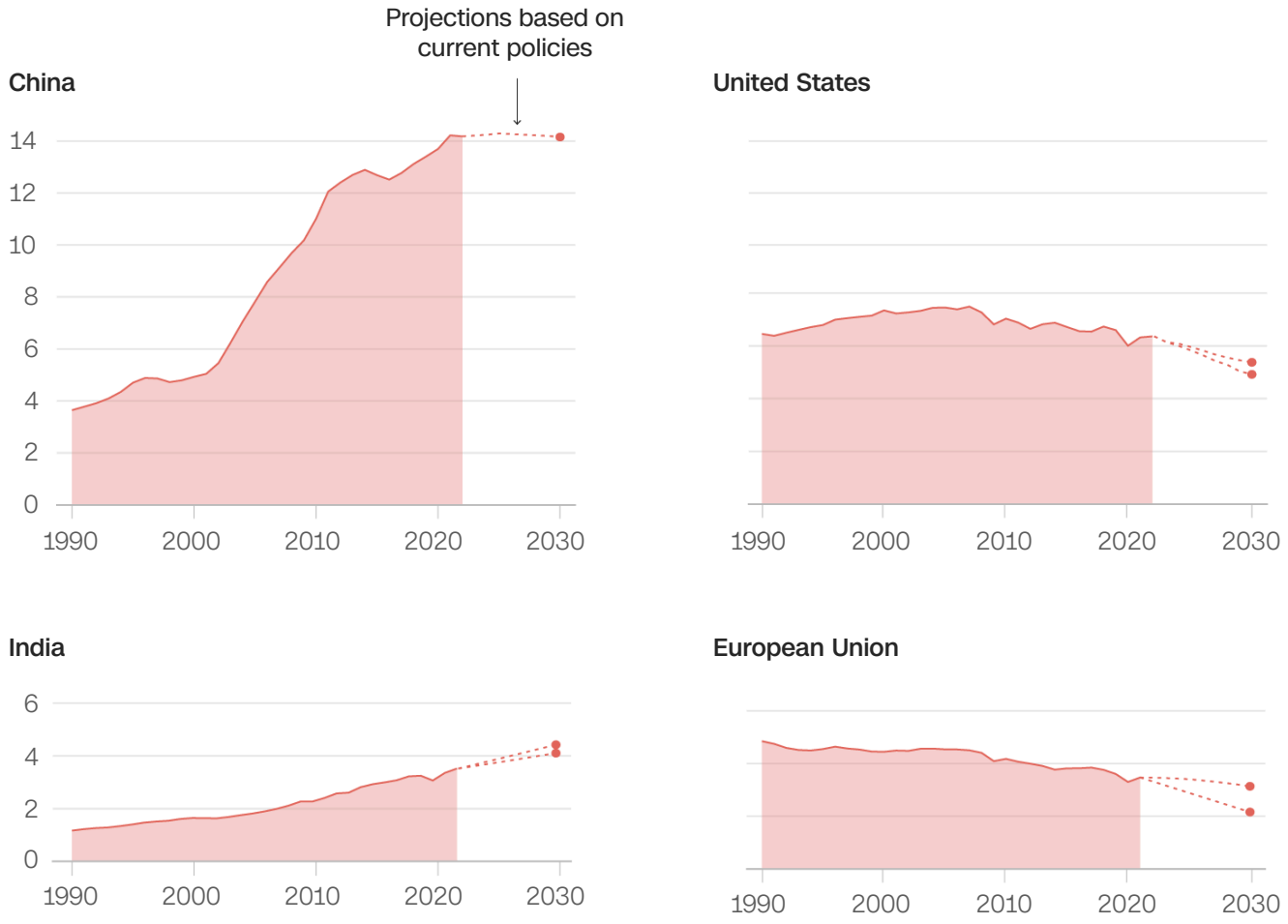
The difference between 1.5 and 2 degrees means hundreds of millions more lives will be at risk from extreme weather events. And for some ecosystems, it’s a death sentence. For coral reefs, it’s the difference between “wiping them off the face of the Earth” and managing to hang onto some of them, Fransen said.

The task ahead is comparable to “turning around a huge tanker,” she said — it cannot be done immediately or easily. “The trouble is that we've run out of lead time and now we're having to turn the ship very, very quickly.”

A look at the data reveals why it’s proving so hard.

Current policies suggest that by 2030, China's total emissions will stagnate, US emissions will drop and India's emissions will grow, according to Climate Action Tracker.

Total greenhouse gas emissions of top four emitters in billion metric tons of carbon dioxide equivalent



Note: For some countries, 2030 emission projections vary so a minimum and a maximum range is shown. Carbon dioxide equivalent (CO_2e) is a metric used to show total emissions from CO_2 and other greenhouse gases. Non-CO_2 greenhouse gases are expressed as the amount of CO_2 that would create the same warming impact. Data updated Nov. 20, 2023.

Source: Climate Action Tracker

Graphic: Annette Choi, CNN

The goals of the world's biggest climate polluters tell very different stories.

Planet-heating pollution in China soared as the country relied heavily on coal to grow its economy. But its emissions have started to plateau, and are projected to peak by 2025, according to Climate Action Tracker. Toward the end of 2023, China also committed, alongside the US, to ramping up renewable energy and reducing all greenhouse gas emissions.

anywhere in the world, but is also rapidly adding new coal power. The “good thing about China,” he said, “is they have the power and the will to pay to make change.”

In the US and EU, levels of planet-heating pollution have been declining for years as both amp up the ambition of their climate policies. In 2022, US President Joe Biden signed the Inflation Reduction Act, the largest climate investment in the country's history, and the EU has set out an ambitious plan to massively scale up clean energy.

But there’s a “long way to go,” Höhne said. Both are starting from such high levels of emissions, there is still a considerable distance to reach net zero by 2050 — the plan to reduce planet-heating pollution as close to zero as possible, and remove from the atmosphere whatever remains.

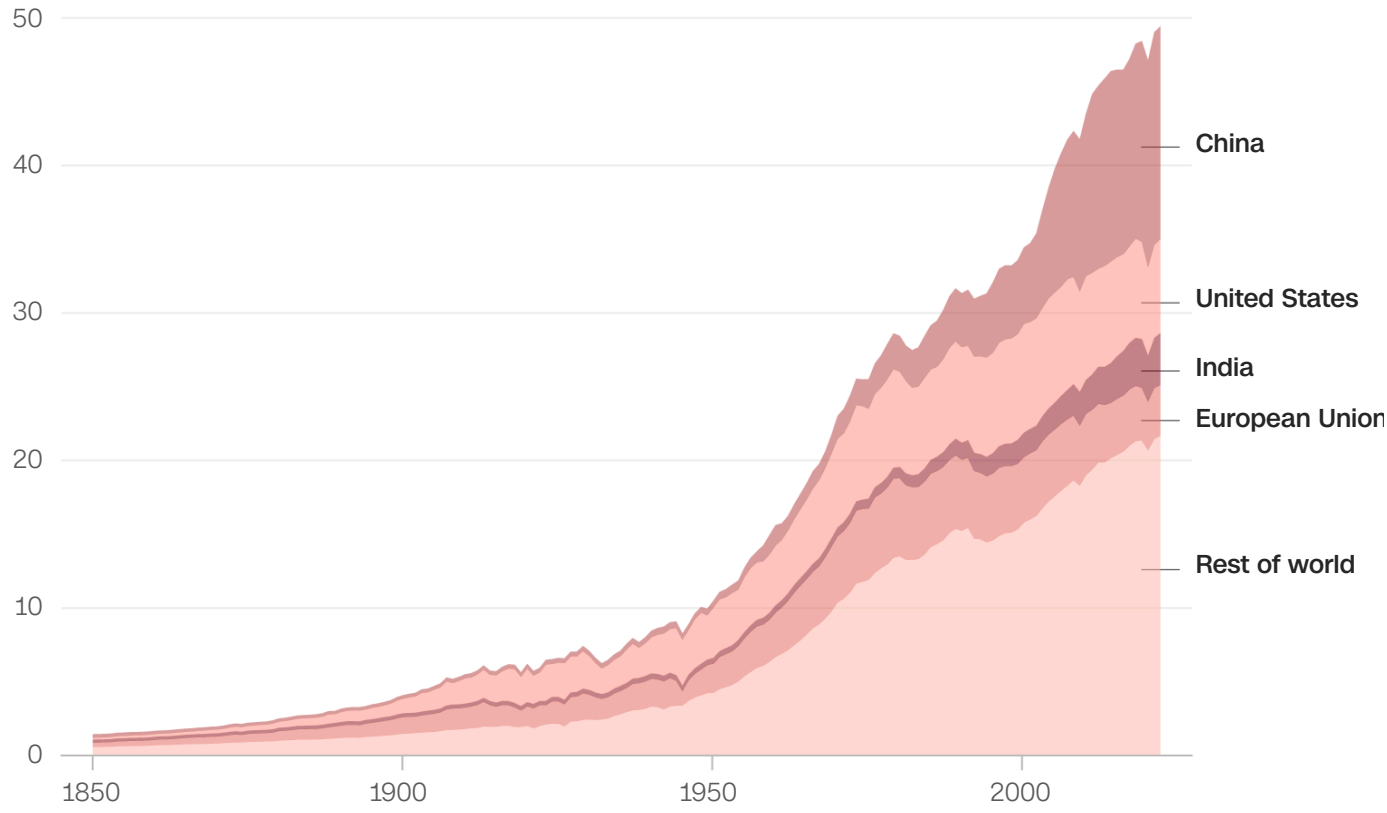
India, where emissions are rising steeply, is often lumped in with China: Two major emerging economies and the world’s most populous nations, Fransen said, “but they’re actually quite different.”

India is much earlier on its development trajectory and has contributed very little to historical emissions. The country of more than 1.4 billion people has far lower per capita emissions than China and is still grappling with “tremendous levels of poverty,” Fransen said.

As India develops, its emissions are projected to increase. While it is investing in major renewable energy projects, it also remains reliant on coal.

Top 4 polluters are responsible for more planet-heating emissions than the rest of the world combined: China, the US, India and the EU accounted for more than 56% of total global emissions in 2022.

Total greenhouse gas emissions in billion metric tons of carbon dioxide equivalent per year



Note: This chart shows both modern emissions and emissions during the "pre-industrial era" (1850-1900), widely used as a benchmark for measuring human activity-caused global warming. Carbon dioxide equivalent (CO_2e) is a metric used to show total emissions from CO_2 and other greenhouse gases. Non-CO_2 greenhouse gases are expressed as the amount of CO_2 that would create the same warming impact. Data updated Nov. 20, 2023.

Sources: Climate Action Tracker, Gütschow, J., Pflüger, M. (2023)
Graphic: Annette Choi, CNN

When coal, oil and gas are burned, they release carbon dioxide into the atmosphere, where it stays and keeps warming the planet for hundreds of years.

“What causes climate change today is not just the amount of emissions that occurred this year; it's all emissions that have occurred at least since the industrial revolution,” Fransen said. While China may have been the biggest polluter in 2022, the US has been by far the largest over time.

Not only do developed countries bear a greater historical responsibility for climate change, they built their economies — and their wealth — on it. Many in the Global

The concept of fairness when it comes to climate action has long been a tense topic. At the COP28 climate summit in Dubai in December, countries formally adopted a fund to help nations hit hardest by the climate crisis, and pledged more than $700 million dollars.

Yet many climate vulnerable nations were left bitterly disappointed. Despite the summit's final agreement noting trillions of dollars are needed every year to help them cope with climate change, it included no requirements for rich countries to give more.

Countries need to cut climate pollution. But what is their 'fair share?'

Climate Action Tracker analyzes factors such as countries' historical emissions and current wealth to suggest how much each needs to reduce emissions to make a "fair" contribution to limiting global warming to 1.5 degrees. While some, such as the US, are in "debt" because they have burned so many fossil fuels, others like Nigeria technically have space left to emit, CAT's analysis suggests — although scientists warn every country must act to reduce emissions.

The figures in this table show how much countries need to reduce planet-heating pollution to meet what a Climate Action Tracker analysis suggests is their "fair share" of emissions reductions by 2030 to put them on course to meet the 1.5-degree target. The analysis, based on more than 40 scientific studies, takes into account a range of factors including countries' historical emissions and their ability to pay for climate action.

It reflects the reality that every country needs to act on climate change, but not all at the same pace, Fransen said. "Countries are different. They have different histories. They have different capabilities today."

The EU and the US top the chart in part because of their outsized responsibility for historical emissions, Höhne said. Developed countries have emitted so much over the last nearly 200 years that "they are now in debt," he added.

At the other end of the table, Nigeria has much lower historical responsibility for the climate crisis, and fewer resources to tackle it. The country technically has "a lot of space left to emit," said Hanna Fekete of the NewClimate Institute, who works on the Climate Action Tracker. But that doesn't mean Nigeria shouldn't act, she added, especially as the country is a big producer and exporter of fossil fuels, and the tool does not capture exported emissions.

are just one way of attempting to quantify responsibility.

“There is no one single answer” to the question of who should do what, he added. “It's not about physics. It's not about math. It's not about climate science. It's about decision and policy and diplomacy.”

Related stories

OCTOBER 2023

They went hunting for fossil fuels. What they found could help save the world

FEBRUARY 2023

This controversial climate solution could be exactly what the planet needs. Or it could be a colossal disaste

MAY 2023

The world's largest lakes are shrinking dramatically, and scientists say they have figured out why

---

Credits

Bubble Chart
United Nations, European Union, Gütschow, J., Pflüger, M. (2023)

Reporter
Laura Paddison

Data and Graphics Editor
Annette Choi

Developers
Byron Manley and Annette Choi