

AMERICA MISLED

How the fossil fuel industry
deliberately misled Americans
about climate change

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First published in October 2019.

For more information, visit <https://www.climatechangecommunication.org/america-misled/>

Graphic design: Wendy Cook

Cite as:

Cook, J., Supran, G., Lewandowsky, S., Oreskes, N., & Maibach, E., (2019). America Misled: How the fossil fuel industry deliberately misled Americans about climate change. Fairfax, VA: George Mason University Center for Climate Change Communication. Available at <https://www.climatechangecommunication.org/america-misled/>

How the fossil fuel industry polluted the information landscape

Key points

1. Internal corporate documents show that the fossil fuel industry has known about the reality of human-caused climate change for decades. Its response was to actively orchestrate and fund denial and disinformation so as to stifle action and protect its status quo business operations.
2. As the scientific consensus on climate change emerged and strengthened, the industry and its political allies attacked the consensus and exaggerated the uncertainties.
3. The fossil fuel industry offered no consistent alternative explanation for why the climate was changing—the goal was merely to undermine support for action.
4. The strategy, tactics, infrastructure, and rhetorical arguments and techniques used by fossil fuel interests to challenge the scientific evidence of climate change—including cherry picking, fake experts, and conspiracy theories—come straight out of the tobacco industry's playbook for delaying tobacco control.

These key points reflect the position of experts studying climate denial and the history of fossil fuel interests, based on thousands of pages of documented evidence.

The Essential Truth About Climate Change in Ten Words

The basic facts of climate change, established over decades of research, can be summarized in five key points:

IT'S REAL

Global warming is happening.

IT'S US

Human activity is the main cause.

EXPERTS AGREE

There's scientific consensus on human-caused global warming.

IT'S BAD

The impacts are serious and affect people.

THERE'S HOPE

We have the technology needed to avoid the worst climate impacts.

Denying our right to be accurately informed

Over the past few decades, the fossil fuel industry has subjected the American public to a well-funded, well-orchestrated disinformation campaign about the reality and severity of human-caused climate change. The purpose of this web of denial has been to confuse the public and decision-makers in order to delay climate action and thereby protect fossil fuel business interests and defend libertarian, free-market conservative ideologies¹. The fossil fuel industry's denial and delay tactics come straight out of Big Tobacco's playbook. As a result, the American public have been denied the right to be accurately informed about climate change, just as they were denied the right to be informed about the risks of smoking by the tobacco industry. While fossil fuel companies attacked the science and called on politicians to "reset the alarm," climate-catalyzed damages worsened, including increased storm intensities, droughts, forest damage and wildfires, all at substantial loss of life and cost to the American people².

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Climate disinformation has had many negative effects. It reduces public understanding of climate change³, lowers support for climate action⁴, cancels out accurate information^{5,6}, polarizes the public along political lines⁷, and reinforces climate silence—the lack of public dialogue and private conversation about climate change⁸. Climate deniers directly impact the scientific community—and, in turn, its ability to serve the public good—by forcing climate scientists to respond to bad-faith demands⁹ and arguably causing a chilling effect pressuring scientists to underplay scientific results^{10,11,12}.

Strategies proposed to counter climate disinformation include political mechanisms, financial transparency, legal strategies, and inoculation of the public¹³. Inoculation involves explaining how and why climate deniers mislead, in order to neutralize the influence of their disinformation.

This report explores the techniques used to mislead the American public about climate change, and outlines three ways of inoculating against disinformation:

1. Communicating facts (this is a necessary but insufficient condition in the face of disinformation).
2. Revealing misleading sources (explaining why, how and from whom the disinformation arose).
3. Explaining denialist techniques (explaining fallacies and tactics used to mislead).

Attacking the scientific consensus on climate change

In the late 1980s and early 1990s, a scientific consensus emerged that human-caused climate change—which had long been predicted—was now underway^{14,15,16}. Since that time, a number of studies have found over 90% agreement among climate scientists on human-caused global warming, with multiple studies converging on 97% consensus¹⁷. The emergence of a shared consensus among thousands of independent scientists all around the globe through independent lines of evidence is a clear and strong signal of robust scientific knowledge¹⁸. Climate scientists are as sure that burning fossil fuels causes global warming as public health scientists are sure that smoking tobacco causes cancer¹⁹.

“Climate scientists are as sure that burning fossil fuels causes global warming as public health scientists are sure that smoking tobacco causes cancer.”

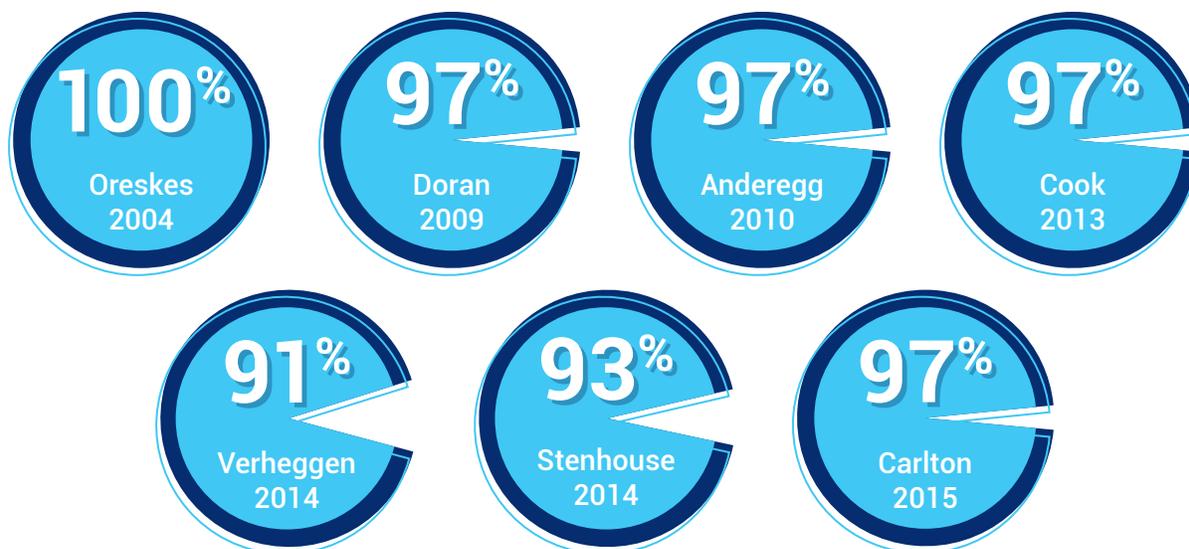


Figure 1: Studies quantifying the consensus on human-caused global warming¹⁷.

Attacking this consensus is one of the chief strategies of climate deniers²⁰. The strategy behind the denier attack on consensus is informed by market research conducted by industry groups²¹ and political strategists²². This market research found that confusing the public about the scientific consensus on climate change reduced public support for climate policy. Science denial continues unabated—in the last decade, content analysis of online misinformation has found the prevalence of science denial has been on the increase²³.

What fossil fuel knew vs. what fossil fuel did

Scientists working for the fossil fuel industry knew about the potential warming effects of CO₂ emissions as early as the 1950s²⁴. Exxon's internal documents show that their own scientists were explicitly aware of the potential dangers of human-caused climate change caused by their products, but instead of taking action or warning the public, they spent millions of dollars on disinformation campaigns designed to obscure the scientific reality²⁵.

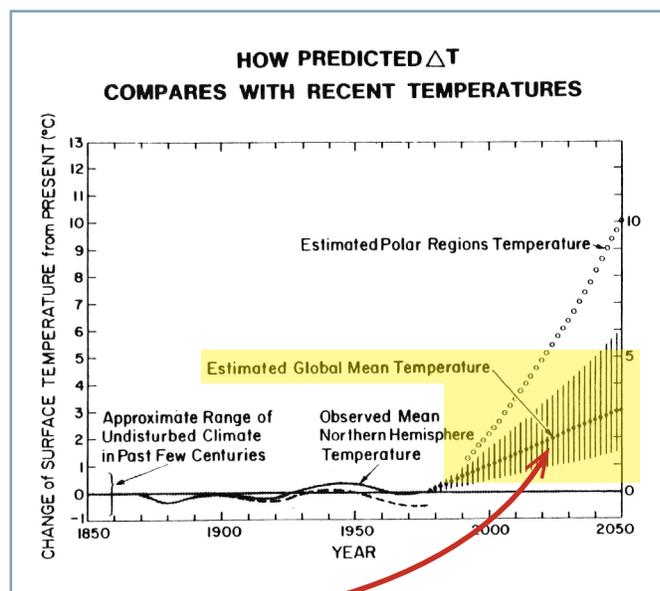


CO₂ is causing climate change.

CO₂ comes from burning fossil fuels.

SUMMARY

- I. CO₂ RELEASE MOST LIKELY SOURCE OF INADVERTENT CLIMATE MODIFICATION.
- II. PREVAILING OPINION ATTRIBUTES CO₂ INCREASE TO FOSSIL FUEL COMBUSTION.
- III. DOUBLING CO₂ COULD INCREASE AVERAGE GLOBAL TEMPERATURE 1°C TO 3°C BY 2050 A.D. (10°C PREDICTED AT POLES).
- IV. MORE RESEARCH IS NEEDED ON MOST ASPECTS OF GREENHOUSE EFFECT.
- V. 5-10 YR. TIME WINDOW TO GET NECESSARY INFORMATION.
- VI. MAJOR RESEARCH EFFORT BEING CONSIDERED BY DOE.



Time is running out!

CO₂ emissions will cause 1-3°C warming.

Figure 2: Exxon 1977 internal memo.
Fossil fuel industry documents show that they knew the basics of climate science in the 1950s-80s.

Fossil fuel schemed (1980s-90s)

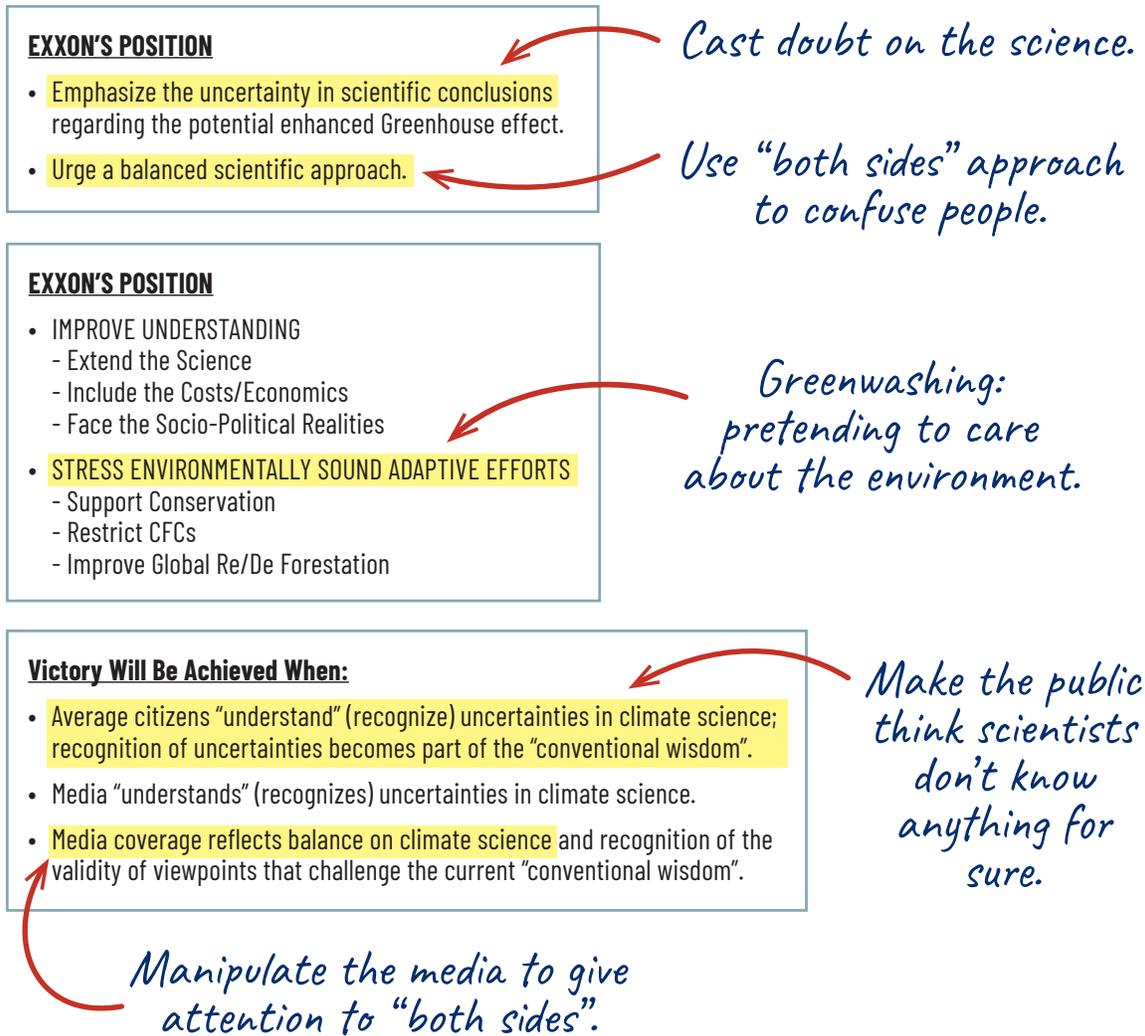


Figure 3: Top: Exxon 1988 internal memo. Middle: Exxon 1989 internal memo. Bottom: Exxon et al. 1998 internal memo. Fossil fuel industry documents show that they devised public relations strategies to promote doubt about climate science in the 1980s-90s.

Fossil fuel denied (1990s-2010s)

Falsely argues that because we don't know everything, we know nothing.

False: In the 1990s, scientists had already formed a consensus that humans were causing global warming.

Just because climate has changed naturally in the past does not mean it's natural now.

Unsettled Science

Knowing that weather forecasts are reliable for a few days at best, we should recognize the enormous challenge facing scientists seeking to predict climate change and its impact over the next century. In spite of everyone's desire for clear answers, it is not surprising that **fundamental gaps in knowledge leave scientists unable to make reliable predictions about future changes.**

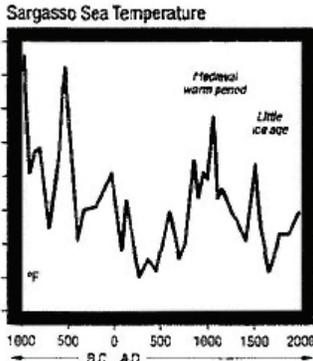
A recent report from the National Research Council (NRC) raises important issues, including these still-unanswered questions: (1) Has human activity already begun to change temperature and the climate, and (2) How significant will future change be?

The NRC report confirms that Earth's surface temperature has risen by about 1 degree Fahrenheit over the past 150 years. Some use this result to claim that humans are causing global warming, and they point to storms or floods to say that dangerous impacts are already under way. **Yet scientists remain unable to confirm either contention.**

Geological evidence indicates that climate and greenhouse gas levels experience significant natural variability for reasons having nothing to do with human activity. **Historical records and current scientific evidence show that Europe and North America experienced a medieval warm period one thousand years ago, followed centuries later by a little ice age.** The geological record shows even larger changes throughout Earth's history. Against this backdrop of large, poorly understood natural variability, it is impossible for scientists to attribute the recent small surface temperature increase to human causes.

Moreover, computer models relied upon by climate scientists predict that lower atmospheric temperatures will rise as fast as or faster than temperatures at the surface. However, only within the last 20 years have reliable global measurements of temperatures in the lower atmosphere been available through the use of satellite technology. **These measurements show little if any warming.**

Even less is known about the potential positive or negative impacts of climate change. In fact, many academic studies and field experiments have demonstrated that increased levels of carbon dioxide can promote crop and forest growth.



So, while some argue that the science debate is settled and governments should focus only on near-term policies—that is empty rhetoric. **Inevitably, future scientific research will help us understand how human actions and natural climate change may affect the world and will help determine what actions may be desirable to address the long-term.**

Science has given us enough information to know that climate changes may pose long-term risks. Natural variability and human activity may lead to climate change that could be significant and perhaps both positive and negative. Consequently, people, companies and governments should take responsible actions now to address the issue.

One essential step is to encourage development of lower-emission technologies to meet our future needs for energy. We'll next look at the promise of technology and what is being done today.

ExxonMobil

Cast doubt on the scientific consensus on climate change.

Contradicts themselves: they already talk about 1 degree warming.

Uses the same delay argument as the tobacco industry: "Let's wait before we act".

Figure 4: ExxonMobil 2000 advertorial in The New York Times. The fossil fuel industry implemented their plans to promote climate denial in the 1990s-2010s.

Contradictory contrarianism

The most common denialist arguments have been shown to contain fatal assumptions or fallacies²⁶. Climate deniers do not offer any rational explanation for why our climate is changing. Rather, denialist arguments are incoherent and often contradictory²⁷. For example, deniers will seize on snowfall to claim that global warming is a hoax, while at the same time claiming that an extreme event such as a drought or wildfire cannot be attributed to climate change. This is incoherent because either extreme events can be a signal of climate change or they cannot be.

Climate denial lacks consistency because it is not about scientific evidence—it is about how to continue business as usual in the face of climate disruption. Climate deniers reject climate science because they are averse to proposed or perceived solutions to climate change²⁸.

“Climate denial lacks consistency because it is not about scientific evidence—it is about how to continue business as usual in the face of climate disruption.”

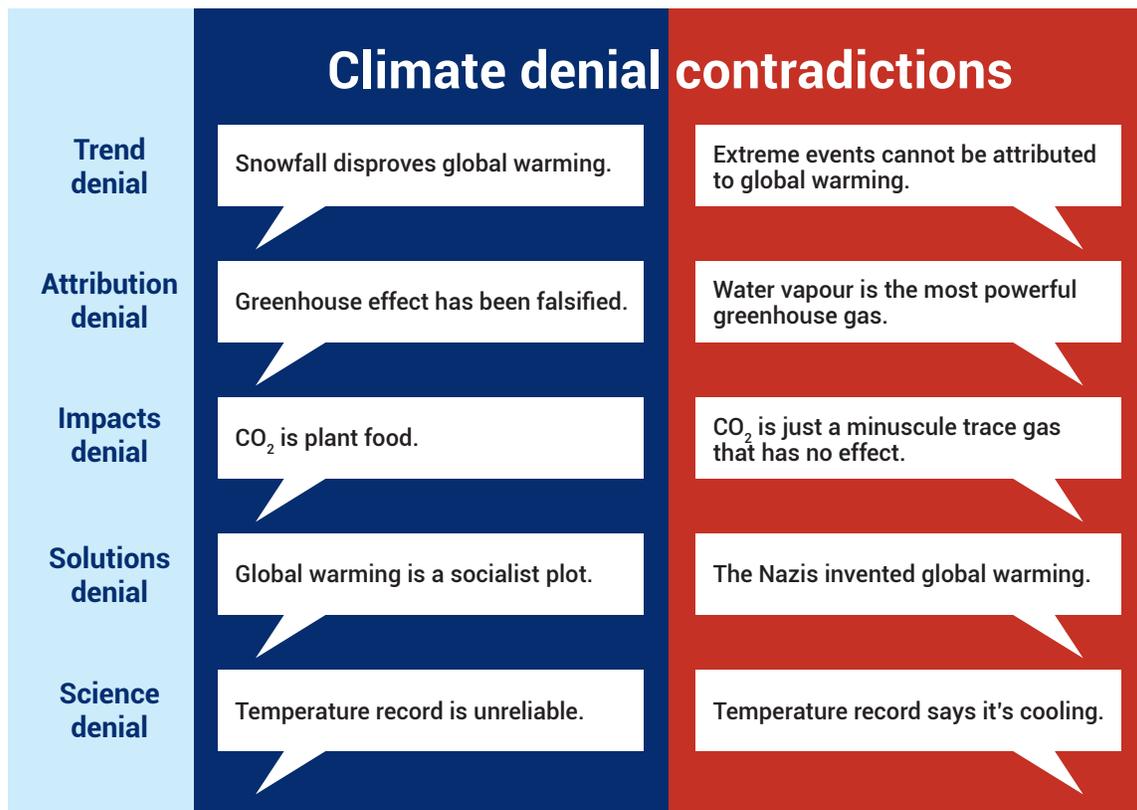


Figure 5: Examples of common climate denialist arguments that contradict each other.

Denialist techniques

Climate denial arguments can be summarized by the five techniques of science denial (summarized with the acronym FLICC): fake experts, logical fallacies, impossible expectation, cherry picking, and conspiracy theories^{29,30}.



Figure 6: FLICC: The techniques of science denial.

Understanding the techniques of denial is necessary to avoid being misled by disinformation. This is why explaining denialist techniques is effective in neutralizing disinformation³¹.

Common Fallacies



Fake Experts

Promoting dissenting non-experts as highly qualified while not having published any actual climate research and/or received any relevant education.



Logical Fallacies

Logically flawed arguments that lead to false conclusions. Common logical fallacies are red herrings, non sequiturs, and false dichotomies.



Impossible Expectations

Demanding unrealistic standards of certainty before acting on the science. A technique practised by the tobacco industry.



Cherry Picking

Selectively choosing data that supports a desired conclusion that differs from the conclusion arising from all the available data³².



Conspiracy Theories

Proposing a secret plan among a number of people, generally to implement a nefarious scheme such as conspiring to hide a truth or perpetuate misinformation. Climate deniers are more likely to be conspiracy theorists³³.

Deconstructing Denial

Figure 7 shows deconstructions of some of the most common myths about climate change. Determining the misleading techniques of a climate myth requires outlining the argument structure: listing any premises (starting assumptions) and the conclusion. This allows one to ascertain whether any premises are false, and/or whether the argument is logically invalid.

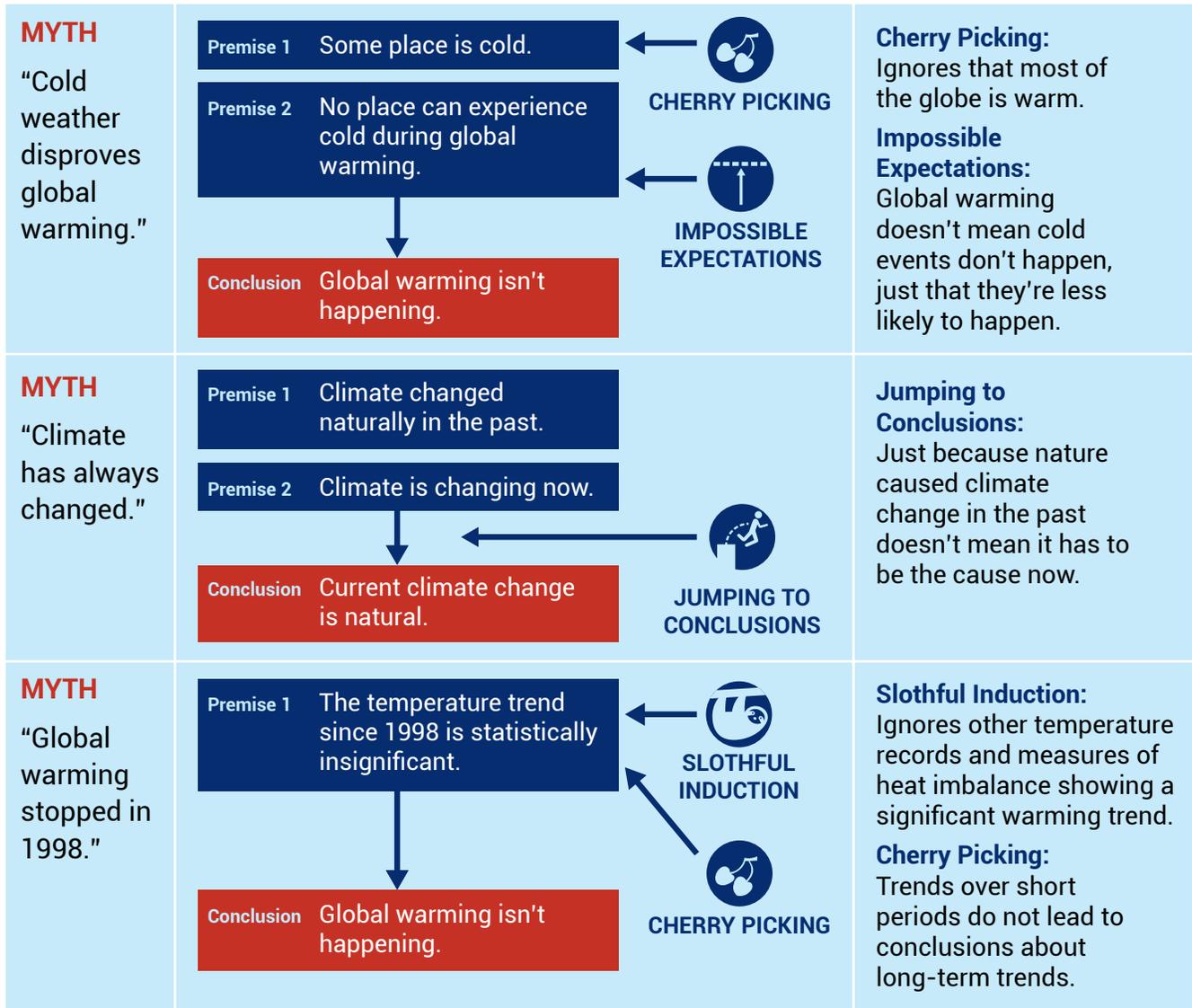


Figure 7: Deconstruction of common climate myths.

Conclusion

Disinformation about climate change has a straightforward purpose—to block action on climate change. In America, it has largely succeeded, with policies to mitigate climate change stymied or delayed for decades.

Meanwhile, climate change has intensified, causing impacts such as intensified extreme weather events, rising sea level, harmful effects on human health, and much more.

Climate denial has seriously hurt the American people. The damage, deaths, and harm to people will continue to worsen if we don't expose and discredit denial.

This is not the first time that corporations prioritizing profits over people have caused great harm. The tobacco industry spent hundreds of millions of dollars disinforming the public about the health impacts of smoking in order to undermine tobacco control^{34,35}. The World Health Organization estimates that six million people die every year from preventable tobacco-caused disease. Drawing on the tobacco industry's playbook, fossil fuel companies have done the same on climate change, spending hundreds of millions of dollars confusing the public and delaying life-saving action. Their legacy is the death, destruction, and injustices of irreversible global warming. Big Oil is the new Big Tobacco.

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The legacy of the fossil fuel industry is death, destruction, and injustices of irreversible global warming. Big Oil is the new Big Tobacco.”

References

- 1 Oreskes, N., & Conway, E. M. (2011). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. New York: Bloomsbury Publishing USA.
- 2 Hayhoe, K., Wuebbles, D. J., Easterling, D. R., Fahey, D. W., Doherty, S., Kossin, J., Sweet, W., Vose, R. & Wehner, M. (2018). Our changing climate. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, 2, 72-144.
- 3 Ranney, M.A. & Clark, D. (2016). Climate Change Conceptual Change: Scientific Information Can Transform Attitudes. *Topics in Cognitive Science*, 8(1), 49-75.
- 4 van der Linden, S., Leiserowitz, A. A., Feinberg, G. D., & Maibach, E. W. (2015). The scientific consensus on climate change as a gateway belief: Experimental evidence. *PLOS ONE*, 10(2), e0118489.
- 5 McCright, A. M., Charters, M., Dentzman, K., & Dietz, T. (2016). Examining the Effectiveness of Climate Change Frames in the Face of a Climate Change Denial Counter-Frame. *Topics in Cognitive Science*, 8(1), 76-97.
- 6 van der Linden, S., Leiserowitz, A., Rosenthal, S., & Maibach, E. (2017). Inoculating the public against misinformation about climate change. *Global Challenges*, 1(2), 1600008.
- 7 Cook, J., Lewandowsky, S., & Ecker, U. K. (2017). Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. *PLOS One*, 12(5), e0175799.
- 8 Geiger, N., & Swim, J. (2016). Climate of silence: Pluralistic ignorance as a barrier to climate change discussion. *Journal of Environmental Psychology*, 47, 79-90.
- 9 Biddle, J. B., & Leuschner, A. (2015). Climate skepticism and the manufacture of doubt: can dissent in science be epistemically detrimental? *European Journal for Philosophy of Science*, 5(3), 261-278.
- 10 Brysse, K., Oreskes, N., O'Reilly, J., & Oppenheimer, M. (2013). Climate change prediction: Erring on the side of least drama? *Global Environmental Change*, 23(1), 327-337.
- 11 Lewandowsky, S., Oreskes, N., Risbey, J. S., Newell, B. R., & Smithson, M. (2015). Seepage: Climate change denial and its effect on the scientific community. *Global Environmental Change*, 33, 1-13.
- 12 Lewandowsky et al. (2019). Influence and seepage: An evidence-resistant minority can affect public opinion and scientific belief formation. *Cognition*, 188, 124-139.
- 13 Farrell, J., McConnell, K., & Brulle, R. (2019). Evidence-based strategies to combat scientific misinformation. *Nature Climate Change*, 1.
- 14 Oreskes, N. (2004). The scientific consensus on climate change. *Science*, 306(5702), 1686-1686.
- 15 Shwed, U., & Bearman, P. S. (2010). The temporal structure of scientific consensus formation. *American Sociological Review*, 75(6), 817-840.
- 16 Cook, J., Nuccitelli, D., Green, S.A., Richardson, M., Winkler, B., Painting, R., Way, R., Jacobs, P., & Skuce, A. (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental Research Letters*, 8(2), 024024+.
- 17 Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R., Verheggen, B., Maibach, E. W., Carlton, J. S., Lewandowsky, S., Skuce, A. G., Green, S. A., & Nuccitelli, D. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters*, 11(4), 048002.
- 18 Oreskes, N. (2019). *Why Trust Science?* (Vol. 1). Princeton University Press.
- 19 Molina, M., McCarthy, J., Wall, D., Alley, R., Cobb, K., Cole, J., Das, S., Diffenbaugh, N., Emanuel, K., Frumkin, H., Hayhoe, K., Parmesan, C., Shepherd, M. (2014). *What we know: The reality, risks, and responses to climate change*. American Association for the Advancement of Science (AAAS): http://whatwewknow.aaas.org/wp-content/uploads/2014/07/whatwewknow_website.pdf.
- 20 Elsasser, S. W., & Dunlap, R. E. (2013). Leading voices in the denier choir: Conservative columnists' dismissal of global warming and denigration of climate science. *American Behavioral Scientist*, 57(6), 754-776.

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- 21 Dunlap, R. E., & McCright, A. M. (2011). Organized climate change denial. *The Oxford Handbook of Climate Change and Society*, 144-160.
 - 22 Luntz, F. (2002) *The environment: a cleaner, safer, healthier America*. Luntz Research, Alexandria. Retrieved from <https://www2.bc.edu/~plater/Newpublicsite06/suppmats/02.6.pdf>.
 - 23 Boussalis, C., & Coan, T. G. (2016). Text-mining the signals of climate change doubt. *Global Environmental Change*, 36, 89-100.
 - 24 Franta, B. (2018). Early oil industry knowledge of CO₂ and global warming. *Nature Climate Change*, 1.
 - 25 Supran, G. & Oreskes, N. (2017). Assessing ExxonMobil's climate change communications (1977–2014). *Environmental Research Letters*, 12(8).
 - 26 Cook, J., Ellerton, P., & Kinkead, D. (2018). Deconstructing climate misinformation to identify reasoning errors. *Environmental Research Letters*, 13(2), 024018.
 - 27 Lewandowsky, S., Cook, J., & Lloyd, E. (2016). The 'Alice in Wonderland' mechanics of the rejection of (climate) science: simulating coherence by conspiracism. *Synthese*, 195(1), 175-196.
 - 28 Campbell, T. H., & Kay, A. C. (2014). Solution aversion: On the relation between ideology and motivated disbelief. *Journal of personality and social psychology*, 107(5), 809.
 - 29 Diethelm, P., & McKee, M. (2009). Denialism: what is it and how should scientists respond? *The European Journal of Public Health*, 19(1), 2-4. doi:10.1093/eurpub/ckn139.
 - 30 Hoofnagle, M. (2007, April 30). Hello Scienceblogs. Denialism Blog. Retrieved from <http://scienceblogs.com/denialism/about/>.
 - 31 Schmid, P., & Betsch, C. (2019). Effective strategies for rebutting science denialism in public discussions. *Nature Human Behaviour*, 1.
 - 32 Lewandowsky, S., Ballard, T., Oberauer, K., & Benestad, R. (2016). A blind expert test of contrarian claims about climate data. *Global Environmental Change*, 39, 91-97.
 - 33 Lewandowsky, S., Gignac, G. E., & Oberauer, K. (2013). The role of conspiracist ideation and worldviews in predicting rejection of science. *PloS one*, 8(10), e75637.
 - 34 Brandt, A. M. (2007). *The cigarette century: the rise, fall, and deadly persistence of the product that defined America*. Basic Books (AZ).
 - 35 Proctor, R. N. (2011). *Golden holocaust: origins of the cigarette catastrophe and the case for abolition*. Univ of California Press.

