

UNIVERSITY OF VIRGINIA NET-ZERO RESIDENCE INITIATIVE 2022

PROJECT ENERGY GENERATION GROUP

**WHY DO A LARGE NUMBER OF AMERICANS DISTRUST CLIMATE
SCIENTISTS AND DO NOT BELIEVE IN GLOBAL WARMING?**

A Research Paper submitted to the Department of Engineering and Society

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science in Major Mechanical Engineering

By:

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8/11/2022

On my honor as a University student, I have neither given nor received unauthorized aid on
this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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INITIAL REASONING

As of 2020, only 57 percent of Americans believe that global warming is real (Figure 1). When asked about global warming in 2014, only 48 percent of Americans said that they believe in global warming (Chinni, 2021).

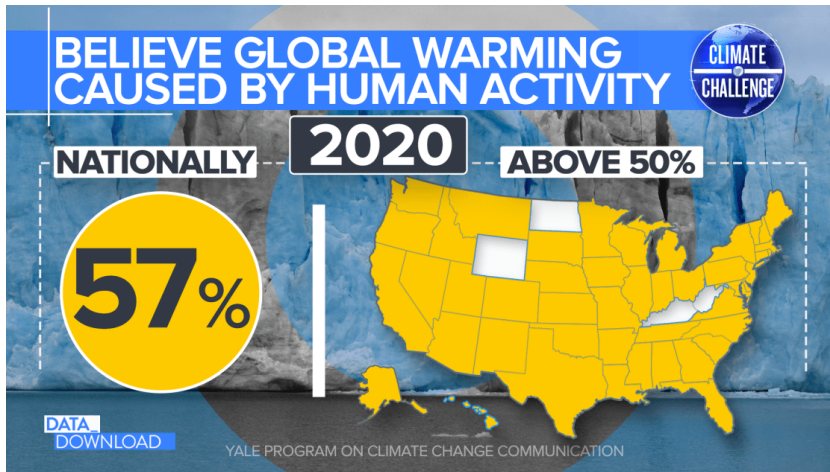


Figure 1: What states do over half of the residents believe in global warming? This shows the percentage of Americans who do not believe in human caused global warming and the 4 states where less than half of their residents believe in global warming (Chinni, 2021).

The large number of voters who do not believe in global warming greatly hinders the chance of policies being enacted to help fight global warming. If people do not believe in global warming, they are less likely to try to fight climate change. People will also vote for candidates who pledge that they will not fight climate change. In addition, only 43 percent of Americans believe that global warming will harm them individually (Chinni, 2021). If people do not find something to be threatening to them, they will not care about preventing it. Why do so many people not believe in human caused climate change despite nearly all climate scientists saying that global warming is real and a serious hazard? What causes someone to be more likely to question experts in the field of climate science? Are certain social groups more likely to be skeptical about the existence of global warming? Understanding why people ignore scientists and

who they trust is crucial in trying to change their opinions in an effective manner. People need to see what they believe and where they get their information. What they were taught and who taught it to them? Did they learn their beliefs from their parents, teachers, the internet or anything else? Which people are more likely to trust a random person on Facebook more than a peer reviewed scientific study. It is important to see why people are more likely to trust untrustworthy sources and see what they believe. Also, it is important to look into the differing levels of trust in climate scientists. Some people are simply skeptical while others are very adamant that climate change is a hoax. We need to see where different groups of people fall on that spectrum. Many different groups are overall more skeptical about climate change. It is important to look into these different groups and see why they distrust scientists and how we can change their opinions. It is important to see why they are skeptical so that people can teach them about climate change in a way that will be effective. It is important to teach people in a way that does not make them feel stupid. The belief that climate change is not real is a conspiracy theory. It is important to see why people believe in conspiracy theories that say that you should not trust experts in a given field. While every conspiracy theory is different, it is important to see why people believe in them. Understanding why people believe in conspiracy theories that have nothing to do with climate change can still help us understand why people believe in conspiracy theories that do involve climate change. The technical project associated with this report is about researching ways to combat climate change using engineering. This can be done by manufacturing specialized materials that reflect nearly all sunlight they come into contact with while emitting energy in a specialized range. Earth's atmosphere does not trap light with wavelengths between 8-13 μm . If a material can exclusively emit heat with wavelengths in this

range, all of its emitted heat will travel through Earth's atmosphere into space. This can cause the material's temperature to decrease below the ambient air temperature.

RISK ANALYSIS

The STS framework that was used is the risk analysis framework. This paper will talk about the risks that climate change poses, how long humanity has known about those risks and what people have done to address these risks. It will look at who is more likely to view climate change as a serious risk to them and who is not. This paper compares how worry about climate change relates to a person's beliefs about climate change (Campbell et al., 2021).

REASONS WHY PEOPLE DO NOT BELIEVE IN CLIMATE CHANGE

There are many reasons why people believe in various conspiracy theories. Many conspiracy theories shift the balance of power from what it actually is to a reality where their opposition is significantly more powerful. This makes people feel helpless and it causes them to be less trusting in the mainstream media. People are also more likely to only view sources that agree with their own beliefs giving them a confirmation bias. People are also more likely to believe in a conspiracy theory if it gives them a sense of community, both online and offline (Stempel et al., 2007). These are some of the reasons why people will believe in conspiracy theories like claiming that global warming is a hoax.

Evidence for human caused climate change has been around since the end of World War Two. By the 1960s, climate change started to become a public issue that impacted who people voted for and what a political candidate's policies would entail (Boneuil et al., 2021). In the 1960s, the American Petroleum Institute received warning on how the expansion in the use of

fossil fuels will cause significant change to the climate in the following decades. This led to some of the first true research in the field of human caused climate change. In 1971, French scientist François Durand-Dastès published some of the first data on the early warning signs that the increase in the burning of fossil fuels is dangerous to the environment. His report talked about how carbon dioxide is one of the main contributors to global warming and that he is worried that the production of carbon dioxide is going to continue to increase. He also mentioned how this could cause the polar ice caps to melt and the sea levels to rise. He also predicted that the atmospheric concentration of carbon dioxide would reach 400 parts per million by 2010. This prediction was nearly accurate when the atmospheric concentration of carbon dioxide reached 400 parts per million in 2015. He also stated that we risked increasing the Earth's average temperature by 1-1.5°C (Boneuil et al., 2021). The report stated that an increase in global temperature would have resulted in drastic changes to the planet, the polar ice caps would melt causing global sea levels to rise and there would be severe complications to atmospheric circulation. This report was one of the many reasons why climate change was brought up as an international concern at the 1972 UN General Assembly. The United Nations assessed the possible risks to many issues climate change could cause like rising sea levels flooding coastal communities. The UN laid out 109 recommendations to countries on how they should address the climate emergency (UN, 1972 pp. 6-27). The UN also laid out an action plan that should be taken to stop climate change. It is clear that 50 years ago, the UN assessed climate change to be a severe issue that must be dealt with. If climate experts and the United Nations have been claiming that humans are causing the planet's climate to change, why do so many people distrust them?

According to a study done at George Mason University in January 2010, only 57 percent of interviewees said ‘yes’ to the question, “Do you think global warming is happening?” (Leiserowitz et al., 2010, p. 2). Twenty percent answered that question ‘no’ while 23 percent answered ‘don’t know’. This means that as of 2010, nearly half of all Americans do not believe in global warming or are doubtful about its existence. In addition, when the people who answered yes to the previous question were asked, “How sure are you that global warming is happening?”, only 23 percent answered ‘extremely sure’ while 35 percent said ‘very sure’, 37 percent said ‘somewhat sure’ and 5 percent said ‘not at all sure’ (Leiserowitz et al., 2010, p. 2). When the interviewees were asked the question, “Assuming global warming is happening, do you think it is...” 47 percent answered ‘caused mostly by human activities’ while 36 percent answered ‘caused mostly by natural changes in the environment’ while 9 percent stated ‘none of the above because global warming isn’t happening’ (Leiserowitz et al., 2010, p. 3). This means that less than half of Americans do not believe that global warming is caused by human activity even though nearly every climate scientist has been saying that climate change is real and it is caused by humans for decades. When asked how worried they are about global warming, half of all participants said they were either somewhat or very worried while the other half said they were either not very worried or not worried at all (Leiserowitz et al., 2010, p. 4) Why do over half of Americans not believe climate scientists?

WHY PEOPLE DO NOT BELIEVE IN CLIMATE CHANGE?

In order to fight climate change, we need almost everyone to believe that it is real and we need more people who are willing to try to fight it. We must understand why people do not believe in climate change and do not trust the peer-reviewed data published by experts in the

field of climate science. We should also look at people who distrust experts in different fields and see why they have those beliefs. One explanation could be due to receiving an inadequate education as a kid. People who participated in educational nature activities are more likely to believe in climate change (Ranney et al., 2021). This also means that people who spent more of their youth inside are more likely to be skeptical about climate change. Not everyone was taught that climate change is real when they were in school. People whose science teachers taught them not to worry about climate change or that it is a hoax are likely to continue to believe that throughout their lives. Also, many people have been taught that climate change is not a severe risk. If people are told that climate change will not cause them or their community harm, they are less likely to take the issue seriously.

POLITICAL VIEWS

Membership in a political party is another reason why many Americans may not believe in climate change. From a poll done in April 2020, climate change is the 13th most important issue concerning all registered voters, but it was the 2nd most important issue for liberal Democrats (Campbell et al., 2021). This means that Democrats are significantly more likely to believe that climate change is real and a serious issue compared to non-Democrats. In addition, people primarily consume media that promotes their side's beliefs. This means that Democrats are more likely to watch stories or click on new articles about climate change compared to non-Democrats. If people only consume media telling them climate change is a hoax, they are more likely to believe that climate change is a hoax. A study done in 2019 showed that exposure to liberal media sources caused people to consider climate change a serious issue when voting for a political candidate (Campbell et al., 2021). This is because liberal media sources often state

that the risks of not addressing climate change are severe. They attempt to make people worried about climate change and the more of a risk someone believes climate change to be, the more likely they will vote for a candidate who will fight it. It also showed that the more a person consumes conservative media, the less likely they are to vote for a candidate based on their climate change policies. This was shown when in 2020, 83 percent of Democrats said climate change is a 'high' or 'very high' priority when it came to voting while only 22 percent of Republicans said so (Campbell et al., 2021).

MEDIA CONSUMPTION

There are many other reasons why people do not believe in climate change including how much of a risk you believe climate change to be, media influences and social norms. In 2019, data scientists interviewed many different people about their beliefs on climate change and what could be the reason as to why they have them. They then use a generalized linear model to see if certain factors correlate to being skeptical about the existence of climate change. It was shown that the more a person believes climate change to be dangerous and how worried people were about climate change caused climate change to be more important when they are voting (Campbell et al., 2021). Certain media sites like Fox News usually downplay the severity of climate change or say that it is not real. This can cause its viewers to gain these beliefs because they consider Fox News a trustworthy source of information. This is why the study found that the more a person watches Fox News, the more skeptical they will be about the severity of climate change (Campbell et al., 2021). This causes many people to believe that climate change is only a small issue. They view the risk of allowing climate change to happen to be minimal. However, the study showed that consuming mainstream media sources like ABC, NBC & CBS

and liberal media like MSNBC and CNN correlates to an increased worry for climate change. This study also showed that the more these biased media sites bash the other side, the more people will agree with them. This means that the more Fox News blames Democrats for the negative side effects that arise from passing climate legislation, the more its viewers will be skeptical about climate change. The viewers assess the risk of climate change to be too small to change their habits. People are more willing to inconvenience themselves the more serious they find the risk of not changing their actions. It also showed that the more a person talks about climate change with their family and friends, the more likely they are to consider it an issue when voting.

Social media is another huge determining factor as to why certain people distrust experts in the field of climate science. Many people's beliefs come from posts on various social media sites. The more a person receives their news from social media, the more likely they are to believe in various conspiracy theories, including that climate change is a hoax. A study from 2021 found that among people who claim to get most of their news from social media are more likely to believe in multiple conspiracy theories (Enders et al., 2021). Compared to people who receive most of their news from TV, people who consume news on social media on average believe in two more conspiracy theories. It also showed that how likely a person is to believe in conspiracy theories is dependent on what social media site(s) they use. The study showed that the more people use 4chan/8chan, the more likely they are to believe in a conspiracy theory. It also showed that Facebook is the least likely popular social media site to be the cause of a person's beliefs in a conspiracy theory. Therefore, the type of media a person consumes greatly determines if they are more or less likely to believe in conspiracy theories, like that climate change is not real.

RELIGIOUS BELIEFS

A person's religious beliefs can greatly determine whether they are more or less likely to be skeptical about climate change. How religious a person believes themselves to be is also a large factor. A study published in 2020 asked 1000 people from the Pacific Northwest various questions relating to their beliefs on religion and climate change. The study had every participant rank how religious they believe themselves to be on a scale of 1 to 7. People were instructed to answer 1 if they almost never attend religious services, 7 if they attend them multiple times a week or answer somewhere in the middle based on how often they attend religious services. The study found that for every point above 1 someone ranked their religiosity, they were 12% more likely to be skeptical about the existence of climate change (Sarithchandra et al., 2020).

Are people who distrust experts in the field of climate change more likely to distrust experts in other fields? Are the groups that are most likely to distrust experts the same when dealing with other issues? The COVID-19 pandemic was another hot button issue that had a lot of skeptics. Similar to climate change, people were very skeptical of both its existence and its severity. Are the social groups who are more likely to be skeptical of climate change also more likely to be skeptical about the severity of COVID-19?

COMPARISONS TO COVID-19 SKEPTICS

Over the course of the COVID-19 pandemic, a growing share of Americans has refused to comply with guidelines set by the U.S. Centers for Disease Control and Prevention (CDC). Political ideology is one reason for this. While vaccination is not the only way to protect oneself and others from the virus, it is one of the best ways.

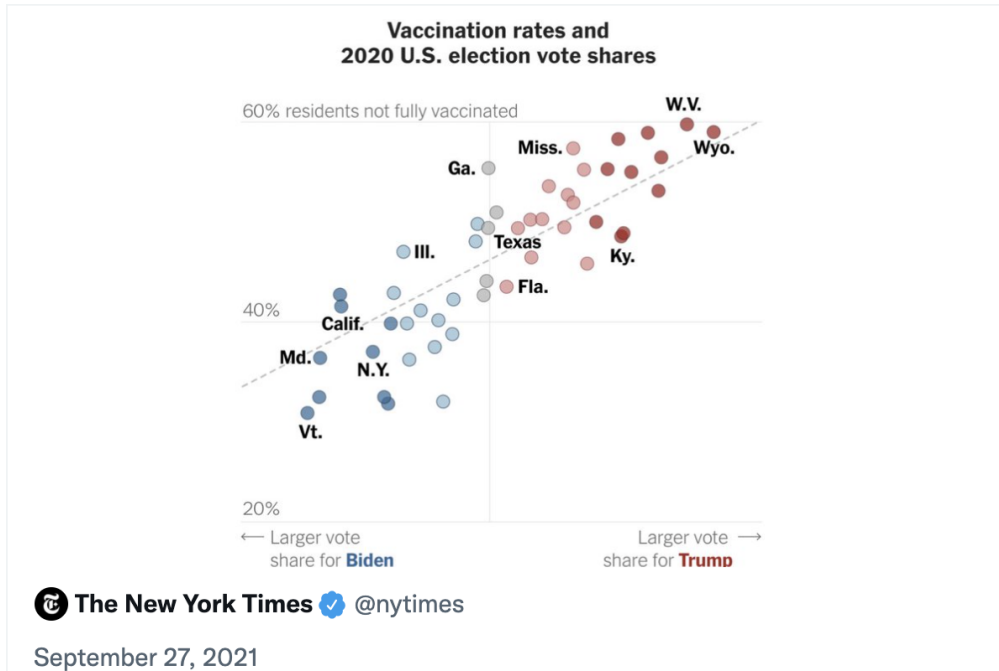


Figure 2: Non-vaccinated by red and blue states. This graph compares each state’s vaccine rate to how they voted in the 2020 presidential election (New York Times, 2021)

There is a clear correlation between how a state’s population voted in 2020 and the vaccination rate of its residents (Figure. 2). In the US, as of September 2021, approximately 88 percent of Democrats adults are vaccinated (Todd, 2021), while only 55 percent of Republican adults are. About 91 percent of Biden voters in the 2020 general election are vaccinated, while only 50 percent of Trump voters are. Social media posts opposing lockdowns and other COVID restrictions were primarily posted by Republicans from accounts that promoted common Republican beliefs (Leonhardt, 2021). On Republican-leaning news sites, such as Fox News and OAN, hosts have downplayed the severity of the virus (University of Washington, 2020), while hosts of Democratic-leaning news sites, such as CNN and MSNBC, did not. Many say that CNN and MSNBC have instilled fear among the public by exaggerating COVID’s dangers. The more people see COVID as a risk to them and/or their loved ones, the more they will do to lower the spread of the virus.

Religion has been another common reason for refusing to follow COVID guidelines. Many cited religious grounds for claiming exemptions from vaccinations or mask requirements. Some argued that since masks are not in the Bible, they are unbiblical (Graves-Fitzsimmons, 2021). Resurrection Catholic School in Michigan sued the state over its mask mandate claiming “because God created us in His image, we are masking that image” (Graves-Fitzsimmons, 2021 p. 1). Some religious leaders alleged that COVID was God’s punishment. When compared, Atheists are significantly more likely to follow COVID restrictions compared to theists (Todd, 2021).

The groups of people who were more likely to be skeptical about the severity of the COVID-19 pandemic are very similar to the groups of people who are more likely to be skeptical about the existence of human caused climate change. When it comes to skepticism about the severity of both climate change and COVID-19, the more conservative one views themselves, the more likely they will be skeptical about these two issues. In addition, the more religious a person views themselves to be, the more likely they will be skeptical about both of these issues. For both issues, the more liberal biased media a person consumes, the more likely they are to consider both these issues to be threatening. Conversely, the more conservative biased media a person consumes, the more likely they are to be skeptical about the severity of both of these issues.

WHAT GROUPS OF PEOPLE ARE MOST SKEPTICAL ABOUT THE SEVERITY OF CLIMATE CHANGE?

This paper shows some of the reasons why people are less likely to believe that climate change is real and that it is caused by human activity. It discussed many different groups that are either more or less likely to trust the word of climate scientists and believe in what they say. It

looked into people who are more likely to trust experts in a particular field. This paper showed some of the reasons why people do not believe in climate change. It also looked into who sees climate change as a risk to them and who does not. This paper looked at what groups of people are more likely to distrust experts and instead believe the word of people who are not well educated in the particular field. It showed that the more religious a person views themselves to be, the more likely they will distrust climate scientists. One reason is that most religious people believe that their god is responsible for all weather on Earth and humans cannot change it. These are some of the reasons why certain people do not believe the words of experts in the field of climate science.

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