



The Utility of Positive Messaging in Promoting Acceptance of Climate Change

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The Utility of Positive Messaging in
Promoting Acceptance of Climate Change

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A Thesis in the field of Sustainability and Environmental Management
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

November, 2016

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Abstract

This project investigates whether framing climate change in terms of the U.S. military would resonate with climate change deniers by incorporating other aspects of their world-view. A goal of this research is to find common ground, areas not directly connected to climate change in the public's mind, such as the economy and the military, thereby garnering support for the U.S. to enact meaningful climate change legislation.

Anthropogenic climate change is the greatest threat facing the United States yet the warnings of scientists are drowned out by a denial machine created by the fossil fuel industry and aided by many in the Republican party. The denier perspective is continuously reinforced by news media aligned with their platform.

An internet survey was conducted to test the hypothesis that the positive message that actions ameliorating climate change benefit America would resonate with climate deniers by incorporating other aspects of their world-view. Survey respondents were informed that the U.S. military connects global warming and threats to national and global security, such as economic stability, terrorism, refugees and the need for increased U.S. military involvement. The respondents were asked if they agree some of the climate change scenarios of the U. S. military are likely to occur and if they support measures to promote economic growth while reducing dependence on oil by supporting alternative energy sources. The survey was conducted by Decision Analyst, using 406 randomly selected respondents from their database of millions of online survey participants.

While military concerns were not effective in motivating climate change deniers to action, the survey revealed important findings. Unexpectedly, the most striking result was finding the need for the military to communicate its priorities within its own ranks. Survey respondents who identified themselves as climate change deniers with military affiliations failed to acknowledge the line connecting fossil fuel dependence and the resulting military and security issues. Of this group, 79% of the females and 72% of males were Republican. Regardless of military affiliation, the denier group ranked growth in the U.S. economy as their number one concern which highlights the disconnect between their priorities and the economic effects of failing to halt global warming. I conclude that the climate change message would benefit from shifting from one of science to one including military and economic factors, delivered by a trusted source, such as a well know thought leader and/or the Ad Council.

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Chapter I

Introduction

Anthropogenic global warming is changing the earth's climate creating an inordinate challenge to life as we know it. Early effects are evident in the form of increased temperatures (last year was the hottest on record), shrinking glaciers, acidic oceans, coral bleaching, increased flooding, coastal erosion, drought, thawing tundra, the spread of vector-borne disease, forests decimated by insects, island nations swamped by rising seas, and inter dependent species no longer coordinating their life cycles. These are a small example of visible documented changes currently taking place on the earth.

Ninety-seven percent of the world's scientists believe mankind's use of fossil fuels is the mechanism driving this rapid climate change. Scientists warn that we are approaching a tipping point in our atmosphere from which we cannot recover (Barnosky et al., 2012), and it may already be too late to avoid catastrophic consequences.

The geopolitical fallout is just beginning to be felt as 70 percent of the world's nations deem climate change a threat to their national security (Holland & DeGarmo, 2014). The Global Military Advisory Council on Climate Change, made up of current and former generals, are planning for conflicts over natural resources such as food and water and migrants from climate ravaged areas (Global Military Advisory Council on Climate Change, 2015). More importantly, they wish to work with politicians to ensure these events don't continue to arise. In the United States, the focus is on the internal conflict about whether climate change is really happening. Discussions on how to stop

climate change while planning for its impacts are overshadowed or met with ridicule by non-believers.

Research Significance and Goals

The U.S. military, scientists, environmental groups and the general public who acknowledge the reality of global warming are frustrated by the lack of understanding and concern demonstrated by significant segments of the US population. Believing inaction is ushering in impending doom, climate change activists tend to issue statements and visuals that are frightening, such as drowning polar bears or London underwater. The messengers themselves can be polarizing figures to the point where any issue they promote would be met with disdain from individuals in the climate denier group. Other messages to connect the dots between human behaviors such as energy use and global warming oftentimes implicate the American way of life as a root cause. Furthermore, the stated need for immediate action to stop the climbing carbon count on an issue many see as far off, if real at all, cannot compete with the daily concerns of everyday life. All of these messages have failed to raise awareness, concern or belief among the denier group while entrenched interests have successfully conveyed the premise that climate change is a political issue promoted by a liberal agenda.

This thesis explores other areas climate change deniers may be concerned about and whether they would respond positively when given affirmative messages about the benefits of climate change remediation policies, such as the economy and the U.S. military. As a major contributor to climate change, the United States government must be fully on board, if not a leader, in a worldwide effort to find solutions and put them in

place. In order for that to occur, politicians from all parties must be engaged in the process. As a means of gaining traction toward that end, deniers must be made aware that the Department of Defense considers global warming to be a threat multiplier, affecting the ability to defend ourselves, while damaging our economy and harming our infrastructure. At the same time more demands will be placed on the U.S. military and its reserve forces as terrorist activity, political instability, humanitarian assistance, environmental degradation and food and water shortages stress its ability to function.

Background

The science surrounding global warming is not a recent discovery, yet, climate change denier groups choose to embrace the anti-science communication coming from special interest groups.

Vested Interests

In the United States, the vested interests of the fossil fuel industry have utilized their vast wealth to plant seeds of denial, distorting facts of global warming and insisting the majority of scientists do not agree that anthropogenic climate change is happening. Television commercials tout the benefits of carbon, wrapping use of fossil fuels in terms of American independence. The news media often grants climate deniers equal time without revealing their minority positions or their funding sources. Viewers who watch Fox News are exposed to a steady stream of climate change denial often described as a scam and a hoax, implying honest scientists do not agree with it. A 2012 study found the

Fox network misrepresented climate science 93 percent of the time (Huertas & Adler, 2012) coinciding with a 2011 Yale University finding that people were less likely to believe the reality of climate change the more they tuned into Fox (Feldman, Maibach, Roser-Renouf & Leiserowitz, 2011). The widely read print newspaper, *The Wall Street Journal*, is equally culpable, neglecting to inform readers of climate science and instead running a December, 2015 editorial stating “if climate change really does imperil the Earth, and we doubt it does, nothing coming out of a gaggle of governments and the United Nations will save it” (“Paris Climate of Conformity,” 2015).

Facts regarding the timing, causation and magnitude of global warming are manipulated in a fashion reminiscent of the cigarette health controversy of decades past. Climate scientists themselves have become targets of the fossil fuel industry, enduring bullying and harassment in an effort to intimidate them into silence. Too many Republican politicians, influenced by campaign donations and eager to remain in the mainstream of party politics, pander to the fossil fuel industry and Fox viewing constituents by obstructing passage of meaningful legislation curbing greenhouse gases. Together, these groups have successfully muted and confused the warnings mainstream scientists struggle to communicate.

This misinformation campaign is aided by a lack of scientific literacy among the general population. According to a study by AAAS, as of 2008, just 28 percent of American adults had a sufficient understanding of scientific concepts to comprehend the Tuesday science section of *The New York Times* (Miller, 2010). The confusion and uncertainties in the public's mind have limited the number of Americans who believe that global warming is real to only 63 percent, and only half of all Americans believe the

cause is largely anthropogenic. An October, 2015 report by the Yale Program on Climate Change Communication puts the number of climate change believers at 67 percent and if it is happening, 33 percent feel it is largely due to natural phenomena (Leiserowitz, Maibach, Roser-Renouf, Feinberg, & Rosenthal, 2015).

Despite years of denial and funding climate change denial groups, such as the American Legislative Exchange Council, many major oil companies have recently been acknowledging climate change is real and caused by increased emissions of carbon dioxide. Strikingly, these acknowledgements by powerful players in the fossil fuel industry have not penetrated the Republican political agenda nor the right-leaning news outlets from which many people draw their perceptions and attitudes. Similar to the alarm scientists have raised, the seemingly quiet admissions from industry have not garnered public understanding and acceptance of climate change. Clearly it is time to present a new message, one that conveys the connections around anthropogenic climate change, the U.S. military, the economy and other facets of our lives

Global Warming Science

Variations in the sun's intensity, light reflecting aerosols from volcanic eruptions, and natural cycles of heat trapping gases in the atmosphere such as methane and carbon (Huertas & Adler, 2012) all drive changes in climate. Average radioactive forcing of surface warming and cooling influencers are shown in Figure 1.

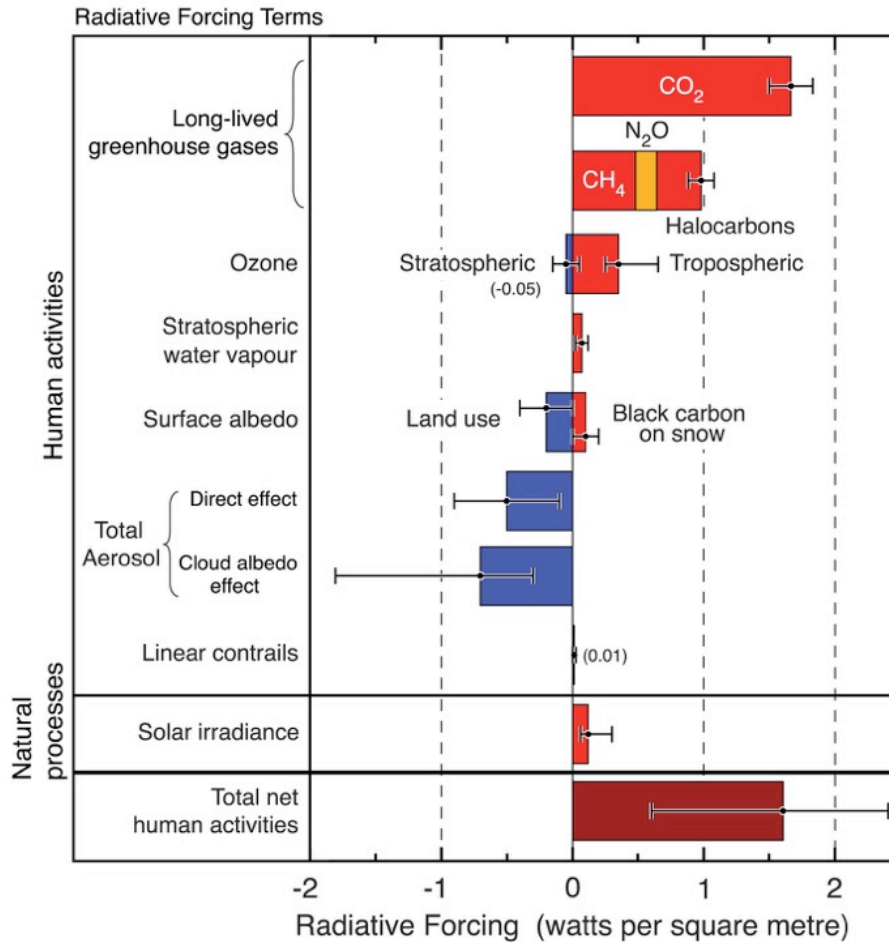


Figure I. Climate influencers between 1750 and 2005. Average radioactive forcing of surface warming and cooling influence (Forster et al., 2007).

Although there are many influencing factors, carbon and methane gases are the most significant. Methane is approximately 20 times more potent trapping heat but only remains in the atmosphere for approximately 20 years. Carbon is more prevalent in the atmosphere, is being added in greater quantities and lingers for 100 or more years, making carbon the main driver of climate change.

Through the work of John Tyndall and Svante Arrhenius in the 1800s, mankind learned carbon dioxide is a heat trapping gas and realized burning fossil fuels would

increase its concentration in the atmosphere causing the earth to warm. With the advent of the industrial revolution, greenhouse gases have been steadily increasing with carbon alone rising 30 ppm in the last two decades whereas it had never increased more than 30 ppm in any prior 1,000-year time period (American Chemical Society, 2007). As predicted, the earth is warming. Unlike natural variations in climate which are measured in geological time, the anthropogenic effect on carbon in the atmosphere is clearly demonstrated in measurements taken from the late 1950s onward in Mauna Loa, Hawaii (Figure 2).

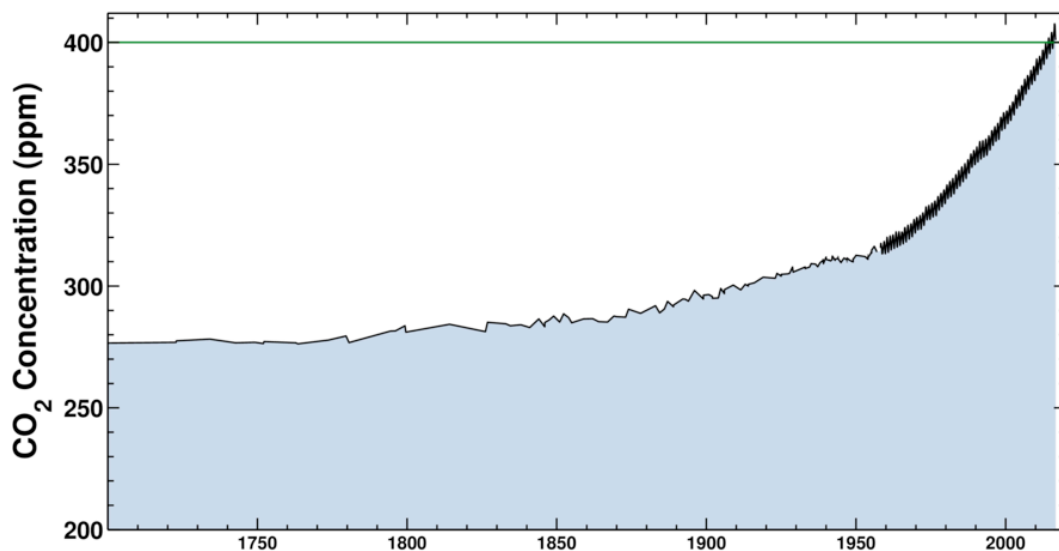


Figure 2. Mauna Loa CO₂ reading of 400.91 ppm on September 30, 2016. Ice-core data before 1958, Mauna Loa data after 1958, compared with historical ice core sample CO₂ levels (Scripps Institution of Oceanography, 2016).

Earth's climate is an intricate system consisting of the cryosphere, geosphere, hydrosphere, biosphere and atmosphere, which continuously interact (Figure 3). The terms “global warming” and “climate change” refer to the warming of the earth due to the

increased amounts of heat trapping gases added to the atmosphere, which prevent the heat from passing into space. In this paper, they are used interchangeably. This phenomenon is known as the greenhouse effect, and today, mankind is accelerating the earth's warming largely by burning fossil fuels.

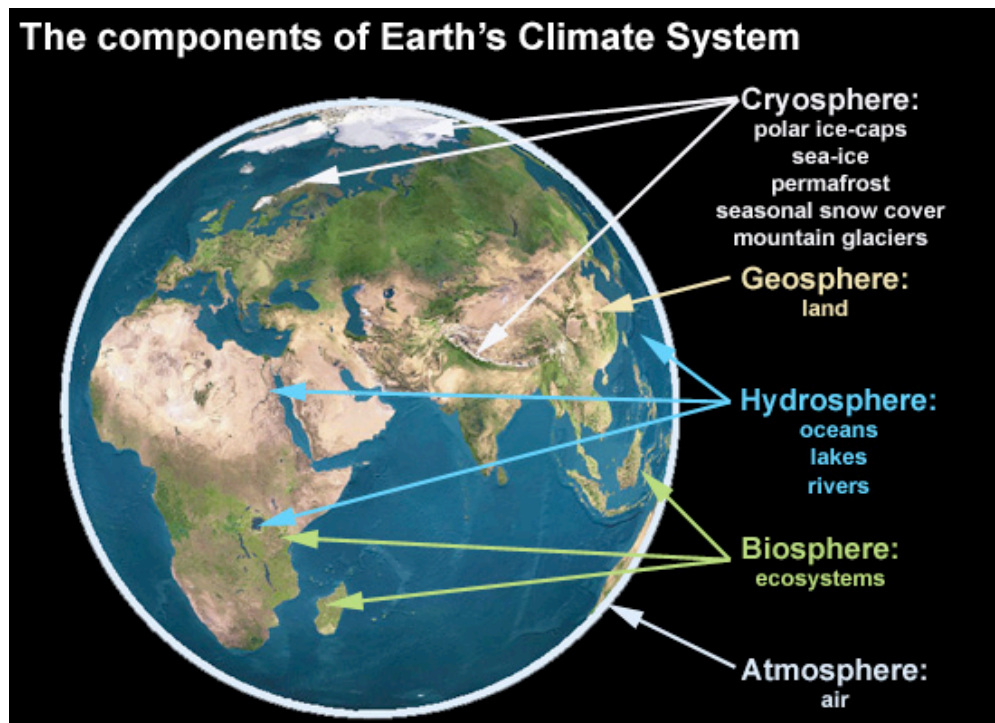


Figure 3. The components of Earth's climate system. Details cryosphere, hydrosphere, biosphere and atmosphere (Mason, 2013).

We know that throughout most of geological time, earth's climate and changes in CO₂ occur together (Mason, 2013). When the level of carbon dioxide increases, temperature increases. In the past earth has generally warmed and cooled over time, allowing life to adjust to new conditions. But when there were periods of abrupt warming, resulting from massive amounts of CO₂ released into the atmosphere, such as

during volcanic eruptions, the result was massive die-offs of life that needed time to adapt to changing conditions. Today, the combustion of fossil fuel is bringing about an imbalance in the earth's carbon cycle.

Complex relationships between the components of earth's atmosphere are well understood by climate scientists yet there remain many unknowns regarding how increasing temperatures will affect earth's varied ecosystems. Overlapping issues and positive feedback loops, such as the shrinking size of glaciers decreasing the amount of sunlight reflected back, in turn increasing the amount of dark ocean absorbing heat, causing glaciers to shrink even more, complicates predicting exactly how a warming earth will react.

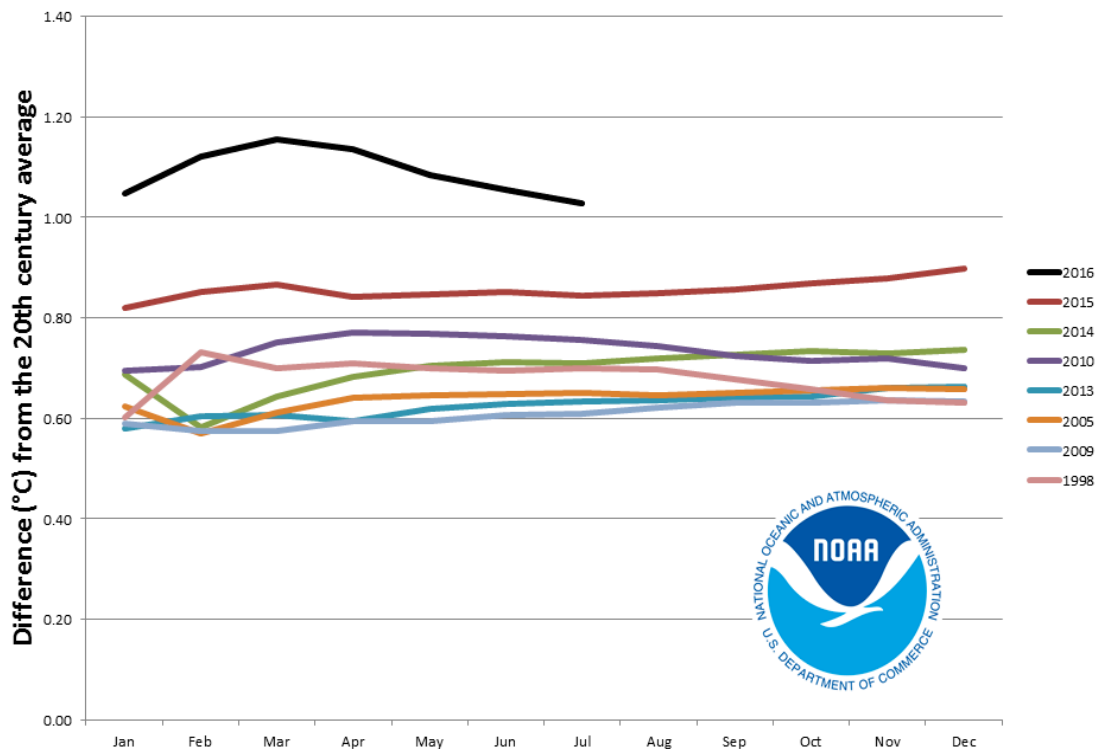


Figure 4. Year-to-date global temperatures. Shows eight warmest years on record (National Oceanic and Atmospheric Administration, 2016b).

Computer models and the negative impacts currently being observed tell us the consequence of allowing atmospheric carbon count to continue to climb will change life as we know it. The past 15 months have been the warmest on record with July, 2016 being the hottest (Figure 4). The extreme weather we are currently witnessing—massive wildfires in drought-stricken areas, devastating 1000 year flooding, insects decimating forests—all bear the imprint of climate change. The human toll and social and financial impact of the events of July, 2016 will be devastating for years to come.

The majority of people recognize that over the last 10,000 years the Earth has warmed and changes in climate, over time and space, are normal. However, most scientists agree the increase in the warming trend over the past 100 years is due in large part to the activities of mankind. Starting in the 1950s the amount of carbon in the atmosphere has been actively tracked. In order to examine what earth's atmosphere looked like in the distant past, scientists have examined ice core samples, such as those taken by researchers at the Russian Vostok Station in Antarctica. By melting the ice, scientists can measure the amount of carbon and other gases that were trapped when the ice formed. The chart below (Figure 5) demonstrates the vast expanse of geologic time that passed before shifts in levels of both carbon and methane. In August, 2016, the average CO₂ level was 402.25ppm. On August 21, 2016, the Co₂ level was 402.15ppm (National Oceanic & Atmospheric Administration, 2016a).

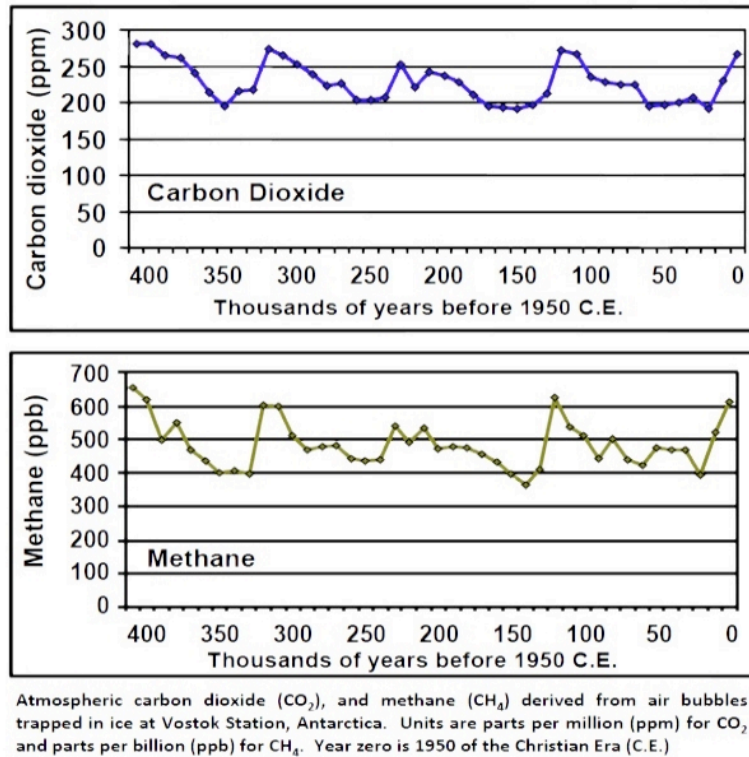


Figure 5. Atmospheric carbon dioxide and methane. Historic atmospheric carbon dioxide and methane levels pre 1950. Measurements from ice core at Vostok Station in Antarctica (Barnola, Raynaud, Lorius & Barkov, 2013).

Mired in Denial

The rest of the world largely recognizes the realities of climate change and many countries are working to find solutions utilizing the United Nations UPCC, climate treaties, development of renewable energy, carbon taxes, carbon trading, carbon sequestration and multiple sustainability approaches. Politically, the United States remains mired in a discussion of “do you believe in climate change?” Political identity is the single most identifying factor in determining that answer. According to the Center for American Progress, there are 182 deniers in Congress, and all of them are Republican

(Strong, 2016). Along with the majority of Republican voters, they have yet to show appreciation for what the climate change belief equation looks like today:

Oil companies + Scientists + U.S. Military+ Pope Francis + 84% democrats+ 40% Republicans Versus Deniers

The stronger someone identifies with being a Republican, the greater the chance they identify as a climate denier. People on both sides readily accept statements that coincide with their worldview, which is reinforced by outlets catering to their existing beliefs, such as Republican politicians, Fox News and *The Wall Street Journal*.

Interestingly, the 2008 Republican Platform held a different view, it included the following statement in the Environmental Protection section titled Addressing Climate Change Responsibly:

The same human economic activity that has brought freedom and opportunity to billions has also increased the amount of carbon in the atmosphere. While the scope and long-term consequences of this are the subject of ongoing scientific research, common sense dictates that the United States should take measured and reasonable steps today to reduce any impact on the environment. Those steps, if consistent with our global competitiveness will also be good for our national security, our energy independence, and our economy. Any policies should be global in nature, based on sound science and technology, and should not harm the economy (Republican National Committee, 2008).

The current Republican presidential nominee, however, has referred to climate change as a hoax, a very expensive form of tax, and something on which people are making money. Climate change denial and dismantling climate saving measures are a hallmark of the 2016 Republican presidential campaign. Not surprisingly, the current Republican platform evinces a different philosophy than the enlightened one of 2008. In fact, the only similarity on this issue between the 2008 and 2016 platforms is the mere

mention of climate change in the current platform, albeit in a form diminishing its significance: “Climate Change is far from this nation’s most pressing national security issue” (Republican National Committee, 2016).

The American Military Perspective on Climate Change

The U.S. military does not have the luxury of sticking its head in the sand or engaging in political gamesmanship; it is charged with defending the country and US interests. As such the military has numerous tasks, including natural disaster relief, policing in volatile areas, food and humanitarian relief, law enforcement, rescue operations, security of embassies and other places, medical assistance in impoverished areas, and piracy and drug intervention (Military.com, 2016). Many of these missions are directly impacted by or intersect with emerging issues exacerbated by climate change.

The military is thus on the front lines of climate change, from harm to assets at home to the ramifications a warming earth will have around the world necessitating U.S. military involvement. The 2016 Republican Platform states “the first order of business for a Republican president and Congress will be to restore our nation’s military might.” Republicans continue to support American military superiority which has been the cornerstone of a strategy that seeks to deter aggression or defeat those who threaten our vital national security interests” (Republican National Committee, 2016). The disconnect is glaring.

The CNA Military Advisory Board (“MAB”), made up of 16 retired generals and admirals published a 2014 report titled “National Security and the Accelerating Risks of

Climate Change.” The report updates their 2007 findings and emphasizes the ways in which global warming imperils national security and implores American leaders to pay attention and act immediately to mitigate the damages. The MAB details national security issues brought on or amplified by climate change, which largely mirror the stated concerns of current U.S. military leaders. Specifically, the MAB states that climate change is already accelerating instability in the world in “countries and regions posing the greatest security threats to the United States.” It puts “key elements of our National Power including political, military, economic, social, infrastructure and information systems” at risk (The CNA Corporation, 2007). The connection between national security and the economy is well understood and the connection between fossil fuels, climate change and national security have been analyzed by scholars and the military (Matthew 2011).

The Department of Defense published the 2014 Climate Change Adaptation Roadmap which states “Climate change will affect the DOD’s ability to defend the nation and poses immediate risks to U.S. national security.” In fact, the DOD refers to climate change as a “threat multiplier” and spells out the military’s concerns, making clear that they are planning for global warming now, not just in the future, and that the associated problems will only escalate. The Roadmap details the impacts for the military and how they must adapt for those challenges. In order to maintain a prepared and agile military, they are planning for increased demand for their services including the reserves as global warming increases stressors on issues as varied as political instability, terrorist activity, humanitarian assistance, water shortages, newly opened routes through the Arctic, environmental degradation, and increased costs. The Roadmap also stresses how the

military must examine the impacts on its own infrastructure, much of which is located along vulnerable coastlines, including the viability of supply chains, increased dust on sensitive equipment, increase in disease vectors impacting the health and safety of personnel (U.S. Department of Defense, 2014).

Research Questions, Hypotheses, and Specific Aims

Global warming deniers have not embraced scientific findings, images of Miami raising its street levels, or photographs of shrinking icebergs. Scare tactics and being told their way of life is implicit in bringing about catastrophic changes have not resonated. But climate deniers lean heavily Republican, and this raises the prospect of tapping into other concerns – by asking the following research questions:

In the interest of improving life in the U.S. by promoting growth in the economy while reducing U.S. dependence on foreign oil, alternative energy sources can be encouraged and supported. Would climate deniers want lawmakers and regulators to implement subsidies or encourage development of such projects?

As a means of improving the electrical grid, both supply and infrastructure, would climate deniers be amenable to subsidizing renewable energy or funding nuclear power plants?

When informed of the Department of Defense concerns regarding threats to its ability to function competently as a result of global warming and the resulting sea level rise, how would deniers react to instituting methods to halt the warming such as cap and trade, carbon tax or creating alternatives to carbon based technologies?

If told how the U. S military sees climate change as an immediate threat to national and global security and their military will have to be more involved with food shortages, refugees and economic instability, does that information from the military create an opening for climate action or do deniers still feel these scenarios will almost certainly not happen?

When presented with a list of 12 items for them to fund, which are potentially part of the Federal budget, are there differences between hard and soft choices, when they do and do not have any monetary restrictions, and do deniers wish to fund items that are not outwardly related to climate change?

Would the impacts global warming will have on the U.S. military and economy be enough to sway climate deniers to determine mitigation efforts are an appropriate measure?

Hypothesis

My main hypothesis with respect to these research questions includes:

1) The climate change message can be modified to resonate with individual skeptics by incorporating other aspects of their world-view.

a) People who identify as climate change deniers are oftentimes concerned about the economy, want a strong military and have other concerns which are not directly related to climate change, such as an increase in terrorism.

b) Umbrella issues, such as the economy, homeland security, on-going wars in the Middle East, and terrorist activity have the potential to gain traction for climate fighting legislation which fights climate change as a by-product, such as renewable energy.

2) Climate change activists need a patriotic or practical message, emphasizing the positive by focusing on removing our fossil fuel dependency is imperative to the U.S. Military, to people in coastal cities, and others who will be directly or indirectly affected, while developing renewable energy ensures energy independence, to resonate with climate change deniers.

Specific Aims

The hypotheses articulated above generate specific research aims and associated techniques of analysis.

Specific aim 1: To explore the relationship between climate change beliefs and issues related to climate change impacts, especially as they relate to the economy and the U.S military.

Specific aim 2: To test the theory that an alternative message – one looking at climate change through the lens of military need and preparedness- might resonate with deniers while concomitantly bringing Americans the benefits of addressing the burgeoning climate crisis.

Specific aim 3: To examine relationships between climate change belief, separated in categories of believer, unsure or denier and other demographics such as gender, age, relationship to the military, income and education level.

Specific aim 4: To uncover alternative climate change messages which would likely resonate with individuals in the denier category.

Chapter II

Methods

The method utilized a survey to collect data to determine where a statistically significant group of a random selection of people fall on the spectrum of acceptors or deniers of climate change, and how these individuals respond to soft and hard choices for policies that would address global warming and related issues. Accordingly, the questionnaire was designed to determine whether climate change deniers would respond to the stated needs of the U.S. military or to governmental efforts to ameliorate climate change-related issues for economic or other reasons. Throughout the survey, the terms climate change and global warming are used interchangeably.

An internet-based panel survey was conducted with the help of Decision Analyst, a strategic research, analytics and modeling company located in Arlington, Texas. Decision Analyst reviewed the survey and removed researcher bias. The researcher provided funding for the survey. Decision Analyst maintains a panel of millions of email addresses for persons who have been enrolled to participate in internet surveys. The email panels are used by market research firms, pollsters, and the Federal government to conduct surveys each year. Approval from the Committee on the Use of Human Subjects at Harvard University was obtained prior to distribution of the survey by Decision Analyst.

The questionnaire was hosted entirely online with the sample of individuals directed to the website hosting the questionnaire. Since most surveys conducted in the

United States have a relatively low response rate, an assumed response rate of approximately 40 percent for a pre-qualified panel was utilized, resulting in an initial sample size of 1,000. In exchange for participating in the survey, participants earned points that they can turn in for prizes with Decision Analyst. Potential respondents were contacted by email. The final sample size of respondents to the survey was 406. This is adequate to estimate a 95 percent confidence interval with a maximum margin of error of plus or minus five percent for binary indicia, assuming a missing-at-random model for non-respondents. Data was collected by Decision Analyst and put in both Excel and SPSS format.

Survey Design

The survey was designed so that respondents were given a set of messages to rate regarding ways to improve life in the U.S. through the implementation of various scenarios. A key component of the questionnaire is that some of the issues on which respondents were queried are not issues the general public would readily associate with climate change. This was done so potential bias in the responses, based on responders inferring what the researcher may have in mind, is minimized and to gauge their perspectives.

Responders were presented with the concerns of the Department of Defense and the American military regarding climate change, then asked a series of questions regarding national priorities and spending. The questionnaire concluded by obtaining information about the characteristics of the respondents. Data analysis examined which messages were accepted or rejected by respondents, separated into subgroups by age,

education level, political identity, military service, gender, household income, degree of acceptance, and whether particular messages resonate more with some groups than with others. Respondents were first given the following introduction:

This questionnaire asks you to consider the types of concerns you may face when thinking about long term changes in the nation, in the economy, and in the way we live our lives. We'd like to know what concerns you most, choices you would make, and tradeoffs in terms of which problems to tackle first. First, we'd like to ask you about your perceptions about key issues.

The survey consisted of six parts:

1. Section A consisted of a list of 20 items which the respondent is asked to rate on a scale of 1 to 7 according to his or her concerns about the American way of life—and how these concerns may affect them personally in the next few years. The issues included two direct climate change questions along with questions on the economy and miscellaneous issues, such as pre-k education. Embedded in this set of questions were topics the general public would not necessarily relate to climate change but subjects that are in fact significantly impacted by it. These questions involve the spread of disease in the U.S., terrorist activity outside the U.S., spread of diseases in the U.S., ongoing wars in the Middle East, and homeland security and U.S. national defense. This set established a backdrop for measuring which issues a respondent is generally concerned about. Respondents were then asked a separate question to determine where they stand on climate change. Choices are on a 1 to 7 scale, with 1 being “Climate Change Not Caused by Human Activities; Not a Serious Problem,” to 4 being “Not Sure of Cause or Impact on the U. S.,” to 7 being “Climate Change Caused by Human Activities; Definitely a Serious Problem.”

2. Section B is made of three parts. Using a scale of 1 to 7, respondents were asked to choose if they would like to see various policies implemented as a way of improving life in the United States. The three parts were methods of promoting growth in the economy, ways of improving the electrical grid along infrastructure, and means to alleviate Department of Defense concerns about its ability to function competently in the environment of a warming planet and the resulting sea level rise caused by melting polar ice. All sections were made of questions related to promoting alternative energy by either taxpayer subsidy, green development tax break, encouragement, carbon tax or cap and trade.

3. In Section C, respondents were given the following statement:

The American Military is concerned about climate change and sees it as an immediate threat to national and global security. Changes in weather patterns and rising seas could result in increased U.S. military involvement due to food and water shortages, refugee and political or economic instability.

Respondents were then asked to rate a series of nine questions on a 1 to 7 scale with 1 being “Almost Certain Not to Happen,” 4 being “About 50/50” and 7 being “Almost Certain to Happen.” All of the questions directly involve scenarios the military is concerned about regarding climate change.

4. Section D had two parts. In each one respondents were asked to suppose they could decide how to supplement the federal budget. They were asked to list amounts in the millions of dollars in the column next to the list of 12 policies or expenditures they would like to see implemented, giving more to the programs they deem have a higher priority. A zero next to a program means they would not spend any money on it. The programs included items both related and unrelated to climate change issues. The two sections are identical except in the first part there was no limit on the amount that

could be spent (these are soft preferences) and in the second part the respondents had a fixed budget, so choices had monetary limitations and expenditures for climate change take away from expenditures for other things such as defense, health research, or job training (these would be hard preferences).

5. Finally, respondents were asked to provide their demographic characteristics regarding age, party affiliation, income, gender, military experience and geography in order to place their answers in context.

Chapter III

Results

As expected, Republicans tend toward denying climate change while Democrats tend to be believers and Independents are generally in the middle. Statements from the Department of Defense detailing dire consequences in the future for the U.S. military attributable to global warming failed to impact the views of deniers. This is an unexpected result. Even more remarkable is the disconnect between the views of military leaders and people with military connections. The former is quite concerned about global warming and its negative consequences for the U.S. military and national security, whereas the latter seem unaware of such a connection.

Question 1: Life Concerns

Respondents were asked to rate their level of concern on various issues regarding the American way of life and how those issues might affect them personally in the next few years. The choices were presented to respondents in a random order. Economic growth was the respondents' principal concern, followed closely by Homeland Security and National Defense, Unemployment, Infrastructure and U.S. major crime rates (Figure 6).

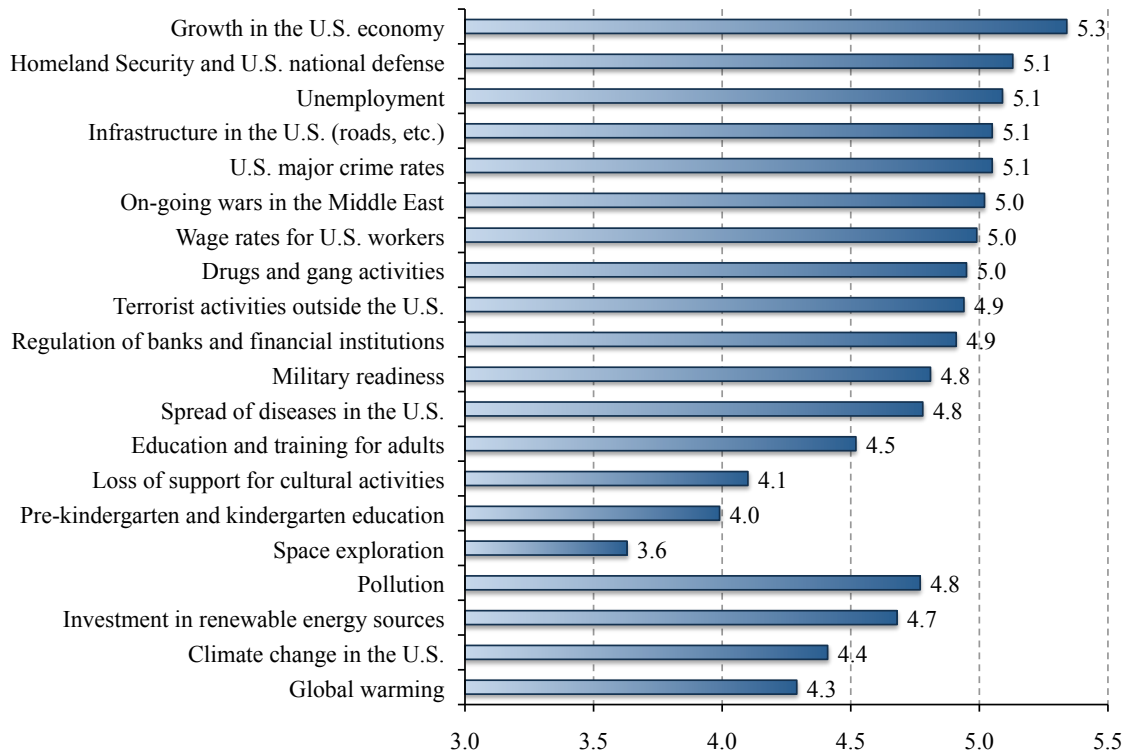


Figure 6. Life concerns. Respondents concerns regarding American way of life on scale of 1-7.

Climate change in the U.S. and global warming concerns are near the bottom, ranked ahead of only loss of support for cultural activities, early childhood education and space exploration. When separated by climate change belief, a picture emerges of deniers concerned about the spread of diseases in the U.S., military readiness, terrorist activities outside the U.S., on-going wars in the Middle East, Homeland Security, and national defense (Figure 7). All of these issues, of course, are directly impacted by climate change illuminating a critical disconnect between U.S. military beliefs and those of the denier group.

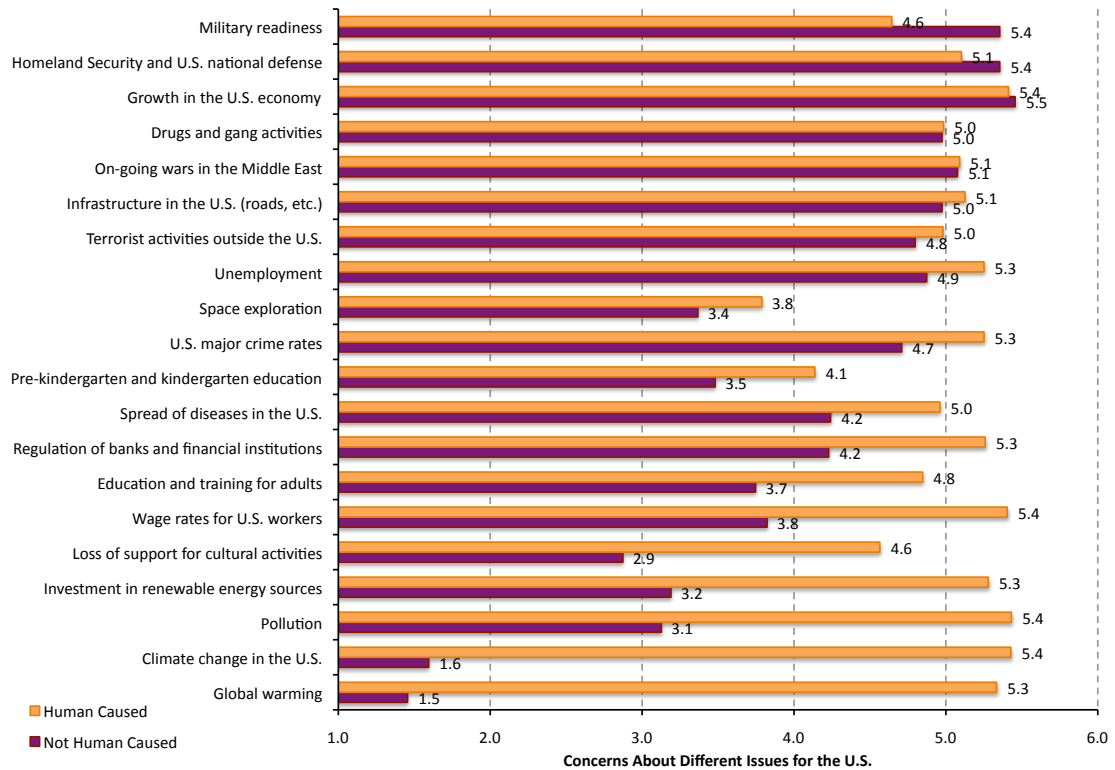


Figure 7. Life concerns by climate belief.

Question 2: Climate Change Belief

Of the 406 respondents, 63 percent agreed climate change is caused by human activities and is definitely a serious problem. Eighteen percent were not sure of the cause or impact on the U.S., while 19 percent felt climate change is not caused by human activities and is not a serious problem (Figure 8). A contemporaneous 2015 study by Yale University yielded similar results, with 63 percent of the Yale respondents agreeing that global warming is real, 18 percent indicating global warming is not really happening and 19 percent not sure (Leiserowitz et al., 2015). These attitudes from Yale surveys have remained the same since 2013.

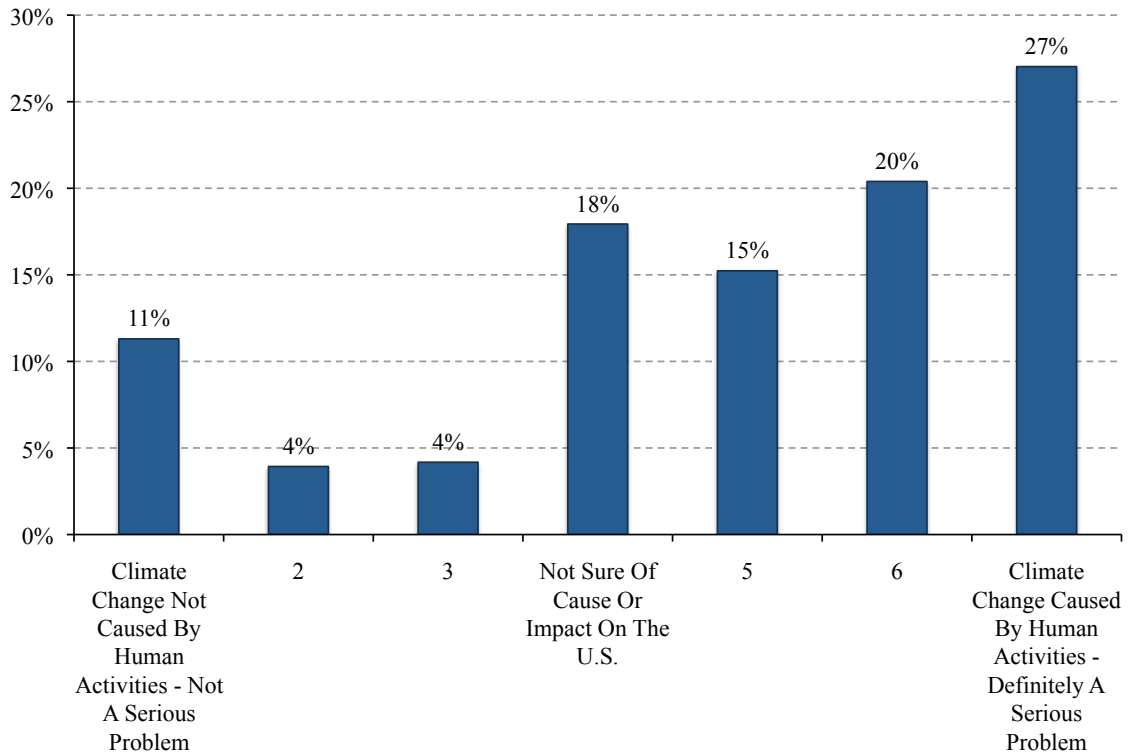


Figure 8. Respondents climate change belief graph.

Question 3: Alternative Energy Sources

Respondents were given the following statement:

As a means of promoting growth in the economy and reducing U.S. dependence on foreign oil, alternative energy sources can be encouraged and supported. There are several ways this can be accomplished, each with its own payoff in supporting our economy. Please choose whether lawmakers and regulators should or should not implement these alternatives

Three options were given: subsidize farmers to grow switchgrass and other biofuel crops; encourage a micro-grid development where a network of local renewable energy is distributed for nearby use; and subsidize homeowners' purchases of geothermal heat pumps to reduce heating and cooling costs. As reflected in Figure 9, support among

deniers is minimal for implementing all three forms of alternative energy, particularly where subsidies are called for. Those unsure of climate change are in the middle in terms of their support, and believers are in favor of all three methods. Similar to deniers, both the unsure and believer groups favor encouraging micro-grid development more than subsidies though the differential among these alternatives is greater for the deniers.

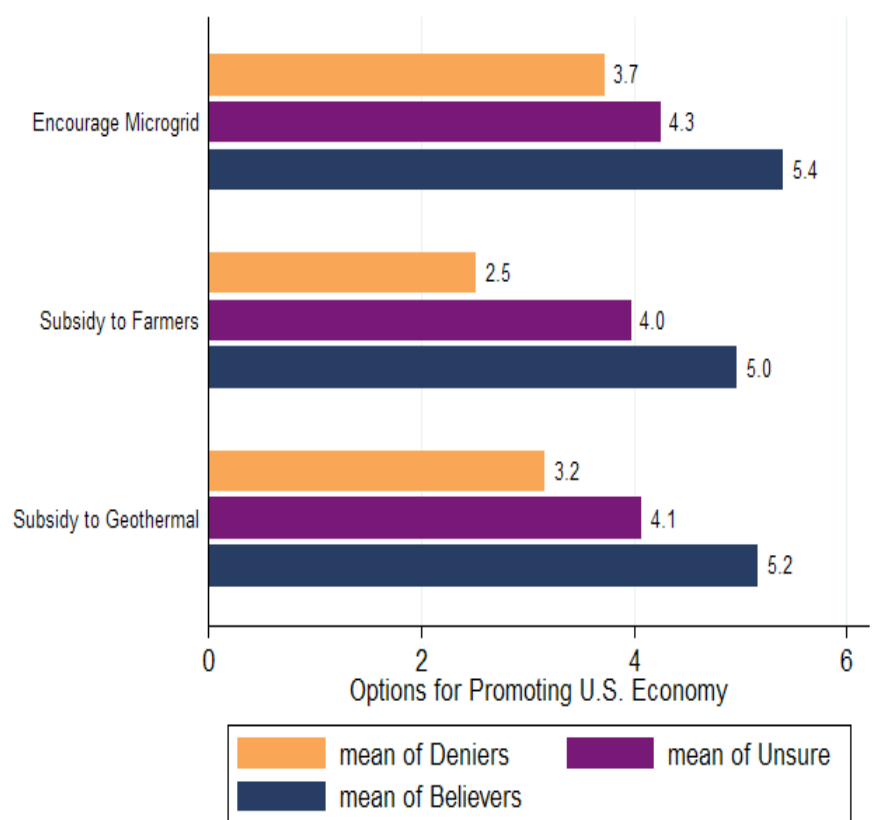


Figure 9. Options for promoting U.S. economy by mean of deniers, unsure and believers.

Those with bachelor degrees were more inclined to implement all three options, followed by those with a trade school background. Respondents with a strong military background and females were more in favor of subsidizing farmers than those without.

Older respondents were more likely to favor subsidizing farmers or geothermal. Republicans are the least interested in implementing any of the programs while independents fall in the middle of Republicans and Democrats. There were no significant differences due to income level.

Question 4: Alternative Energy Production

Respondents were given the following statement:

As a means of improving our electrical grid and ensuring an abundant supply of electrical energy, alternative methods of electrical production can be used. There are several ways this can be accomplished, each with its own payoff in improving our infrastructure. Please choose whether lawmakers and regulators should or should not implement these alternatives.

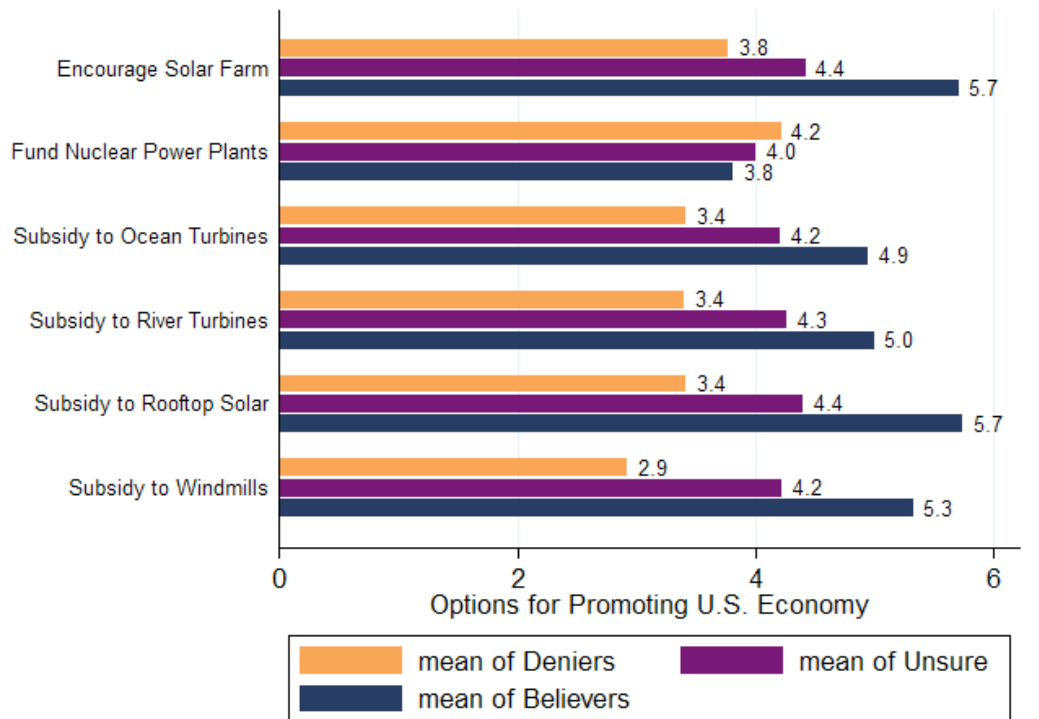


Figure 10. Alternative energy production by mean of deniers, unsure and believers.

The results here mirror the results for question 3 and follow a similar pattern depending on whether the responder is a denier, unsure, or a believer. Republican responders were the least likely to favor any of the measures, with the exception of funding nuclear power plants (Figure 10). This finding is particularly noteworthy as nuclear is the only entry with the option of funding in lieu of subsidizing or simply encouraging. Graduate degree holders were less inclined to favor subsidizing windmills and river and ocean turbines compared to those with bachelor and associate degrees. They were also less interested in subsidizing or encouraging development of solar compared to those with bachelor degree. Respondents with bachelor degrees were more likely to support subsidizing windmills, river turbines, solar, and encouraging solar development compared to those with a high school education. Older and middle age respondents were less in favor of supporting windmill subsidies. Compared to males, females were more in favor of subsidizing solar and windmills and less in favor of supporting new nuclear plants. There were no significant differences in income levels.

Question 5: Department of Defense Concerns

In this question, Respondents were explicitly told about some of the concerns of the U.S. military and given the following statement regarding ways to halt the warming trend:

The Department of Defense is concerned about threats to its ability to function competently as a result of a warming planet and resulting sea level rise as polar ice melts. There are multiple ways to halt this warming trend, each with a payoff in supporting our military. Please choose whether lawmakers and regulators should or should not implement these alternatives.

Deniers are unmoved by this statement of the Department of Defense (Figure 11). In fact, the mean of their responses in favor of implementing various programs put to them is actually lower than their mean support for the choices they were given in questions 3 and 4 (2.68 here versus 3.52 for question 4 and 3.13 for question 3). This is especially noteworthy because those other questions were posed prior to their being told of the military's concerns.

Middle and higher income respondents are more interested in creating alternative technologies for flight, shipping, and ground transport that do not rely on carbon based fuels. Females are more interested in instituting a cap and trade program than males. Older respondents are less interested in any of the programs, and Republicans and Independents are less inclined than Democrats to implement any of the programs. Respondents with a bachelor degree are much more in favor of all programs except carbon reduction, where they were equal to the other education groups.

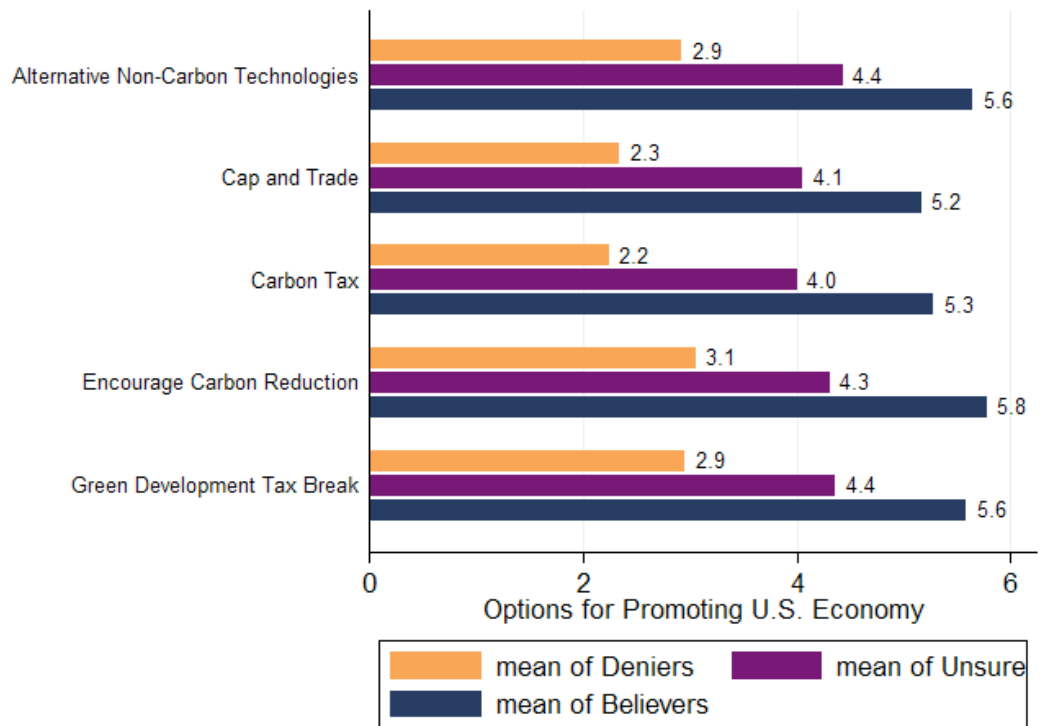


Figure 11. Options for promoting U.S. economy after explanation of DOD concerns by mean of deniers, unsure and believers.

Question 6: Immediate Threat to National Security

Respondents are shown the following statement:

The American Military is concerned about climate change and sees it as an immediate threat to national and global security. Changes in weather patterns and rising seas could result in increased U.S. military involvement due to food and water shortages, refugees, and political or economic instability, then asked to rate how likely the listed outcomes might be.

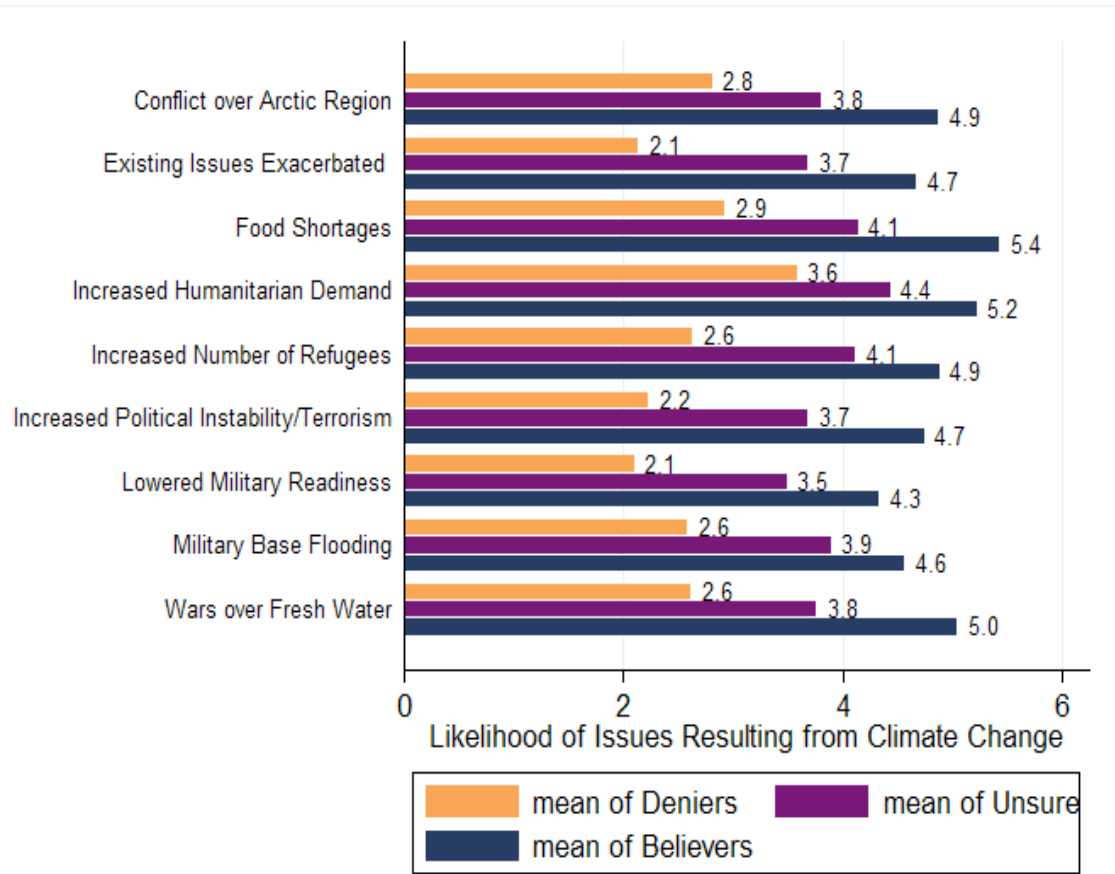


Figure 12. Likelihood of issues resulting from climate change after explanation of American military concerns by mean of deniers, unsure and believers.

Deniers were not impacted by the concerns of the military (Figure 12). Among other demographics, graduate degree holders were less likely than those with a bachelor degree to believe any of the outcomes are almost certain to happen except for the likelihood of an increased demand on the U.S. military for humanitarian assistance, where they are in agreement. Respondents with bachelor degrees believed there is a higher likelihood that fresh water wars, food shortages, climate refugees, control of arctic region, exacerbated existing issues and military readiness will be significant issues more than those with associate degrees. Republicans and to a lesser degree Independents were

not as likely as Democrats to believe any of the outcomes are almost certain to happen. Older people were less likely than other age groups to believe the outcomes are likely except control of the arctic region, need for humanitarian assistance and political instability, where they were in agreement with the other groups. Respondents with a higher income were more inclined to find freshwater wars, control of the arctic region, the need for humanitarian assistance and political instability more likely to happen.

Questions 7 and 8: Budget Allocation and Fixed Budget Allocation

In these sections respondents are told:

Suppose you could decide how to supplement the federal budget. The average cost of any expenditure like those listed below is several million dollars. Some are more, some are less, and how much is spent on any one of these is a function of how important you think a program is. Please review the list below and enter how many dollars (in millions) you would allocate to each item on the list. Entries can be any number you like, but to make it easier for you, enter your numbers as millions. Thus, an entry of “1” is one million, “10” is ten million, and “100” is 100 million. Zero means you would not spend any money on a program.

Respondents were then shown a list of 24 items each of which they were asked about earlier in the survey. In question 7, respondents were free to allot any amount (in millions of dollars) they choose. In question 8, respondents are reminded that there is a cost to the taxpayer for technology or new regulations. They were then told they now have a fixed budget—limits on what they could spend, but the budget must add up to \$100 million. Respondents are given the same list of 24 items and instructed:

...[T]he right-hand column tracks your entries so they sum to \$100 million. You can make changes until you are satisfied with your allocation – you can move to the next page only when the column adds up to \$100 million. Zero dollars means you would not invest in a program.

Unfortunately, the results of this section (particularly question 8 with a limited budget), are not statistically valid and therefore do not warrant significant examination. It appears too many of the respondents only followed directions to the extent needed to continue to the next question and complete the survey. Notwithstanding the fact that a comparison of hard and soft choices is not possible, the results do contain interesting information, providing a few takeaways.

For the unlimited funding question, the four highest funding areas by belief are broken out in Table 1:

Table 1. Highest categories funded by climate change belief.

Unsure	
DOD Weaponry	(\$36.958 mil)
Disease Funding	(30.167 mil)
NSA Equipment	(22.917 mil)
Early Education	(20.042 mil)
Believers	
Disease Funding	(\$61.816 mil)
National Electric Grid	(59.078 mil)
Solar Roof	(56.957 mil)
National Rail	(55.855 mil)
Deniers	
DOD Weaponry	(\$71.152 mil)
National Electric Grid	(59.076 mil)
NASA	(56.127mil)
Disease Funding	(51.025 mil)

Notably, the denier and unsure groups favor DOD spending and disease funding. The denier group also spent the second largest amount on the national electric grid. All

three of these issues are directly related to climate change. This suggests that pursuing a strategy of persuading deniers through the vehicle of national defense makes sense because it implicates the issues they care about. The problem is in getting that message across.

Question 9: Quality Control

For quality control purposes respondents were asked to type in the main topic of the survey. These answers are not part of the survey results and they have not been made available to the researcher.

Questions 10 – 13: Respondent Demographic

Demographic makeup of the 406 respondents was as follows:

Table 2. Demographic makeup of respondents by education, political party, income, age, military affiliation and gender.

<u>Education</u>	Denial	Unsure	Believe	Size
HS or less	23%	21%	57%	53
Trade/Tech/Vocational	28%	28%	44%	18
Some college/Associate's	23%	19%	59%	140
Bachelor's	10%	19%	70%	108
Some graduate	21%	5%	74%	19
Advanced degree	22%	12%	66%	68
<u>Party</u>				
Strong Democrat	2%	19%	80%	54
Mostly Democrat	8%	12%	80%	85
Independent	14%	20%	66%	132
Mostly Republican	35%	21%	44%	71
Strong Republican	59%	13%	28%	39
Prefer not to answer	20%	20%	60%	25
<u>Income</u>				
Less than 20k	24%	14%	61%	49
20-39k	20%	12%	68%	97
40-59k	16%	24%	59%	86
60-74k	19%	17%	64%	58
75-99k	23%	21%	56%	57
100-149k	19%	17%	64%	36
150k+	13%	17%	70%	23
<u>Age</u>				
18-25	13%	13%	73%	45
26-35	11%	29%	61%	76
36-45	14%	15%	70%	71
46-55	25%	11%	64%	76
56-65	23%	15%	62%	66
66-75	21%	28%	51%	39
75+	39%	12%	48%	33
<u>Military</u>				
No military	17%	19%	64%	266
Weak military	21%	19%	60%	72
Strong military	28%	10%	62%	68
<u>Gender</u>				
Male	25%	14%	62%	204
Female	14%	22%	64%	202

Of all the variables, the strongest indicator of climate change belief was political identification. Respondents who identified as strong Democrat or mostly Democrat were 80 percent likely to be believers, while those who identify as mostly Republican were 35 percent and mostly Republican 59 percent likely to be a denier. Of the 79 total deniers in the sample, 61 percent were strong or mostly Republican while only 10 percent were strong or mostly Democrat (Table 2). Another 6 percent of deniers preferred not to disclose any party affiliation.

There are other interesting demographic observations. Of particular note is education, where we observe that the percentage of deniers falling in the “Some graduate” and “Advanced degree” tiers is 24 percent, while the “HS or less” and “Trade/Tech/Vocational” tiers are only slightly behind at 21 percent (Table 2). Forty-one percent of the 79 deniers (32 individuals) are in the Some college/Associate category. Only 14 percent of those with a Bachelor degree are deniers.

It is also revealing to deconstruct some of these data further with the use of CHAID charts to see whether deniers and all others, grouped by political affiliation, can be further differentiated on the basis of gender, race, and educational level.

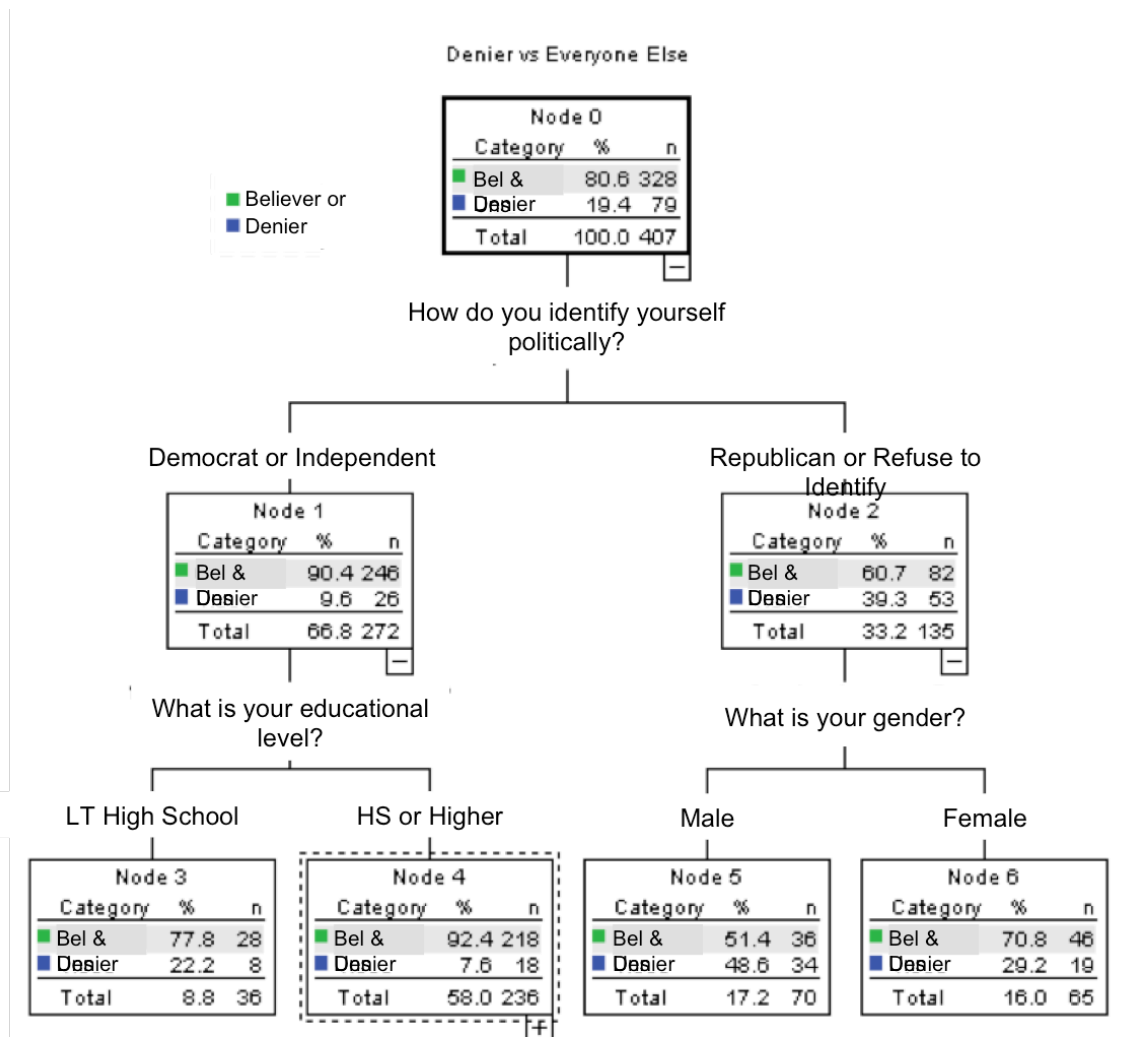


Figure 13. CHAID chart of deniers vs others. Further divides into political identity, gender and education level.

In Figure 13, respondents were grouped first on the basis of whether they were deniers or not, and then on the basis of whether they identified as Republicans (strong or weak) and Prefer not to Answer (135 individuals) versus whether they identified as Democrats (strong or weak) and Independents (272 individuals). Within the first political grouping, 39.3 percent of the respondents, or 53 individuals, self identified as deniers.

But within the second political grouping, only 9.8 percent of the respondents, or 26 individuals, self identified as deniers.

If we then further break down the first political grouping on the basis of gender, we find that the percentage of deniers is considerably higher for men than women. Specifically, 29.2 percent of Republican and Prefer not to Answer females were deniers but a very high 48.6 percent of men in these political groupings describe themselves as deniers. Expressed differently, of the deniers in this grouping, 64 percent were male and 36 percent female even though the sample sizes for each sex were relatively close (52 percent men and 48 percent women).

Turning to the second political grouping, if we further break it down by educational level, we find that of the deniers, 22.2 percent were in the lowest three categories (at most Some College/Associate) while 7.6 percent were in the highest three categories (at least a Bachelor degree).

Taken together, the data may suggest that for those who identified in the more politically conservative groupings, women appear to be a more receptive audience than men on the dangers of climate change. For those in the more politically liberal groupings, of the few respondents who identified themselves as deniers, education seems to be a differentiator suggesting that these individuals may not have had sufficient exposure to the dangers of climate change to see it as an issue that may fit in with their other political views.

The CHAID in Figure 14 breaks down political affiliation more finely to zero in on Independents and then look at age as a factor within that group. It shows that of Independents, only 14.6 percent (23 individuals) self identified as deniers. Twenty of

those individuals, however, or 18.7 percent of the deniers in this group, are over the age of 45; the rest are 45 or younger suggesting that messages aimed at convincing older Independents may have the greatest potential to make a difference.

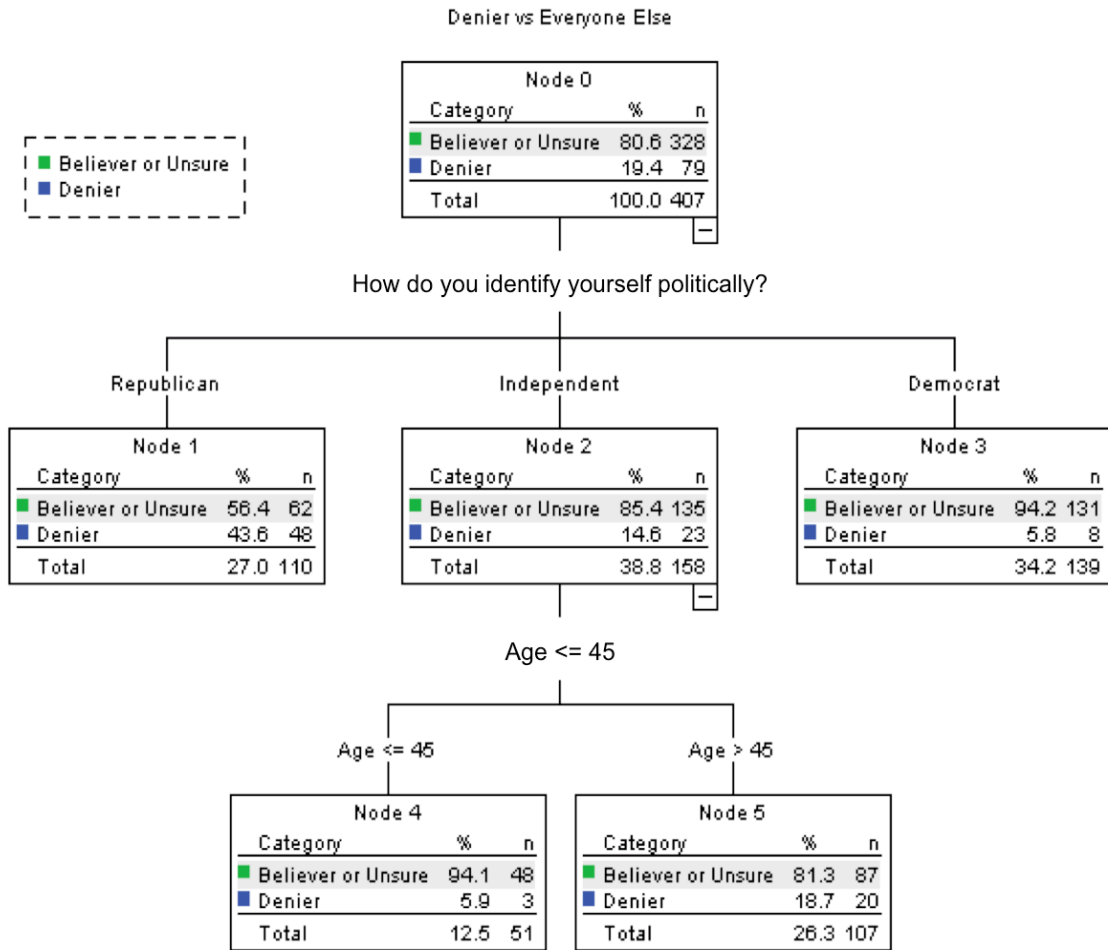


Figure 14. CHAID chart deniers vs others/independents. Further divides into political identity focusing on independents.

Table 3 shows the military connections of respondents broken out by education, party affiliation, income, gender, and age.

Of the 406 respondents in the survey, 68 self-categorized as having a “Strong military” connection, 72 a “Weak military” connection, and 266 “No military connection. Of note, while 17% with no military connection were climate deniers, 21% with a weak military connection were climate deniers and 28% with a strong military connection were climate deniers. Therefore, the stronger the military connection, the higher the proportion of deniers.

Table 3. Climate change denier demographic. Divides deniers into military affiliation and compares with other demographics.

<u>Education</u>							
	High School	Trade	Associate	Bachelor	Graduate		
No Military	39	9	88	78	52		266
Weak Military	7	3	28	18	16		72
Strong Military	7	6	24	12	19		68
	53	18	140	108	87		406

<u>Party Affiliation</u>								
	Strong D	Mostly D	Independent	Mostly R	Strong R	N/A		
No Military	37	63	87	37	22	20	266	
Weak Military	6	13	26	17	6	4	72	
Strong Military	11	9	19	17	11	1	68	
	54	85	132	71	39	25	406	

<u>Income</u>							
	< 20k	20-39k	40-59k	50-74k	75-99k	100-149k	> 150k
No Military	34	61	55	39	36	28	15
Weak Military	5	19	15	9	15	7	2
Strong Military	10	17	16	12	6	1	6
	49	97	86	58	57	36	23

<u>Gender</u>			
	Male	Female	
No Military	123	143	266
Weak Military	17	55	72
Strong Military	64	4	68
	204	202	46

<u>Age</u>								
	< 18	18-25	26-35	36-45	46-55	56-65	66-75	> 75
No military	0	31	63	56	48	31	17	20
Weak military	0	10	12	10	13	17	8	2
Strong military	0	4	1	5	15	18	14	11
	0	45	76	71	76	66	39	33

Chapter IV

Discussion

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Department of Defense concerns in the survey failed to positively impact the denier group's perspectives as evidenced in their responses to the questions that followed (Figures 11 and 12). That does not necessarily mean, however, that the hypothesis is wrong that climate deniers can be influenced by understanding the view of the Department of Defense on how climate change affects many of the issues the deniers are concerned about.

Military Message

If our military institutions themselves were proactive in getting their views across, along with the research and analysis that underlies them, and explained how climate change affects such things as disease and the electric grid, there may well be an effect. The point is, it may be critical who is doing the communicating. Just because statements in the survey about the concerns of the Department of Defense and the military aren't enough to turn perspectives quickly, that does not mean that hearing the message from the military itself—often and specifically—would also have no impact. They will have to be persuaded, and who better to do the persuading than the institutions most concerned about this issue explaining how one problem leads to another and ultimately affects our national security.

The military does publish documents referencing climate change, such as the

Department of Defense 2014 Climate Change Adaptation Roadmap (U.S. Department of Defense, 2014), but the intended audience of this messaging is not the general public nor rank and file military personnel. This is consistent with the unexpected survey finding (Table 4) that respondents with military affiliations failed to acknowledge the line connecting fossil fuel dependence and military/security issues.

Table 4. Percent denier military/political affiliation. Compares political affiliation and age with military affiliation and gender.

Percent Denier					
Political Affiliation	Age	Not Military		Military	
		Male	Female	Male	Female
Democrat	Age <= 45	0%	0%	8%	0%
	Age > 45	12%	13%	3%	6%
Independent	Age <= 45	0%	13%	14%	0%
	Age > 45	9%	20%	28%	12%
Republican	Age <= 45	33%	17%	14%	54%
	Age > 45	53%	50%	58%	25%

This surprising result underscores that a necessary starting point for conveying DOD climate change messages would be to their own troops, in a top-down information campaign. At the same time, the military can also show the connection in a public service message utilizing the Ad Counsel similar to what the Pentagon did in 2005 when it collaborated with the Ad Council to create a campaign aimed at increasing support for U.S. troops (Teinowitz, 2005).

Successful national campaign ads of the past—such as Rosie the Riveter, which challenged social norms and transformed working women into the patriotic ideal, to commercials featuring a crying Indian bringing shame to polluters simply by a tear

running down one cheek while gazing at a landscape strewn with refuse—show that the climate change denial issue, featuring patriotism and smart action to support our national interests, can successfully be approached in the same fashion. Similar to the fossil fuel industry’s carbon commercials, a positive campaign tapping into military/economic good for the country could be successful, as both issues rated highly with denier respondents (Figure 7). Seeing our military freed from having to secure foreign oil production sites, and the money and lives that would be saved, could also tap into respondents’ concerns over U.S. involvement in foreign wars.

What Else Resonates: Economic Concerns

Respondents rated the economy as their number one concern (Figure 6). Denier politicians often paint action to mitigate climate change as unnecessary, and frame their opposition in terms of harming the economy. In actuality, however, the externalities of using fossil fuels are fraught with hidden economic costs in the form of air pollution, coal ash, toxic water, and the enormous quantities of fresh water used in the production of coal in fracking for gas—water that is exempt from the Clean Water Act. The economic damage begins with the search for fossil fuels and extends to their extraction from the earth, transportation, and ultimate use when they are burned to generate energy. The external costs are practically limitless as witnessed by the BP oil disaster of the Deep Water Horizon in the Gulf of Mexico.

The resulting harm to human health and ensuing health care costs for asthma, cardiovascular disease, cancer and death are immense. The Center for Health and the Global Environment at Harvard’s Medical School looked at the economic, health and

environmental costs of coal alone, and found the cost to the U.S. economy to be between \$330 and \$500 billion dollars per year (“Harvard Medical School,” 2011).

The Risky Business Project, undertaken by a blue ribbon group of concerned business stakeholders, studied the economic cost of climate change to the U.S. and found the following significant dangers. In the short term (5-25 years), they estimate:

[H]igher sea levels combined with storm surge will likely increase the average annual cost of coastal storms along the Eastern Seaboard and Gulf of Mexico by \$2 billion to \$3.5 billion. Adding potential changes in hurricane activity, the likely increase in average annual losses grows to up to \$7.3 billion, bringing the total annual price tag for hurricanes and other coastal storms to \$35 billion (Risky Business, 2016).

In addition, they estimate midwestern and southern crop yields dropping by greater than 20 percent for cotton, soy, wheat and corn. Increased temperatures will require up to 95 gigawatts of new power production costing up to \$12 billion per year. By 2050, the Risky Business Project anticipates that “by 2050 between \$66 billion and \$106 billion of existing coastal property will likely be below sea level nationwide, with \$238 billion to \$507 billion worth of property below sea level by 2100” (Risky Business, 2016).

Benefits of Action

Costs associated with taking the necessary steps to address climate change can be offset by positive factors that enter into the equation, in the form of indirect benefits. Continuous innovations help mitigate costs, for example, through future technological advances such as carbon capture methods, improved battery storage, decreasing renewable energy prices as new technologies are brought to market and scaled up, improved efficiencies of existing renewable energy sources, advancements in buildings and transportation, and reductions in the amount of energy and resources wasted in food

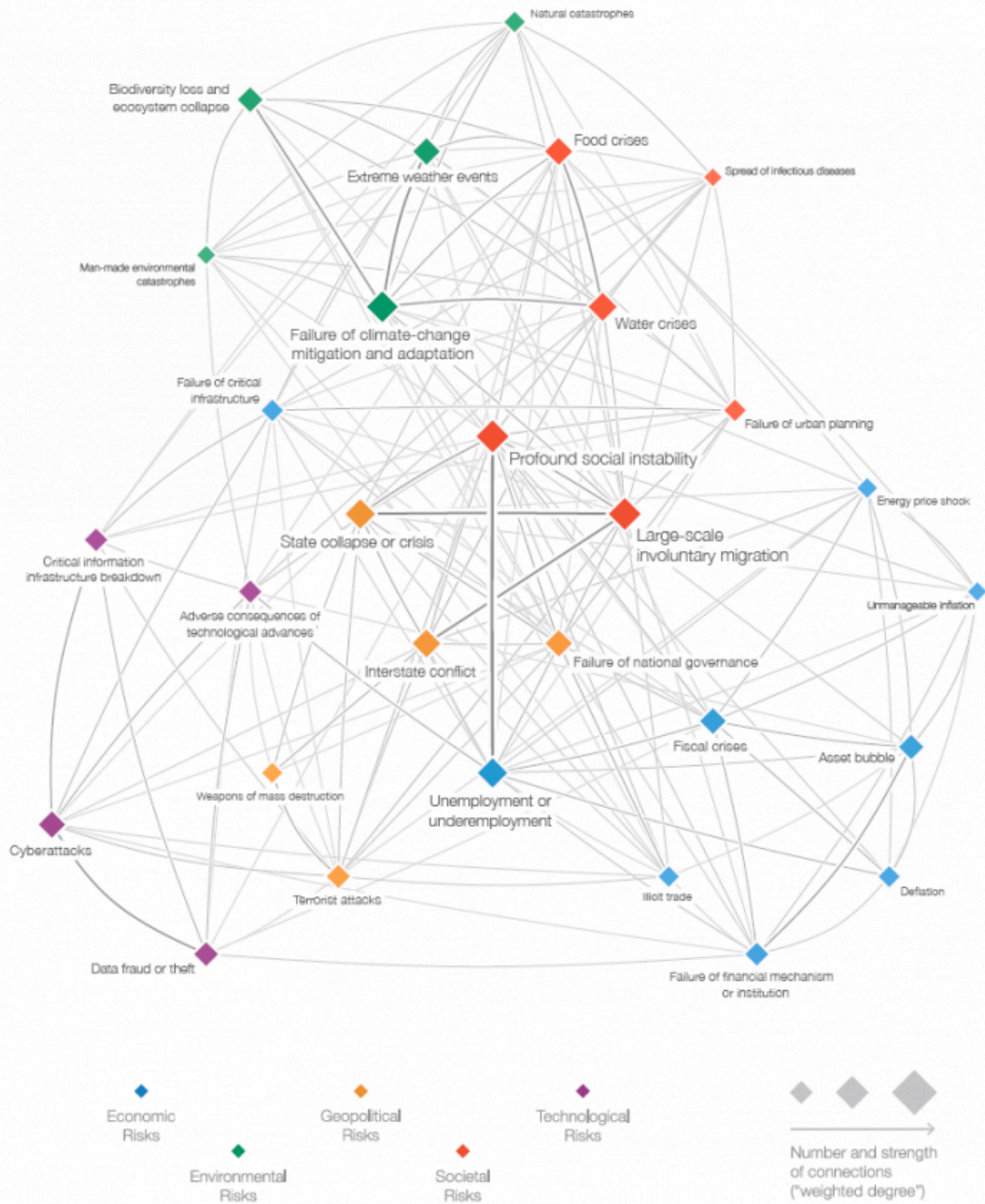
production. All of these innovations will have an offsetting cost impact while spurring new industry and invigorating existing ones. An example of this is the growing ocean energy business along the coast of Maine where the development of tidal energy has brought millions of new business to the existing maritime industry.

There are also ready ways everyone can participate, and through engagement, increase buy-in. From unplugging cell phone chargers when not in use, powering down electronics, and wrapping electric hot water heaters in thermal blankets to replacing dark roofs in warm climates with light colors or solar reflective shingles, the opportunities are virtually endless with payoff to consumers in monetary savings. Monthly power bills could track the carbon footprint of homes and businesses, increasing awareness among consumers that their behavior matters and rewarding them for conserving. However, the longer we wait to transition to sustainable living, in every sector of our economy, the more difficult effective climate action will be. The economy will suffer, not benefit, from taking a myopic view and ignoring the negative medium and longer term economic ramifications of putting our heads in the sand and only focusing on the short term

Global Connections

The World Economic Forum report titled Global Risks 2016 is a compendium of responses to their Global Risk Perception Survey sent to approximately 750 diverse experts and policymakers from within the World Economic Forums multistakeholder communities (World Economic Forum, 2016). Asked to consider 29 global risks ranging from geopolitical, societal, technological, environmental and economic and rank them according to likelihood and impact, they identified as the number one issue the “failure of

climate mitigation and adaptation” (Risky Business, 2016). Echoing U.S. military concerns, the study shows negative impacts flowing from unchecked climate change including large-scale involuntary migration, water crises and food security risks. All of these are directly related to political and social stability and economic well-being. Figure 13 demonstrates the interconnected nature of risks facing the world today and serves to highlight the disconnection between anti-climate politicians and their constituents with the factors that contribute to economic harm.



Read more: wef.ch/risks2016 #risks2016

Figure 15. Global risks interconnections map 2016 (World Economic Forum, 2016).

Conclusion

Climate change deniers fail to recognize many of their core beliefs militate in favor of addressing climate change rather than ignoring it. The military, the economy and terrorism are important to the vast majority of Americans and their shared goals (Figure 7). According to the Pew Research Center, the top two issues people want to hear about in political debates are the economy and terrorism (Oliphant, 2016), yet news media on neither side seem to be connecting the dots so the general public can understand how these issues are interconnected and directly impacted by climate change. Department of Defense concerns presented in the survey failed to impact the beliefs of climate change deniers and surprisingly, those with military connections were least likely to believe there was a connection. Yet the military itself recognizes the dangers and is planning for global warming.

As other climate change messages have failed to raise awareness among the denier group, using a message tailored to what many deniers value highly, including the military, the economy, and terrorism concerns—may well resonate with them, especially if that message comes from a trusted source, such as the military itself, instead of an internet survey. An Ad Council campaign highlighting the U.S. military, is an excellent topic for further research.

Appendix

Survey Questionnaire

Introduction: This questionnaire asks you to consider the types of concerns you may face when thinking about long term changes in the nation, in the economy, and in the way we live our lives. We'd like to know what concerns you most, choices you would make, and tradeoffs in terms of which problems to tackle first. First, we'd like to ask you about your perceptions about key issues.

A. Please rate the following according to your concerns about the American way of life—how these concerns might affect you personally in the next few years.

Item	No Concerns					Highly Concerned	
Growth in the U.S. Economy	1	2	3	4	5	6	7
Infrastructure in the United States (roads, etc)	1	2	3	4	5	6	7
Unemployment	1	2	3	4	5	6	7
Climate Change in the U.S.	1	2	3	4	5	6	7
U.S. Major Crime Rates	1	2	3	4	5	6	7
Homeland Security and U.S. National Defense	1	2	3	4	5	6	7
Education and Training for Adults	1	2	3	4	5	6	7
Wage rates for U.S. Workers	1	2	3	4	5	6	7
Pre-K and K Education	1	2	3	4	5	6	7
Regulation of banks and financial institutions	1	2	3	4	5	6	7
Pollution	1	2	3	4	5	6	7
On-going wars in the Middle East	1	2	3	4	5	6	7
Military readiness	1	2	3	4	5	6	7
Drugs and gang activities	1	2	3	4	5	6	7
Terrorist activities outside the U.S.	1	2	3	4	5	6	7
Loss of support for cultural activities	1	2	3	4	5	6	7
Spread of diseases in the U.S.	1	2	3	4	5	6	7
Investment in renewable energy sources	1	2	3	4	5	6	7
Space exploration	1	2	3	4	5	6	7
Global warming	1	2	3	4	5	6	7

A.1. Some people have strong concerns about climate change and global warming. Other people do not believe that global warming will have a serious impact on the way we live or that global warming is not caused or exacerbated by human activities but instead is simply part of the natural ecological cycle. Some people aren't sure how they feel on this issue. Where do you stand?

Climate Change
Not Caused by
Human Activities;
Not a Serious Problem

Not Sure
of Cause
or Impact
on the U.S.

Climate Change
Caused by
Human Activities;
Definitely a Serious Problem

① ② ③ ④ ⑤ ⑥ ⑦

B.3. The Department of Defense is concerned about threats to its ability to function competently as a result of a warming planet and resulting sea level rise as polar ice melts. There are multiple ways to halt this warming trend, each with a payoff in supporting our military.

B.3.a. Encourage a reduction in the rate of use of carbon based energy sources by providing clean alternatives ① ② ③ ④ ⑤ ⑥ ⑦

B.3.b. Create alternative technologies for flight, shipping, and ground transport that do not rely on carbon based fuels ① ② ③ ④ ⑤ ⑥ ⑦

B.3.c. Institute Cap and Trade, putting limits on heat trapping gases released into the atmosphere ① ② ③ ④ ⑤ ⑥ ⑦

B.3.d. Institute a carbon tax to incentivize businesses to find alternatives to burning coal, oil, and other fossil fuels ① ② ③ ④ ⑤ ⑥ ⑦

B.3.e. Institute tax breaks for green development ① ② ③ ④ ⑤ ⑥ ⑦

C. The American military is concerned about climate change and sees it as an immediate threat to national and global security. Changes in weather patterns and rising seas could result in increased U.S. military involvement due to food and water shortages, refugees and political or economic instability.

How likely do you think each of the following outcomes might be?

Almost Certain Not to Happen		About 50 / 50			Almost Certain to Happen	
1	2	3	4	5	6	7

C.1. Wars over fresh water: increased temperatures and incidents of severe weather will increase scarcity of fresh water ① ② ③ ④ ⑤ ⑥ ⑦

C.2. Severe weather events/fresh water shortages/hot temperatures will result in food shortages in areas already socially and/or economically unstable ① ② ③ ④ ⑤ ⑥ ⑦

C.3. Emergence of refugees as land becomes submerged and/or food and water scarce ① ② ③ ④ ⑤ ⑥ ⑦

C.4. Arctic region becomes concern as nations vie for control of the area (fishing, shipping, natural resources) and military prepares for disaster response in the region ① ② ③ ④ ⑤ ⑥ ⑦

C.5. Increased demand on US military for humanitarian assistance ① ② ③ ④ ⑤ ⑥ ⑦

C.6. Climate change could add to political instability and increased social tensions creating the environment for terrorist activity to flourish ① ② ③ ④ ⑤ ⑥ ⑦

C.7. Military operations and bases along coastlines could be subject to flooding and storm surge, undermining their use for the military ① ② ③ ④ ⑤ ⑥ ⑦

C.8. Existing issues around the globe will be exacerbated by climate change, stretching the military's ability to effectively deal with them. ① ② ③ ④ ⑤ ⑥ ⑦

C.9. Heat waves and sea level rise will affect military readiness ① ② ③ ④ ⑤ ⑥ ⑦

D. In previous sections, we asked about methods that could be used to encourage technological development and strengthening of the U.S. infrastructure.

Suppose you could decide how to supplement the Federal Budget. The average cost of any expenditure like those listed below is about 10 million dollars. Some are more, some are less, and how much is spent on any one of these is a function of how important you think the program is. Review the list below and enter how **you** would allocate dollars as millions to each item on the list. Entries can be any number you like, but to make it easier for you enter your numbers as millions. Thus, an entry of "1" is one million, "10" is 10 million, and "100" is a 100 million.

Zero means you would not spend any money on a program.

	Item	Dollars
1	Carbon tax to incentivize businesses to find clean alternatives	
2	Funding for Dept. of Defense research into alternative technologies for flight and transport	
3	Funding for the Dept. of Defense needed to assist refugees from climate disasters	
4	Funding for micro grid development of local renewable energy	
5	National program to upgrade the national electrical grid	
6	Subsidize farmers to grow biofuel crops	
7	Subsidize homeowners purchase of geothermal heat pumps	
8	Subsidize private sector development of solar panel farms	
9	Subsidize private sector development of wind farms	
10	Subsidize rooftop solar for homes and businesses	
11	Tax breaks for green development in construction	
12	Tax incentives for construction of new nuclear power plants	
1	Electronic equipment for the NSA for discovering\monitoring potential threats	
2	Expanded space exploration by NASA	
3	Expanded subsidies for art in public spaces	
4	Funding of mental health research	
5	Investments in a National Rail System for train transport and travel	
6	Investments in Improving Pre-K and Kindergarten programs	
7	Investments in refurbishing and expanding national parks	
8	New weapon development for the Department of Defense	
9	Research on diseases and disease prevention	
10	Jobs programs and training programs for adults	
11	Investments in infrastructure (roads, bridges, tunnels, water systems)	
12	Expanded regulatory oversight of financial institutions	

E. In previous section, we asked you how much you wanted to spend, in millions of dollars, to encourage technological development and strengthening of the U.S. infrastructure. However, none of these policies are free—there’s a cost to the taxpayer for technology or new regulation.

Suppose now you have a fixed Budget - you have limits on what you can spend. Review the list below and enter how **you** would allocate resources in millions with a fixed budget. The right-hand column tracks your entries so they sum to \$100 million. You can make changes until you are satisfied with your allocation; you can move to the final page only when the column adds up to \$100 million.

Zero dollars means you would not invest in a program.

	Item	Dollars
1	Carbon tax to incentivize businesses to find clean alternatives	
2	Funding for Dept. of Defense research into alternative technologies for flight and transport	
3	Funding for the Dept. of Defense needed to assist refugees from climate disasters	
4	Funding for Micro Grid Development of local renewable energy	
5	National program to upgrade the national electrical grid	
6	Subsidize farmers to grow biofuel crops	
7	Subsidize homeowners purchase of geothermal heat pumps	
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9	Subsidize private sector development of wind farms	
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1	Electronic equipment for the NSA for discovering\monitoring potential threats	
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7	Investments in refurbishing and expanding National Parks	
8	New weapon development for the Department of Defense	
9	Research on diseases and disease prevention	
10	Jobs programs and training programs for adults	
11	Investments in infrastructure (roads, bridges, tunnels, water systems)	
12	Expanded regulatory oversight of financial institutions	
	Total	\$100 million

F. Finally, we need some information about you to put your answers in context.

- Age ①18-25 ②26-35 ③36-45 ④46-55 ⑤ 56-65 ⑥66-75 ⑦75 and
older
- Education ① < H.S. degree ② H.S. degree or GED ③ H.S. plus some college
④ Associate's or Voc. Ed. ⑤ Bachelor's ⑥ Master's ⑦ Ph.B.
- Political ① Strong Democrat ③ Independent ④ Mostly Republican
② Mostly Democrat ⑤ Strong Republican ⑥ Other affiliation
- Military ① Yes, current or reserves ② Former military ③ No Military Service
Service
- Gender ① Male ② Female Zip Code _ _ _ _ _
- Household ① <\$20,000 ② \$20-\$40,000 ③ \$40 - \$60,000 ④ \$60-\$75,000
Income ⑤ \$75-\$100,000 ⑥ \$100-\$150,000 ⑦ \$150,000 or more

Thank you for completing our questionnaire!

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