

The Climate Nuggets Project's Assessment of the U.S. Share of Necessary Cuts to Global Carbon Emissions to Limit Global Heating to 2 °C

February, 2026

This “WORLD WAR” is about Human Behaviors

To actually limit Global Heating to 2 °C (we are already hitting 1.5 °C), humans across the planet will have to severely and dramatically halt emitting carbon into the atmosphere. Most do not believe that this could happen - very few are changing their behaviors, either individually or by country. Nonetheless, we will all be held accountable for such a failure. The purpose of this Study is to assess what might be the appropriate goals for cutting emissions in the U.S to do our part to avoid hitting 2 °C above pre-industrial levels.

There are many fronts in this “World War” we typically refer to as “Climate Change”. We are already seeing migrations driven by rising heat/humidity, crop failures, and resource loss. We are experiencing climates changing, erratic and intensifying weather, hotter fires, flooding, sea level rise, ecosystem and coral reef destruction, species extinctions, and ocean acidification. And, worse, looking where we are headed on our current trajectory, we are likely facing **global societal disruption as early as 2040-2070¹**, **and, indeed, this has already started regionally**. But those changes are the effects of a problem; they are not the problem itself.

When we look for the CAUSES of these global situations, it is clear that natural system variabilities are far too small to explain what is happening. HUMAN BEHAVIORS are at the core. We are breaking what are called our “Planetary Boundaries”², which threatens the health and stability of our land, ocean, and atmosphere, our ecosystems, our fresh water, the biosphere, and the like. We do this by taking resources and releasing waste products beyond the planet’s capacity to replenish or heal, introducing alien chemicals, and disrupting geochemical flows. We are exercising our freedoms without the understanding and controls which would protect our fellow inhabitants (human and non-human) and our home planet.

The Climate Nuggets Project is focused on one “Battle” in this War, and it is the major one: Emissions of Greenhouse Gases. **Climate Changes are caused by global heating. And...**

GLOBAL HEATING is CAUSED BY EMISSIONS FROM THE BURNING OF FOSSIL FUELS.

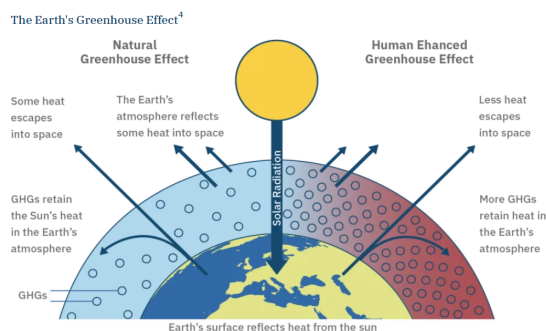
¹Timing and Impacts Study - July 2024

² Planetary boundaries - Stockholm Resilience Centre

We will be talking a lot about Temperatures, Carbon Emissions, and Atmospheric Concentrations of Greenhouse Gases (GHGs). Since these concepts are crucial to our initiative, let's unpack them a little.



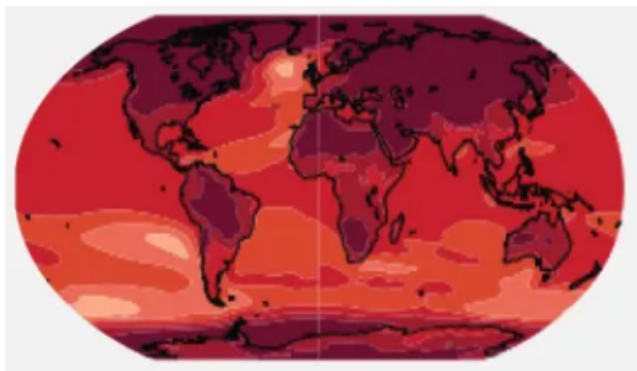
CARBON EMISSIONS: These are measured in billions of metric tonnes (tonnes are similar to our 2,000 lb. tons). The idea is that we are dumping fossil combustion wastes and other polluting products. These emissions are not yet distributed into the atmosphere, so are discussed differently from gases in the atmosphere. **The critical feature of emissions is that if you stop them, they stop.** GHGs in the atmosphere can stabilize.



GREENHOUSE GASES in the atmosphere - hold in heat, so the planet warms:

Once dumped into the atmosphere, the waste products (e.g., carbon dioxide CO₂, methane CH₄, nitrous oxide N₂O, and others) disperse and the conversation is now “what is the concentration of greenhouses gases (GHGs) in the atmosphere?”. We discuss **parts per million** (ppm) of GHGs in terms of CO₂ equivalents (CO₂e). At present, we have about 427 ppm of CO₂ up there, and around 450 ppm CO₂e. **The critical feature of GHGs in the atmosphere is that if you stop emissions on the**

ground, the atmospheric concentrations do not go away - in fact they only decay slowly over centuries (and secondary effects from a warmer planet and changes in land use can keep making things worse). So stopping emissions can help stop the planet from getting even warmer, but the planet doesn't cool for a long time because the GHGs are still there acting like a blanket.



TEMPERATURE RISE (global warming):

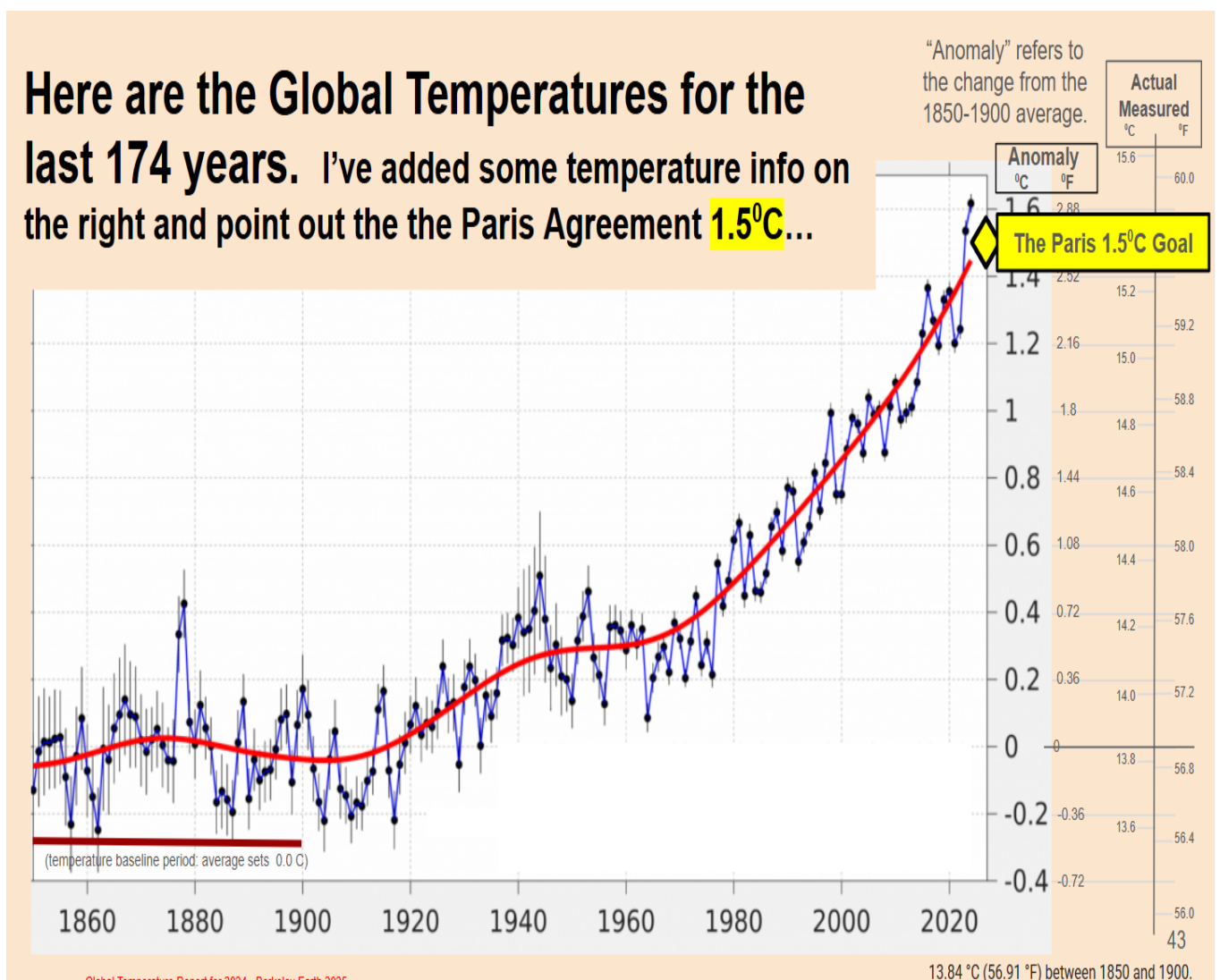
We often talk about how much the planet is warming since the beginnings of the Industrial Age (around 1750). When we talk about a 1.5 deg C increase (about 2.7 deg F), that was the goal set in Paris in 2015 to ensure a reasonably stable planet. We're now past this. The actual average temperature is not as important as the temperature rise. As you will see, **Temperature rise is caused by the concentration of greenhouse gases in the atmosphere - primarily from emissions (which we control).**



CLIMATES CHANGE ALL OVER THE PLANET

I use this following chart as a kind of Rosetta Stone for temperature discussions. In almost all of the literature, scientists set aside the actual measured temperatures, because the CHANGE in average global temperatures is much more important. Degrees Celsius ($^{\circ}\text{C}$) is used instead of Fahrenheit and you can see both on the right of the chart.

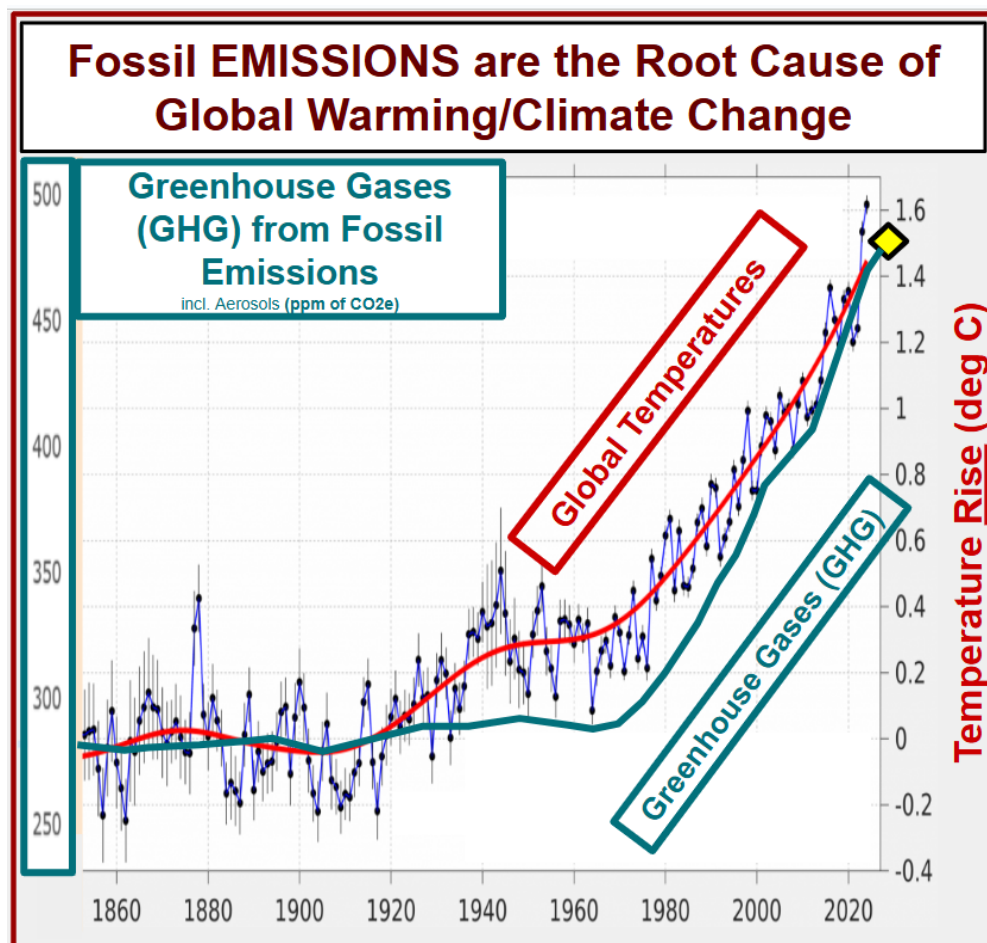
The ZERO value line is helping us understand how things were before the Industrial Age - when human-caused GHGs started from burning fossil coal, which began around 1750. Reliable global temperature measurements were not really available until around 1850 and, as you can see, the average during the period 1850-1900 is not too bad for use as a ZERO point. And, since fossil fuel usage didn't really take off until after 1900, that 1850-1900 average is reasonably close to the conditions in 1750.



All the following discussions are in the context that **EMISSIONS** must be our focus. It is Emissions that send **GREENHOUSE GASES (GHGs)** up into the atmosphere. GHGs, in turn, hold more of the sun's energy in, resulting in **TEMPERATURES RISING (GLOBAL WARMING)**. Rising Temperatures cause **CLIMATE CHANGES**.

The important message is that - because we can control them - GLOBAL EMISSIONS must be our focus if we want to stop the heating of the planet and its profound, negative impacts.

Take a look at this next chart and remember it: Emissions from burning fossil fuels increase the amount of greenhouse gases (GHGs) in the atmosphere. These GHGs prevent more and more of the sun's energy from escaping back into space, resulting in Global Heating^{3,4}. Climate changes and other impacts are a result of this heating. **This problem has a solution: stop human burning of fossil fuels.** No other solution or technology can possibly do the job for the short or the long term.

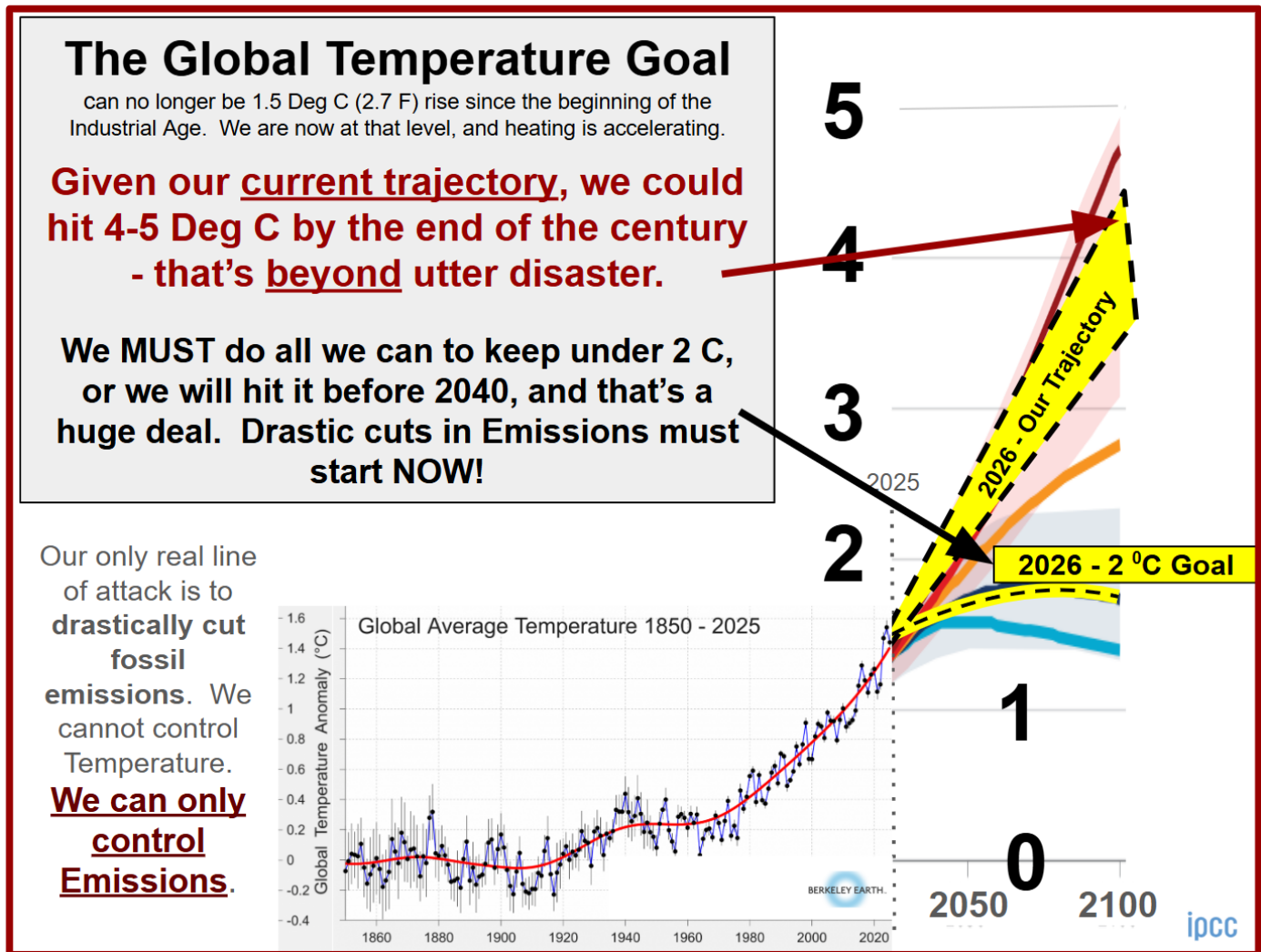


In a separate analysis we have attempted to capture the IMPACTS on the planet and its inhabitants as we reach various “benchmark” temperatures (1.5, 2.0, 3.0, etc. deg C). **At this point, we will rely on the Paris Agreement of 2015, which considered 2.0 C to be avoided at all costs.**

³ [Global Temperature Report for 2025 - Berkeley Earth](#)

⁴ [Atmospheric greenhouse gas concentrations | Indicators | European Environment Agency \(EEA\)](#)

In the context of the Paris Agreement of 1.5 deg C Increase and “well below 2 deg C”, let’s look at where we are headed on our current trajectory⁵⁶⁷:



We do have to talk about our **Temperature Goal**, because that is what disrupts everything. So, we must do all we can to **avoid 2 deg C above pre-industrial times**. But we will talk from now on about **Emissions** - it is emissions that cause the Heating and that is something under human control.

The Climate Nuggets Project must aid policymakers to stimulate non-fossil alternatives and barriers to continued fossil uses. Effectiveness will ultimately be measured by reductions in global and, specifically, U.S. fossil emissions.

⁵ [Global Temperature Report for 2025 - Berkeley Earth](#)

⁶ [Climate Change 2023 Synthesis Report - IPCC](#) p.25

⁷ [Global Temperature in 2025, 2026, 2027 - Hansen et al](#)

THE ENEMY is Human-caused **Carbon Emissions**

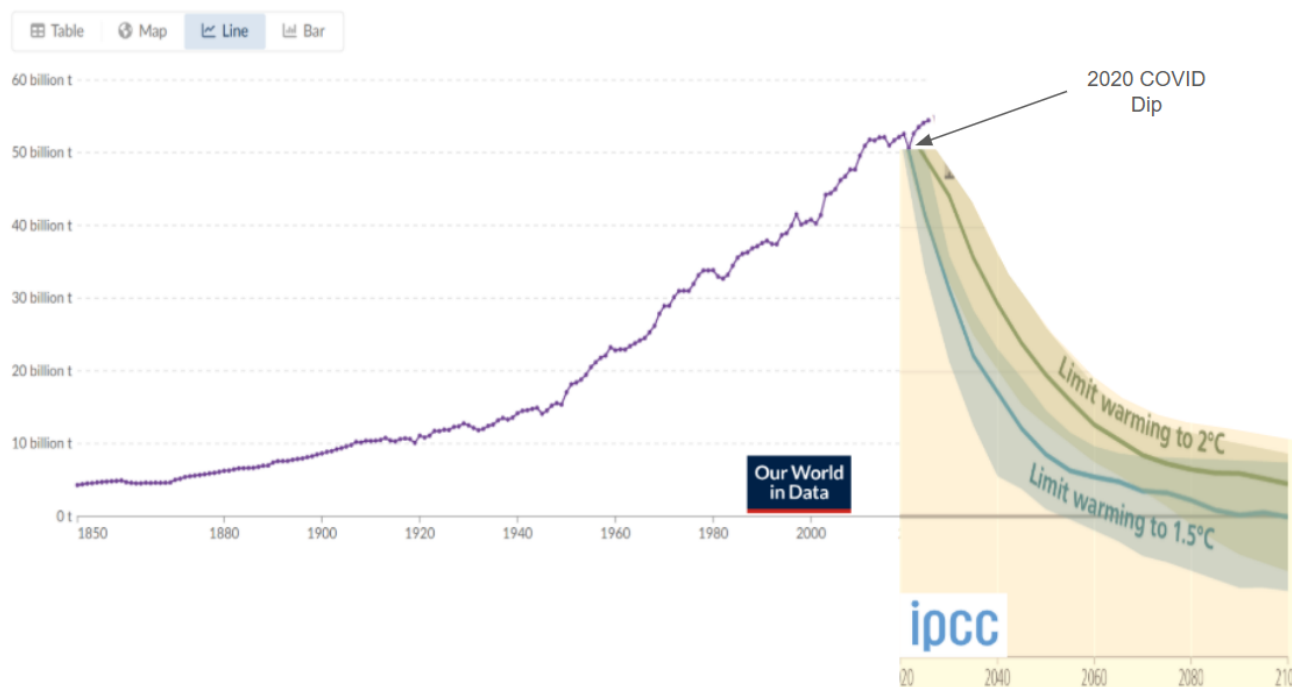
While we experience the harms of global heating, it is the fossil emissions that we have to fight - and we have the technologies for this. When you think about it, we can't control how much of the carbon emissions remain in the atmosphere to heat up the planet. In fact, even if we could, how the earth responds is itself out of our control. At this point, we see that the temperatures are rising fast as GHGs are increasing, and we may well be hitting tipping points which can further accelerate heating.

What we can control is how much we send up by burning fossil fuels and by other practices. Humans control Greenhouse Gas Emissions. In the chart below you can see the steady rise since 1850, through 2024. The 2025 value will be added as soon as it's available, but preliminary analyses indicate a continuing rise⁸. We have linked the actual emissions data to the IPCC analysis of what it will take to keep the planet below a 2 C increase.⁹ The 1.5 C goal is impossible to attain.

The Global Picture for Emissions

Greenhouse gas emissions

Greenhouse gas emissions include carbon dioxide, methane and nitrous oxide from all sources, including land-use change. They are measured in tonnes of carbon dioxide-equivalents over a 100-year timescale.



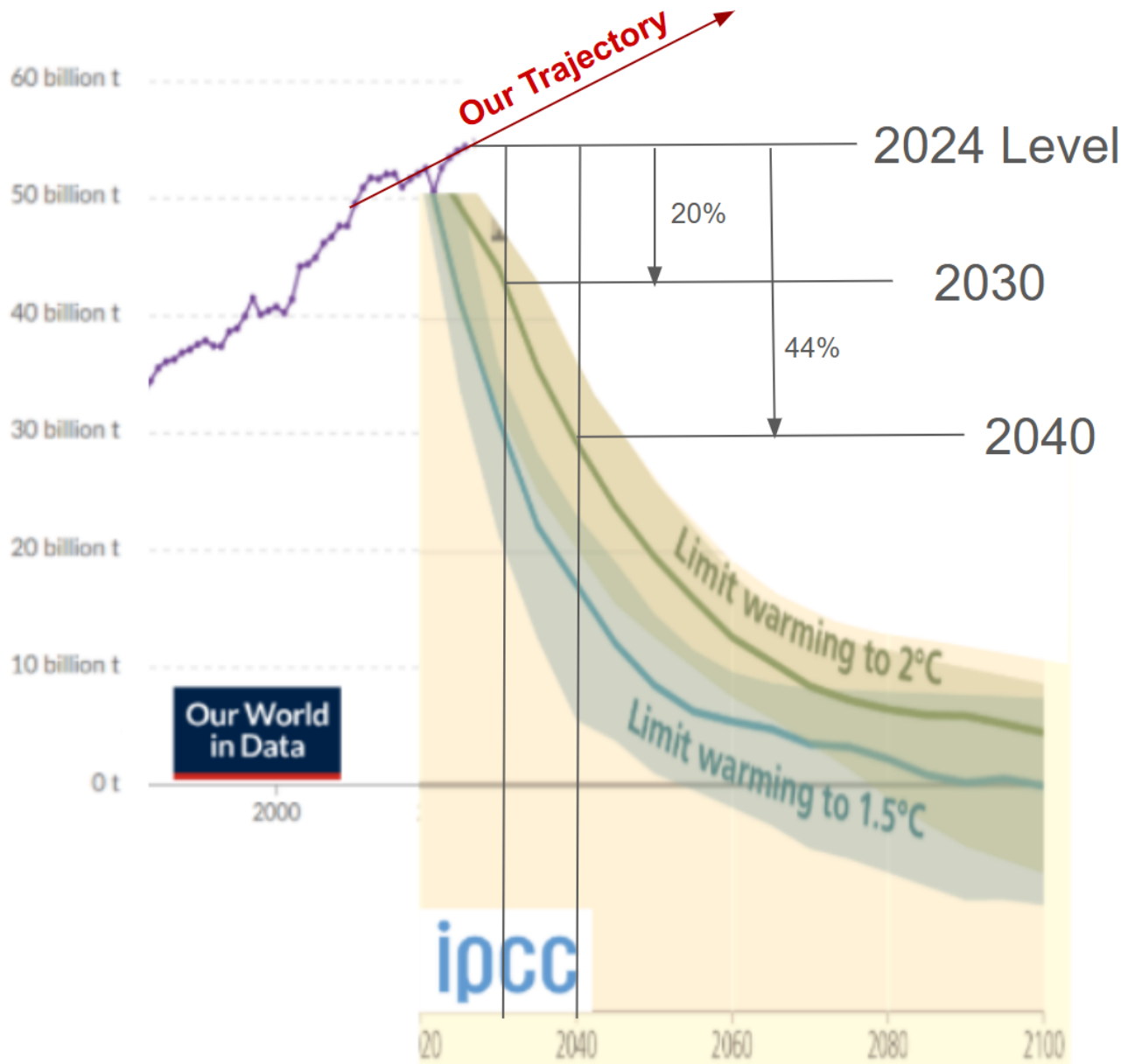
For perspective, look at the notch right at 2020. This was the COVID impact! Although the global economy was severely impacted, actual emissions only reduced by about 7%. And since then we have been setting records each year.

⁸ [Greenhouse gas emissions - Our World in Data](#)

⁹ [Figure AR6 WG2 -IPCC](#)

Cutting emissions is a very big deal; it is almost inconceivable that we could even achieve the 2 C limit, given what we see in this chart. **But this is what is needed by every living thing on this planet, so we will keep our focus on this Goal.**

Let's zoom into the peak and try to quantify what it will take to limit the heating to 2 C:



Starting with the emissions in 2024, to stay under the 2 C temperature increase, globally, we need to severely cut emissions by about 20% by 2030 (in 4 years) and by about 44% by 2040 (15 years). In contrast, on our current trajectory we are increasing emissions over 1% per year. Globally, we need to cut emissions by around 5% every year this decade.

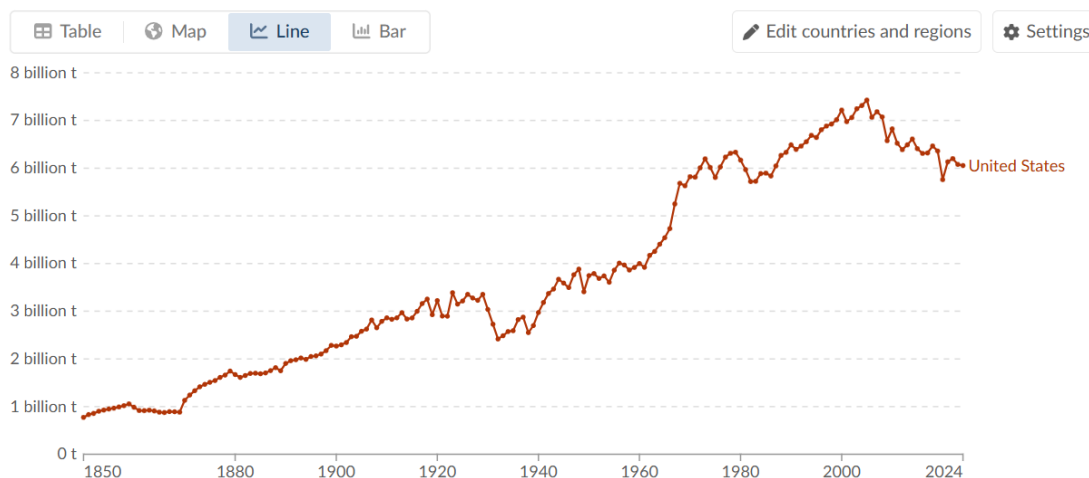
The U.S. Picture for Emissions

The Climate Nuggets Project is not a global initiative, so let's look at what this means at the country level. From the chart below, the United States can take credit for bringing emissions down over the last 40 years. A careful look at the 2022-2024 interval also looks like we're making progress; however, early estimates for 2025 imply we are going up again from data center demands.¹⁰

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Our World
in Data

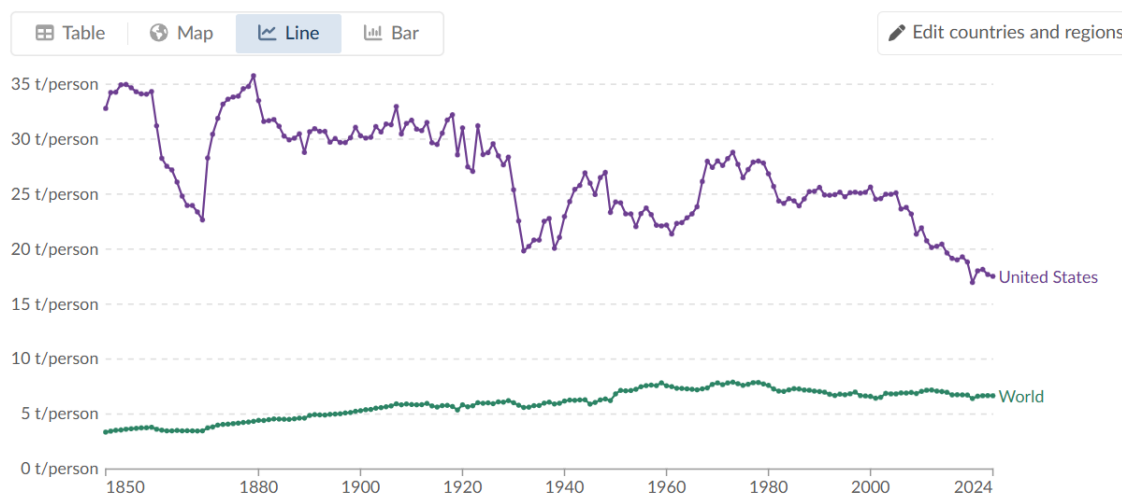


But, looking at the graph below, we can see that our per capita emissions, while halved from 100 years ago, are still over twice the global average, which have been steady for quite a while.

Per capita greenhouse gas emissions

Greenhouse gas emissions include carbon dioxide, methane and nitrous oxide from all sources, including land-use change. They are measured in tonnes of carbon dioxide-equivalents over a 100-year timescale.

Our World
in Data



¹⁰ [Preliminary US Greenhouse Gas Emissions Estimates for 2025 – Rhodium Group](#)

The Climate Nuggets Project's 2 °C Emission Goals FOR THE U.S.

Given the significant difference in the U.S.'s per capita emissions vs the global levels (not to mention that we are responsible for 20-25% of all global emissions ever), if anything, we should be bearing an even larger percentage cut in emissions in the coming years. Here are the rough appropriate U.S. GOALS necessary to achieve keeping under 2 C increase in global temperatures, as seen by the Climate Nuggets Project:

By Year	The Climate Nuggets Project's Goal for U.S. Emissions Cut from <u>2024</u> to keep planet less than 2 °C over preindustrial Temperatures	Emissions Goal for this year
2024	0%	6 billion tonnes
2030	25%	4.5
2040	50%	3.0
2050	75%	1.5

It has to be noted, however, that these reflect an orderly increase in temperatures from increasing emissions. It seems more likely that we will hit some TIPPING POINTS during this time (indeed, we already have hit the coral reef destruction tipping point)¹¹. If we do, the effects will be irreversible and highly destructive and increase the rate of heating.¹²

CONCLUSION

This analysis is not rigorous, but it certainly reveals the magnitude of drastic cuts which the U.S. and all major emitters must achieve to have a chance at preserving the quite stable conditions we have enjoyed for over 10,000 years - since the end of the last ice age.

This analysis will be an ongoing motivator for The Climate Nuggets Project actions. **While we cannot directly cut emissions ourselves, we will do all we can to force national policies and actions which can help.**

¹¹[Planet's first catastrophic climate tipping point reached, report says, with coral reefs facing 'widespread dieback'](#)

¹² [Global Tipping Points](#)