

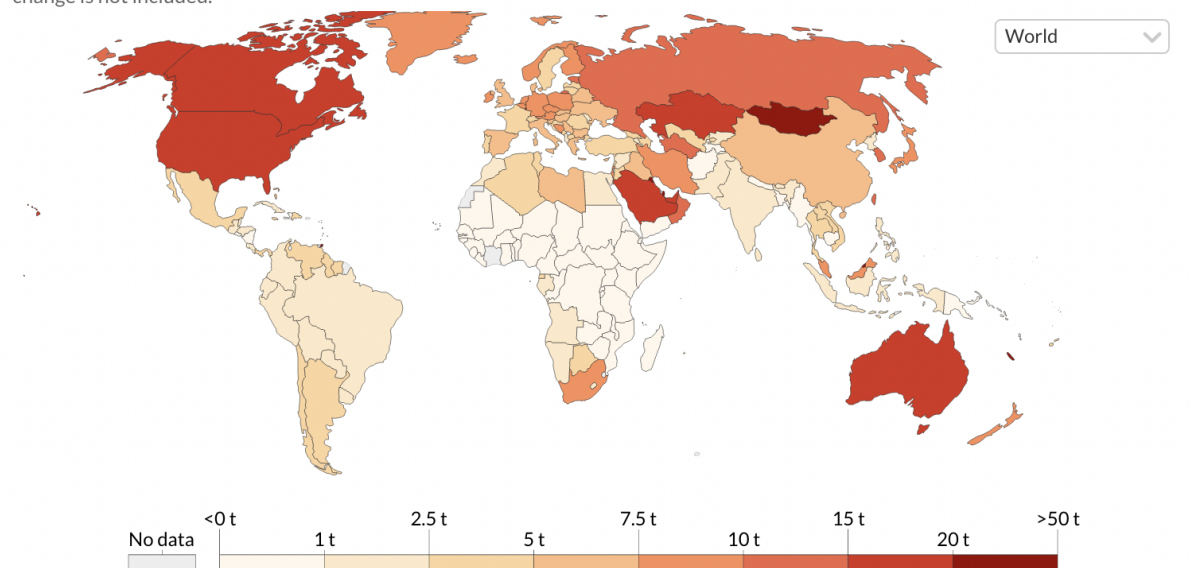
Source:

<https://ourworldindata.org/co2-emissions?country=&fbclid=IwAR2NFwNeF6PPd70pdi5YpMSCeifnelmgpnplYHChwlc4HUNNrTQ5nNog9cVA>

## Per capita CO<sub>2</sub> emissions, 2019

Carbon dioxide (CO<sub>2</sub>) emissions from the burning of fossil fuels for energy and cement production. Land use change is not included.

Our World  
in Data



Source: Our World in Data based on the Global Carbon Project; Gapminder & UN

Note: CO<sub>2</sub> emissions are measured on a production basis, meaning they do not correct for emissions embedded in traded goods.  
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions/ • CC BY

1800 2019

CHART

MAP

TABLE

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Related: [Where in the world do people emit the most CO<sub>2</sub>?](#)

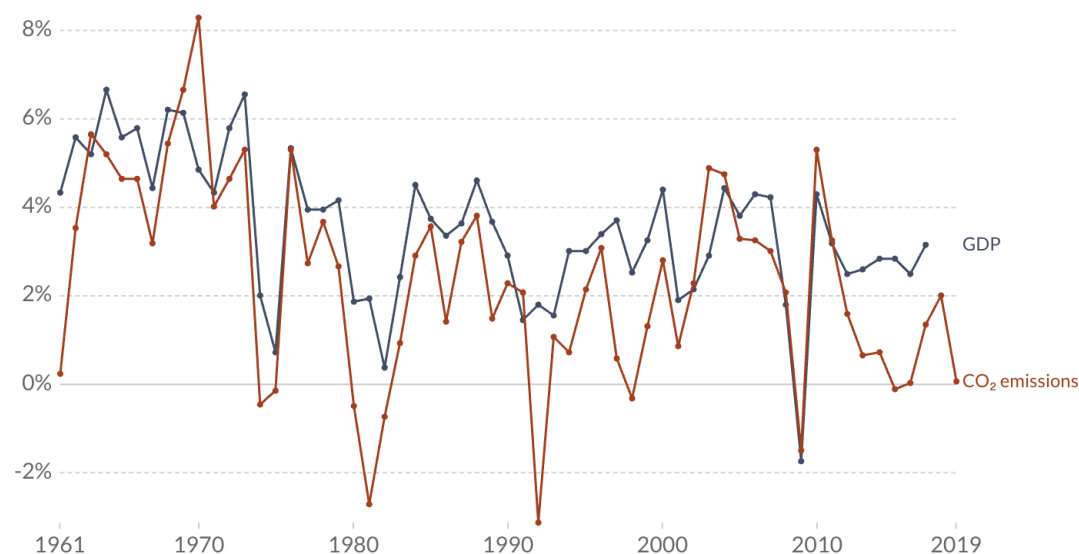
# CO<sub>2</sub> emissions are sensitive to economic shocks

## Annual growth in GDP and CO<sub>2</sub> emissions, World

Annual percentage change in total gross domestic product (GDP) and annual carbon dioxide (CO<sub>2</sub>) emissions.

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Source: Our World in Data based on Global Carbon Project; World Bank [OurWorldInData.org/co2-and-other-greenhouse-gas-emissions](https://OurWorldInData.org/co2-and-other-greenhouse-gas-emissions) • CC BY  
Note: GDP is measured in constant 2010 dollars, and therefore adjusts for inflation.

1961 2019

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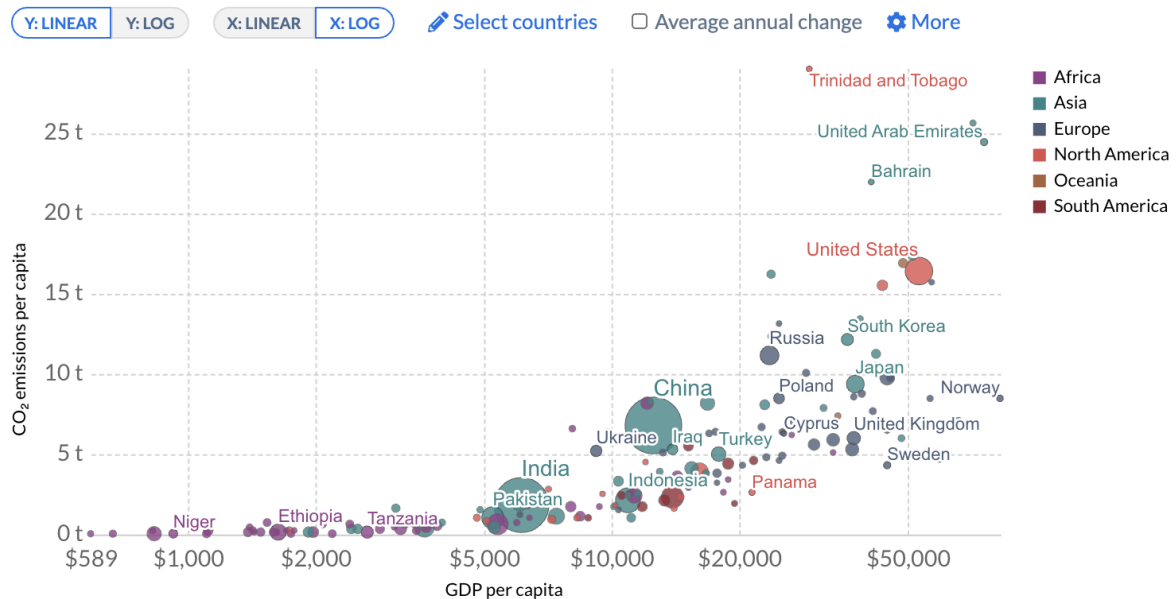
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## CO<sub>2</sub> emissions per capita vs GDP per capita, 2016

This measures CO<sub>2</sub> emissions from fossil fuels and cement production only – land use change is not included. Gross domestic product (GDP) per capita is measured in international-\$ in 2011 prices to adjust for price differences between countries and adjust for inflation.

Our World  
in Data



1800 2016

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MARCH 18, 2019 | 10:22 AM

# WHY IS 1.5 DEGREES THE DANGER LINE FOR

# GLOBAL WARMING?

How a seemingly small change in average temperatures could trigger lasting changes for life as we know it.

Honestly, it's a great question.

“Why is holding global warming to 1.5 degrees Celsius such a big deal?”

Many people think of the hottest days of the summer where temperatures already hit 40 degrees (that's 104 degrees Fahrenheit) where they live – or hotter. Another degree or two is a little bit more uncomfortable, sure, but hardly feels like the end of the world.

So how does global warming crossing the 1.5-degree line become – as one reader put it – “an extinction-level event”?

Spoiler alert: it's not. At least not for humans. But it is right about the point that scientists project we'll see some of the climate impacts we already see today begin to go from bad to outright terrifying. It's about the point where we'll likely see many natural systems begin to cross dangerous points of no return, triggering lasting changes and transforming life as we know it.

To put it another way, we want to do everything we can to keep warming below 1.5 degrees.

To understand why, read on.

# GLOBAL WARMING IS ABOUT *AVERAGE* TEMPERATURES

When we talk about 1.5 degrees of warming, we're talking about the increase in the Earth's average temperature. We measure this increase from a baseline average temperature in the mid-to-late nineteenth century – when the Industrial Revolution swung into high gear and people began burning fossil fuels on an unprecedented level, jumpstarting climate change.

The important thing to understand is that global warming that comes from burning fossil fuels is not a uniform process. Due to a host of natural factors, some areas – [like the poles](#) – are warming much faster than others. So when we talk about preventing 1.5 degrees of global warming, we're talking about preventing a 1.5 degree increase in the Earth's average temperature. *Some places have already crossed that line.*

## TEMPERATURES WILL GET MUCH HOTTER THAN 1.5 DEGREES

Global warming reaching 1.5 degrees doesn't mean that average temperatures in some places won't rise significantly beyond that number. Again – it's just the global average.

Then there's the fact that as average temperatures rise, spikes and heatwaves will go much, much higher than just 1.5 degrees.

As the Intergovernmental Panel on Climate Change (IPCC) – basically the gold standard for climate science – reported: “Several regional changes in

climate are assessed to occur with global warming up to 1.5°C compared to pre-industrial levels, including warming of extreme temperatures in many regions.”

That’s rock-star-scientist-speak for: “If global warming reaches up to 1.5 degrees, the hottest of the hot temperatures will increase and many (more) places will get dangerously hot.”

We got a preview of what “extreme temperatures in many regions” looked like in 2018.

In Pakistan, [a May heatwave took temperatures above 110 degrees Fahrenheit \(43.3 degrees Celsius\) and cost 65 lives in one city alone.](#)

Europe also had a taste of the new normal last summer, with [temperatures soaring above 115 degrees Fahrenheit \(46 degrees Celsius\) in Portugal.](#) It wasn’t just Portugal either – the same heatwave [roasted countries across the continent, breaking records and costing yet more lives.](#)

All of which is to say, 1.5 degrees is not the limit of how much hotter things will get at some points throughout the year. *Far from it.*

## THE CLIMATE CRISIS DOESN’T START AT 1.5 DEGREES – IT’S ALREADY HERE

Another critical thing to understand about global warming is that it’s not the case that everything up to 1.49999 degrees is rainbows and unicorns and free ice cream for everyone. (But once we cross the 1.5 degrees-line, the

Four Horsemen of the Apocalypse polish off their martinis, look at each other, and say, “It’s go time.”)

That’s because the climate crisis is already here. Today. **Higher temperatures are already dragging out droughts and wiping out crops. Himalayan glaciers that provide water to some 240 million people are already melting. Storms like Hurricanes Harvey, Irma, and Marie are already getting stronger and more devastating thanks to climate change.** The list goes on.

All of these impacts (and so many more) involve complex systems. Some overlap. Some don’t. But what they all have in common is heat. Heat is the factor that throws natural systems with their delicate checks and balances out of whack.

The (over)simple version is that the more heat added to the Earth’s climate system, the more out of balance natural systems get. The more out of balance natural systems get the more destruction and suffering we see. And it’s almost always poor families and people of color who suffer the most.

So where does the 1.5-degree number fit in?

Well, at about 1.5 degrees of global warming is right about where there’s enough heat to push many of the natural systems that sustain us past a dangerous turning point.

Think of 1.5 degrees not as an absolute line in the sand, but as a general indicator of where many climate impacts – on balance – go from

destructive to catastrophic. It's the sign on the door that leads to somewhere very dark indeed, somewhere no one wants to go.

## THE BAD NEWS: THINGS GET WORSE ABOVE 1.5 DEGREES

So here's the bad news: Back in the fall, the IPCC (remember, our team of global rock star scientists) [released a report comparing best projections for what global warming looks like at 1.5 degrees versus 2 degrees](#). And at 2 degrees, we start getting into scenarios that make most dystopian horror movies look like children's coloring books.

The IPCC projects that going from 1.5 degrees of global warming to 2 degrees could mean:

- 1.7 billion more people experience severe heatwaves at least once every five years.
- Seas rise – on average – another 10 centimeters (almost 4 inches),.
- Up to several hundred million more people become exposed to climate-related risks and poverty.
- The coral reefs that support marine environments around the world could decline as much as 99 percent.
- Global fishery catches could decline by another 1.5 million tonnes.

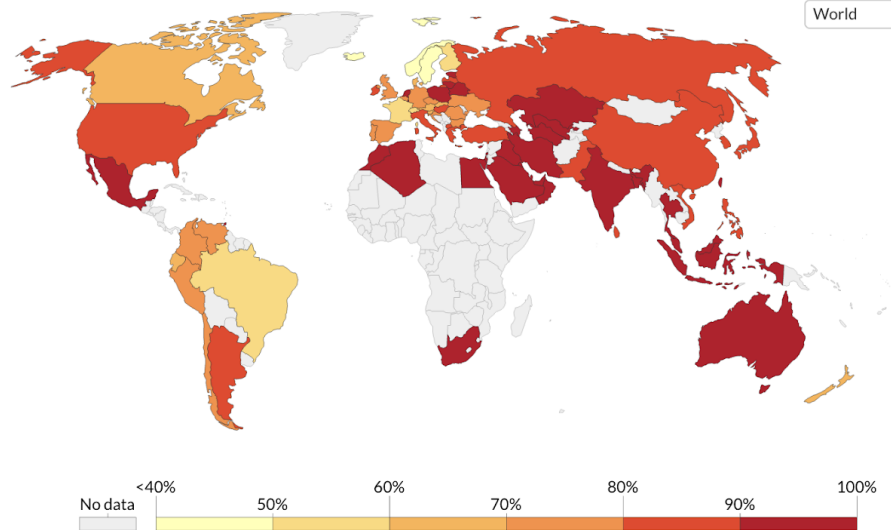
Source:

<https://www.climaterealityproject.org/blog/why-15-degrees-danger-line-global-warming#:~:text=Global%20Warming%20is%20about%20Average.in%20the%20Earth's%20average%20temperature.>



# What share of **primary energy** comes from fossil fuels?

Share of primary energy from fossil fuels, 2019



Source: Our World in Data based on BP Statistical Review of World Energy (2020)

Note: Primary energy is calculated using the 'substitution method' which takes account of the inefficiencies energy production from fossil fuels.

OurWorldInData.org/energy • CC BY

1965 2019

How do fossil  
primary energy

In 2019, around  
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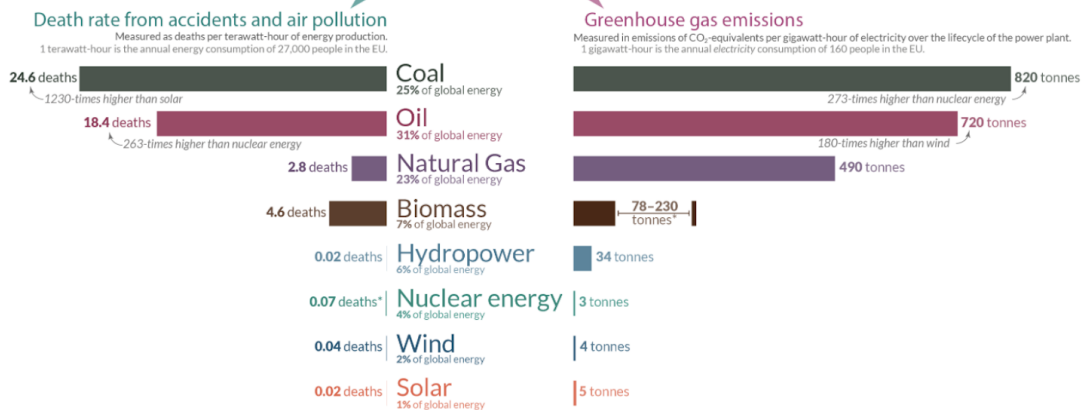
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Two tip

# What are the safest and cleanest sources of energy?



\*Life-cycle emissions from biomass vary significantly depending on fuel (e.g. crop residues vs. forestry) and the treatment of biogenic sources.

\*The death rate for nuclear energy includes deaths from the Fukushima and Chernobyl disasters as well as the deaths from occupational accidents (largely mining and milling).

Energy shares refer to 2019 and are shown in primary energy substitution equivalents to correct for inefficiencies of fossil fuel combustion. Traditional biomass is taken into account.

Data sources: Death rates from Markandya & Wilkinson (2007) in *The Lancet*, and Sovacool et al. (2016) in *Journal of Cleaner Production*;

Greenhouse gas emission factors from IPCC AR5 (2014) and Pehl et al. (2017) in *Nature*; Energy shares from BP (2019) and Smil (2017).

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[https://www.theworldcounts.com/challenges/climate-change/global-warming/global-co2-emissions/story?fbclid=IwAR1h-7OnsBkZlDykqjMM1pPsXbAWDJuTA7z0IP4rLK\\_1ekMWMvYo-A42BDU](https://www.theworldcounts.com/challenges/climate-change/global-warming/global-co2-emissions/story?fbclid=IwAR1h-7OnsBkZlDykqjMM1pPsXbAWDJuTA7z0IP4rLK_1ekMWMvYo-A42BDU)