

# THE 12 QUESTIONS

*Every Climate Activist Hears  
and What to Say*

A handy guide to the most common arguments  
against the reality of man-made climate change  
*and why they're totally wrong.*

# WE'VE ALL BEEN THERE.

Maybe you're at a holiday party. The eggnog gets spiked and the climate denier questions start up. Or perhaps you're visiting older relatives who ask what you're up to these days. Then again, maybe it's yet another laughable Facebook post from that guy you met at your cousin's birthday party.

No matter the situation, the questions stay the same, cycling through whenever blustery talk-show hosts need a boost in ratings. They're practically a broken record at this point.

**Here's what you're likely to hear – and how to shut them down.**

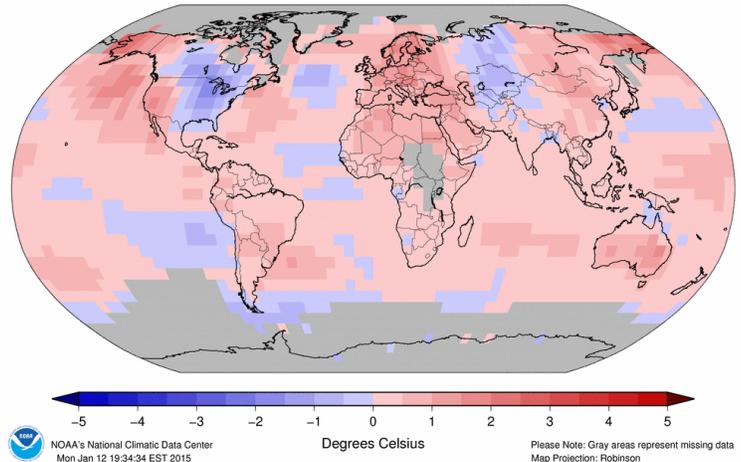
# 1. HOW CAN THERE BE GLOBAL WARMING WHEN THERE'S A SNOWSTORM?

The simple fact is that climate change throws natural systems out of balance. What does that mean? Previously uncommon events like the polar vortex become more likely and frequent.

Just because there's one snowstorm — in a place that usually gets them, mind you — doesn't negate the years of warming scientists have measured worldwide.

Since 1950, hot days have become more common and cold days have become less common around the world. Globally, extremely hot days are now [100 times more likely to occur](#) than they were from 1951–1980. In the US, record-high temperatures are being set more than twice as often as record-cold temperatures. In fact, 2014 – the year that pesky polar vortex blasted the Eastern US – was the hottest year ever recorded globally.

Land & Ocean Temperature Departure from Average Jan–Dec 2014  
(with respect to a 1981–2010 base period)  
Data Source: GHCN–M version 3.2.2 & ERSST version 3b



The bottom line is this:

**“Less cold” doesn’t mean “never cold.”**

Cold days – and the snowstorms that come with them – will happen less often as the world warms, but they won't go away.

Additional Reading:

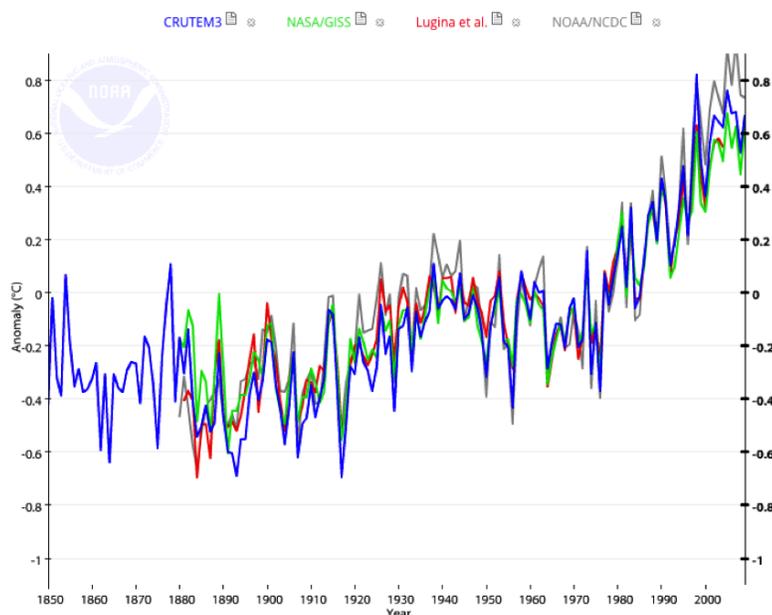
- [Don't Let the Polar Vortex Freeze the Climate Conversation](#)
- [Does Cold Weather Disprove Global Warming?](#)

## 2. BUT IT HASN'T GOTTEN WARMER FOR, LIKE, 15 YEARS, RIGHT?

Fourteen of the 15 hottest years on record globally have occurred since 2000. Global data shows that 2014 was the hottest yet, and [2015 is likely to be another record-breaker too](#).

As our climate changes, some years will be warmer than others. Yes, 1998 was unusually warm (partly because it was a strong El Niño year). But overall, 2014, 2010, and 2005 — the hottest three years on record, globally — were hotter. Scientists have observed rising global temperatures, rising sea levels, melting glaciers, melting Arctic sea ice, and increasing humidity over the last several decades. The full range of available data since 1880 conclusively shows the world is warming. And we can expect that trend to continue as long as humans keep sending carbon pollution and other greenhouse gases into the atmosphere.

Land Surface Air Temperature



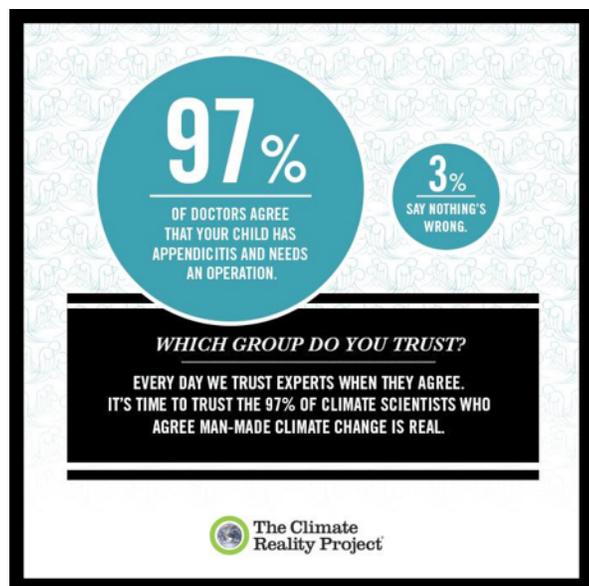
Nope, no warming here. (NOT!)

### Additional Reading:

- [Does the Global Warming “Pause” Mean What You Think?](#)
- [The 10 Warmest Years: Not Exactly Forever Ago](#)
- [Three Ways Climate Deniers Cherry-Pick Facts about Climate Change](#)

### 3. BUT NOT EVEN THE SCIENTISTS AGREE, RIGHT?

Wrong. More than 97 percent of climate scientists agree it's happening and it's because of us.



Think of it this way. If you're having excruciating pain, the kind that leaves you unable to do or think about anything else, you naturally want to get the right treatment. Let's say you visit one doctor, who says you need surgery. Then, to make sure before you go under the knife, you go get a second opinion from another doctor. Now repeat that 98 more times. If 97 of those doctors told you that you needed that surgery and three told you to do nothing, what would you decide?

Within the scientific community, there's overwhelming consensus that man-made global warming is happening. [According to a recent survey](#), 99.99 percent of authors of peer-reviewed scientific studies on climate change between 2013–2014 agree with that statement. And every major national academy of science in the world agrees that man-made climate change is happening and poses real threats.

If 97 percent of doctors diagnosed you with a serious illness, would you listen to the remaining 3 percent and skip treatment? Of course not.

Additional Reading:

- [The True Scientific Consensus on Anthropogenic Global Warming](#)
- [The 97 Percent Consensus on Global Warming](#)
- [Scientific Consensus: Earth's Climate Is Warming](#)

## 4. THESE SCIENTISTS CAN'T EVEN PREDICT THE WEATHER, MUCH LESS THE CLIMATE. HOW DO THEY KNOW WHAT TEMPERATURES WERE LIKE 500 YEARS AGO – OR WHAT IT WILL BE LIKE IN ANOTHER 100 YEARS?

Or, “They were predicting a new ice age in the 1970s.”

Climate change deniers never get tired of this argument, or its sister complaint, “Well, in the 1970s, these scientists said there was going to be a new Ice Age!” The phrasing may differ but the implication is the same: According to them, “mad” scientists are toying with data in their labs to make wild guesses, none of which will ever come true out here in the real world.

Here’s the reality. No one can predict exactly what the weather will be like on a certain day 100 years from now – but scientists *are* very confident that the world as a whole will be a lot warmer.

Look at it this way: does a motorcycle accident down the street mean you can’t drive your (electric) car safely? No. In much the same way, “incorrect” weather forecasts don’t tell us much about the reliability of climate projections.

Weather forecasters and climate scientists don’t look at the future the same way. A weather forecaster in New Jersey, for example, is interested in the chance of rain in Hoboken three days from now. On the other hand, a climate scientist is interested in whether the state of New Jersey will be wetter or drier on average 40 or 50 years from now.

Much like a motorcycle and an electric car, weather and climate models include

similar parts, but they also use different kinds of data and are operated in different ways to arrive at their respective destinations. Climate scientists can't tell you with 100-percent certainty how much the world will warm in 100 years (the planet has some pretty complex systems and scientists are understanding more and more about them every year). **But they can say with certainty that the world will continue to warm**, especially if we continue on our business-as-usual path of burning ever more fossil fuels . . .

And the more carbon pollution we put in the atmosphere, the worse things will get.

Additional Reading:

- [Ten Clear Indicators Our Climate Is Changing](#)
- [Don't Let the Polar Vortex Freeze the Climate Conversation](#)
- [Video: Weather Versus Climate Change](#)

## 5. IF THE PLANET IS GETTING WARMER, WHY ARE ARTICLES CLAIMING ICE IS INCREASING AT THE POLES?

Certain media outlets love to tout this morsel of misinformation, presented in the most unscientific way possible, to skew the story to support their climate denial. Even while the Antarctic land ice disintegrates down south, and Arctic sea ice contracts further up North, climate change deniers are touting the record extent of Antarctic ice and using that to claim that climate change isn't even happening. "Record ice at the poles!" or "Global warming scientists trapped by too much polar ice!" scream the headlines. Naturally, people get confused.

See how they don't specify what kind of ice or even which of the Earth's poles this is taking place at?

Here's why: **There's a difference between sea ice and land ice.** Antarctica's land ice has been melting at an alarming rate.

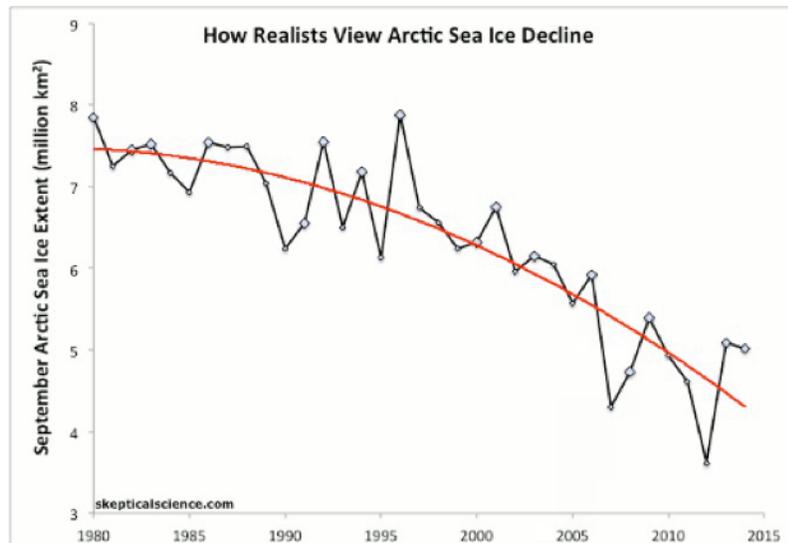
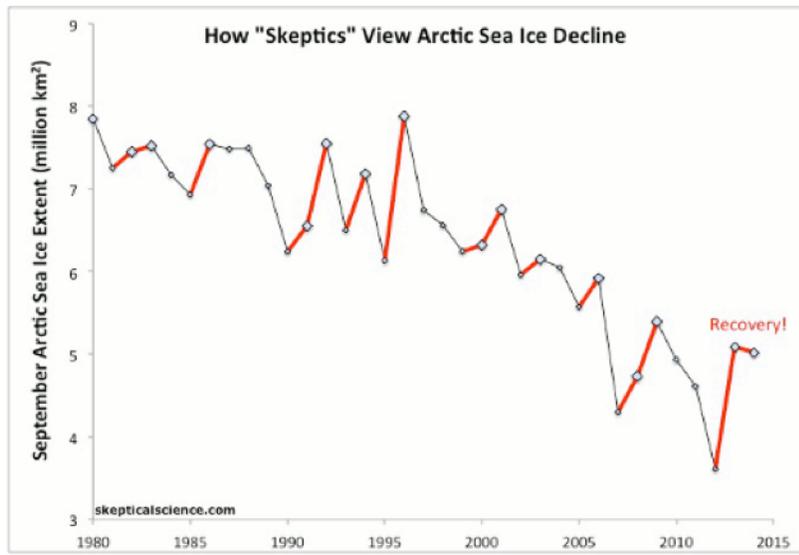
Sea ice is frozen, floating seawater, while land ice (called glaciers or ice sheets) is ice that's accumulated over time on land.

Overall, Antarctic sea ice has been stable (so far) — but that doesn't contradict the evidence that our climate is warming.

The sheet of land ice that covers most of Antarctica has been melting at the rate of about 159 billion metric tons every year in recent years. **When land ice melts, it flows as water into the ocean, contributing to sea-level rise.** Antarctica's melting land ice poses a direct threat to the hundreds of millions of people living on islands and near coasts.

At the North Pole, the Arctic has been warming at twice the global average rate in recent decades. Which is leading sea ice to melt. (Surprise!) In fact, 2015 could have the [second-lowest level of sea ice ever](#). But even at the Arctic, the level of sea ice can vary significantly within a single year as ice melts in the warmer summer months

and freezes during the colder winter months. When you hear climate change deniers saying that sea ice is growing, they're usually comparing minimum levels of ice in the summer (when it's warmest) of one year to maximum levels in the winter (when it's coldest) of another. Not exactly an apples-to-apples comparison.



Additional Reading:

- [Climate Change Skeptics May Be about to Lose One of Their Favorite Arguments](#)
- [Ice, Ice Baby: Is Antarctica Ice Melting or Growing?](#)
- [Is Antarctica Losing or Gaining Ice?](#)

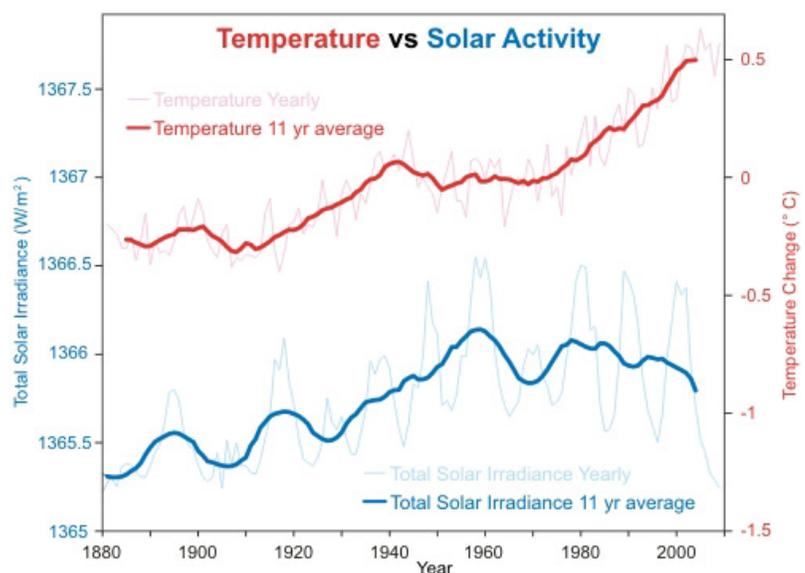
## 6. OK, SO MAYBE IT'S GETTING WARMER. HOW DO WE KNOW WE ARE TO BLAME? ARE WE REALLY SO POWERFUL THAT WE CAN AFFECT THE ENTIRE ATMOSPHERE? MAYBE IT'S THE SUN. OR VOLCANOES. OR A NATURAL CYCLE.

It's called "the greenhouse effect." More carbon dioxide traps more heat in the atmosphere. And ever since the Industrial Revolution, we've been releasing more and more carbon dioxide and other greenhouse gases into the atmosphere.

Scientists know our climate is changing, primarily due to carbon pollution from the burning of dirty energy like oil and coal. It's true that other factors affect our climate, including other greenhouse gases such as methane. Solar variation, volcanoes, and clouds all affect the climate, too.

Humans, however, release at least [100 times more carbon dioxide into the air than volcanoes](#). Emissions from Mount Pinatubo, the strongest volcanic eruption over the past 50 years, amounted to just 0.2 percent of human emissions in 1991. Just 0.2 percent! On the other hand, we're releasing around 35 billion metric tons of carbon dioxide into the atmosphere each year. If that sounds like a lot, that's because it is — and it makes us the main drivers of climate change.

As for the sun, it's our primary source of energy here on Earth, and yes, it most definitely keeps us warm. And its power helps us generate energy through solar technology. We love the sun! After all, we wouldn't be where we are today without it.



But here's the thing — without greenhouse gases like carbon dioxide in our atmosphere, the Earth would be a lot colder because most of the sun's heat would quickly disappear into space. (Need an example? [Check out the temperatures on the moon.](#))

Today, we're putting more and more heat-trapping carbon pollution and other greenhouse gases in the atmosphere by burning dirty fossil fuels like oil and coal. Over the last 35 years, the sun has shown a slight cooling trend while global temperatures have been increasing.

**Has our climate changed before?** Absolutely! Nobody disagrees with that. But arguing that humans aren't the cause of climate change today is like arguing humans can't cause forest fires because they've been started by lightning in the past. Basic physics tells us something important: climate change happens for a reason. Some past changes in the climate were driven by the sun burning brighter, or by an increase in volcanic activity.

That's not the case now.

**Climate change happens for a reason.  
And right now that reason is us.**

Climate scientists take all these factors (and more) into account and weigh the contributions that each one makes to our climate. When they do, it's clear that **man-made carbon dioxide pollution is overwhelmingly responsible for the global warming we're experiencing now.** When people say otherwise, they're basing their claim on something other than accepted science.

Additional Reading

- [What Does Past Climate Change Tell Us about Global Warming?](#)
- [Three Ways Climate Denier Cherry-Pick Facts about Climate Change](#)

## 7. ISN'T MORE CARBON DIOXIDE MORE PLANT FOOD?

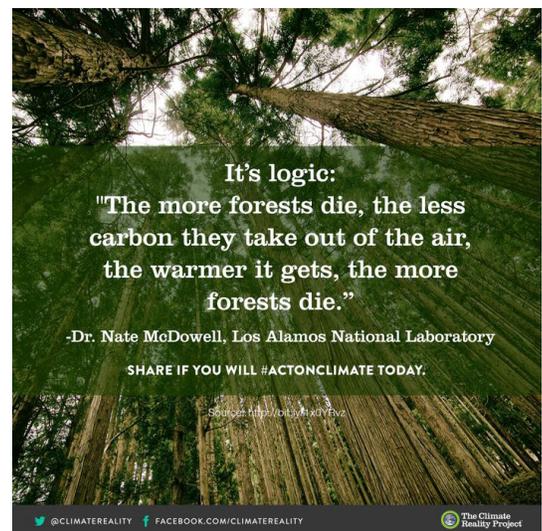
Ever heard the phrase “Too much of a good thing?” Try growing crops in a flood — because they’re coming more often as atmospheric carbon levels rise and the climate changes.

To grow, plants need three main things: sunlight, water, and carbon dioxide. But that doesn’t mean we can jump to the conclusion that more carbon dioxide will be good for plants. More isn’t always better. **A glass of wine with dinner can be a great thing. A bottle on your own is asking for a hangover (or worse).** In much the same way, a flood is a terrible way to supply water to a forest.

While experiments have shown that some plants respond well to higher carbon dioxide levels, others have shown that abnormally high levels of carbon dioxide can cause damage.

Keep in mind that as carbon dioxide increases, temperatures also increase, rainfall patterns change, and some kinds of **extreme weather events become more common and severe.** This certainly spells bad news for plants... and all of us people who rely on plants for our food and our livelihoods.

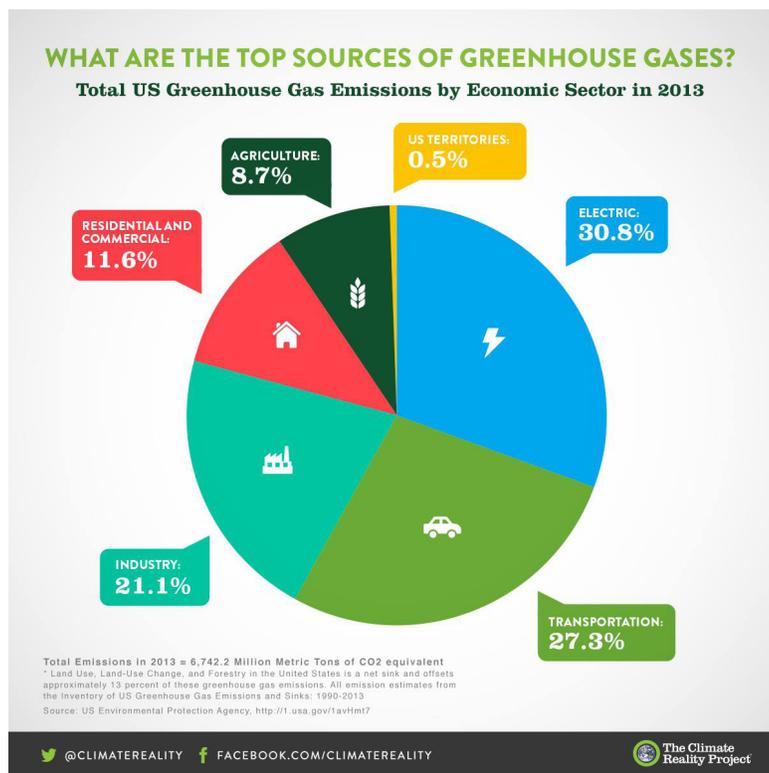
Not convinced? Ask the peanut farmers in drought-ridden Texas. Find out about the wine grapes in Australia and California, or the African cacao trees that give us the beans used to make chocolate. **Climate change has not been kind to these plants so far.**



## 8. EVERYONE KNOWS WE BREATHE OXYGEN AND EXHALE CARBON DIOXIDE. SO WHAT SHOULD WE DO – STOP BREATHING?

Let's all step back and take a deep breath here.

Don't worry, that has nothing to do with climate change.



A human exhales about 1 kilogram of carbon dioxide a day. That sounds like a lot when you consider there are about 7 billion of us on the planet. But the carbon we breathe out doesn't come from nowhere – *it comes from the carbon-based things we eat.* And as you may recall, plants take in carbon dioxide to make their own food via photosynthesis. Which creates a closed cycle: the carbon taken in by plants becomes food for us (either directly or indirectly), and then we breathe the carbon out ... and then plants take it in again.

When we burn dirty energy, we're adding carbon to the air that had been out of the loop for millions of years, stored underground as deposits of coal, oil, and gas. Once we take that carbon out of the ground, it can be in our atmosphere for hundreds of years to come.

Additional Reading:

- [Does Breathing Contribute to CO<sub>2</sub> Buildup in the Atmosphere?](#)
- [Sources of Greenhouse Gas Emissions](#)

**Take a deep breath: Your respiration has nothing to do with climate change.**

## 9. WHAT'S WRONG WITH A FEW DEGREES ANYWAYS?

Even a global temperature rise of 2 degrees Celsius will disrupt our lives and challenge our ability to cope.

Think of it this way: What's the difference between 0 and 1 degree Celsius? Well, that's the difference between ice and water. One degree can make a huge difference in the natural world and we're on track to warm the planet 2–4 degrees Celsius by 2100, accelerating glacial melt, sea-level rise, and other changes.

The world has **already** warmed about 0.8 degrees Celsius since 1880 (that's 1.5 degrees Fahrenheit). That may not sound like much, but we're already starting to see what a warmer world has in store for us. Intense rainstorms, severe droughts, and heat waves are becoming more frequent. Rising seas are damaging homes near the water. Some populations of animals are starting to die out. And that's just 0.8 degrees! Now consider what could happen if we do nothing to limit the carbon pollution that's causing global warming.



**In other words, the more we pollute,  
the worse things will get.**

Additional Reading:

- [What Is Global Warming?](#)
- [The Consequences of Climate Change](#)
- [Study: CO2 Isn't Spurring Plant Growth as Expected](#)
- [More Carbon Dioxide Is Not Necessarily Good for Plants](#)
- [Findings Cast Doubt On Plant Benefits from CO2](#)

## 10. IF WE LIMIT CARBON EMISSIONS, WON'T WE HALT GROWTH, CUT OUR GDP, LOSE JOBS, AND HURT THE ECONOMY?

Once again, certain media outlets love to repeat this one and just like with other claims, the absence of supporting facts doesn't seem to stop them.

Over and over, we hear the claim that we can't afford to shift to clean energy and address climate change. Here's the truth: we can't afford not to. According to a 2012 study by the European non-governmental organization the DARA Group and the Climate Vulnerable Forum, climate change is already contributing to over 400,000 deaths and costing the world more than \$1.2 trillion each year ([PDF](#)).

How? Just look at the devastation of the New Jersey shore in the wake of Superstorm Sandy. Witness the homes turned to splinters in the Philippines by Typhoon Haiyan. In each case, the horrifying list of injuries and fatalities was just the beginning, as businesses and the communities that relied on them struggled to get back on their feet long after the rescue crews and television cameras left. Consider the California farmers forced to watch their fields wither as one year of record drought stretches into another. And on and on.

Here's the flipside to give you a good bit of #ClimateHope: decarbonizing the electricity system would [save \\$1.8 trillion](#) over the coming two decades. Lose \$1.2 trillion or save \$1.8 trillion? It's not a trick question.

If we look at just the US, limiting carbon pollution could expand GDP by more than \$155 billion a year ([PDF](#)). As demand for dirty fossil fuels declines, demand for clean energy technologies skyrockets, creating good middle-class jobs and new opportunities for businesses and entrepreneurs in a rapidly growing sector.



In fact, we're already seeing this trend as solar-related industries employ more Americans than coal. And that's just one example.

Plus, as the use of solar and wind technologies continue to grow while the cost of doing so continues to drop, we'll be paying less for our energy and less for the impacts of climate change thanks to fossil fuels. Which leaves more money in the pockets of people everywhere. **What's not to like?**

Additional Reading:

- [Shift to Low-Carbon Economy Could Free up \\$1.8 Trillion, Study Says](#)
- [Study Finds Climate Change Will Reshape Global Economy](#)
- [The Impact of Clean Energy Innovation](#)

## 11. EVEN IF WE WENT TO 100-PERCENT CLEAN ENERGY NOW, THE WORLD WOULD STILL KEEP WARMING. AT THIS POINT, ISN'T IT TOO LATE TO DO ANYTHING?

Climate change is already happening today. How much the climate warms in the future is up to us.

It's true – even if we completely stopped emitting carbon pollution today, we'd continue to experience warming for a considerable time. This is because the pollution that causes climate change stays in the atmosphere for hundreds of years, and because our climate is sort of like an enormous tanker with a ton of momentum behind it. Once climate change gets going in one direction, it's difficult to stop right away. There's a [big time lag](#) between when we emit carbon pollution and when we feel its full effects.



But using this fact to argue we shouldn't do anything about climate change is akin to telling a friend who's in debt that she should ignore what she owes and go on a shopping spree.

In reality, you'd probably tell your friends to really watch their spending and make payments on time. You'd know that, down the line, this could mean the difference between living with freedom and going totally bankrupt.

The same goes for climate. If we act now to swiftly transition from dirty fossil fuels to clean energy, there's a chance [we could limit warming to 2 degrees Celsius](#) (3.6 degrees Fahrenheit). If we do nothing, and continue on the path we're on, the temperature could rise **over 6 degrees Celsius** ([PDF](#)) (10.8 degrees Fahrenheit) by

early next century. The difference between these two scenarios is dramatic. As World Bank Group President Jim Yong Kim [has explained](#): “Lack of action on climate change threatens to make the world our children inherit a completely different world than we are living in today.”

We’re already feeling the effects of climate change. But that’s precisely why we need to both prepare for the climate change impacts we can’t avoid and act quickly to cut the carbon pollution that’s causing the problem — and could make it worse. It’s not an either/or decision — we need to do both. The longer we wait to make the transition to clean energy, the worse this problem will get for our children and future generations.

**It’s our choice.**

## 12. OK. I THINK I GET IT NOW. WHAT CAN I DO TO HELP, AND WHAT IMPACT WILL IT HAVE?

There's an extensive list of things we can do today to limit the amount of global warming we'll see in the future. At the most basic level, we should take measures to reduce the amount of energy we burn [overall](#). If we're smarter about how we use energy and design our cities, buildings, and appliances, we'll be able to do just as much or more than we do now, only using less energy.

Then, of course, we need to do whatever we can to quit burning dirty energy (like oil, coal, and gas) and use clean energy (like wind and solar) instead. One step to help us do so would be to pass laws correcting for the fact that companies now get to profit from fossil fuels without paying for the damage they do (what we call "[putting a price on carbon](#)").

We can also [set limits](#) on how much carbon pollution we can emit. And, we can support [clean energy research and projects](#).

Meanwhile, we should continue to have a conversation with our leaders and the public about the real cost of carbon pollution and what we can do about it. If you want to help advocate for climate solutions, [become a certified Climate Reality Leader by training with former US Vice President Al Gore and leading scientists](#). Climate Reality Leaders are playing an instrumental role in building the public support essential for action worldwide by engaging their communities in discussions about climate science and solutions. [Learn more here](#).

**We have many options.  
But doing *nothing* isn't one of them.**



# ADDITIONAL RESOURCES

Thirsty for more? Visit these websites for a more comprehensive look into the topics discussed in this e-book — and subjects that we didn't have space to cover.

## **SKEPTICAL SCIENCE**

Skeptical Science provides the basics of climate change science as well as rebuttals to some of the most common myths perpetuated by climate change deniers.

<https://www.skepticalscience.com>

## **CLIMATE CENTRAL**

Climate Central is a credible source of climate change news and analysis, as well as a range of videos, graphics, and mapping tools that visualize local impacts like heat, extreme weather, and sea-level rise.

<http://www.climatecentral.org>

## **US ENVIRONMENTAL PROTECTION AGENCY**

The US Environmental Protection Agency website includes a comprehensive climate science section and provides users with information on impacts by region and strategies for mitigating and adapting.

<http://www.epa.gov/climatechange/>

## **YALE PROJECT ON CLIMATE CHANGE COMMUNICATION**

The Yale Project on Climate Change Communication offers communication resources on a variety of user-selectable topics.

<http://environment.yale.edu/climate-communication/>

## **THE US NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION**

The US National Oceanic and Atmospheric Administration's climate website consolidates US climate trends, data, climate change news, as well as teaching aids and tools to help explain the issues clearly and effectively.

<http://www.climate.gov>

**NASA**

NASA's Global Climate Change page is a one-stop resource not only for climate change science information, but also a variety of other climate-related multimedia data and mapping resources.

<http://climate.nasa.gov>

**INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE**

The IPCC is a group of hundreds of scientists and advisers representing 195 nations that regularly surveys the research on climate change happening around the globe, distilling the verdict of the planet's leading climate scientists in a series of authoritative assessment reports to help guide policymakers. The reports are available through the organization's portal.

<http://www.ipcc.ch>

**CLIMATE ADAPT EUROPEAN CLIMATE ADAPTATION PLATFORM**

Climate Adapt European Climate Adaptation Platform provides users with climate vulnerability information as well as potential adaptation strategies, case studies, and other useful tools.

<http://climate-adapt.eea.europa.eu>

# ABOUT THE CLIMATE REALITY PROJECT



## The Climate Reality Project<sup>®</sup>

At The Climate Reality Project, our mission is to catalyze a global solution to the climate crisis by making urgent action a necessity across every level of society. Our dynamic communications initiatives speak the evolving language of social media to bring the story of climate disruption into popular culture and shape the discussions on solutions happening everywhere from dinner tables to news desks. Our grassroots campaigns take this message to constituencies from mommy bloggers to national security voters to skiers to make climate personal and build a movement that is as inclusive as it is diverse.

We speak up with relentless honesty about the solutions we have right in front of us and the forces standing in our way: the anti-science climate change deniers and the wealthy corporations who put their own healthy profits before a healthy planet for all of us. The result is a forward-looking movement that is growing across every time zone. A movement that will not stop until we live in a world powered by renewable energy. This is our reality.

For more information, visit [www.ClimateRealityProject.org](http://www.ClimateRealityProject.org), “Like” us on Facebook at [facebook.com/ClimateReality](https://facebook.com/ClimateReality), or follow us on Twitter at [@ClimateReality](https://twitter.com/ClimateReality).